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PEFR in Categorizing the Recovery Pattern in COPD

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Abstract- Improvement in Peak Expiratory Flow Rate (PEFR) in 35 Patients with acute severe bronchospasm was studied to evaluate the rate of recovery from the episodic attack. Two groups of COPD were identified. One group with quick and complete recovery from the episodic attack of bronchospasm who were described as “Accelerated Responders” and in the other group the recovery was slow and incomplete and were referred to as “slow Responders”. The way how PEFR values establish a pattern in obstructive disease help us not only to identify the patients into groups but also to discriminate them for diagnosis & treatment of chronic obstruction for patients who are particularly at risk are discussed over here.

Index Terms- PEFR IN COPD, ACCLARATED RESPONDERS, SLOW RESPONDERS

I. INTRODUCTION

Measurement of PEFR has been used for a number of years in evaluation of obstructive ventilator defects. The Wright Peak Flow Meter⁽¹⁾ a device for measuring peak expiratory flow rate was introduced in 1959^(1,2) for assessing ventilator capacity particularly in obstructive airway diseases. Peak Flow Meter was widely used^(3,4) because of its easy management^(5,6), accuracy and reproducibility^(6,7,8). A number of studies^(9,10) have already shown the usefulness of this method of peak expiratory flow rate measurement for rapid determination of pulmonary reserve for pre-operative assessment of pulmonary function and in evaluating change in patient's degree of pulmonary disability^(11,12,13).

Although Peak flow measurements seem fairly well established, there have not been many studies for evaluating the pattern of results of COPD for categorization and treatment. Recording of PEFR 4 times a day (8am, 12 noon, 2pm, 6pm) in patients with acute severe spasmodic attack help us to predict confidently which patients will recover rapidly and which will not.

From PEFR reading these patients may be divided into two groups. One group of patients with complete recovery from the attack (demonstrated by quick improvement in PEFR from initial reading) were referred to as “Accelerated responders” to drugs.

Group of patients whose recovery was slow and incomplete with no significant improvement in PEFR was referred to as “Slow Responders”. There were significant difference between the two groups in duration of Hospital admission and treatment. The value of recording the simple measurement of PEFR using a handy simple instrument, yielding

so many valuable information for treatment and evaluation are discussed over here.

II. MATERIALS AND METHODS

The present study comprised 35 diagnosed COPD patients (26 males & 9 females) who were selected from out patients of chest and allergy- asthma clinics of General Hospital. The patients were diagnosed on the basis of History, Clinical assessment followed by Radiologic examinations. They had complaints of frequent episodic illness Bronchospasm before and during the course of study. PEFR was measured for all patients using Wright Peak Flow Meter.

Measurements were taken with the subject sitting upright and the highest value from three peak expiratory flow rate maneuvers was recorded. Care was taken to ensure that the instrument was kept horizontal and none of the venting slots were obscured. Peak flow rate was measured four times a day 8am, 12 noon, 2pm, 6pm in a standard fashion for all patients. Recovery from the attack was assessed by improvement in Peak Flow Rate.

Most of the patients included in the present study received oral or intravenous steroids. In high doses and inhaled intravenous Bronchodilators in a standard fashion. Some of them who were considered to be not so ill received oral steroid therapy and inhaled Bronchodilators only. When acute phase has passed, parenteral treatment was slowly discontinued and then withdrawn at varying intervals for each patient.

III. RESULTS AND OBSERVATION

Recovery was examined in terms of increase of Peak Expiratory Flow Rate from the time of admission. It became apparent that 2 distinct pattern of recovery could be established.

Group-1. (Accelerated Responders). Among the total number of 35 patients selected for study, 20 patients belonged to this group. 4 out of 20 achieved 50% of predicted PEFR within 30 hours and 9 out of 20 within 48 hrs. The rest of 7 patients out of 20 showed improvement in PEFR in 72 hours.

The mean duration of treatment was for one week (ie 4-11 days). 25% of them were successfully treated without recourse to intravenous steroids or bronchodilators. The diurnal variation of PEFR measurement associating with the morning exacerbation of symptoms (ie fall in PEFR reading at 8am. (Morning Dip) was a prominent feature in Group 1. There was Morning Dip or Morning and Evening Dip (ie fall in PEFR reading at 12 noon and 6 pm in this Group). Diurnal fluctuation in PEFR reading was statistically significant in Accelerated Responders unlike the other group. The mean difference in PEFR reading between

8am and 2pm is greater than 9% which is statistically significant ($p < .05$).

The rate of recovery correlated well with the difference of improvement in PEFR in consecutive readings in a day ($r = 0.75$). These patients were successfully treated with oral steroids and inhaled bronchodilators. PEFR at the time of discharge is almost at the level of predicted value or slightly more. Most of the patients in this group are youngsters, suffering from atopic asthma revealed from personnel history and multiple skin tests (table 1 and Group 111)

Group 11 (Slow Responders) The rest of 15 patients among 35 were segregated to this category. They Required a long period of treatment of 21 days Mean PEFR was only 60.4% of the predicted value at the time of discharge. Moreover patients in the slow recovery group had significantly lower PEFR (< 60 lit/mint). The diurnal variation in measurement of PEFR is only 1-3% between 4 consecutive readings in first 3-4 days which is not significant and the measurement became statistically significant only after minimum of one full week of treatment and there was a statistically significant difference in PEFR values between 1 and 11 Group at the time of discharge from Hospital ($p < 0.01$). Patients in the Second Group were older, more ill, with either chronic smokers, or possibly associated with chronic bronchitis and some of them even with fungal infections (table 11 and 111)

In Group 1 among the 20 patients who were categorized as "Accelerated Responders" showing complete recovery at the time of discharge. One patient showed very low i.e., irrecordable peak flow rate on admission with severe morning and evening dip in PEFR. The rate of recovery of this patient was slower than the rest of the usual in this group 1 but by the 3rd day of admission he had caught up and thereafter there was no difference between him and the rest of the patients in Group 1 and this patient had a coryzal illness with purulent bronchitis at the time of admission.

IV. DISCUSSION

For practical purposes acute severe Asthma may be defined as an initially unresponsive attack of Asthma sufficiently severe to lead to hospitalization and inevitably it embraces an inhomogeneous group of patients. Within each of the major groups identified, the manner of improvement in PEFR was remarkably similar. No individual could be assigned with confidence to either of the Recovery Group at the time of admission. Assessment of PEFR at least 4 times a day establish a full extent of potential variation in airway obstruction and helpful in categorization of the patients into specific group of recovery and determination of the nature of further treatment. Factors precipitating the attacks were also studied but have not been analysed statistically. Attacks could not be confidently attributed to any particular precipitating factor but emotional or physical or mental stress were the predominant factors for most of the patients in group 11. Other factors such as duration of symptoms, type of treatment and rate of development of the attack before admission could also be assessed retrospectively by PEFR measurement.

TABLE 1
CONSTITUTION OF STUDY POPULATION IN GROUP 1
TOTAL NO= 20

AETIOLOGY	MALE	FEMALE
ATOPIC ASTHMA	3	0
UPPER RESPIRATORY INFECTION	3	2
EXERCISE INDUCED ASTHMA	3	0
POLLEN INDUCED(GARDENER)	0	1
DUST INDUCED	6	2

TABLE - 11
CONSTITUTION OF STUDY POPULATION IN GROUP2
TOTAL NO=15

AETIOLOGY	MALE	FEMALE
CHRONIC BRONCHITIS(SMOKERS)	3	1
BRONCHOPULMONARY ASPERGILLOSIS	0	1
CHRONIC BRONCHITIS WITH EMPHYSEMA	2	0
BRONCHIECTASIS	2	1
ASTHMATIC BRONCHITIS(COTTON MILL WEAVER)	2	1
EMPHYSEMA	1	0
CORPULMONALE	1	0

TABLE 111
CLINICAL FEATURES IN BOTH GROUPS

INDICES	GROUP 1	GROUP 2
TOTAL NO	20	15
AGE (YEARS) RANGE	22.4 15-40	51.0 47-60
DURATION OF RECOVERY(DAYS) RANGE	7 4-11	21 16-26
PEFR LIT/MIN.(PRE TREATMENT) RANGE LIT/MIN	125 100-205	80 60-120
PEFR LIT/MIN (POST TREATMENT) RANGE	380 350-430	200 160-320

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DIFFERENCE BETWEEN PRE AND POST TREATMENT P < 0.01

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Internal Uprising/Insurgency: A Theoretical Analysis of NATO Intervention and Regime Change in Africa

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Abstract- It appears that the study of insurgency and peacekeeping intervention in Africa suffers from general disregard for an examination of some covert intended outcomes by the intervening organisations– the gap which this study attempts to fill with special focus on the North Atlantic Treaty Organization, NATO. Yet, it is observable that due to huge resource gaps, African Union peacekeepers depend upon external assistance, most notably from states within the EU and NATO in form of classroom education, field training exercises, the provision of equipment, and support to deploy African peacekeepers and equipment into the theater of operations. How has this form of assistance transformed from humanitarian intervention to interference? Using Libya as a case study, this paper sets to discuss this subtle metamorphosis particularly within the context of the US-led NATO operations on the Continent.

Index Terms- Insurgency, Regime Change, Uprising

I. INTRODUCTION

Conflict and insecurity rank among the worst of the disasters that have afflicted Africa and serve as major causes of poverty, hunger, and unemployment. They are also primary factors leading many Africans to emigrate and seek asylum in other parts of the world (Ngabirano 2011: iv). The end of superpower rivalry has proved empowering for insurgents in several respects and has dramatically changed the nature of African conflict. During the Cold War, foreign supporters usually linked their material support to groups exhibiting acceptable ideological or political agendas; Warsaw Pact nations often being the primary suppliers to African rebellions. Now, after the collapse of the Soviet Union and the demobilization or shrinking of non-African militaries, such cash-strapped nations as Bulgaria sell equipment to insurgents without political preconditions (Howe 2001:5).

The end of the superpower rivalry has, therefore, changed the nature of African conflict. The availability of weapons has escalated the number of armed actors, especially trained militias and insurgent groups, and contributed to the militarization of African political discourse. The diversities of Africa's nation-states, the fact that they are almost invariably multi-ethnic, multi-religious, multilingual, and multi-cultural in the midst of relatively high levels of material poverty and uneven spatial and social development, and have been dominated by corrupt governments, created a combustible mix that periodically erupted into open conflict and warfare. The peacekeeping efforts by different International and regional organizations on the

continent, therefore, require a thorough examination particularly within the context of their overt mission and covert intended outcomes essentially as it affects regime change.

II. INTERNAL UPRISING/INSURGENCY AND CHANGING SECURITY PATTERN IN AFRICA

Conflict has engaged the interest of scholars and given peace-loving humanity cause for anxiety since the earliest times. Thus, the explosion of internal violence in contemporary times, particularly in Sub-Saharan Africa, has elicited a similar explosion of studies seeking to explain, and unveil the causes, dynamics and trajectories of these conflicts (Agbonifo, 2004:2). Africa is in a deep and persistent malaise. It is by far the least developed continent economically, and the most conflict-prone politically. In policy-making circles and media characterizations, it is "the hopeless continent" (The Economist May 13-19, 2000 cited in Jackson, 2002). Such pessimism is driven in part by the failure to manage — much less resolve — the destructive consequences of multiple violent conflicts.

The tumultuous post-independence years in Africa shattered any optimistic hopes that state security forces would provide stability or help to unify the new African states. Instead we have seen the decline and corruption of state security forces on the continent. Most African militaries are little more than show pieces for annual independence celebrations, and disintegrate quickly when required to perform even the simplest military task (Brooks, 2002:70).

As observed by Howe (2001:5), the availability of weapons has escalated the number of armed participants, especially poorly trained militias and insurgent groups, and contributed to the militarization of African political discourse. Adding to the volatile mix are skilled demobilized soldiers from South Africa and Eastern Europe. Many African states now lack the military resources to halt the shift of the coercive balance. Somalia, Liberia, and Sierra Leone were three examples during the 1990s of countries having virtually no national military to face growing armed opposition. From 1960 to 1990, insurgencies and invasions overthrew only two sub-Saharan African states (Chad and Uganda); during the 1990s, however, armed force, exclusive of coups, toppled at least six governments.

Africa's militarized conflictual behavior is at the stage where most conflicts are among proximate adversaries. This is due to a number of reasons: crises of legitimacy, ethnic rivalries, and irredentist movements, among others. The proximity factor is also consistent with Africa's low level of industrialization and its technological inability to project power across great territorial expanses as well as sustain long-range military confrontations. In

domestic conflicts a primary factor is the extensiveness of interaction between actors related to their common geographic location. Interactions can have physical (locational), structural (institutionalized) and psychological (perceptions of threat) dimensions especially in relation to geographic proximity.

Many of Africa's conflict countries have histories of political and institutional turmoil, which have severely distorted the actions of national actors—opportunistic behaviour has often come to dominate longer-term considerations. This is particularly evident in state institutions where corruption, together with war-profiteering, often replaces long-term planning and considerations of the national interest. As noted by Matanga and Nzau (2013:56), throughout the post-independence period, Africa experienced many crises of governance. Today many sitting governments around Africa are highly compromised due to the low degree of legitimacy they actually enjoy among the populace. It was not surprising that due to this state of things many Presidential Elections have been highly contested but poorly conducted and ill informed, culminating in violence and mass protests, destruction and economic retrogression.

Conflicts in Africa, although usually internal in character, have important regional dimensions. In that sense Africa forms a 'security complex' as defined by Buzan (cited in Laakso, 2005:2), i.e. a regional group of states, whose security concerns are interlinked. Therefore it is pertinent to assume that regional level cooperation, irrespective of the policy sector where it occurs and how it occurs, affects those concerns. And indeed, even though enhancing peace is not included in the actual mandate of most African regional organizations, peace and security are often mentioned in their constitutive agreements as the indirect benefits of deepening regional cooperation. Precisely this common understanding of the benefits of regional cooperation for security is at the core of the notion of a security community.

For years Africa was a backwater for al-Qaeda-linked insurgents, but today it is a rising axis for extremism. Two African insurgencies now rank among the most dangerous internationally: Boko Haram in Nigeria and Somalia's al-Shabab. Going by the number of fatalities per attack, Nigeria now has the world's deadliest insurgency (killing an average 24 people per assault, versus two in Iraq), according to Maplecroft (cited in *The Economist*, 2014)- a risk consultancy. Violence has split into neighbouring Chad, Cameroon and Niger. In Somalia, al-Shabab has come under pressure from regional African forces, but has responded by striking beyond its borders. Kenya has been particularly hard hit. Since the bloody siege on Westgate Mall in Nairobi, the capital, in 2013, a series of coastal attacks has cost hundreds of lives and hammered the tourism industry.

Unprecedented popular protests in North Africa demanding greater political freedom, dignity, and economic opportunity have captivated the world's attention since they burst onto the global stage in January 2011. The subsequent resignations of long-time autocrats in Egypt and Tunisia, the toppling of the Gaddafi regime in Libya, and a shift toward constitutional monarchy in Morocco have dramatically reshaped state-citizen relations in this long static region. With tentative steps toward democracy, long held assumptions of public passivity and the inviolability of stable, autocratic states in the Arab world have withered.

Despite the major social, cultural, and economic differences between North Africa and the rest of the continent, the mass protests in Tunisia and Egypt have riveted the attention of millions of Africans from all walks of life. Expressions of frustration with political exclusion, corruption, yawning inequality, and impunity seen on the streets of Cairo and Tunis resonated deeply across the continent. Indeed, protests demanding more political liberties, services, and accountability were seen in over a dozen Sub-Saharan African countries including Burkina Faso, Uganda, Senegal, Benin, Malawi, Kenya, Djibouti, Mauritania, Cameroon, Gabon, Guinea-Bissau, and Swaziland in the months following the launch of the Arab Spring. Africa's democratization experience, accordingly, predates the Arab Spring. The demands of protesters in North Africa -elections, a free press, freedom of assembly - are rights most Africans ostensibly already have. Indeed, one of the remarkable aspects of the prospective democratic transitions in North Africa and the Middle East is that it has taken so long. With the exception of Central Asia, the Arab world is the last major region to start down the democratic path (ACSS, 2011).

III. NATO AND THE DYNAMICS OF PEACEKEEPING IN AFRICA: FOCUS ON REGIME CHANGE IN LIBYA

The nature of peace operations in Africa has changed dramatically over the past decade in the sense that such operations now involve a range of actors, ranging from the UN, the AU, and the European Union (EU) to regional organizations like ECOWAS, as well as a plethora of states and non-governmental organizations (NGOs). Many operations are partnerships that involve multilevel coordination among and between the actors involved. While participation in these operations has increased, the scope and aims of these operations have also widened (Okumu and Jaye, 2010:11).

The Middle East is – for geographical necessity if nothing else – an area of growing importance for NATO. Since the 1990s, NATO has had a role in the Middle East, largely conducted through the mostly dormant talk shops of the Mediterranean Partnership and the Istanbul Cooperation Council. More ambitious peacekeeping roles have been repeatedly proposed for NATO in Lebanon and the Israeli-Palestinian conflict. These cases aside, Libya is the first 'proper' operation in the Middle East – the limited NATO Training Mission in Iraq exempted.

As waves of protest spread across North Africa in early 2011, authoritarian regimes appeared more vulnerable than at any time in the contemporary history of the Middle East. Protest movements gave voice to the failure of Arab autocrats to address deeply held economic, social, and political grievances, challenging notions of authoritarian regimes as adaptive and capable of adjusting their strategies and tactics to changing conditions (Heydemann, 2013:61). The Arab Spring has certainly resulted in a change of regime in Tunisia and then Egypt. The uprisings against Gaddafi's regime triggered a military intervention by NATO that drove the Libyan leader and his entourage from power. Ali Abdullah Saleh finally relinquished his grip on power in Yemen. However, the ramifications of regime change for state-society relations in Tunisia, Egypt, Yemen and Libya are still uncertain. Mubarak may be on trial,

Gaddafi is dead and Ben Ali is currently enjoying the dubious pleasures of exile in Saudi Arabia.

The international community did not stand idly by as Gaddafi was embarking on what was described as a warfare against his own people. The issue was brought before the Security Council, which on 17 March voted in favour of imposing a no-fly zone over Libya, restricting Gaddafi from using his air force against the Libyan population. The vote was not uncontroversial, and five countries chose to abstain; Brazil, China, Germany, India and the Russian Federation. However, resolution 1973 passed and the responsibility of enforcing the no-fly zone was distributed amongst the member states of the UN with NATO as the commanding organization.

Unlike in other cases caught up in the Arab Spring, it is only in the case of Libya that Western forces became actively involved as interventionists against the regime of Gaddafi. Can their involvement be explained by economic interests, in particular the mining of oil that had been nationalized by Gaddafi when he came to power in 1969? If the answer to this question is in the affirmative, then, power theory could be useful in explaining the Libyan case. Being part of the Realist approach to international relations, Power theory is guided by the tenets that states are the only actors in international relations and that they act to secure and defend their national interests (Matanga and Nzau, 2013:48).

Indeed, haphazardness, rather than deliberate strategy, was the reason why NATO became involved in the bombardment of military targets in Libya in the first place. The intervention in Libya is interesting from the perspective that it is not only rooted in international considerations, but also to a great degree in domestic factors. It was France under the leadership of Sarkozy who issued the first official recognition of the National Transitional Council and then initiated the first air bombardments against military targets in Libya. The Libya intervention started out being widely popular in France and seemed to give Sarkozy a much-needed success at a time of unfavourable opinion polls in the run-up to the presidential elections in 2012.

France felt she had failed her historical responsibility during the 'Arab Spring' in Tunisia, and Libya therefore became a welcome opportunity to manifest a French return to North Africa with support to revolutionary movements and willingness to back words with action (DIIS, 2011:1). In fact, from the beginning of the uprising in February 2011 to the time of Col. Muammar Gaddafi's capture and subsequent killing in October 2011; 25,000 people had lost their lives. The Libya experience was quite controversial due to disagreement as to whether it was truly a Libyan affair or a Western-led invasion aimed at making spoils from Libyan vast oil riches; though shrouded in "helping defeat Gaddafi's authoritarian regime" that was out to exterminate its own people (Matanga and Nzau, 2013:45),

The doctrine of protection of civilians from atrocities ('responsibility to protect') prescribes that the international society has a right and duty to intervene and hinder humanitarian catastrophes against civilians around the globe. This doctrine is important for understanding why NATO actually ended up intervening in Libya in the first place. When it comes to the real consequences of this doctrine, however, a whole list of other countries appear as potential targets for external intervention. Syria and Bahrain are just the latest examples of violent

crackdowns on demonstrators of the 'Arab Spring', which could equally lead to justification for external intervention. If the intention is to enforce humanitarian principles around the globe, it would seem just as obvious to intervene in countries like Zimbabwe, North Korea or Burma. The perpetual problem with these kinds of interventions is, therefore, that they are extremely selective (DIIS, 2011:2). As stated in the Danish Institute for International Studies' Policy Brief:

In 2010 NATO published a New Strategic Concept...for the future of the Transatlantic Alliance. The New Strategic Concept outlines the elements of a more political NATO which seeks to influence the surrounding world through strategic partnerships and political agreements. The Concept seems to attempt to redefine NATO beyond the predominantly peace-making role which the Alliance invested in during the 1990s, when the security landscape was characterised by a high degree of instability following the disintegration of Yugoslavia. With the gradual consolidation of NATO's geopolitical presence in south-east Europe, the Alliance seems to be preparing for the encounter with a new world order with limited possibilities for further expansion. The Libya intervention, however, must be said to constitute somewhat of a paradox vis-à-vis NATO's self-declared vision of playing a larger political role in the future. The intervention in Libya clearly represents a return to the 'peace-making through air bombardments' of the 1990s, only now with a new geographical focus.

On 20 October 2011, the National Transitional Council, NTC, backed by NATO did not only overthrow Gaddafi out of power but captured him and subsequently killed him gruesomely. This shows that the NATO intervention was designed to depose the Gaddafi regime and not the purported reason of protecting civilians and forestalling humanitarian crisis. In fact, even the civilians that the NATO coalition claimed to protect also suffered untold destruction in the hands of NATO forces. Evidence showed that NATO contributed significantly to the death of civilians that it claimed to protect in Libya. A US-based Human Rights Watch examined in detail evidence of claims of civilian deaths from eight separate NATO strikes. In one instance, it said a first bomb killed 14 people and a second, moments later, killed 18 more who had rushed to help victims. Similarly, in March, 2010, another human rights organization, Amnesty International, said it had documented 55 cases of named civilians, including 16 children and 14 women, killed in air strikes by NATO (Chigozie C.F et al 2013:6). Little wonder, Rahnema, has dubbed NATO's intervention in Libya "protecting to kill, killing to protect".

In any case, most Africans are upset about the outcome of NATO's operations in Libya. The AU and some African heads of state, as well as the African intelligentsia and large swathes of public opinion, consider that what happened in Libya was not a revolution such as those of Egypt and Tunisia, but a coup d'état orchestrated by a heteroclite coalition of putschists helped by NATO under the pretext of its responsibility to protect (Paul-Simon handy, 2011:9). The manner American fighter-jets bombarded Libya showed that NATO had ulterior motive. The first American attacks against the Gaddafi regime occurred on 18 March, and consisted mostly of Tomahawk attacks against air defense, radar, and missile systems in an effort to set the conditions for the no-fly zone implementation (this action would allow Allied planes to operate with reduced anti-aircraft threat)

(Kirkpatrick et al., 2011). The campaign intensified over the following day, as airstrikes on 19 March focused on strategic command and control targets in Tripoli as well as Libyan mechanized and motorized forces in the vicinity of Benghazi (Kirkpatrick and Elisabeth, 2011). These strikes sent a particular signal. That is, the strikes near Benghazi demonstrated NATO's support for the rebel fighters on the ground and a willingness to attack Libyan forces that could suppress the rebellion

Gaddafi's fall was made possible by the actions of powerful states in flagrant violation of the mandate initially conferred by the UN Security Council through Resolutions 1970 (26 February 2011) and 1973 (17 March 2011). While the UN did authorise an international force to ensure the 'protection of civilians' and initiate political dialogue, the NATO countries that decided to implement the resolutions sided with the rebels and refused to consider the option of political process unless on the condition of regime change. In retrospect, it is now clear that some of the countries engaged in the campaign never intended being bound by the UN mandate – unless they had it their way.

Former South African President Thabo Mbeki, in a lengthy address Feb. 16 in South Africa, entitled "Reflections on Peacemaking, State Sovereignty and Democratic Governance in Africa," systematically exposed the manner in which the U.S.A., U.K., and France, with the full collaboration of the UN, intended to implement regime change in Libya from the beginning, and willfully ignored African efforts to resolve the crisis

Mbeki asserted that the crisis in Libya could have been resolved without regime change, but the NATO powers were determined to push it through. Instead, on March 17, seven days after the AU made its Roadmap decision, the UNSC adopted Resolution 1973, which provided the space for NATO political alliance, "to intervene in Libya to impose a violent resolution of this conflict, centered on regime change, which objective was completely at variance with Resolution 1973." In so doing, Mbeki stated, NATO intervened, not to protect civilians as the UNSC resolution called for, "but to lead and empower the opposition National Transitional Council in a military campaign to overthrow the Gaddafi regime" (cited in EIR, 2012).

IV. NATO AND POST-GADDAFI GOVERNANCE CRISIS IN LIBYA

The history of NATO and the history of Libya are intertwined in many ways. It was two years after the formation of the North American Treaty Organization that Libya became independent in 1951. However, for the Europeans, the strategic importance of Libya during the Second World War and the memory of the siege of Tobruk were too fresh in their minds for NATO to give up Libya entirely. The compromise was that NATO and the US would maintain a military presence. The US established a base called Wheelus Air Base in Libya. This base was called a 'Little America' until the US was asked to leave after Gaddafi seized power in 1969. The US had been scheming to get back into Libya since then. For a short while Gaddafi was supported as an anti-communist stalwart, but later he became a useful nuisance shifting as friend and foe over the years. As the US fabricated the myth of al Qaeda in the Maghreb, cooperation was extended to this leader but Gaddafi was opposed to the

establishment of US and French military bases in Africa (Campbell, 2011).

NATO had been formed as an alliance ostensibly to defend Western Europe against the Soviet Union. Charles De Gaulle had pulled France out of this alliance in 1966 after it became clear that this military alliance was dominated by the USA and Britain (supporting their military industries). Usually, when an alliance is formed for a specific purpose such as halting the spread of communism, that alliance is folded when the mission is complete. Hence, after the fall of the Soviet Union in 1991, it was expected that the mission of NATO would be scaled down (ibid). Perhaps, Gaddafi's greatest crime, in the eyes of NATO, was his desire to put the interests of local labour above foreign capital and his quest for a strong and truly United States of Africa. In fact, in August 2011, President Obama confiscated \$30 billion from Libya's Central Bank, which Gaddafi had earmarked for the establishment of the African IMF and African Central Bank. In 2011, the West's objective was clearly not to help the Libyan people, who already had the highest standard of living in Africa, but to oust Gaddafi, install a puppet regime, and gain control of Libya's natural resources.

For over 40 years, Gaddafi promoted economic democracy and used the nationalized oil wealth to sustain progressive social welfare programs for all Libyans. Under Gaddafi's rule, Libyans enjoyed not only free health-care and free education, but also free electricity and interest-free loans. Now, the health-care sector is on the verge of collapse as thousands of Filipino health workers flee the country, institutions of higher education across the East of the country are shut down, and black outs are a common occurrence in once thriving Tripoli (Chengu, 2014). After the assassination and humiliation of Gaddafi in October 2011, Hifter became leader of one of the 1700 militias with over 250,000 persons under arms. Abdelhakim Belhadj became the most powerful person in Tripoli after the NATO 'victory' when he installed himself as the head of the Tripoli Military Council. When the United States undertook its transition program for Libya, Belhadj dropped his military title and contested elections as a civilian leader. Hifter could not openly challenge the LIFG forces in Tripoli so he worked to build relations with the Zintan militias working hard to emerge as the new military strongman of Libya. Since 2014, Hifter has been involved in a number of high profile military actions (first a declared military takeover in a failed coup attempt of February 2014 and later in May in a prolonged war to defeat the Misrata forces and those supported by Qatar). From the western platforms and those who have interviewed Hifter, this general claims the allegiance of over 70,000 troops along with the Zintan militia forces.

On Friday, February 14, Maj. Gen. Khalifa Hifter announced a coup in Libya. 'The national command of the Libyan Army is declaring a movement for a new road map' (to rescue the country), Hifter declared through a video post. Even the New York Times ridiculed this coup attempt with the story by David Kirkpatrick who reported on the coup from Cairo (Campbell, 2014). Western and regional governments share responsibility for much that has happened in Libya, but so too should the media. The Libyan uprising was reported as a simple-minded clash between good and evil. Gaddafi and his regime were demonised and his opponents treated with a naïve lack of skepticism and enquiry. The foreign media have dealt with the subsequent

collapse of the Libyan state since 2011 mostly by ignoring it, though politicians have stopped referring to Libya as an exemplar of successful foreign intervention (Cockburn, 2014).

Since the 2011 overthrow of the Gaddafi regime, Libya's path has been tumultuous. Despite a number of advantages compared with other post-conflict societies, progress on political, economic, and security fronts has fallen far behind, generating frustration and threatening the recovery altogether. Libya has teetered on the brink of a relapse into civil war on more than one occasion in the past year. Libya's most serious problem has been the lack of security. Insecurity has had negative repercussions across the spectrum. It has undermined efforts to build functioning political and administrative institutions, further constricted an already minimal international footprint, and facilitated the expansion of criminal and jihadist groups within Libya and the wider region.

Libyan political leaders have been under constant threat of attack, as displayed most dramatically in the October 2013 kidnapping of Prime Minister Ali Zeidan. The lack of security stems primarily from the failure of the effort to disarm and demobilize rebel militias after the war. Both international advisors and Libya's political leadership recognized the importance of rebel disarmament from the outset, but neither has been able to implement it. As a result, various types of armed groups control much of the country and the elected government is at their mercy (Chivvis, and Martini, 2014:ix). Libya is imploding. Its oil exports have fallen from 1.4 million barrels a day in 2011 to 235,000 barrels a day. Militias hold 8,000 people in prisons, many of whom say they have been tortured. Some 40,000 people from the town of Tawergha south of Misrata were driven from their homes which have been destroyed (Cockburn, 2014).

The problem of the lack of security in Libya negatively impacts on the path to democracy and seriously hinders the establishment of political and administrative institutions and also contributes to the increase in crime and activities of radical groups (Middle East Monitor, 2014). The political turmoil and military clashes in the country have also provided a hotbed for religious extremism and terrorism such as the Islamic State militant group. In fact, the Libya crisis is closely related to the indifferent attitude of the Western powers, which have not adopted practical measures to help the country set up a powerful central government capable of stabilizing the situation and reestablishing the normal public order. Similar situations have occurred in some other Middle East countries such as Iraq and Syria after the Western powers, especially the United States, adopted wrong policies there (Shilei, 2014).

Western governments believed that their approach would facilitate a smooth transition to democracy in which the opposition and the revolutionary leaders would be able to govern on the basis of joint governance of the state and its institutions after the liberation phase was over. Contrary to this, Libya witnessed a dangerous security deterioration that resulted in much desperation and pessimism towards the future of political stability in the country, especially since the scenario of overthrowing the regime was accomplished with the help of NATO forces based on a mandate from the UN Security Council. The deterioration of the situation in Libya gives the impression that the events of the past three years explain the failure of the

West's approach to achieving stability. Instead, the country has been plunged into a civil war due to the lack of an effective central authority that was able to protect Libya from falling into chaos.

V. CONCLUDING REMARKS

External intervention is not a primary cause of Africa's conflicts, but more an exacerbating factor. It is directly related to the failure of the African state. In other words, because African political systems "are internally incoherent and because aspects of their internal form are projections of the external environment, they are easily manipulated from the outside" (Mujaju 1989:260). Numerous African states exist on the verge of internal conflict, and they must be monitored and assisted before large scale violence erupts or war economies become entrenched. When a state has been identified as being at risk, there are numerous preventive measures which can be applied: diplomacy and mediation, fact-finding missions, arms embargoes, the creation of demilitarised zones, disarmament and decommissioning of weapons, the preventive deployment of military or civilian peacekeepers, and programmes to deal with economic and humanitarian crises, to name a few (Jackson, 2002:18).

The situation in Africa is frightening because the region is the most backward in term of development and most vulnerable as far as peace, security and stability are concerned (Ngunan, 2013:128). The sub-Saharan Africa is the poorest part of the world and as a consequence is devastated in many ways (Nwaorgu, 2013:147). At the less extreme end of the scale, internal conflict is the inadvertent result of nonetheless risky strategies by African elites to hold onto power — particularly in times of crisis — establish hegemony, or manage political demands. Pursuing exclusionary politics, the indiscriminate use of state coercion on civilian populations, unleashing ethnic chauvinism, or manipulating multiparty elections are all high-risk strategies that can lead directly to war. Similarly, the failure to deal appropriately with spill-over or contagion effects, internal or external shocks, or eroding state autonomy (state collapse), can also result in internal conflict.

Over the past ten years, the AU's Peace and Security department developed a substantial capacity that saw the young organization taking the lead in many conflict situations in Africa. Even more than the noticeable increase in the number and quality of its military interventions (such as in Somalia, Darfur and Burundi), the AU's biggest achievement so far appears to be its role in promoting norms and implementing security regimes throughout the continent. The prohibition of unconstitutional changes of government, and the more-or-less systematic enforcement of this norm throughout the continent, have been seen by many as important milestones insofar as they have transformed multilateral relations within the continent as well as Africa's relations with the international system (Handy, 2011:9).

NATO's operation in Libya elicits many reflections and has several implications for the current and future security situation in the Mediterranean. One reflection regards the future role of Europe in Mediterranean security in light of the general impression that European powers took the lead in NATO's operation. A second reflection regards the implications of what

seems to be unfinished business in Libya, due to the continued violence in the country and the apparent lack of stability (Sally, 2012:122). There are many risks that threaten the North African coast and the Maghreb region, as the explosion of disputes in the area leads to the instability of the entire coastal area, while the war in Libya adds more dismay to the scene and multiplies these risks. Moreover, this space acts as a relatively safe haven for the network of international armed groups that find all the facilities needed for military training, recruiting fighters, carrying out assassinations, suicide bombings, suicide attacks and kidnappings, and building training camps (Middle East Monitor, 2014).

Undeniably, as noted by Shah (2013), the Arab Spring has more sabotaged peace and common man's life than proved constructive. Just regime changes for never ending instability and chaos cannot be a revolution. The most crucial and important was to stabilize the uprising states in the post uprising era, which proved a brutal failure. Arab spring's hallow success is quite manifested in Egypt's continuing bloodshed, saga of strives and civil wars, the formation of new incapable and west's puppet establishments, exclusion of women and minority voices, emergence of vulgar militias with territory politics and proliferation of terror through widespread weapons with arms smuggling, etc.. Thus everything is being witnessed as worst than the pre-spring scenario. Libya today is far weaker and insecure even than the Gaddafi era, where actualizing a centralized control mechanism and curbing arrogant tribal militias seems a project of decades and formation of a powerful national army a very difficult challenge.

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Alignment of the Technical University of Mombasa's Strategy to the social pillar of Kenyan Vision 2030

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Abstract- TUM has undergone three distinct phases from a tertiary Technical, Industrial, Vocational Entrepreneurship and Training (TIVET) Institute to constituent college (i.e. Mombasa Polytechnic University College) and finally as a Technical University of Mombasa (TUM) aligned to the fulfillment of social pillar of Vision 2030. Specifically, TUM has been earmarked as Vision 2030 center of specialization in Tourism, Hospitality, and Marine based sciences and Technology. We examine the synchronization of TUM's current Strategic Plan 2014 - 2018 and Kenya Vision 2030 social pillar. We then look at implementation practices and barriers that can make TUM not realize its vision; and finally, we come-up with viable recommendations that will make TUM realize its vision as "a university of global excellence in advancing Knowledge, Science and Technology".

Index Terms- Strategic Plan, Kenya Vision 2030, TIVET and Strategy Implementation.

I. INTRODUCTION

University and vocational education is an important factor to the development of national economy. Castells (2001), Dill and Sporn (1995), and Newman (2001) unanimously agree that it is a mainstay in the development and support of economic, social and political development of a country. Gibbons (1994), Guruz (2003), and Scott (1995) have the view that the contribution of university education is premier and unparalleled to the advancements of scientific and technological innovations. Johnstone and Teferra (2004) affirms that these advancements have been the cornerstone for the development of specialized human resources but also universities represent the most meaningful symbol of intellectual, economic, cultural and social life of the community in general. In other words, establishing these institutions require huge investment and consequently have great expectations in propelling the economy. Therefore, "to live in the market" (Clark, 1995, 165) and to be "innovative" (van Vught, 2000, 350), the universities need to develop the internal structures to meet their new missions (Detomasi, 1995). Johnstone and Teferra, (2004, 1) concludes that these institutions "... are important symbols of national identity and repositories of the histories, languages, and cultures of the people(s)".

Kenya, by no means, is not an exception to this development notion. In fact, the Republic of Kenya (2007) created a development program referred to as the "Vision 2030" in order to realize economic growth, gain competitiveness and achieve improved quality of life for its citizens by the year 2030. To facilitate economic growth, the country has embarked on a substantial infrastructure investment program. The plans are nothing if not ambitious, involving port construction, airport expansion, a massive improvement and extension of the country's road network, the creation or upgrading of road and rail links from Kenya's ports to central Africa and to countries north of Kenya, a threefold increase in electric power generation capacity and a new oil pipeline to the coast. Thus, the program faces a number of challenges, ranging from the existence of over regulations, to meeting intellectual needs for development demands. The following is an excerpt of the Vision 2030:

A national long term development blueprint to create a globally, competitive and prosperous nation with high quality of life by 2030, that aims to transform Kenya into a newly industrialized, middle income country providing a quality of life for its citizens by 2030 in a clean and secured environment. The vision is anchored on three pillars; economic, social and political governance.

The key objective of ~~vision~~-Vision 2030 is "to make the country globally competitive and prosperous with a high quality of life by 2030." The vision is anchored on three pillars: 1) Economic; 2) Social; and 3) political Governance. The social pillar of Vision 2030 seeks to create "a just, cohesive and equitable social development in a clean and secure environment". It, therefore, presents comprehensive social interventions aimed at improving the quality of life of all Kenyans and Kenyan residents. The vision classifies interventions in the social pillar into six broad areas of focus. These include education, health, water and sanitation, environment, housing and urbanization, and gender, youth and vulnerable groups.

The education sector diagnostics looked comprehensively at issues affecting education and training. The diagnostics covered access to education, quality, equity, relevance, institutional management and capacity development. The Vision for education and training is

“Globally Competitive Quality Education, Training and Research for sustainable development”. The strategies for achieving this vision have been categorized into seven strategic thrusts. These were early childhood development education (ECDE), primary education, secondary education, special education, adult education, TIVET and University.

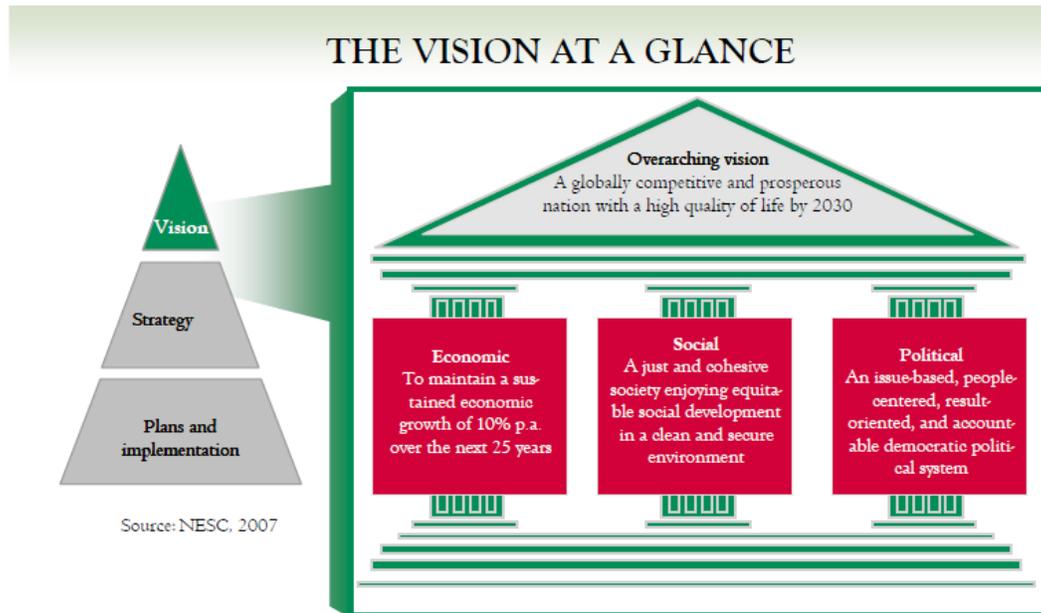


Figure 1: Kenyan Vision 2030 (Source: The Bulletin of the Institute of Economic Affairs, 2007)

TUM's Vision is stated as *a university of global excellence in advancing Knowledge, science and Technology*. The mission is, *to provide leadership and outstanding programmes by engaging in scholarly reflection, cultivating critical thinking and advancing creative problem-solving skills in the fields of engineering, the sciences, business and related areas that benefit society*. The Philosophy states that *TUM shall endeavor to offer opportunities for access of commensurate scientific, technical, entrepreneurship education and research skills for innovation and creativity to enhance employment opportunities for wealth creation*. The core values states that the management, staff and students of the TUM will endeavour to institutionalize, and inculcate values that foster a strong corporate culture that promotes excellence, cohesion and achievement. TUM espouses the following values in the conduct of all its functions: Professionalism, Equity and Social justice, Efficiency and Efficacy, Commitment, Service Delivery, Team Work, Creativity and Innovativeness, Integrity, and Environmental sustainability

In strategizing the social pillar, the Kenyan Government has recognized the award of the University Charter to TUM as marking a major milestone on the Vision 2030 Social Pillar, which underscores the need for intellectual development to meet the emerging demands. Kibati (2012) notes that TUM would help promote higher education development countrywide. He disclosed that the Vision 2030 Secretariat was considering identifying TUM as a Marine Studies and Technology Centre of Specialization. He also remarked that TUM stands a good chance of progressing on to become Vision 2030 Centre's of Specialization in Tourism, Hospitality, and Marine based Science & Technology disciplines.

The University has four well-established Faculties and Schools, namely Faculty of Applied and Health Sciences, School of Business, School of Humanities and Liberal Studies, and Faculty of Engineering and Technology. The University has also continued to offer TIVET programs alongside the other programs as provided in the Legal Order. As a result of demand for TUM programs, the student population has tremendously grown over the years, attracting both genders in the three thematic areas.

TUM has modelled itself as a "learning organization," that continually aims at improving the provision of learning opportunities to its employees. Since elevation into a University, TUM has recorded tremendous all round growth, making her one of the fastest growing Universities in the region. To sustain the growth and reposition as a world-class university of Engineering, Science and Technology, TUM has continued to develop policy instruments, infrastructure and human resources that are dynamic and responsive to the Country needs. Also the University has signed collaborative agreements with leading international institutions of higher learning to partner in research, training and technology transfer. In line with government policy to increase access to University Education, the University has opened two strategic satellite Campuses in Kwale and Lamu County. Plans are underway to open a new Campus in Kilifi County. These Campuses have made it convenient for deserving students to access TUM degree, diploma and certificate programs without necessarily coming to the main Campus. The transition to the Technical University of Mombasa is therefore timely as the Country moves forward in addressing the social pillars of the Kenya vision 2030.

The main objectives of the paper include: (1) To examine synchronization of TUM's strategic plan to Kenyan Vision2030, (2) To examine strategic implementation barriers that can make TUM not realize its vision, and (3) Make propositions on viable strategies for TUM in overcoming the implementation barriers. The paper is set out as follows. We start with a literature review on strategic planning and strategic implementation practices and barriers. Next, we outline the research methodology for the above objectives. In the subsequently section, we give a synchronization of TUM's Strategic Plan(2014-2018) with that of Vision2030. This is followed by a discussion on the findings on implementation barriers. The study ends with recommendations and conclusion on the realistic strategies that TUM can adopt.

II. LITERATURE REVIEW

Mintzberg and Lampel (1999) and Tsoukas and Knudsen(2012) observed that there are at least a dozen different views on strategy that is derived from Greek words “stratos” and “agein”. According to Bailey (2007), when combined into the term “strategos” it means the art of troop leader, office of general, command or generalship. In military context, strategy is defined as the art and science of identifying, assembling and marshalling troops and equipment of war in a manner that must guarantee the complete defeat of the enemy. Bailey enumerates different definitions of strategy in the context of business management that can be summarized as a way of action that is necessary to achieve the main goal given scarcity of resources. In other words, it is about gaining a competitive advantage over adversaries given a set of options (Ahmed, 2014).

Planning, as defined by Bateman and Zeithml (1993), is a conscious, systematic process during which decisions are made about the goals and activities that an individual, group, work unit or organization will pursue in the future. It provides individuals and work units a map to follow in their future activities. Combining the word "strategic" and "planning", Steiner (1979) defines the joint terms as the systematic and more or less formalized effort of a company to establish basic company purposes, objectives, policies and strategies. It involves the development of detailed plans to implement policies and strategies to achieve objectives and basic company purposes. Wendy (1997) describes the strategic planning process as comprising analysis, choice and implementation. These three elements enable organizations to turn its vision or mission into concrete achievable objectives. Bryson (1989), Stoner (1994) and Viljoen (1995) argue that strategic planning assists in providing direction so organization members to know where the organization is heading and where to expend their major efforts. It guides in defining the business the firm is in, the ends it seeks and the means it will use to accomplish those ends. According to Crupta, Crollakota and Srinivasan (2007) strategic direction involves developing a long-term vision of the firm's strategic intent. Ilesanmi (2011) clarifies that a vision is simply a shared mental framework that gives form to the future of an organization. It must be challenging, create a purposeful and more tangible perception of a promise to a brighter future. Ilesanmi further emphasizes that when people talk about shared vision in organizations, it is expected that members of the organization share a common mental image of the future, which integrates their efforts towards the future state.

Strategic management is the art and science of *formulating, implementing, and evaluating* cross-functional decisions that enable an organization to achieve its objectives. Strategy formulation includes developing a vision and mission, identifying an organization's external opportunities and threats, determining internal strengths and weaknesses, establishing long-term objectives, generating alternative strategies, and choosing particular strategies to pursue. Strategy implementation requires a firm to establish annual objectives, devise policies, motivate employees, and allocate resources so that formulated strategies can be executed and is often called the action stage. Finally, strategy evaluation is the reviewing of external and internal factors that are the bases for current strategies, measuring performance, and taking corrective actions. This research tries to identify the obstacles of strategic implementation and how they can be overcome with specific reference to TUM. Johnson and Scholes (2002) makes a distinction between the intended(planned) strategy and realized strategy as shown in Figure 2.

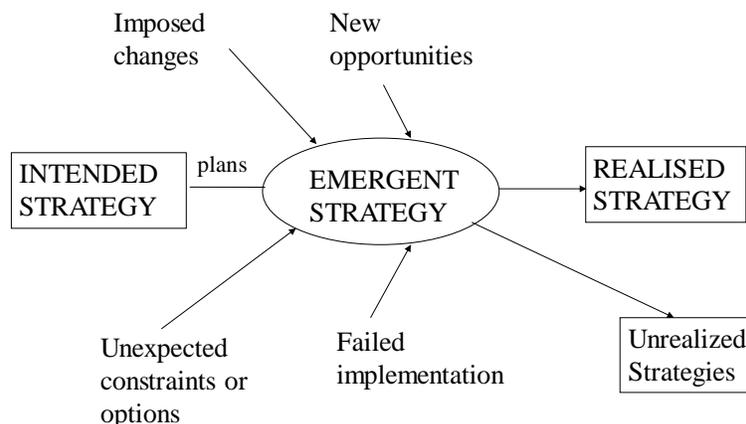


Figure 2: Realities of strategy development (Source: Johnson & Scholes, 2002)

The realized strategy is a blend of intentions and emergence, which can be interpreted by reference to the strength of pressure from the external environment—a kind of environmental determinism (Mcgee, Thomas & Wilson 2005 p 11). Intended strategy, on the other hand, is conceived by the top management after a thorough process of negotiation, bargaining, and compromise, involving many individuals and groups within the organization. The realized strategy is only part of what was originally planned and according to Mintzberg (1994) only about 10–30 % of intended strategy is realized. An emergent strategy is more operational with some flexibility on current demand. It is adopted on instances where an organization lacks specific mission and goals. An organization will adopt an emergent strategy as a method of learning while in operation.

van Vught (2003) observes that the demands on university education is putting a big responsibility on governance and management of institutions. But with the rapid increase in the number of universities in Kenya, this does not come-up as a surprise, for example, the number of universities increased from 13 in 2003 to 26 in 2012 (ROPb, 2013). Rasmussen (1998) affirms that the use of strategic management in the steering of the universities has become indispensable. Several researchers have stressed the need of strategic management in different tune and styles. For instance Davis (1995) applauds that universities should become ‘entrepreneurial’; Clark (1995) insist they should be ‘innovative’; de Boer (1996) suggests that they should be run in a ‘corporate style’; while Geurts and Maassen (1996) advocates ‘managerialism’, ‘business-like’, and ‘external orientation’. Bryson (1988) concludes that the increase in operational complexity requires universities to embrace strategic management ever than before.

Machado and Taylor (2010) observe a number of significant factors that can change the strategic management landscape in higher education. Market forces and dynamism are exerting significant impact on management and running of the universities. The current landscape in Kenya is where public universities are forced to diversify their programs, establish flexible learning schedule, set-up campuses away from the traditional location. These are only but a few of the many challenges. With awarding of charters, university independence and autonomy grows, so do institutional responsibilities and accountability. Outcomes then determine the future level of autonomy for an institution. Taylor, Amaral and Machado (2004) observe that the strategic problems facing institutions of higher learning are similar, that is: (1) The inadequate funding of public higher education through the protective cloak of the existing welfare state, (2) The inability to adequately manage emerging massification, and (3) The lack of experience and expertise to confront the current and projected demographic decline in students. According to Brinkschröder (2014), the strategy implementation process is inter-twined between structures and behaviour. People and their behavior play a significant role, as they are the ones who respond to the organizational strategy. The people have defined roles linked to the organizational structures that affect their behavior, but the converse is also true i.e. people's behavior has an influence on the organizational structure. Brinkschröder summarizes the challenges underpinning each of the element as shown in Table 1.

Table 1: Challenges of strategy implementation (Source: Brinkschröder, 2014)

Strategy	Behaviour	Structure
Formulation & Planning <ul style="list-style-type: none"> Give people the change to contribute where the payoff is highest Consistency of strategy Stating what not to do and what is most important 	Commitment <ul style="list-style-type: none"> Resistance Involvement and integration of lower levels 	Cross functional <ul style="list-style-type: none"> Little reward, no relief from normal responsibilities for implementers Tension between departments Physical barrier, location Turf barriers Cross- functional systems
Consensus <ul style="list-style-type: none"> Lack of clear, common understanding Poor understanding of broader scope and goals Lack of strategic consensus and clarity 	Leadership <ul style="list-style-type: none"> Combination of technical skills, interpersonal skills and sensitivity to the needs of other functions Balance between powerful charismatic leadership and sufficient autonomy for employees Consistency of leadership Capable, contributing, competent, effective and executive leader 	Resource allocation <ul style="list-style-type: none"> Coordinating and integrating activities of participating individuals and functions Leave room for experimentation Throw away of knowledge Realignment
	Cultural context <ul style="list-style-type: none"> Set tone, pace and character System of shared values 	Control <ul style="list-style-type: none"> Go no go decision Creativity inhibition & incentives Balance between hierarchy and creativity & self-responsibility in connection with business strategy

		<p>Communication</p> <ul style="list-style-type: none"> • Common language and understanding • Lack of honest upward conversations about barriers and underlying causes by top-down management style • Poor vertical communication • Open dialog
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III. METHODOLOGY

The study employed a case study design necessitated by the fact that the objectives were confined to TUM's strategy synchronization (to Vision2030) and implementation barriers. The data collection instrument was a questionnaire consisting of structured closed and open-ended questions. Top management (Deans, CODs of all the faculties/schools and selected non-academic staff as shown in Table 2) were the study's key target respondents. Eighteen (i.e. about 70%) of the twenty six staff returned their questionnaires duly filled. Each respondent was also mandated to generate SWOT, PESTEL and Stakeholder's Analysis that were consolidated into coherent whole taking into account what was done in TUM Strategic Plan 2014-2018 (refer to Table 3, 4 and 5).

Thus, a qualitative research approach within a mixed methods design was used. Content analysis was used by making by systematic and objective inferences while identifying specified characteristics of messages and using the same to relate trends. This approach is useful in gaining fresh materials in what was thought to be unknown.

Table 2: Staff interviewed

ACADEMIC STAFF	NON-ACADEMIC STAFF
<ul style="list-style-type: none"> • Dean - Faculty of Engineering • COD - Electrical and Electronics Engineering • COD - Building and Civil Engineering • COD - Computer Science and Information Technology • COD - Mechanical and Automotive Engineering • COD - Medical Engineering 	<ul style="list-style-type: none"> • Finance Manager • Registrar • Procurement Manager • Director AQA • Deputy Director SGS • Director IRIE • Director PC/QMS
<ul style="list-style-type: none"> • Dean - Faculty of Applied and Health Sciences • COD - Pure and Applied Sciences • COD - Medical Sciences • COD - Environment and Health Sciences • COD - Mathematics and Physics 	<p>Both primary and secondary data was sourced and utilized for purposes of addressing the research objectives. Secondary data was extracted from existing published records such as the TUM Strategic Plan 2014-2015, Vision 2030 Second Medium Tem Plan, TUM profile, TUM Academic Policy Manual, the institution's Newsletter, among other sources. All these provided additional information and also aided the researcher with authentic and valid information sufficient enough to draw conclusions. Primary data was also collected on strategic planning process and also on some performance indicators using the likert type scale and qualitative approach.</p>
<ul style="list-style-type: none"> • Dean - School of Business • COD - Department of Business Administration • COD - Department of Accounting • COD - Department of Management Science 	
<ul style="list-style-type: none"> • Dean - School of Humanities & Social Sciences • COD - Hospitality and Tourism • COD - Liberal Studies & Community Development • COD - Communication Studies 	

Table 3: SWOT Analysis

	Opportunities (External)	Threats (External)
Strengths (Internal)	<p>How can TUM use its strengths to take advantage of the available opportunities?</p> <ol style="list-style-type: none"> 1. Use the <u>simulator</u> to exploit the Port and Maritime environment (undertake marketing) 2. Spread/reduce the fees to make it affordable (by leverage on <u>building ownership</u>) to attract more students 3. Make use of the <u>infrastructure</u> (lecture halls, library, 	<p>How can TUM use its strengths to overcome the threats identified?</p> <ol style="list-style-type: none"> 1. Thrash-off <u>misplaced priorities</u>, conflict of interest by adherence to university policies, standards (ISO) 2. Lower or have uniform fees compared to competitors in the region to make university <u>education affordable</u> 3. Have a focus on training and continuous improvement especially to the <u>weak staff</u>.

	<p>laboratories) to gain competitive edge</p> <ol style="list-style-type: none"> Use <u>AQA/QMS Directorate</u> to monitor quality education (encourage punctuality, class sessions, part-time lecturers, value for money paid, etc) Using <u>qualified staff</u> and undertake proper marketing to offer professional courses in the region Capitalize on the <u>location</u> and do marketing to attract more students Using <u>TUMEL</u> and other linkages to facilitate scholarship acquisition through HELB or alternate sponsors Using the <u>ICT Directorate</u> in conjunction with Faculties/Schools initiate online learning. Make use of the <u>website</u> for online access to information (programs), advertisement and marketing Capitalize on the <u>expertise</u> to come up with new market-driven programs 	<ol style="list-style-type: none"> Provide infrastructure to make TUM learning atmosphere <u>attractive</u> to the students (e.g. especially on the new campuses at Kwale and Lamu) The building (especially lecture halls and laboratories) should be equipped with <u>modern items</u> (e.g. mounting projectors, smart TVs, computing, etc) Ensure <u>steady-cash flow</u> by introducing early payment incentives e.g. offer 10% discount on full fees settlement at registration Undertake and maintain call-in registers to curb <u>staff absenteeism</u> that compromises on quality standards. Ensure <u>money paid is accounted</u> for through proper authorization and audit Offer competitive packages to avoid staff <u>brain drain</u> Offer <u>attractive programs</u> as per the market needs and competition
<p>Weaknesses (Internal)</p>	<p>What does TUM need to do to overcome the identified weaknesses in order to take advantage of the opportunities?</p> <ol style="list-style-type: none"> <u>Recruit marine professionals</u> to run the degree programs and executive seafarer training Provide <u>competitive packages</u> (benchmarked against other universities) for staff retention Come-up with <u>novel marketing strategies</u> to recruiting students to TUM Train and <u>recruit ICT professionals</u> and relevant experts to initiate e-Learning Open <u>regional offices</u> in town centers as opposed to rural areas to gain visibility <u>Outsource subordinate staff</u> (e.g. accommodation, environmental staff, etc.) to create conducive learning environment (e.g. classroom cleanliness, landscaping, etc.) Introduce <u>flexible modes of learning</u> (e.g. weekends, distance-learning) to tap-in more students <u>Outsource accommodation</u> to private investors Commit to a thorough <u>annual staff evaluation</u> to weed out incompetent staff and replace with better staff. Strengthen <u>TUMEL with outside expertise</u> to operate as purely commercial entity 	<p>How will TUM minimize its weakness to overcome the identified threats?</p> <ol style="list-style-type: none"> Test TUM students in the job market by <u>undertaking employer surveys</u> as a quality test Admission letters to be <u>given on the spot</u> if one qualifies Establish <u>university kiosks</u> in strategic locations to undertake marketing of the university Introduce a <u>monitoring a measurement system</u> (e.g. a register, inspectors, etc.) that will complement performance charter <u>Reduce fees</u> if not lower than competitors Create a <u>scholarship advisory office</u> to educate students where they can get funding <u>Tidiness and renovation</u> should be carried out on both the old and new buildings - to make them attractive On regular basis, <u>educate the staff on HIV/AIDs</u> and other life threatening diseases <u>Fence TUM land</u> to intensify security and avoid the culture of illegal acquisition <u>Undertake career talks and sensitization</u> to generate interest in education within the local community

Table 4: PESTEL Analysis

	Key Trends	Impact
<p>Political</p>	<p>Regional set-up of the universities and partnership with the local government. Avoid conflict of interest and undue influence in the administration of the university. Seek support from politicians especially on the new campuses. Local politicians unresponsive and political goodwill is very much needed.</p>	<ul style="list-style-type: none"> Compromising standards of education and training Poorly planning can lead to chaos and misappropriation of funds Sense of lack of ownership of the campuses can breed hostility with the local community
<p>Economic</p>	<p>Lack of adequate funding from the Exchequer and the prevalent poverty level that limits the number of students to have access to university education. Inflation affects income hence inability to pay fees. Fees raise</p>	<ul style="list-style-type: none"> Compromising standards in practical training Low class numbers and high dropout rate Most students cannot afford and are not able to complete their studies

	consultation must be done early, and also sensitize the students on the benefits they will expect due to increment	<ul style="list-style-type: none"> Frequent students strike may lead to losing credibility and competitive edge
Social	Nepotism and tribalism is taking toll on the advancement of education. Drugs and substance abuse coupled with poverty level has adversely affected the enrolment rate from the local community (the college is dominated by students from upcountry). This has negatively affected the education in the region	<ul style="list-style-type: none"> Compromised tendering and supply procedures Increase in peer pressure and students unrest There is a rift among the employers and county government. Quite a number of students from TUM, eventually get employed and settled in Mombasa county
Technological	The competitiveness of universities is also measured by access to ICT that is highly underscored for TUM. The recommended ratio of one PC for two student is far from reality. Staff unwillingness to embrace electronic age and effective use in communication. Technological programmes require high capital base and TUM is highly underfunded on it	<ul style="list-style-type: none"> Compromising practical training technology Outdated equipment with no studios makes TUM to be unattractive Students not empowered on technology and innovations and not able to compete in the market
Environment	TUM has natural resource, the marine environment that has been much under-utilized.	<ul style="list-style-type: none"> TUM is losing competitive edge in both marine science and maritime commercial TUM's niche, as a Marine University, is not pervasive
Legal	TUM is guided by statutes and policies through award of Charter under University Act 2012 and cognizance of the TVET Act 2013. Students discipline is paramount to good citizenship and abiding by the law.	<ul style="list-style-type: none"> TUM has fully autonomy; TIVET provides transition from certificate and diploma course to degree, master and doctorate qualification Indiscipline can lead to students expulsion from the university or prosecution by law Indiscipline can also lead to disharmony with county government

Table 5: Stakeholders Analysis (Source: TUM Strategic Plan 2014-2018)

Stakeholder	TUM Interests/Expectations	Influence/Power	Needs	Stakeholders Expectations
Students	<ul style="list-style-type: none"> To get quality education Complete the studies Affordable services Discipline and law abiding (a better citizen) Academic excellence Respect for authority Ethical responsible 	Parents, lecturers, mentors	Quality education	<ul style="list-style-type: none"> To get jobs after completion Timely graduation Professional guidance and counseling Clean and safe environment Adequate and quality learning facilities Conformance of programs to relevant professional bodies Variety of academic programmes Adequate health and recreation facilities Safe accommodation facilities Affordable and good quality catering services Defined programmes schedules
Parents, Guardians and sponsors	<ul style="list-style-type: none"> To ensure their children get the best education Timely graduation of students 	Parent Association	To enable self-independence of their children	<ul style="list-style-type: none"> To be reliable citizens Value for money Quality programmes Safety, health and security of

	<ul style="list-style-type: none"> • Prompt payment of fees • Guidance and counseling of students • Ambassadorial role 			<p>students</p> <ul style="list-style-type: none"> • Adequate facilities • Employable graduates • Scholarships for needy students
Lecturers and Part-time Lecturers	To give quality education.	Departments	Department support	<ul style="list-style-type: none"> • To produce good citizens • Facilitation • Better pay and promotion
Administrative and Non-teaching staff	<ul style="list-style-type: none"> • Continuity of university • Career satisfaction • Quality service delivery • Commitment and loyalty • Productivity in research • Ethical and responsible • Respect for authority 	Council and Top Management	Good working conditions	<ul style="list-style-type: none"> • Better pay and promotion • Justice, equality, training and development • Tenure of teaching faculty • Equity and meritocracy • Continuing education • Sustainability of the University
Local community	<ul style="list-style-type: none"> • Business and jobs • Good relationship with university • Social programmes • Acceptance and cooperation • Promotion of higher education values 	County Government	Corporate Social Responsibility	<ul style="list-style-type: none"> • Peaceful coexistence • To be operational • Employment opportunities • Needs-based corporate social programmes • Educational and training opportunities • Business opportunities
Industry	<ul style="list-style-type: none"> • Competitive students • Sharing information • Feedback on quality graduates • Placement and attachment opportunities for students and staff • Joint commercialization of ideas 	Market needs	Ready availability of manpower	<ul style="list-style-type: none"> • Funding research • Competent and employable graduate • Relevant academic programmes • Sharing of research and innovation • Joint research activities
National Government	<ul style="list-style-type: none"> • Regular and adequate funding • Development of policy governing University education • Facilitation and collaboration with development partners 	Constitution	Realization of Vision 2030	<ul style="list-style-type: none"> • Quality HR capacity for national development • Programmes based on national development needs • Innovations for industrialization • Technology and knowledge transfer • Proper utilization and accountability for resources • Promotion of national cohesion • Facilitate accessibility to higher education
County Government	<ul style="list-style-type: none"> • Partnerships • Research • Infrastructural development • Regular and adequate funding 	National Government	Regional development	<ul style="list-style-type: none"> • Quality HR for national development • Programmes based on national development needs • Innovations for industrialization • Needs-based community outreach • Technology and knowledge transfer • Proper utilization and accountability for resources

				<ul style="list-style-type: none"> • Promotion of national cohesion • Facilities accessibility to higher education
Development partners	<ul style="list-style-type: none"> • Support and collaborations • Timely release of grants 	Partner	Growth and development	<ul style="list-style-type: none"> • Efficient use of donations and grants • Funded project outcome • Accountability
Research and other institutions of higher learning	<ul style="list-style-type: none"> • Development opportunities for staff • Peer guidance • Joint ventures 	Graduate programmes, publication, research funding	Research and innovation	<ul style="list-style-type: none"> • Collaboration in research and projects • Exchange Programmes • Sharing the use of critical equipment
Alumni	<ul style="list-style-type: none"> • Fundraising • Role modeling, mentorship and networking • Infrastructural development • Scholarships 	Members	Network, job placement, improving university welfare	<ul style="list-style-type: none"> • Comprehensive database of alumni • Strong relations with alumni • Involvement in university development activities and functions • Referencing and support
Professional Bodies	<ul style="list-style-type: none"> • Quality assurance of University Programmes • Assist in development of Programmes 	Administration	Becoming professional	<ul style="list-style-type: none"> • Quality academic Programmes • Qualified graduates • Sharing of information • Conformity to professional standards and ethics

IV. MATCHING TUM'S STRATEGY TO VISION 2030

On matching TUM Strategic Objectives to Vision 2030, Table 6 gives a summary based on TUM Strategic Plan 2014-2018 and Vision 2030 strategy (Ndung'u, Thuge&Otieno, 2010).

The Vision 2030's Social pillar has outlined the strategic objectives for TIVET and University front as follows:-

(a) Vision 2030 strategies for TIVET institution

1. Undertaking labour market skills survey and training needs assessment in collaboration with the industry and service sector;
2. In-service training and training for lecturers in technical education in line with skills oriented curriculum;
3. Developing a legal framework for a tripartite delivery mechanism in tertiary education and PPPs;
4. Providing an alternative path for accessing higher education and training up to degree level;
5. Mobilizing resources to rehabilitate TIVET institutions; and
6. Government support for private providers and industry, with the industry providing relevant support, such as, attachments and research.

(b) Vision 2030 strategies for expanding University education

7. Review of curriculum to reflect skills requirement in the realization of the 2030 vision;
8. Promoting rationalization of academic programmes among universities and creating Centre's of excellence;
9. In-service and training for lecturers (public and private) in line with skills oriented curriculum;
10. Empowering HELB to mobilize resources from the private sector;
11. Promoting the expansion of university education and training in tandem with population growth and the demand;
12. Promoting all private sector investment in university education and training;
13. Providing scholarships based on the needs of the economy;
14. Facilitating an all-embracing national accreditation system with credit transfer; and
15. De-linking accommodation and catering from admission.

Table 6: TUM Strategic Objectives Vs Social Pillar of Vision 2030 Objectives

S/N	TUM Strategic Issue	TUM Strategic Objective	Social Pillar of Vision 2030
1	Academic programs	Develop and review programs	1, 7
		Staff capacity building	2
2	Research, Innovation and Extension	To develop a research culture at the University	
		To promote innovation and extension	12
		To establish collaborative research linkages	
3	Access and Equity	To attend gender parity at all levels within the university	
		To enhance access to tertiary and higher education for marginalized groups	4
		Increase access and address the needs of the people with special needs	
		Introduce distance learning	
4	Finance and Resource Mobilization	Consolidate existing sources of funding	5
		Identify and tap additional sources of funding	5
		Put in place mechanisms for prudent financial management	5
5	Manpower Plan and Human Resource Development	To attract and retain competent workforce	
		To develop existing staff by equipping them with relevant skills	2, 9
		Provision of conducive working environment	
6	Infrastructure Development	To provide appropriate infrastructure for academics, scientific and technological training and administration	2
		To maintain the existing infrastructure	
7	Produce competitive graduates	To produce graduates with a high level of general knowledge, technological capabilities and competitive skills	
		To provide students with appropriate combination of ability and attitudes for success in the twenty first century	
8	Partnerships and Linkages	To enhance the international experience of faculty and students in the areas of teaching, research and curriculum development	
		Enhance connections between alumni and students	6
		To further collaborations through academic programs in student exchange and faculty development	6
		To contribute further to the regional understanding between both countries and both universities through mutual cooperation programmes	
9	Community Outreach and Transfer of Technology	To provide needs-based community extension services	
		To facilitate transfer of appropriate technologies and diffusion of new knowledge across the various sectors of the Kenyan economy	11
10	Alumni Relations	Communicate strategically with graduates to create and enhance affinity to the campus	
		Enhance connections between alumni and students	
		Expand opportunities for alumni involvement	

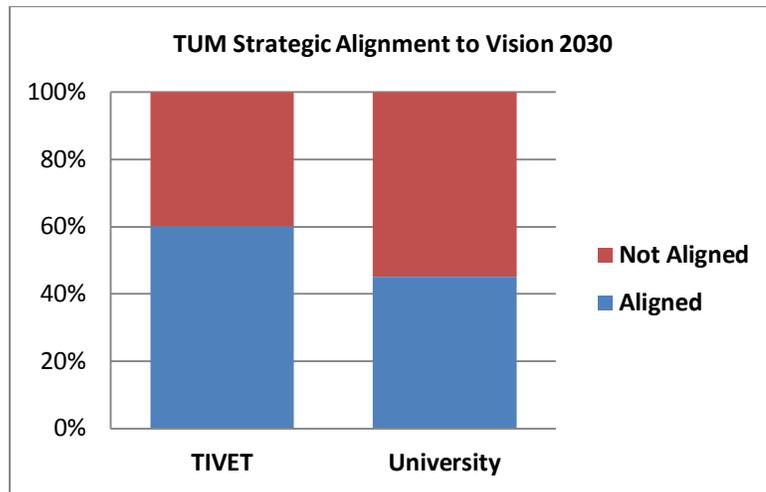


Figure 3: TUM Strategic Alignment to Vision 2030

About 60% of the respondents confirmed that TUM Strategic Plan is aligned to that of Social Pillar of Vision 2030 as TIVET and about 45% as the University. However, they pointed out the following strategic objectives are not captured in the strategic objective i.e. refer to part (a) and part (b) below:

(a) TIVET Institute

- Undertaking labour market skills survey and training needs assessment in collaboration with the industry and service sector;
- In-service training and training for lecturers in technical education in line with skills oriented curriculum;
- Providing an alternative path for accessing higher education and training up to degree level;
- Mobilizing resources to rehabilitate TIVET institutions.

(b) University

- Promoting rationalization of academic programmes among universities and creating Centre's of excellence;
- In-service and training for lecturers (public and private) in line with skills oriented curriculum;
- Promoting all private sector investment in university education and training;
- De-linking accommodation and catering from admission.

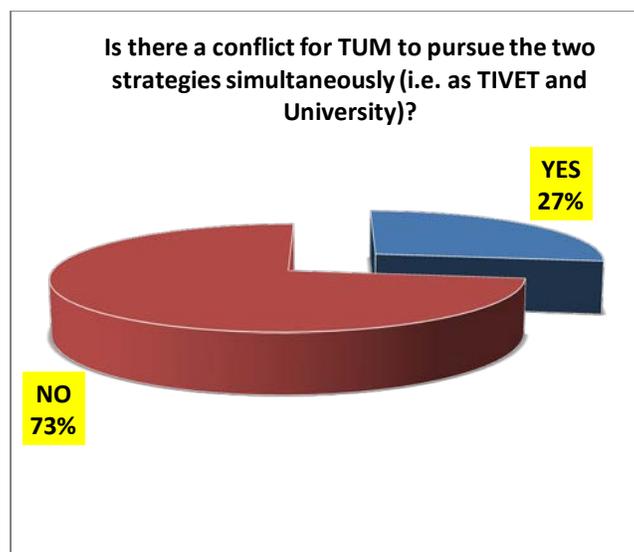


Figure 2: TUM's TIVET Vs University Strategy

Majority (about 73%) concur that there is no conflict for TUM to pursue the two strategies simultaneously citing that it is not only provided for by the constitution but TIVET programmes are the primary source of clients to the university and should be strengthened. On the foregoing basis, the proponents call for strengthening of TIVET programs and aligning them in parallel to the university objectives. Those who affirm existence of conflict (about 27%) argue that majority of the TIVET courses offered at TUM are also on offer by the competitors (i.e. MTI and GTI). Further, they noted Marine not to be a TIVET program. The first argument dwells more on competition than strategy and cannot be relied as a strong measure of conflict. Similarly, marine courses are also TIVET at the seafarer training level.

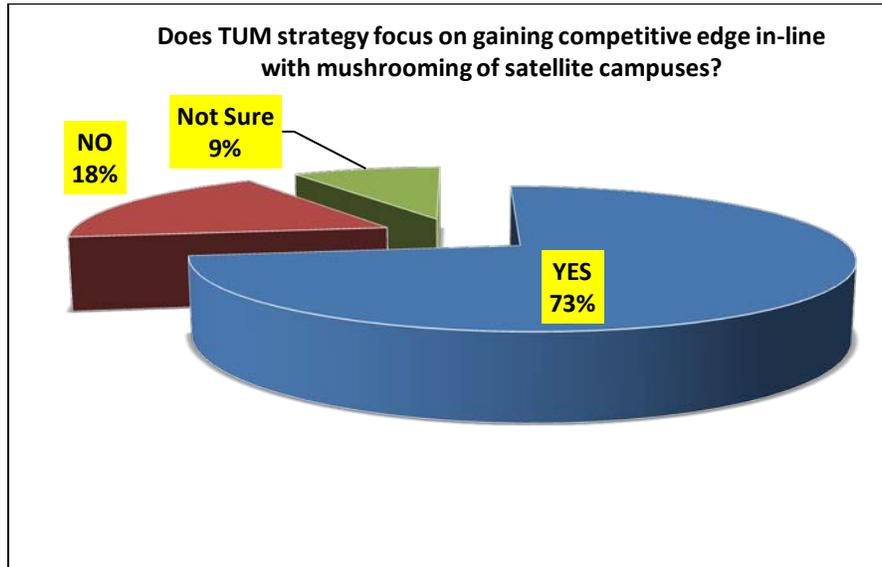


Figure 3: TUM's Strategic Focus

Figure 3 shows that about 73% of the respondents affirm on the competitiveness of TUM's strategy in-line with mushrooming of satellite campuses. The following facts have been stated to support the competitiveness notion:

- i. The establishment of fully fledged Seafarer Training and MET department shall give TUM an edge
- ii. Adoption of new courses in the market to be compatible with the market requirements
- iii. Production of competitive graduates
- iv. On the objective on finance and resource mobilization, TUM has opened two satellite campuses. This is the diversification strategy meant for competition and generation of more revenue.
- v. The existence and establishment of the Institute of Research, Innovation and Extension (IRIE) to spearhead research, innovation, linkage and collaborations
- vi. By offering unique programs, partnering in science and engineering. Pursuing hospitality based courses that are novel. Pursuing to offer Marine based courses
- vii. Achievement of goal oriented results. Developing several new and relevant programs.

TUM's focus on establishing a Marine Center as a niche, although not highlighted in the Strategic Plan 2014-2018, has 70% indication towards its fulfilling this particular goal. The respondents affirmed with the following remarks:

- Establishment of a Marine Center of Excellence
- MoU with the Arab Academy for Science Technology and Marine Transport.
- Development of Professional Marine Training and Certificate courses.
- Conducting a training needs assessment for lecturers currently delivering marine units in both nautical science and marine areas
- TUM is working closely with maritime industry experts to bring onboard the exact requirements
- Several new marine programmes have been developed
- It is the only university in the region that has acquired simulator for training. Recently TUM delegation visited Germany on matters concerning Oil and Gas research. To explore the resources in the ocean, the simulator will be used to navigate the process

V. STRATEGY IMPLEMENTATION

TUM has put in place some support systems for successful implementation of the strategy, notably, these include professionalism, accessibility and transparency. Similarly, quality management systems and the establishment of the office of performance contracting is a testimony to the support offered to strategic plan. In addition, the departmental heads have been mandated to execute the strategic plan with clear guidelines and target. It is also their responsibilities to cascade the plan down to all employees, and integrate it as part of the appraisal system and performance charter. Several other mechanisms have been put in place that directly or indirectly support the process. For instance, there is steady cash flow since students are not allowed to sit for exams before fees completion, in effect, this helps to avail required resources at the right time. Likewise, development of new programs are subjected to vigorous checks by AQA Directorate to ensure compliance with CUE requirement. MIS System have been made user friendly with ready support from ICT section and other dedicated staff.

As a result of the above support systems, TUM has made successful implementation strides but at a relatively low pace compared to other universities. The increase in number of degree students (especially from Kenya Universities and Colleges Central Placement Service) and mounting of new courses is a testimony for this. This shows that more and more citizens are developing confidence in TUM. There has been several MoUs with different universities and industry for research collaboration, partnership and linkage. The recent ISO certification has given credit to the processes, system, policies and guiding procedures guiding TUM. Similarly, the Compliance with National health, safety and security standards adds on the implementation effectiveness.

Although the launching of TUM's Strategic Plan is recent, there are several implementation challenges worthy of discussion. These challenges emanate from the nature of the institution having evolved from three distinct stages (from tertiary to MPUC and finally to TUM). But also, the decline in the number of students enrolling serves as an indicator of strategy not being fully implemented. On another dimension, there have some structural challenges that, in a way, also hampered the implementation. These include development of new schools and diversification in employment opportunities. However, the major challenges TUM encounters can be summarized into organization structure, leadership style, human resource, ICT, finance, culture and reward system.

Structure: Organization structure is important because it guides in allocation of duties, however, at TUM it is evident that the structure is not conclusive enough in helping to achieve its objectives, missions and vision hence, a challenge to strategic plan implementation. To a very large extent, there is poor delegation, poor confirmation and follow through, which is a major drawback. There is a dire need for capacity building in structure and overhaul in some areas.

Leadership: leadership ensures coherent management of information, personnel and programmes. The study found out that leadership traits are lacking in some management staff, posing challenge to capacity to direct and supervise strategic plans implementation. The capacity is essential because it influences the activities and even the attitudes of the lower level employees. Lack of leadership skills is evident in the recurrent staff complaints about some of their supervisors. There is poor communication and coordination of activities with bias relationship. There is also lack of familiarization of the principle players within the strategic role and execution.

Human Resource: The role of human resource management is to plan, develop, and administer policies and programmes designed to make expeditious use of an organization's human resources. The study noted that human resource was not given much attention with some sections understaffed; there is shortage of well-trained and highly qualified personnel. There is lack of enough lecturers to facilitate several degree programs and there is over reliance on part-timers. Some of the lecturers are not committed to excellence in teaching, have no commitment, weak loyalty, low ethics and professionalism. Despite several request, HR Department has not done much in terms of bringing in manpower to those sections citing financial constraints.

ICT: Although ICT is a key management tool that helps in fast tracking all the activities, its visibility in TUM is weak. It was discovered that where data was not captured adequately, it impacted negatively on the clients and strategy execution. TUM has weak accounting systems that have witness expensive revenue leakages. Unfortunately, the top management has not taken this as a major challenge. Instead, they have been addressing symptoms by investing in a more robust ICT system that will minimize complaints by clients and staff. But even then, the eRegister usage, although meant to bring efficiency and effectiveness has been slow and frustrating. Majority of the users have no access to internet and lack necessary IT skills to appreciate the system. Most of the users find the system too demanding of their time with relative low monetary reward than if they are engaged in other duties.

Finance: There is lack of sufficient funds to realize the strategy as formulated. It has become a culture where many projects initiated and undertaken are abandoned half-way and remain uncompleted with sub-standard materials being used. The Learning Center is incomplete, Kwale Campus infrastructure is wanting, establishment of the medical School requires heavy funding, are just to name but a few of the examples. If TUM is to establish a Maritime Center, it has to sacrifice and prioritize many of the pending projects that, too, require heavy funding. Similarly, due to funding, many infrastructures are either missing or not efficiently established, notably ICT and security apparatus (such as CCTV, electronic ID or Door Access cards, etc). Most strategic initiatives, such as new programmes and infrastructure developing, anticipated availability of funds from the exchequer - such funds are not available, stalling the strategies.

Culture: Organizational culture proved to be a major and unique challenge to strategy implementation at TUM. Having evolved from the three distinct levels, the drastic shift of cultures from tertiary mind set to University College mind set and to a fully-fledged university mind set present tremendous strategy implementation challenges. There is always resistance but through enlightenment and orientation staff become co-operative and finally adopt to the change. The initial thought was that strategic planning belong to top management and other employees were not involved. But now it is clear that all players are involved, from the administrators (e.g.VC, DVC, Registrar, Deans and CODs) through academic staff to non-academic staff (Finance, Procurement) and subordinate staff. Policies, procedures and processes were singled out as cultures that impede strategy implementation because they are time wasting, lengthy and cumbersome. However, the institution strategy of taking staff through training, workshops, management talks and service charter talks is slowly but surely cultivating the desired culture.

Reward and Monitoring System: Most noted was the poor reward system that the top management has often failed to address. This was seen as a challenge when lack of motivation was cited as one of the factors that hinder effective strategy implementation at some level of the institution. Inadequate facilities and understaffing in key Engineering programmes were noted as among crucial challenges worth giving attention by top management. Although monitoring and evaluation was found to exist and undertaken by Directorate of Performance Contracting that reports on quarterly basis, but this is limited to the activities captured in the signed contracts. Controls and checks to ensure tasks are undertaken within the budgeted time frame were cited as a major challenge to strategy implementation.

VI. CONCLUSION AND RECOMMENDATIONS

In conclusion, we can confidently say that strategic plan in TUM has been received positively and looks promising. Most often managers invest a lot of time in planning but the important part about strategy is the implementation. To ensure management does not lose the grip of the implementation, there needs to be a monitoring team, which would track the strategic initiatives using the relevant KPI for each of the objective. Such KPIs should be SMART with an element of both financial and non-financial measure and be assigned to a champion, as someone who will drive and realize a set target. In addition, TUM should be able to quantify the required resources needed to drive each of the initiative and thrash-off any misplaced priorities. Further, the KPIs should be reported to the top management on regular basis with a dashboard, like a Balance Scorecard, displayed in a strategic location, for viewing and action. On the same breadth, on regular basis, all staff should know the status or progress of the strategic initiatives and what percentage has been realized. All these is possible if top management cultivate team work and avoid conflict of interest or personalizing offices by adherence to university policies and standards (ISO).

To guide TUM realize its vision, the study came-up with several recommendations that are either strategic in nature, missing in TUM Strategic Plan 2014 - 2018 or pose as a barrier to the strategic implementation.

Outsourcing and De-linking: TUM should consider de-linking accommodation and catering from admission. This can be done by partnership with the private sector to provide accommodation services to the students at affordable rates. To focus on the core function of the university, TUM should outsource subordinate staff duties, such as, for accommodation, ICT Help Desk, and environmental.

Research and Extension: TUM with a marine simulator, the only one in East and Central Africa, lacks a maritime strategy. There is a need to launch marine related programmes and establish Centre of excellence in maritime. Ensure effective linkage between science experts, public policy makers and education leaders to enhance sustainability in coastal marine system. Train, inspire and empower the people to be maritime enquire leaders. TUM should think about interactive development through providing appropriate infrastructure for academics, scientific and technological training and administration. There is a need to have a strategic objective to embrace more modern technology in all fields and champion collaborations. This in turn, will enhance the coastal economy through research and application of new knowledge as well as establishing loyal and reputable partners from private sector. There has been several scholarship advertisements but staff are not responsive to opportunities.

Human Resource: As a flagship project outlined in ROP (2003b), TUM needs to strengthen human capital by developing science, technology and engineering courses by training faculty at PhD and masters level. It was noted that TUM decided to inherit TSC teachers when they became a University, they now have a liability and need to develop clear strategies for training and transferring interested staff from instructors into lecturers. Recruitment of part-time lecturers into permanent is also a good and easy strategy to address the shortage of permanent lectures in key specialization areas. They also need to ensure that the staff are registered and engaged in different professional bodies. Similarly, in-service and training for lectures in line with skills development should be continuous. Head hunting of key personnel in niche programs could be a workable strategy. They, as well as the other staff, would then be retained by offering competitive packages, to avoid brain drain.

Leadership: Some respondents observed that there is poor delegation, poor confirmation and follow through are major drawbacks.

There is a dire need for capacity building in structure and overhaul in some areas. There is poor communication and coordination of activities with bias relationship (nepotism and tribalism is taking toll on the advancement of education). There is also lack of familiarization of the principle players within the strategic role and execution, as such, leaders should be able to provide direction and set funding on implementation. Resistance to change and lack of motivation was cited as one of the factors that hinder effective strategy implementation. Leaders should communicate and provide sufficient information on the strategic plan with clear accountability on the execution role. Similarly, to avert strikes, fees raise consultation and communication to the student must be done appropriately and timely.

Marketing: TUM needs to come-up with a marketing strategic plan. They need to have regional offices or kiosks in the central Business areas such as in Mombasa, Ukunda, Lamu, Malindi and Kilifi where competitors from outside the county have purchased big buildings and have strong presence. As a marketing strategy, TUM should spread or reduce the fees to make it affordable (by leverage on building ownership) relative to that of competitors. Using TUMEL and other linkages, they can facilitate scholarship acquisition through HELB or alternate sponsors. They can make use of the website for online advertisement and initiate career talks to secondary schools to generate interest in education within the local community. TUM needs to create a scholarship advisory office to educate students on where they can get funds.

Enrolment Strategy: TUM student enrolment strategy should be improved to reduced rigidity and take less duration. The competitors take the shortest time, actually 2 days from the time students' application to the time they are giving admission letter. On the contrary, it takes weeks or even a month to respond to a TUM applicant.

Setting-Up of Campuses: TUM is ambitious in their expansion and plans to launch a medical school very soon. There is another plan to open another campus in Kilifi County and one cannot rule out another campus in Mombasa Business Center. However, it will be more prudent to strengthen the infrastructure of the existing campuses in Kwale and Lamu before investing in a new one.

Relevant Courses: TUM has 2 satellite campuses and its planning to have more but there is need to ensure that courses in those campuses will benefit both TUM and the community. TUM should develop curriculum with unique programs that are attractive and competitive. They should be able to plan and generate the required resources needed to finance planned activities, especially if the new programmes require laboratories.

Entrepreneurship: Strengthen TUMEL with outside expertise to operate as a purely commercial entity. There are several proposals that can benefit TUM, for instance, venturing into real estate business, agriculture activities at Kwale campus, among others. As a source of income for the university, TUM should focus on business courses in their expansion strategy.

Security: Campus security need to be enhanced with modern equipment such as CCTV, electronic ID or Door Access cards, etc. Fence TUM land to intensify security and avoid the culture of illegal acquisition.

Monitoring and Evaluation: Most noted was the poor reward system that the top management has often fail to address. Although monitoring and evaluation was found to exist and undertaken by Directorate of Performance Contracting that reports on quarterly basis, this is limited to the activities captured in the signed contracts. Thus there is need to introduce a monitoring measurement system i.e. a Key Performance Indicator (KPI) for each of the strategic objective that will complement performance charter.

Infrastructure: Provide infrastructure to make TUM learning atmosphere attractive to the students (including at the new campuses at Kwale and Lamu). Tidiness and renovation should be carried out on both the old and new buildings - to make them attractive. Inadequate facilities and understaffing in key Engineering programmes were noted as among crucial challenges worth giving attention by top management.

ICT: TUM has weak accounting systems that have witness expensive revenue leakages. Unfortunately, the top management has not taken this as a major challenge. Instead, they have been investing in a more robust ICT system that will minimize complaints by clients and staff. But even then, the eRegister usage, although meant to bring efficiency and effectiveness has been slow and frustrating. Majority of the users have no access to internet and lack necessary IT skills to appreciate the system. Most of the users find the system too demanding on their time with relative low monetary benefits. There is a need to recruit ICT professionals who will initiate e-Learning in conjunction with the faculties/schools. Similarly, TUM need to provide state-of-art equipment (e.g. mounting projectors, smart TVs, computing, etc) in the teaching and encourage students to take technology related courses.

Finance: There is lack of sufficient funds to realize the strategy as formulated. It has become a culture where many projects initiated and undertaken are abandoned half-way and remain uncompleted with sub-standard material. TUM to ensure steady-cash flow by introducing early payment incentives e.g. offer 10% discount on full fees settlement at registration. They should solicit funds from other donors to sponsor specific projects.

Quality Education: TUM should be conducting regular employer surveys as a quality test to assess their students' performance in the job market. Although DAQA gathers information from student's lecture evaluation twice a semester to see whether they are satisfied with the services offered, there are many other variables for measuring quality. According to Oanda and Jowi (2012), common measures include caliber and sufficiency of academic staff, learning and teaching facilities, contact hours, entry behaviour of learners and governance structure. This will go hand in hand with provision of engineering and science equipment to the institutions as an initiative of addressing quality of education. TUM should consider undertaking and maintaining call-in registers to curb staff absenteeism that compromise on quality standards. However, the office of DAQA is thin with no manpower and needs to be strengthened if these measures are to be put in place.

Corporate Social Responsibility: The local community should directly or indirectly benefit from the establishment of the university or campus within their locality. The CSR can range from providing educational and training scholarships or subsidies fees, constructing boreholes or giving access to drinking water to the community (e.g. in Kwale Campus), cleaning the environment, etc. Also offer employment opportunities to the locals especially for subordinate roles that do not require high qualifications.

Industry and Alumnus Support: Approach industries to sponsor students either for a particular course (e.g. Base Titanium) or to undertake research relevant to the industry. The office of IRIE should be on the forefront to push for joint commercialization of ideas and sharing of research and innovation with the industry. Alumnus should be involved in university development activities and functions.

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Local and improved infant flours in vitamin A and iron, using powdered *Moringa oleifera* leaves and *Parkia biglobosa*'s pulps powder

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Abstract- The consequences of malnutrition due to micronutrient deficiency on the health of humans, particularly iron deficiency, vitamin A and iodine, are multiple, particularly mortgaging the socio-economic development of developing countries (DCs). Food diversification, public health actions, food fortification and supplementation are the four (04) main strategies against malnutrition and this can improve the quality of life of a community or a country. The present study aimed to develop Chad infant flours fortified in vitamin A and zinc, iron and vitamin C taken from local products such as powder of dried *Moringa oleifera* leaves and pulps of *Parkia biglobosa* to improve the balance of these micronutrients in flours. The nutritional value of these flours was assessed according to standard analytical methods. The results revealed that, for 100 g of flour, our experimental flour showed 2 times more iron, vitamin C, magnesium, potassium and zinc, 4 times more vitamin A and calcium. The study found a slight increase in protein, total sugars and phosphorus.

Fortification of Chad local infant flours using *Moringa oleifera* leaves powder and pulps of *Parkia biglobosa* increase their micronutrient levels. The leaves of *Moringa oleifera* revealed potentials as a health supplement in the fight against malnutrition due to protein and micronutrient deficiency.

Index Terms- Chad, fortification, infant flours, iron, *Moringa oleifera*, vitamin A.

I. INTRODUCTION

In developing countries (DCs), such as Chad, micronutrient deficiencies, especially iron, vitamin A and iodine, are a public health problem with significant physiological and economic consequences. The main weaknesses identified concern iodine deficiency, iron and vitamin A [1]. According to [2], 40% of the world population suffers from micronutrient deficiencies. Iron deficiency affects about 3.5 billion people worldwide mainly women from adolescence, infants and young children. Almost 27% of the world populations have an inadequate intake of zinc [3]. In developing countries, these deficiencies are rarely isolated and often are additional.

In the Sahel, the major determinants of child malnutrition include: inadequate food and feeding practices in the first two years of life (breastfeeding and complementary foods and

feeding practices); poor care practices for infants, young children and women particularly during pregnancy and lactation; high morbidity levels and poor access to essential health services, safe drinking water and a healthy environment [4].

In 2005, the anemia affecting more than 47% of children under 5 years worldwide. This rate is about 40% in South America, 17% in Europe and 64.6% in the African continent, representing over 90 million children [5]. The prevalence of anemia (hemoglobin, Hb < 11 g/dL) in children 6 months to 5 years, in 11 Francophone African countries amounted to 72.4% (from 60.2 to 87, 8%). Nearly 50% of reproductive age women are anemic. Malnutrition (vitamin and protein-energy) contributes to the development of anemia [6]. Iron deficiency is one of the main causes of anemia in Africa [5]. It is characterized by a low intake of hematopoietic factors (iron, vitamin B12, folates), due to the diets of plant-based that are often the staple food of the poorest populations in developing countries, very rich diets in inhibitory factors (polyphenols, phytates and fibers), and these factors decreasing the bioavailability of iron [7]. The most powerful enhancer of iron is ascorbic acid [8], the dose-dependent effect is a function of other activators or inhibitors (polyphenols, phytates, tannins) and regime [9].

The vitamin A deficiency affects about 127 million pre-school children including 4.4 million with signs of xerophthalmia and nearly 20 million pregnant women, with 25-35% of cases occur in Africa [10].

The vitamin A deficiency is usually due to inadequate intake of preformed vitamin A (retinol) or its precursors. It can also be due to a defect in the intestinal absorption during diarrhea and parasitosis [11].

In Chad, according to the document of the Chadian government, Food and Nutrition National Policy (PNNA) from 2014 to 2025, developed in 2013 with the support of UNICEF [12] for an estimated population of about 12 987 368 inhabitants in 2013; the prevalence of different forms of malnutrition among children under five years are troubling and even see critics across the country, beyond the WHO thresholds. Acute malnutrition (wasting) increased from 14.1% in 1996 [13] to 15.7% in 2010 [14]. Stunting, or chronic malnutrition, decreased from 40.1% in 1996 to 38.7% in 2010. The prevalence of underweight remained too high from 38.8% in 1996 to 30.3 % in 2010. The WHO thresholds being respectively >15%, >40% and >30%, to consider wasting, stunting and underweight as a public health problem. The national rate of exclusive breastfeeding (AME) up

to 6 months is 3.4% and the rate of underweight infants at birth is 19.9% according to [14]. Extreme poverty still affects 46.7% of the Chadian population in 2011 and 59% of the poor live in rural areas against 25% in urban areas. According to the study of [15], two thirds of Chadian children 6 to 59 months were with moderate anemia (hemoglobin levels between 7.0 and 11.0 g/dl) and 11% with severe anemia (hemoglobin < 7.0 g/dl). The prevalence of anemia (76% for combined moderate and severe anemia) is well above the 40% threshold set by WHO to define anemia as a public health problem of severe level in the country [16]. The prevalence of clinical vitamin A deficiency, xerophthalmia (dry eyes) in Chadian children 24 to 59 months is 5% and the coverage of vitamin A supplementation in children was 32% in 2004 [17]. With the efforts of the Government and partners, vitamin A supplementation was 97% in 2010 [14]. The consumption of iodized salt is low, 53%.

Chad is also facing complex and multifaceted challenges of instability in the sub region, the impact of the environment (drought, land degradation etc.) on food security, and international economic conditions (lower oil prices). Moreover, the country must deal with the consequences of high population growth (3.6% per year). SMART surveys were establishment in 2010, Chad has really engaged in a multi-sectoral approach to nutrition and diet from 2012. Thus, Chad officially joined the movement Scaling Up Nutrition (SUN) and REACH initiatives (Renew Effort Against Child Hunger and Undernutrition) and ACT-Sahel (Global Alliance for Resilience in the Sahel Initiative) in 2012 (REACH) and 2013 (SUN, ACT). Malnutrition is the underlying cause of more than 50% of infant mortality in Chad [18].

The consequences of micronutrient deficiencies on people health are multiple.

Iron deficiency, which in its most severe form results in anemia, affects deeply the cognitive development of young children and therefore impairs their ability to learn and their subsequent social and economic integration [19, 20]. Growth and physical performance are also affected [21] and increasing the immune infectious morbidity [22, 23, 24]. It is for these reasons that eradication of iron deficiency is a public health priority. In pregnant women, severe anemia is responsible for 20% of maternal deaths [25]. They increase the risk of morbidity, fetal and neonatal mortality and the risk of preterm birth and low infant weight at birth [26].

Vitamin A deficiency is the leading cause of blindness and visual disturbances (xerophthalmia) and increases the risks of morbidity and mortality probably while affecting the integrity of epithelial barriers and immunological functions [27]. It increases the risk of iron deficiency and anemia in particular negative effect on the mobilization of iron stores [28]. Zinc deficiency has a negative impact on the immune system and growth, and is associated with a higher risk of morbidity including diarrhea [29].

In developing countries, these deficiencies are rarely isolated and often additional. Yet in deficient populations, improving vitamin A status can reduce by 23% the mortality and morbidity in young children and women of childbearing age [30].

There are four (04) main strategies against malnutrition due to micronutrients deficiencies that are part of larger strategies for improving the quality of life of a community or a country. These

four strategies, in decreasing order of sustainability [31] are: food diversification; public health actions; food fortification and supplementation. All international, local or family activities that improve household food security, health and care received by people individually impact micronutrient deficiencies and should always be considered.

In 1979, a joint expert consultation of the WHO/UNICEF infant feeding and young children, recommended the promotion of local products in complementary foods [32]. In West Africa, from private and public sectors dialogue held in Accra (Ghana) in 2002 as part of food fortification in the sub region, food fortification approach has gained ground [33].

The valorization of local plant resources rich in protein and micronutrients, accessible at low cost is a strategy to effectively fight against nutritional deficiency [7, 34]. Imported or commercially developed foods generally are not used by low-income rural households due to high cost and poor availability. Our study is in this topic, valorization local products and strategy, fortification.

Several studies in many countries have highlighted the exceptional nutritional qualities of *M. oleifera leaves*, plant from India, used as food in Asia and Africa [7, 35, 36, 37, 38, 39, 40, 41]. Indeed, studies have shown the effectiveness of these leaves in the prevention, correction of malnutrition and related diseases although they contain anti-nutrients such as phytates and oxalates [38, 39, 40, 42, 43]. They can therefore be a food supplement for subjects malnourished because of its high protein, vitamins (A, B, C, E) and minerals (Ca, K, Mg, P, iron, Zn, As, Cu, Mn Na, Cl) and position itself as a tonic product, fortifying and stimulating the immune system.

Very few works have been conducted in Chad on the nutritional qualities of *Moringa* and *Parkia biglobosa*'s pulp, yet commonly consumed. Knowing also that the soil and climatic conditions strongly affect the nutrient composition of the plants, we have undertaken in one of our previous studies [44] to know the nutritional value and hygienic quality of the powder of dried leaves of *Moringa* and *Parkia biglobosa*'s pulp. This study revealed that the powder of *Moringa oleifera* leaves, for 100g, have a very high content of (ash, Ca, Fe, β -carotene); high content of (Mg, Zn, Vit.C and total sugars). Néré pulp for 100g, content a very good level of (total sugars, Vit.C, Ca and Zn), a good level of (Mg and Fe). Compared to 100g of *Moringa* from Burkina Faso, *Moringa* from Chad had lower levels in (fat, protein, Mg, Zn) [41].

Analysis of our local infant flours, powder of the *Moringa oleifera* dried leaves and néré pulp showed an acceptable hygienic quality according to the microbiological standards (GRET and ORSTOM) presented by [45]. However work is ongoing education to make to women producers to attach particular attention to drying conditions (protection against flies), and take care of their hands when handling flours.

The purpose of the present study was then to fortify Chad infant flours with vitamin A and zinc, iron and vitamin C taken from local products such as powder of dried *Moringa oleifera* leaves and pulps of *Parkia biglobosa* to improve the balance of these micronutrients and proteins in experimental flours.

II. MATERIALS AND METHODS

Our study was conducted at the Laboratory of Biotechnology, Food and Nutritional Sciences (LABSAN) of the Research Center in Biological, Food and Nutritional Sciences (CRSBAN), UFR-SVT, University of Ouaga I Pr Joseph KI-ZERBO from 14 April to 15 October 2013. It focused on fortification of Chad infant flours in iron and vitamin C, vitamin A and zinc incorporating three rate of powder from dried leaves of *M. oleifera* and one rate of *Parkia biglobosa's* pulps powder.

1. Sample collection

Samples of local infant flours was each collected during April 2013 from women producers in 3 towns in Chad : in *N'Djaména* the capital of Chad and in *Bongor* and *Koumra*, cities located respectively at 235 km and 670 km south of *N'Djaména*. **Table I** displays origin and composition of these local infant flours.

The fresh *Moringa oleifera* leaves were collected in *Gounou Gaya*, town 400 km south west of *N'Djaména*. *Parkia biglobosa's* pulps powder was collected from saleswomen at the market in *Kélo*, a town 370 km south of *N'Djaména*. Afterwards, enquiries were made with flours providers by oral questioning to access for flours processing in particular diagram of flours preparations.

2. Formulation of experimental flour

The SRK0, SRB0, MN0 and PN0 are Chad infant flours.

2.1. Processing of raw materials.

Treatment of maize, local rice and millet includes the following steps: manual sorting debris, skinning, winnowing and washing. Duration of drying at sun after washing, depending on the nature of the grain and sunshine. The grinding is performed using public mills followed by sieving. Make sure to ask the owners to clean the mill before grinding.

The millet after winnowing is soaked in water overnight, washed several times in the morning and dried. As for red sorghum, the only operation before the grinding is cleaning.

White beans (*Bongor's* producer used *Vigna*) and peanuts are sorted, roasted sweet separately under fire, skinned and winnowed. Roasting is intended to significantly reduce humidity and viscosity, destroy bacteria, insects, anti-nutrients factors and allow the development of a particularly popular taste. Groundnut is measured and ground separately.

Fresh carrot and soil apple are washed, peeled, sliced and dried. The carrot is dried in the shade.

2.2. Manufacture of Chad infant flours.

Manufacture of red sorghum flour from *Koumra*: Production of the flour, after the common treatments above, is separately grind red sorghum, white beans and groundnuts. It then measures quantities for mixing, according to the manufacturing diagram.

Manufacture of red sorghum flour from *Bongor*: Here, sorghum and *Vigna* are roasted together. Peanuts are roasted on low heat to get white peanut tending towards brown smelling. Sorghum, cowpea, groundnut, potato, carrot; all dried, are ground together. Finally wherever powdered sugar is added with just a little cooking salt and any conditioning.

Manufacture of local rice flour from *N'Djaména*: Dried rice is toasted, ground and measured. The dried carrot in the shade is cleaned and milled. Both flours are mixed and measurement of powdered sugar was added thereto. According to the producer, this light and digestible rice flour is suitable from 4 months in case of impossibility or breastfeeding or mother's illness.

Manufacture of millet flour from *N'Djaména*: The dried millet, ground is measured separately. Beans, carrot and potato are measured and ground together. To this is added the millet flour, peanut paste and powdered sugar.

Manufacture of corn flour from *N'Djaména*: Dried maize, measured is ground separately. Beans, carrot and potato are measured, ground together. All are mixed with peanut paste and powdered sugar.

The percentage compositions of the above ingredients, weight per weight (w/w), in local flours such as developed by the producers are:

Red sorghum flour from *Koumra*: *Sorghum bicolor*: *Phaseolus vulgaris*: *Arachis hypogaea*: sugar (56: 16: 11.5: 16.5).

Red sorghum flour from *Bongor*: *Sorghum bicolor*: *Vigna unguiculata*: *Arachis hypogaea*: *Daucus carota*: *Solanum tuberosum*: sugar (52: 14: 12: 4: 2: 16).

Local rice flour: *Oryza sativa*: *Daucus carota*: sugar (67: 16.5: 16.5).

Millet flour: *Pennisetum typhoides*: *Phaseolus vulgaris*: *Arachis hypogaea*: *Daucus carota*: *Solanum tuberosum*: sugar (38: 9: 18.5: 9: 9: 16.5).

Corn flour: *Zea mays*: *Phaseolus vulgaris*: *Arachis hypogaea*: *Daucus carota*: *Solanum tuberosum*: sugar (38: 13: 19: 4.5: 9: 16.5).

2.3. Formulation experimental flours.

Each of this local flour was fortified with three levels of *Moringa* leaves powder and one level of *nééré* pulp:

- *Moringa*: 5, 10 and 15%;

- *Parkia biglobosa's* pulps powder: 5%.

The standard flour (SRK0 for example) is composed of 100% of the local flour. SRK1 contains 90% SRK0, 5% *Moringa* and 5% *nééré*; SRK2 = SRK0: *Moringa* powder: *nééré* pulp: 85: 10: 5; SRK3 = SRK0: *Moringa* powder: *nééré* pulp: 80: 15: 5% w / w.

3. Physical and Chemical Analysis

The parameters was determined using standard methods. The samples were analyzed in triplicate for ash, calcium, magnesium, iron, zinc, moisture, protein, fat, carbohydrates, vitamins A and C.

3.1. Determining Moisture

The sample (5g) undergoes drying in an oven at 103 ° C ± 2 ° C for three hours. The weight difference shows the moisture content [46].

3.2. Determining the Total Protein Content

Total protein content is determined following the Kjeldahl method [46] based on the total mineralization of the biological material in an acid environment, followed by distillation of

nitrogen in ammonia form. The total mass of vegetable protein is calculated using a conversion factor of 6.25.

3.3. Determination of Fats

The fat content was analyzed according to the Soxhlet method [47]. The weight difference gives the fat content of the sample.

3.4. Determination of Total Sugars

The determination of the total sugar content of the samples was performed in triplicate by spectrometric assay samples [48]. The reading of optical densities was made at 540 nm using a μquant type plate reader (Biotek instrument Serial No. 157904, USA) coupled with a computer running KC integrated Junior (v1.31.5) software.

3.5. Determination of Ash rate

The sample (5g) introduced in metal crucibles was mineralized in a muffle furnace (type VOLCA V50) at 550°C for five (05) hours, removed using tongs and then cooled in a desiccators for about one (01) hour before being weighted. The difference in weight gives the ash content of the sample [47].

3.6. Determination of Fe, Zn, Ca and Mg.

Mineralization was achieved through dry ashing. The ash obtained contains major elements (Na, Ca, Mg, K, etc.) and trace elements (Fe, Zn, etc.). These minerals were determined by *Atomic Absorption Spectrometry* [49] (with a PELKIN Elmer model 3110 device (Connecticut, USA). A hollow Al-Ca-Cu-Fe-Mg-Si-Zn cathod lamp was used.

3.7. Determination of Vitamin A (β-caroten) using HPLC.

The analyzes were performed in the laboratory of toxicology and analytical chemistry Research and Training Unit in Health Sciences (UFR/SDS) from the University of Ouaga I Pr Joseph KI-ZERBO by a method adapted from that of [50] and described by [51]. The HPLC system used for analysis of vitamin A consists of a pump model JASCO PU 980, a UV/Visible JASCO 975, a chromatographic column C18 Nucleosyl model SUPELCO LC18 of 25 mm long; 4.6 mm in diameter with particles of size 5 μm. The system is coupled to an integrator type HP3395 and a computer with software (Galaxy Work Station) for registration, integration and data processing.

Analysis of vitamin A by HPLC: In analysis of vitamin A by the HPLC method at a wave length of 325 nanometers, the following steps should be taken: after the preparation of standards and calibration mixtures, the latter are injected into the system. Each mixture was injected three times and from the average of the values of the areas, the correction factors are calculated. The internal standard and the samples were then prepared and injected. Each sample must be injected three times and the content of vitamin A is retained from average of the triple injection.

3.8. Determination of vitamin C by the method of 2, 6-DIP.

The dosage of vitamin C was made by the method of [52]. Principle: The method is based on reduction of 2, 6-dichlorophenol-indophenol (2,6-DIP) at pH < 3. The solution of 2, 6-dichlorophenol-indophenol blue from becoming pink in

acid. During the titration with a solution of ascorbic acid, it is reduced to a colorless base and at the same time the ascorbic acid is oxidized to dehydroascorbic acid. This method exploits the reducing properties of vitamin C, thus allows the determination of ascorbic acid and dehydroascorbic acid. Indeed, in acid or neutral medium, that is to say under the influence of oxidizing agents, there is opening of the double bond and C = C forming an α-diketone. The reaction is not specific, it is for this reason that acetone is used to trap the SO₂ may be present.

Procedure: Extraction and determination.

5g of sample are triturated for 5 minutes in a mortar in the presence of Fontainebleau sand of gram and 10 ml of acetic acid 90% (v/v). Add 5 ml of distilled water. Filter and recover the supernatant containing vitamin C in a 50 ml vial. The operation is repeated 3 times with 10 ml of 90% acetic acid. Make the volume of the vial with 90% acetic acid to obtain the extract. If the extract is highly concentrated, it must be diluted in 1% acetic acid (v/v) and refrigerate. 50 ml solution prepared from the powder of *Moringa* leaves was pipetted into a 100 ml flask and made up to 100 ml with oxalic acid to 1%. 10 ml of the solution was pipetted, and 2.5 ml acetone was added to it, then all placed in the dark for 10 minutes. The solution was titrated with 2, 6-dichlorophenol-indophenol until the color turns pink. We then prepared a blank in which the sample was replaced by distilled water. The title of DCPIP solution can be determined by titrating 10 ml of vitamin C solution.

Vitamin C content was calculated by the following relationship:

$$\text{Vitamine C content} = \frac{40 (V - V')}{A}$$

where:

V = Volume (ml) of DCPIP used for titration of the powder;

V' = volume (ml) of DCPIP used for titration of the blank;

A = Volume (ml) of DCPIP used for titration of 10 ml of standard solution of vitamin C.

3.9. Determination of phosphorus.

Phosphorus was determined using a Skalar autoanalyzer (Skalar, Breda, The Netherlands) [53].

3.10. Determination of potassium and sodium.

Potassium (K) and sodium (Na) were assessed by flame photometer (Corning 400, Essex, England) [53].

3.11. Calculation of the Energy Value

The energy value of flours was calculated using Watt and Merrill coefficients [54], coefficients adopted by the United Nations Food and Agriculture Organization (FAO) in 1970:

$$X = P \times 4 + G \times 4 + L \times 9$$

Where P = protein percentage, G = carbohydrates percentage, L = lipids (fats) percentage and X = energy value in Kcal/100g.

3.12. Statistical Analysis

All assays were carried out in triplicate, and the averages and Standards Deviations (SD) calculation have been done with the software Excel 2007. SPSS Statistics 21 was used for analysis of variance (ANOVA) between flours.

III. RESULTS

What have we seen at the end of our work ?

The contents of moisture, energy, macro- and micronutrients of our local flours (SRK0, SRB0, PN0, RN0 and MN0) per 100g, in our previous study were: moisture [6.54 ± 0.30 (PN0) to 8.95 ± 0.11 (RN0)], energy [299.80 (SRB0) to 385.84 Kcal (PN0)], protein [7.00 ± 0.44 (RN0) to 12.69 ± 0.44 g (MN0)], lipids [1.83 ± 0.13 (RN0) to 16.26 ± 0.84 g (MN0)], total sugars [29.24 \pm 4.34 (MN0) to 64, 44 \pm 4.52 g (RN0)], vitamin A [2.11 ± 0.04 (SRK0) to 30.47 ± 0.15 μ g ER (SRB0)], vitamin C [9.41 ± 0.00 (RN0) to 28.24 ± 0.00 g (SRB0)], Ca [5.65 ± 0.98 (SRK0) to 22.08 ± 2.96 g (PN0)], Mg [6.74 ± 0.19 (RN0) to 24.99 ± 1.75 g (PN0)], P [109.00 ± 37.00 (RN0) to 295.00 ± 7.00 g (MN0)], K [115.50 ± 10.5 (RN0) to 722.50 ± 10.5 g (SRB0)], Na [1.50 ± 0.50 (PN0) to 7.00 ± 0.00 g (RN0)], Fe [7.11 ± 0.90 (SRK0) to 12.70 ± 0.56 g (PN0)] and Zn [0.67 ± 0.01 (RN0) to 2.51 ± 0.19 g (SRB0)].

The energy value of these flours is lower. To solve this problem, we increased peanut paste content in our experimental flours at the expense of the bean (w/w).

Then, our results leads us to suggest in the formulation of flours, a minimum of 12% to 20% (w/w) of ready to use peanuts in the total weight of the flour in order to have an energy value that meets the standards of at least 400 Kcal/100 g of flour.

According to the producers of these flours, rice flour, which contains only rice, carrot and a little sugar; is a light, easy to assimilate flour. It is not intended for nutritional recovery. For producers, it can be used from the 4th month in case of illness or death of the mother. It is recommended after these women, add after cooking porridge, an egg cooked separately, cooled and crushed.

Our experimental flours were made to improve their energy content (peanut paste) and balance of micronutrients (*M. oleifera* and pulp of *Parkia*). After fortification of flours, we obtained the following results: humidity [3.50 ± 0.16 (SRB1) to 6.96 ± 0.09 (PN1)], energy [349.10 (SRK1) to 439.36 Kcal (MN2)] protein [7.69 ± 0.32 (SRK1) to 16.10 ± 0.60 g (PN3)] lipid [9.03 ± 0.10 (SRK1) to 13.64 ± 0.11 g (MN2)], total sugars [58.39 ± 4.46 (SRK1) to 71.25 ± 1.77 g (SRB3)], vitamin A [19.58 ± 0.09 (SRK1) to 115.88 ± 0.08 μ g ER (MN3)], vitamin C [16.84 ± 0.00 (SRK1) to 37.89 ± 4.21 mg (SRK3) and (SRB3)], Ca [21.54 ± 3.27 (SRK1) to 86.33 ± 4.64 mg (PN3)], Mg [28.65 ± 1.80 (SRK1) to 53.82 ± 4.73 mg (MN3)], P [112.00 ± 44.00 (SRB2) to 302.00 ± 14.00 g (MN1)], K [513.00 ± 10 (MN1) to 858.50 ± 20.5 g (SRB3)], Na [2.00 ± 0.00 (PN1) to 10.50 ± 0.50 g (MN 2)], Fe [15.26 ± 1.38 (SRK2) to 28.42 ± 2.40 mg (PN3)] and Zn [2.18 ± 0.23 (SRB1) to 5.30 ± 0.46 mg (SRB2)].

All these results in macronutrients, minerals, vitamins A and C contents are displayed in Tables II-VI below. These results are compared to Plumpy'nut [55], Ready-to-Use Therapeutic Food (RUTF).

IV. DISCUSSION

The fortification of our local flours in vitamin A and zinc, iron and vitamin C taken from local products such as powder

dried *Moringa oleifera* leaves and pulps of *Parkia biglobosa* decreased moisture and lipid content in the experimental flours.

The comparison of 100g of local infant flours in macro- and micronutrients to 100 g of experimental flours shows 2 times more iron, vitamin C, magnesium, potassium and zinc; 4 times more vitamin A and calcium in experimental flours. But analysis of variance (ANOVA) showed that no significant difference has been found between flours. The study revealed a slight increase in protein, total sugars and phosphorus.

Compared to the standards of complementary foods listed in tables [56, 57, 58], we can say that all our experimental flours have a good iron content, beyond required standards. It is the same for potassium.

For proteins, PN2 and PN3; MN2 and MN3 meet standards. About lipids content, only corn-based flours meet the standards. All red sorghum flours from *Bongor* (SRB), rice's flour from N'Djamena, SRK3, PN2 and PN3, MN2 are in conformity with the standards that relate to total sugars. The SRK3, SRB3, PN2 and PN3, MN3 flours are in conformity with vitamin C standards for children. Three flours, SRK3, SRB2 and MN3 have contents that meet the standards for the content of zinc in addition to infant flours.

As for the other parameters, although there was an increase compared to local flours, we note that our results fall short of the recommendations concerning the vitamin A, calcium, phosphorus, magnesium and sodium content. All experimental flours have a moisture content in conformity with complementary foods. As to the recommended energy value for these flours, only the red sorghum flours from *Koumra* do not reach the minimum of 400 kcal required for 100 g of flour.

Compared to the Plumpy'nut, our experimental flours have the same levels of protein but their total sugars and iron content are higher. For the rest, our results were lower than average levels of Plumpy'nut.

[59] in their study of feasibility of adding the powder of *Moringa* leaves in the flour MISOLA reported that the addition of 5 to 10 g of the *Moringa* powder to 100 g of flour allowed to obtain the following results: vitamin A (300 to 600 μ g ER /day), zinc (0.1 to 0.2 mg/day), iron (1.2 to 2.4 mg/day), vitamin C (2.5-5 mg/day) and calcium (100 to 200 mg/day). These results compared to ours show high levels of vitamin A and calcium in their study while the rest of the parameters analyzed (Zn, Fe and vitamin C), our flours had higher levels.

The contents of our experimental flours in vitamin A, calcium, phosphorus and zinc were lower than those found by [60] who used the mineral and vitamin complex (CMV). Our flours are similar to [60] in energy and iron but have a higher level of fat content.

[40] in their study fortified their cereal flours (corn, rice and millet) using *Cucurbita maxima*, *Moringa oleifera*, pulp of *Parkia biglobosa* and pulp of *Adansonia digitata*. Our experimental flours are in concordance with their moisture and total sugars levels. Their results in protein, potassium and zinc are lower than ours. However, all other parameters analyzed, except for vitamins A and C that are not included in their study, they scored higher than ours. Their results are: energy (424.56 to 458.96), fat (11.82 ± 0.02 to 17.02 ± 0.02), calcium (400 ± 1 to 710 ± 1), phosphorus (251 ± 1 to 430 ± 4), magnesium (115 ± 10

to 190 ± 25) sodium (14 ± 1 to 40 ± 5) and iron (30.23 ± 10 to 37.96 ± 12).

V. CONCLUSION

Fortification of our local infant flours using powder of dried *Moringa oleifera* leaves and pulps of *Parkia biglobosa* increased all levels of minerals, vitamins, proteins and carbohydrates. The strongest increase was in vitamin A and calcium. This contribution decreased moisture and lipid content in the experimental flours. *Moringa oleifera* is able to fortify complementary foods and can be used in the fighting against malnutrition. Bioavailability in non-heme iron still remains to be explored. The use of roasted peanuts and winnowed in formulas between 12 and 20% of the total weight of the infant flour improves the energy value of flours even if the manual mixing of paste with flour remains a difficult task. Product promotions of *Moringa oleifera* necessarily involve good sensitization of the population on the importance of the plant. We must also train people for good processing and better storage of products of *Moringa oleifera*.

This study showed that fortification of complementary foods using local plant resources rich in protein and micronutrients such as *Moringa oleifera*, accessible at low cost is a strategy to effectively fight against malnutrition due to micronutrient deficiency.

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Table I. Origin and composition of local infant flours in Chad.

Nature of flour	Composition	Origin
1. Local child's red sorghum flour, <i>Sorghum bicolor</i> .	1) Red sorghum 2) Beans 3) Peanut butter paste 4) Sugar	Koumra (SRK0)
2. Local child's red sorghum flour, <i>Sorghum bicolor</i> .	1) Red Sorghum 2) Cowpea 3) Peanut butter paste 4) Sugar 5) Potato 6) Carrot	Bongor (SRB0)
3. Local child's rice flour, <i>Oryza sativa</i> .	1) Local husked rice 2) Carrot 3) Sugar	N'Djaména (RN0)
4. Local child's pearl millet flour, <i>Pennisetum typhoides</i> .	1) Pearl millet 2) Beans 3) Peanut butter paste 4) Sugar 5) Potato 6) Carrot	N'Djaména (PN0)
5. Local child's corn flour, <i>Zea mays</i> .	1) Corn 2) Bean 3) Peanut butter paste 4) Sugar 5) Potato 6) Carrot	N'Djaména (MN0)

Table II : Nutrient content of 100 grams, experimental infant flours of a red sorghum-based, from Koumra (average ± standard deviation)

Nutrients	SRK0	SRK1	SRK2	SRK3	Plumpy'nut ^a (per 100 g)	RNI
Energy (Kcal)	353,30	349,10	381,34	400,03	520	400-425 ^e
Moisture (%)	3,19 ± 0,64	3,67 ± 0,19	3,97 ± 0,08	4,11 ± 0,34	2,5	≤ 5 ^e
Ash (g)	1,87 ± 0,00	2,37 ± 0,02	2,80 ± 0,00	3,15 ± 0,02		≤ 3 ^e
Proteins (g)	10,31 ± 0,48	7,69 ± 0,32	10,97 ± 0,55	14,25 ± 0,22	13	15 ^d
Fats (g)	9,74 ± 0,11	9,42 ± 0,14	9,10 ± 0,28	9,03 ± 0,10	26	10-25 ^e
Total sugars(g)	63,16±0,58	58,39 ± 4,46	63,89 ± 4,01	65,44 ±0,57	41	64 ± 4 ^e
Vitamins						
Vitamin A ^b (µg RAE)	2,11 ± 0,04	19,58 ± 0,09	38,70 ± 0,06	60,70 ± 0,12	800	200 ^d
Vitamin C (mg)	18,82 ± 0,00	16,84 ± 0,00	16,84 ± 0,00	37,89 ± 4,21	50	30 ^c
Minerals						
Calcium (mg)	5,65 ± 0,98	21,54 ± 3,27	32,10 ± 3,22	45,98 ± 1,95	300	400 ^c
Phosphorus (mg)	140,50±60,50	136,00±56,00	150,00±70,00	149,00±61,00	361	456 ^e
Potassium (mg)	502,50 ± 20,5	649,00 ± 21	754,00 ± 21	827,50 ± 10,5	1100	516 ^e
Magnesium (mg)	24,56 ± 1,02	28,65 ± 1,80	37,96 ± 1,42	51,99 ± 0,86	80	60 ^c

Sodium (mg)	2,00 ± 0,00	2,50 ± 0,50	2,00 ± 1,00	3,00 ± 1,00	290	296 ^c
Iron (mg)	7,11 ± 0,90	16,30 ± 1,40	15,26 ± 1,38	26,76 ± 1,19	10	11,6 ^c
Zinc (mg)	2,17 ± 0,16	3,17 ± 0,22	3,75 ± 0,24	4,74 ± 0,24	11	4,8 ^c

^a LECOSSAIS, 2014.

^b Estimated from µg beta-carotene using 06 µg beta-carotene = 1 µg RAE

RNI: Recommended Nutrient Intake.

^c FAO/WHO, 2002.

^d CODEX CAC. 1989.

^e CODEX CAC/GL 08. 1991.

Table III : Nutrient content of 100 grams, experimental *infant flours of a red sorghum, from Bongor* (average ± standard deviation)

Nutrients	SRB0	SRB1	SRB2	SRB3	Plumpy'nut (per 100 g)
Energy (Kcal)	403,33	399,49	409,30	420,46	545
Moisture (%)	3,22 ± 0,03	3,50 ± 0,16	4,05 ± 0,15	4,05 ± 0,29	
Ash (g)	2,16 ± 0,01	2,62 ± 0,01	3,01 ± 0,03	3,44 ± 0,01	
Proteins (g)	13,81 ± 2,41	11,95 ± 1,30	12,94 ± 1,22	12,94 ± 0,32	13,6
Fats (g)	8,77 ± 0,98	9,69 ± 0,21	9,38 ± 0,06	9,30 ± 0,06	35,7
Total sugars(g)	67,29 ± 4,05	66,12 ± 1,54	68,28 ± 0,01	71,25 ± 1,77	33,5
Vitamins					
Vitamin A (µg RAE)	30,47 ± 0,15	46,92 ± 0,09	86,86 ± 0,12	103,54 ± 0,08	910
Vitamin C (mg)	21,05 ± 0,00	27,37 ± 2,11	29,47 ± 0,00	37,89 ± 4,21	53
Minerals					
Calcium (mg)	10,49 ± 1,64	35,63 ± 5,63	53,58 ± 7,80	53,78 ± 37,80	320
Phosphorus (mg)	140,00 ± 52,00	127,00 ± 47,00	112,00 ± 44,00	120,50 ± 44,50	394
Potassium (mg)	722,50 ± 10,5	848,00 ± 10	712,00 ± 21	858,50 ± 20,5	1111
Magnesium (mg)	23,30 ± 0,62	37,24 ± 1,29	45,07 ± 0,47	52,94 ± 0,59	92
Sodium (mg)	2,50 ± 0,50	3,00 ± 0,00	3,00 ± 0,00	4,00 ± 0,00	189
Iron (mg)	08,23 ± 1,00	17,25 ± 0,79	18,83 ± 0,80	21,51 ± 2,14	11,5
Zinc (mg)	2,51 ± 0,19	2,18 ± 0,23	5,30 ± 0,46	4,02 ± 0,28	14,00

« Same abbreviations as in table II »

Table IV : Nutrient content of 100 grams, experimental infant flours of millet-based, from N'Djamena (average ± standard deviation)

Nutrients	PN0	PN1	PN2	PN3	Plumpy'nut (per 100 g)
Energy (Kcal)	390,06	384,35	403,47	422,97	545
Moisture (%)	7,47 ± 0,12	6,96 ± 0,09	6,90 ± 0,12	6,73 ± 0,14	
Ash (g)	1,84 ± 0,00	2,39 ± 0,00	2,69 ± 0,01	3,06 ± 0,01	
Proteins (g)	12,06 ± 0,52	12,19 ± 0,25	15,6 ± 0,29	16,1 ± 0,60	13,6
Fats (g)	9,91 ± 0,24	9,35 ± 0,18	9,47 ± 0,30	9,21 ± 0,41	35,7
Total sugars(g)	63,16 ± 0,50	62,86 ± 1,28	63,96 ± 2,30	68,92 ± 1,32	33,5
Vitamins					
Vitamin A (µg RAE)	3,80 ± 0,04	36,26 ± 0,16	51,92 ± 0,16	98,85 ± 0,09	910
Vitamin C (mg)	21,05 ± 4,21	25,26 ± 0,00	33,68 ± 0,00	25,26 ± 0,00	53
Minerals					
Calcium (mg)	22,08 ± 2,96	51,91 ± 0,59	66,22 ± 3,09	86,33 ± 4,64	320
Phosphorus (mg)	120,50±44,50	116,50±48,50	121,00±53,00	116,50±48,50	394
Potassium (mg)	429,50±10,5	659,50±31,5	525,50±81,5	722,50±31,5	1111
Magnesium (mg)	24,99 ± 1,75	32,88 ± 3,00	35,19 ± 2,89	46,54 ± 3,26	92
Sodium (mg)	1,50±0,50	2,00±0,00	2,50±0,50	3,50±0,50	189
Iron (mg)	12,70 ± 0,56	16,49 ± 1,55	23,77 ± 2,69	28,42 ± 2,40	11,5
Zinc (mg)	1,53 ± 0,16	2,59 ± 0,41	3,37 ± 0,01	4,34 ± 0,01	14,00

« Same abbreviations as in table II »

Table V : Nutrient content of 100 grams, experimental infant flours of rice-based, from N'Djamena (average ± standard deviation)

Nutrients	RN0	RN1	RN2	RN3	Plumpy'nut (per 100 g)
Energy (Kcal)	327,88	346,91	356,41	366,07	545
Moisture (%)	6,20 ± 0,04	6,27 ± 0,07	6,33 ± 0,10	6,08 ± 0,05	
Ash (g)	0,73 ± 0,01	1,35 ± 0,00	1,94 ± 0,01	2,39 ± 0,01	
Proteins (g)	9,00 ± 0,22	10,67 ± 0,12	11,56 ± 0,57	11,75 ± 0,64	13,6
Fats (g)	3,79 ± 0,01	3,23 ± 0,16	3,33 ± 0,07	4,11 ± 0,04	35,7
Total sugars (g)	64,44 ± 0,25	68,79 ± 1,60	70,05 ± 1,67	70,52 ± 0,76	33,5
Vitamins					
Vitamin A (µg RAE)	4,33 ± 0,11	32,02 ± 0,11	54,91 ± 0,09	87,40 ± 0,20	910
Vitamin C (mg)	16,84 ± 0,00	21,05 ± 0,00	25,26 ± 4,21	31,58 ± 2,11	53
Minerals					
Calcium (mg)	08,40 ± 0,92	30,31 ± 2,07	84,23 ± 7,29	77,19 ± 9,73	320
Phosphorus (mg)	109,00±37,00	41,50±13,50	39,50±15,50	54,50±18,50	394
Potassium (mg)	115,50±10,5	230,00±21	324,50±31,5	429,50±10,5	1111
Magnesium (mg)	06,74 ± 0,19	15,24 ± 0,79	26,15 ± 0,70	33,38 ± 0,23	92
Sodium (mg)	7,00±0,00	3,00±1,00	1,00±0,00	1,00±0,00	189
Iron (mg)	08,94 ± 0,75	14,50 ± 0,84	14,37 ± 1,68	25,39 ± 2,02	11,5
Zinc (mg)	0,67 ± 0,01	1,57 ± 0,11	2,93 ± 0,14	1,99 ± 0,21	14,00

« Same abbreviations as in table II»

Table VI : Nutrient content of 100 grams, experimental infant flours of corn-based, from N'Djamena (average \pm standard deviation)

Nutrients	MN0	MN1	MN2	MN3	Plumpy'nut (per 100 g)
Energy (Kcal)	439,18	410,66	439,36	419,76	545
Moisture (%)	4,02 \pm 0,08	4,35 \pm 0,09	4,18 \pm 0,05	3,93 \pm 0,05	
Ash (g)	1,75 \pm 0,01	2,50 \pm 0,22	3,07 \pm 0,01	3,41 \pm 0,00	
Proteins (g)	14,69 \pm 0,34	12,72 \pm 1,12	15,13 \pm 1,36	13,59 \pm 1,25	13,6
Fats (g)	14,74 \pm 0,68	13,46 \pm 0,48	13,64 \pm 0,11	13,16 \pm 0,48	35,7
Total sugars (g)	61,94 \pm 1,12	59,66 \pm 2,16	64,02 \pm 1,92	61,74 \pm 1,32	33,5
Vitamins					
Vitamin A (μ g RAE)	13,79 \pm 0,12	41,27 \pm 0,09	76,50 \pm 0,04	115,88 \pm 0,08	910
Vitamin C (mg)	16,84 \pm 0,00	29,47 \pm 4,21	25,26 \pm 0,00	35,79 \pm 2,11	53
Minerals					
Calcium (mg)	09,37 \pm 2,22	32,82 \pm 7,45	41,39 \pm 6,32	71,79 \pm 16,82	320
Phosphorus (mg)	295,00 \pm 7,00	302,00 \pm 14,00	280,50 \pm 21,50	209,50 \pm 78,50	394
Potassium (mg)	366,50 \pm 10,5	513,00 \pm 10	565,00 \pm 21	586,00 \pm 0,00	1111
Magnesium (mg)	17,20 \pm 0,29	30,68 \pm 4,84	39,84 \pm 1,45	53,82 \pm 4,73	92
Sodium (mg)	2,00 \pm 0,00	3,00 \pm 0,00	10,50 \pm 0,50	7,00 \pm 0,00	189
Iron (mg)	8,07 \pm 0,61	15,49 \pm 0,59	21,53 \pm 2,41	26,65 \pm 1,05	11,5
Zinc (mg)	1,73 \pm 0,14	2,89 \pm 0,05	3,82 \pm 0,01	5,11 \pm 0,28	14,00

« Same abbreviations as in table II»

Lower Limbs Doppler Vascular Findings in Jos University Teaching Hospital

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Abstract- Background: Doppler

Ultrasonic imaging provides a non-invasive assessment of the arterial and venous circulation in the lower limb and is accepted as a valuable diagnostic technique.

AIM: To determine the indications for Doppler imaging in the extremities in our institution and describe the main findings.

METHOD: This a retrospective study of 126 patients that had lower limb doppler interrogation for various indications in Jos university Teaching Hospital Radiology Department over a one year period(February 2012-January 2013.The results were retrieved from departmental archive. The age, sex, indications and findings were obtained and analysed.

RESULTS: A total of 126 patients were scanned in which 67 were females and 59 were males. There are more patients with DVT alone (56.3%) compared to the other indications, and it was more females compared to males (38:33). PVD constitute 19.8% of the total indications, which are more in males.

Peripheral vascular disease is the commonest positive findings. It increases with age. A good relationship between indications and findings were noted, which was significant, $p < 0.003$.

CONCLUSION: Ultrasonic scanning is now established as a valuable non-invasive method for investigating lower-limb vascular diseases.

I. INTRODUCTION

Doppler ultrasonic imaging provides a non-invasive assessment of the arterial and venous circulation in the lower limb and is accepted as a valuable diagnostic technique. Grey-scale images identify plaque and thrombus, duplex assessment provides a measurement of blood velocity through a vessel, and colour doppler imaging enables the rapid localization of arterial stenoses and occlusions and the identification of incompetent veins. It is hoped to provide an insight into the strengths and limitations of ultrasonic vascular investigations for those involved in tissue viability and ulcer management.¹

Doppler US findings provide good information about the anatomy and physiology of the vessels. Spectral Doppler ultrasonography and color-flow vascular imaging supplement gray-scale US in identifying blood vessels, confirming the direction of blood flow, and detecting vascular stenosis or occlusion.

Doppler US is a valuable diagnostic test; it is inexpensive and widely available but offers detailed description of the length, severity, or type of the diseased portion of the vessel, all of

which help in planning surgical or endoluminal intervention. Although vascular mapping can be performed to evaluate the iliac vessels and the femoro-popliteal vascular segments, it is time and labor consuming. It is also operator dependent. Pre-angiographic screening with color Doppler flow mapping is an accurate method for predicting the presence of femoro-popliteal artery occlusions amenable to bypass surgery. It is also a sensitive method for predicting the presence of peripheral arterial disease.²

In adults, the clinical conditions that predispose to Venous thrombo-embolism(VTE) are increasing age, cancer and its treatment, prolonged immobility, stroke or paralysis, previous VTE, congestive heart failure, acute infection, pregnancy or puerperium, dehydration, hormonal treatment, varicose veins, long air travel, acute inflammatory bowel disease, rheumatological disease, and nephrotic syndrome. Other acquired factors that have recently been associated with increased risk of VTE disorders include persistent elevation of D-dimer and atherosclerotic disease.³

DVT is a major and a common preventable cause of death worldwide. It affects approximately 0.1% of persons per year. DVT is predominantly a disease of the elderly with an incidence that rises markedly with age.⁴ The incidence of VTE is low in children. Annual incidences of 0.07 to 0.14 per 10,000 children and 5.3 per 10,000 hospital admissions have been reported in Caucasian studies.⁵ History and clinical examination are not reliable ways of diagnosing DVT.⁶ Lower extremity DVT can be symptomatic or asymptomatic. Patients with lower extremity DVT often do not present with erythema, pain, warmth, swelling, or tenderness. Symptomatic patients with proximal DVT may present with lower extremity pain, calf tenderness, and lower extremity swelling.^{7,8} Homans' sign may be demonstrable in DVT.

Peripheral vascular disease(PVD) patients are normally referred with claudication (pain on walking, particularly uphill) or with ulcers around the ankle and on clinical examination the ankle pulses are likely to be weak or absent.¹⁴

Occlusion is characterized by a gradual fall in blood velocity along the vessel as blood is taken away by collateral vessels. The waveform usually becomes monophasic close to the occlusion, and at the blockage the colour Doppler display shows absence of flow. The plaque causing the stenosis can be seen and the colour Doppler shows aliasing. The peak systolic blood velocity, increases from 0.26 proximally to 3.90 m/s through the stenosis, an increase by a factor of 15 indicating a very tight stenosis.¹ DVT has non-compressing veins with thrombose that are of varying echogenicity and decreased or absence blood flow. The

diameter may be normal or increased. Occasionally an embolus may be seen. PVD can be associated with calcifications, plaques and reduced caliber of the arterial diameter. Reduced blood flow and turbulence spectral pattern can be seen. Age, sex and some disease processes are known to be associated with abnormal vascular findings.^{14,15}

CT angiography (CTA) and magnetic resonance angiography(MRA) are quite comparable in visualizing vessels and can provide much of the diagnostic information of the lower-extremity arteries that can be obtained with conventional angiography. These methods are invasive and expensive. The machines needed for these studies are not readily available in a developing nation like ours.

The aim of this study was to determine the indications for Doppler imaging in the lower extremities in our institution and to describe the main findings.

II. MATERIAL AND METHODS

The study was a retrospective analysis of all the lower limbs Doppler ultrasound scan at the Jos University Teaching Hospital (JUTH), Jos, Plateau State. Over a one year period (January 2nd 2013 to January 2nd 2014). All the lower limbs Doppler ultrasound scans were retrieved from the archive of the department after necessary approval that met the inclusion criteria. Information sought for, included patients' age, sex, indications for the scanning and outcome of the scanning.

Inclusion criteria:

- (i) Patients with deep vein thrombosis as indications.
- (ii) Patients with peripheral vascular diseases as indications.

The examination starts with the patient lying supine with the head slightly raised. Coupling gel is put on the thigh from groin to knee over the path of the artery. The probe was placed on the skin in the groin and the common femoral vessels identified using the colour doppler display. The scanner is switched to duplex mode, and the blood velocity waveform in the common femoral vessels was obtained. The waveform is usually biphasic or triphasic. Values significantly above normal may indicate local stenosis, while values below can indicate low flow caused by proximal or distal occlusion. The presence of any plaque intruding into the lumen is noted, and the degree of stenosis is estimated. Figures 3,4 and 5 shows a scan of a femoral artery with a protruding plaque causing about stenosis.

The vessel is scanned as far down the leg as possible and the blood velocity waveform recorded from this distal site. The position is marked on the skin. To complete the examination of the lower-limb vessels, the patient turns onto their side or front and the popliteal vessels was scanned behind the knee. Reduced velocity, decreased compressibility, absent wall to wall filling, visible intraluminal thrombi and emboli are features seen in DVT.(Figure 2). All examinations were performed using LOGIC 5, a real-time GE ultrasound machine fitted with a 10MHZ linear transducer.

Data was analysed using SPSS Version 20. Statistical parameters such as chi square, student's t-test, ANOVA and pearson's correlation were used for association between different variables. P value of <0.05 was considered statistically

significant. The results were presented in the form of tables, graphs and charts.

III. RESULTS

A total of 126 patients were scanned in which (67 were females and 59 were males). There are more patients with DVT alone compared to the other indications, with more females than males. DVT with co-morbidity of HHDx and DM have equal incidence. However, DVT with HHDx is more in females and DVT with DM is more in males.

PVD constitute 19.8% of the total indications. The indications are more in males. Table I

The indications increased with age groups, with the least among those less than 30 and the highest among the ≥ 60 age groups. DVT were noted more among the greater than 60 years. However, DVT with other comorbidity findings were different. DVT with HHDx was commoner in the 51-60 age group and DVT with DM was more in the 31-40 age group. PVD is commoner in >60 age group and the least age group was on the 31-40 age group. The p value is statistically significant(0.001). Table III.

The age group with the highest number of normal was 51-60 age group (56%). There was a steady increase to that age group, after which the incidence dropped. The patients with DVT occurred more at the age group of 31-40-7(31.8%). Followed by >60 age group. PVD was noted to increase with age with the highest incidence seen at >60 age groups. Some patients had DVT and PVD, and they constituted the least in all the age groups. The findings were not statistically significant.(Table IV)

The DVT indication compared to findings showed that majority of the patients had positive findings, with DVT (37)(44.6%) being more which was closely followed by PVD(17)(20.5%). The PVD indications also showed positive findings with 14 patients. PVD was noted with the highest findings in the study population.(Table V)

IV. DISCUSSION

In this study a total of 126 patients were examined of which 67 were females and 59 were males. Deep vein thrombosis (DVT) was the commonest indication in these patients with 101 patients (80.2%) and the remaining 25 patients (19.8%) were for peripheral vascular disease (PVD). DVT is more prevalent as indications for patients that presented for Doppler scanning.

It was found that 21(18.3%) patients had DVT and of these, more males were seen with the condition. This is in contrast to the findings of Olowoyeye et al⁹ and Ose-Emenim et al¹⁰ who had much higher values. This disparity in the case of Olowoyeye et al may be due to the smaller sample population; and Ose-Emenim et al found higher values most likely because they combined lower limb DVT and carotid plaques. The overall average age- and sex-adjusted annual incidence of venous thromboembolism (VTE) is 117 per 100,000 (DVT, 48 per 100,000; PE, 69 per 100,000), with higher age-adjusted rates among males than females (130 vs 110 per 100,000, respectively). Both sexes are equally afflicted by a first VTE,

men having a higher risk of recurrent thrombosis.⁵ This is similar to what we found in our study.

It was found that more females had DVT indication than males, but, more males were noted to have a diagnosis of DVT than females. This was probably due to the facts that they may have more of the risk factors for DVT. DVT rate was comparatively higher in adolescent females because of pregnancy and use of oral contraceptive agents.⁵

Diabetes mellitus and hypertensive heart diseases were noted to have association with DVT. They are chronic diseases that are known to have vascular complications. Of the patients examined, 15 patients with Diabetes mellitus were suspected of having DVT and of these all of them were noted to actually have DVT, with highest incidence in the 31-40 years age group (8 patients). Also, 15 patients with Hypertensive heart disease were suspected to have DVT and were found to have DVT with highest incidence in the 51-60 years age group (7 patients). This was also noted in the study done by Lowe G¹¹ and Tsai et al¹² that noted DM as risk factor for DVT. Wang et al¹³ noted that diabetic have increased risk of DVT and it is 2.76 more in diabetics. Prandoni P³ noted that congestive cardiac failure is a risk factor for DVT, which may occur in some patients with HHD. Our findings showed that these diseases have a strong correlation with DVT.

In this study, peripheral vascular disease was seen in 44 (38.3%) of the patients. This figure was higher than findings in similar studies where Kamar et al¹⁴ and Udenigbo et al¹⁵ found 29% and 24% prevalence rates respectively. Although a similar study done in [UBTH.Nigeria] Ose-Emenim et al found much higher incidence. More patients were noted to have peripheral vascular disease (44 patients) than deep vein thrombosis (21 patients). These findings show that the incidence of peripheral vascular disease is much higher in our environment than previously thought. This may largely be due to the asymptomatic nature of the disease as well as paucity of studies done in this regard.

DVT is a major and a common preventable cause of death worldwide. It affects approximately 0.1% of persons per year. DVT is predominantly a disease of the elderly with an incidence that rises markedly with age.⁶ Age related findings show that the incidence of DVT was higher in the 31-40 years age group. However, our finding was at variance with that of Silverstein et al⁴ that noted that deep vein thrombosis was seen more in the elderly and increased with age.

PVD increased with age with highest rate in the >60yrs age group and the least incidence was seen in the 31-40 age group. These findings are in keeping with studies done in other centres Ose-Emenim et al in University of Benin Teaching Hospital(UBTH) and Silverstein.⁴ in Minnesota, which noted increase PVD with increasing age.

A combination of DVT and PVD was noted in this study among females only. It constituted < 5% of the study population. It was found in the younger age group in this study as against what was found by Silverstein.⁶ where it was found more in the elderly.

In conclusion, ultrasonic scanning is now established as a valuable non-invasive method for investigating lower-limb vascular diseases. It is the first method of choice for arterial stenosis and occlusion, and for venous incompetence. It is also

being used more extensively for the initial investigation of deep vein thrombosis.

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Table I: Relationship between indications and gender

Indications	Female	Male	Total	P
DVT	38(56.7)	33(55.9)	71(56.3)	0.288
DVT with HHDx	11(16.4)	4(6.8)	15(11.9)	
DVT with DM	6(9.0)	9(15.3)	15(11.9)	
PVD	12(17.9)	13(22.0)	25(19.8)	
Total	67(100.0)	59(100.0)	126(100.0)	

Table II: Relationship between findings and gender

Findings	Female	Male	Total	P
Normal	36(38.5)	31(42.0)	56(40.0)	0.159
DVT	9(13.8)	12(24.0)	21(18.3)	
PVD	27(41.5)	17(34.0)	44(38.3)	
PVT with PVD	4(6.2)	0(0.0)	4(3.5)	
Total	76(100.0)	50(100.0)	126(100.0)	

Table III: Relationship between Indications and age group

Indications	Age group					P
	≤30	31-40	41-50	51-60	>60	
DVT	4(36.4)	13(54.2)	17(63.0)	16(59.3)	21(56.8)	0.001
DVT with HHDx	1(9.1)	2(8.3)	1(3.7)	7(25.9)	4(10.8)	
DVT with DM	4(36.4)	8(33.3)	1(3.7)	0(0.0)	2(5.4)	
PVD	2(18.2)	1(4.2)	8(29.6)	4(14.8)	10(27.0)	
Total	11(100.0)	24(100.0)	27(100.0)	27(100.)	37(100.0)	

Table IV: Relationship between findings and age group

Findings	Age group					P
	≤30	31-40	41-50	51-60	>60	
Normal	4(22.2)	9(40.9)	11(42.3)	14(56.0)	10(30.3)	0.058
DVT	4(22.2)	7(31.8)	4(15.4)	3(12.0)	5(15.2)	
PVD	6(33.3)	5(22.7)	11(42.3)	8(32.0)	18(51.5)	
DVT with PVD	4(22.2)	1(4.5)	0(0.0)	0(0.0)	2(3.0)	
Total	18(100.0)	22(100.0)	26(100.0)	25(100.)	35(100.0)	

Table V: Relationship between indications and findings

Indications	Findings				P
	Normal	DVT	PVD	DVT with PVD	
DVT	28(66.7)	37(85.7)	17(41.5)	1(33.3)	0.003
DVT with HHDx	3(7.1)	1(4.8)	9(22.0)	0(0.0)	
DVT with DM	5(11.9)	2(9.5)	1(2.4)	1(33.3)	
PVD	6(14.3)	0(0.0)	14(34.1)	1(33.3)	
Total	42(100.0)	40(100.0)	41(100.0)	3(100.)	

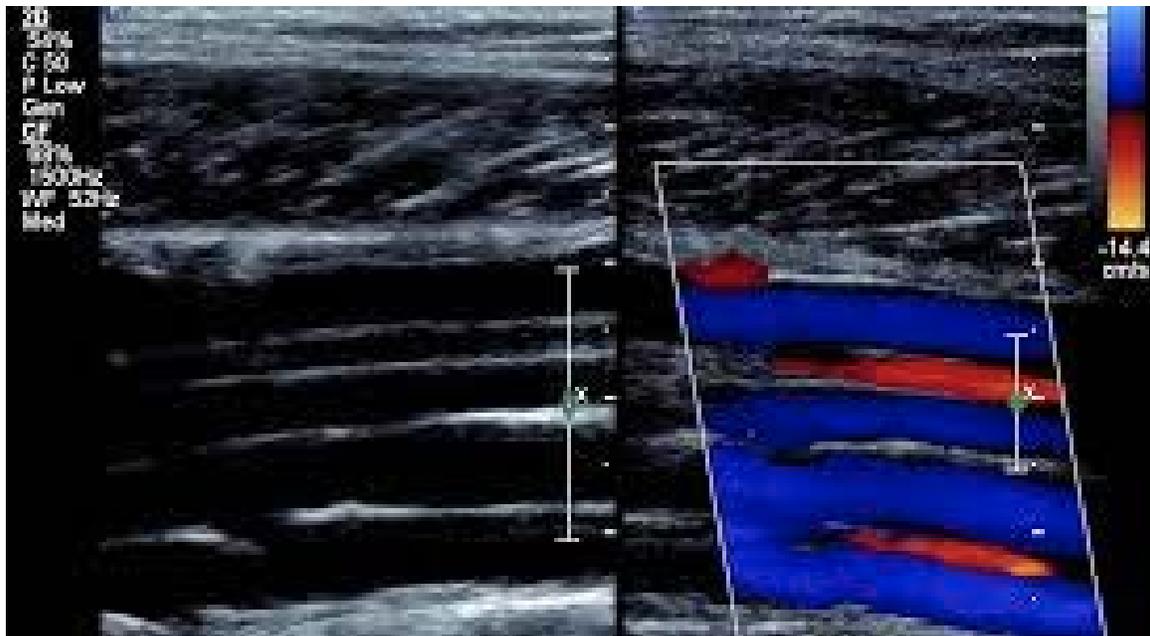


Fig !: Normal duplex scan.

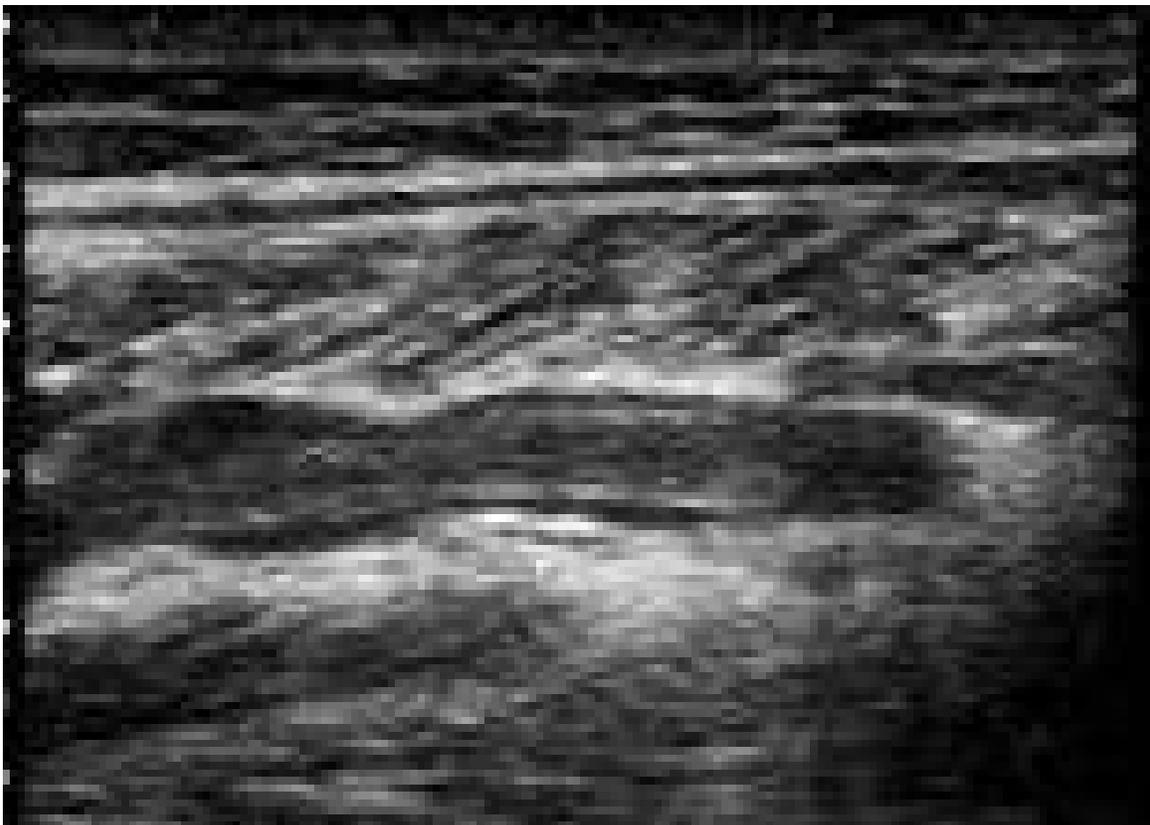


Fig.2: Doppler showing thrombose

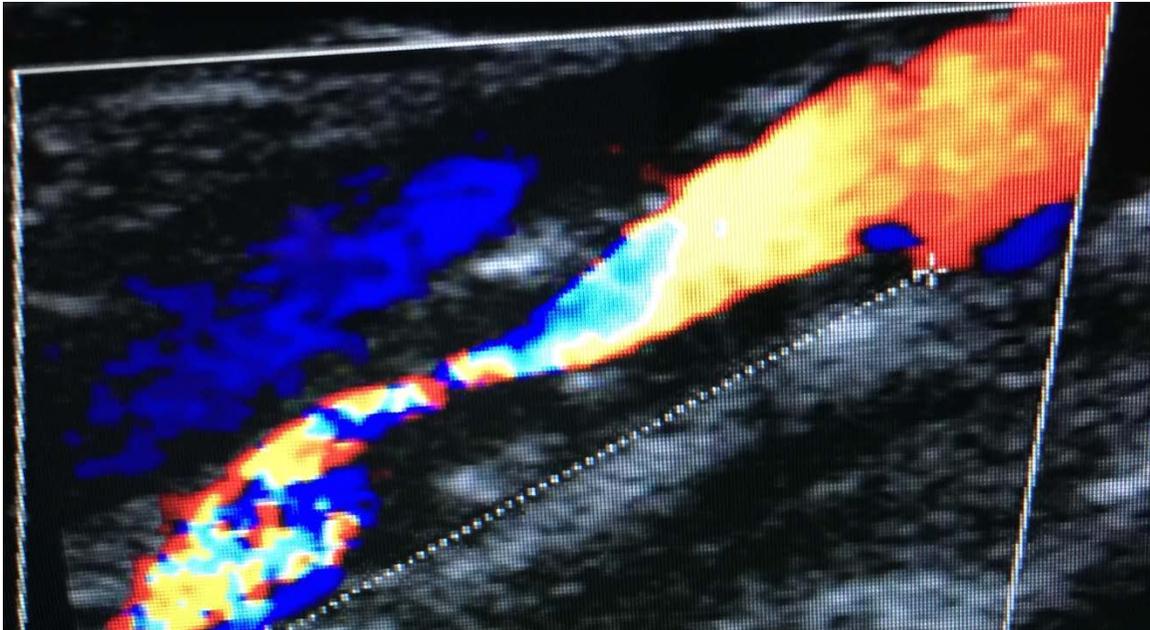


Fig 3:Colour Doppler showing arterial stenosis and turbulence pattern.



Fig 4: Multiple plaques in the arterial wall



Fig. 5: B mode doppler showing multiple arterial calcifications and irregularity.

Correlation between prostate volume and Lower Urinary Tract Symptoms (LUTS) as measured by International Prostate Symptom Score (IPSS)

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Abstract- Lower Urinary tract symptom (LUTS) is a common presentation among elderly patients particularly in men in urology clinical practice. Evaluation and treatment of LUTS is a major consideration and IPSS score and ultrasound KUBP are routine investigations for assessment of such patients. There is a controversy on relationship between IPSS score and the prostate volume in the literature. The objective is to evaluate the relationship between IPSS and prostate volume in patients with LUTS. There is a significant relationship between IPSS and prostate volume measured through abdominal ultrasound. The Total IPSS increases with the prostate volume ($r=0.223$, $p<0.003$). But there was no statistically significant difference between mild, moderate and severe IPSS in relation to prostate volume.

Index Terms- lower Urinary tract symptom (LUTS), International Prostate Symptom Score (IPSS), ultrasound KUBP, prostate volume

I. INTRODUCTION

Lower urinary tract symptom (LUTS) is a common presentation among elderly patients especially encountered in men in urology practice. Numerous population based studies have demonstrated that bothersome LUTS affect 18–26% of men aged 40–79 years.⁽¹⁾ LUTS has many possible causes including supravescical causes such as spinal cord diseases and other neurological dysfunctions. Vesical and intravesical causes such as smooth muscle dysfunction of the bladder and tumors and infravesical causes like urethral strictures. Although BPH is one common cause of these symptoms, some men with LUTS have no prostate enlargement.⁽²⁾

Clinical diagnosis of benign prostatic hyperplasia is made by the assessment of urinary symptoms, prostate size or prostate volume and urinary flow rate evaluation. Treatments of LUTS aim to relieve bothersome symptoms, reduce complications and to increase the quality of life. Therefore the relief of symptoms and improvement in quality of life are the most frequent indications for intervention.⁽³⁾

LUTS is clinically assessed by international prostate symptom score (IPSS). The ultrasound KUB is a routine investigation for assessment of patients with LUTS. Ultrasound KUB refers to a diagnostic medical imaging technique of the abdomen and stands for kidneys, ureters and bladder.

Although in fact the ureters will be visible only if they are abnormally distended.

Although the commonest cause for LUTS among men is benign prostatic enlargement. Several studies have shown that not all the male LUTS are associated with prostate pathology as the bladder also plays a part in the development of LUTS.⁽⁴⁾ Prostatic enlargement and bladder outlet obstruction are involved in altering the histological process.⁽⁵⁾ The mechanisms linking to these histological processes of development of BPH in the prostate and lower urinary tract symptoms remain uncertain. Therefore the treatment is based on the presumed etiology of the symptoms (due to lower urinary tract obstruction, overactive bladder or a combination of both).

Ultrasound of the prostate is the investigation that enables us to visualize the prostate gland directly and is one of the commonest diagnostic modalities performed in patients presenting with LUTS. It can be done using the trans-abdominal approach as well as trans rectal approach. If the measurements of prostate volume correlate poorly with the severity of lower urinary tract symptoms, one should assess the severity of symptoms rather than the increase in prostate volume during the management. IPSS is an interview based (or self administered) clinical parameter.⁽⁶⁾ Prostate volume is measured using ultrasound KUB which is easy, safe, noninvasive, cost-effective, repeatable, less time-consuming and demands little co-operation from the patient. There is a controversy on the relationship between IPSS score and the prostate volume in the literature. The objective of the study was to evaluate the relationship between IPSS and prostate volume in the patients with LUTS.

II. MATERIALS AND METHODS

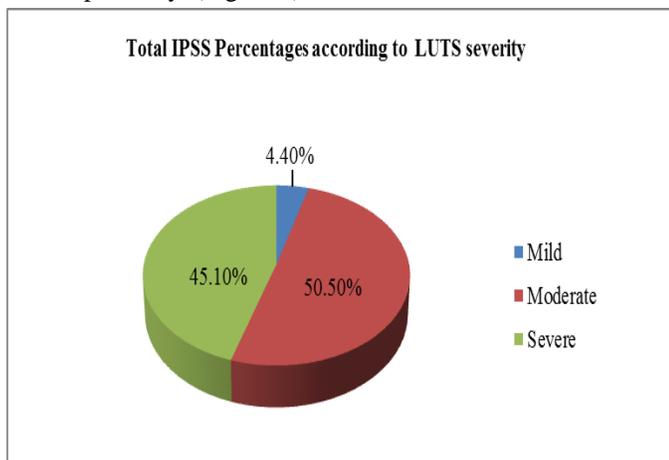
The study was conducted as a descriptive cross sectional study by the Department of Surgery, Faculty of Medicine, University of Peradeniya from June 2014 to May 2015. The study population consisted of patients who were referred to the urology clinic of the teaching hospital Peradeniya. A total of 185 patients were included in this analysis and all the patients were well informed about the study. Informed written consent was taken from patients who were willing to participate in this study. While these patients were clinically evaluated, the standardized questionnaires for IPSS⁽⁷⁾ of the patient were also obtained by trained doctors. The prostate volume of each patient was then estimated by ultrasound KUB.

The IPSS is a numerical symptom scoring system that grades the severity of seven symptoms based on how frequently each symptom afflicts the sufferer. The scale for each symptom ranges from zero (symptom never present) to five (symptom always present). The seven symptoms are incomplete emptying, frequency, intermittency, urgency, weak stream, hesitancy and nocturia. Patient's demographic details, IPSS and prostate volume data were entered and evaluated using the statistical package for social sciences (SPSS) with one way ANOVAs and Spearman's rank correlation tests.

One way ANOVA test was used to detect any statistically significant difference between the IPSS severity groups and Spearman's rank correlation coefficient was used to detect any correlation between prostate volume and Total IPSS score.

III. RESULTS

There were 185 patients in the study population with a mean age of 65.2 (SD=11.46) years. The mean total IPSS was 18.81(SD=7.3) and the mean prostate volume was 41.6cm³(SD=24.2) out of them 4.4% had mild, 50.5% had moderate and 45.1% had severe LUTS according to IPSS total score respectively. (Figure 1)

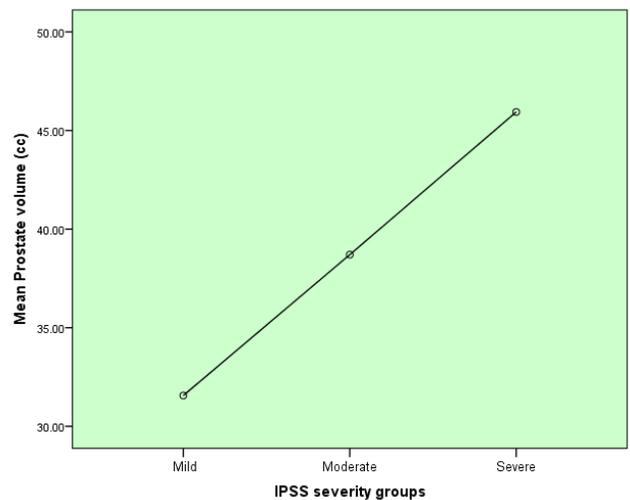


We found that the mean prostate volume measured by this method was 42.5cm³ which was comparable to other study done by Vesely et al⁽⁸⁾ (40.1 cm³) and Dicuio et al⁽⁹⁾ (41 cm³). The mean prostate volumes were 31.56 cm³ in mild, 38.70 cm³ in moderate, and 45.93 cm³ in severe. (Graph 1).

There was an increment in mean prostrate sizes with the severity of the IPSS (Table 01), however there was no statistically significant difference among the mean prostate volumes in each IPSS severity groups as determined by one-way ANOVA (P =.071). A Spearman's rank-order correlation was applied to determine the relationship between prostate volume and total IPSS score. There was a strong positive correlation between two parameters, which was statistically significant.(Correlation Coefficient=0.223, < 0.003)

Table (01) - Variables and values of each IPSS severity groups

IPSS Severity	Variable	Value
Mild	Mean	31.56 cm ³
	Minimum	10 cm ³
	Maximum	55 cm ³
Moderate	Mean	38.7 cm ³
	Minimum	10 cm ³
	Maximum	116 cm ³
Severe	Mean	45.93 cm ³
	Minimum	10 cm ³
	Maximum	140 cm ³



Graph (01) - Mean prostrate volumes in each IPSS severity groups.

IV. DISCUSSION

BPH is a common histological condition among older men, which is intimately related to aging. Several different instruments have been developed to quantitate the severity of BPH symptoms in which IPSS is the one that is widely used.⁽¹⁰⁾ In this study 185 men with LUTS were assessed and among them the vast majority of LUTS patients were elderly males and most of them presented with moderate to severe LUTS. (According to IPSS, score <7 include into mild LUTS, score of 7-20 into moderate and >20 score include into severe LUTS). This study had shown that there is a significant relationship between international prostate symptom score and prostate volume measured through trans-abdominal ultrasound KUBP. This result was similar to the study conducted in Japan T. Tsukamoto et al.⁽¹¹⁾

However there is a controversy on the relationship between the ultrasonic prostate volume and IPSS. One study has shown that there is no significant relationship between international

prostate symptom score and prostate volume in Africans.⁽¹²⁾ and Some studies have shown that prostate volume does not correlate with IPSS where described by Ezz et al.⁽¹³⁾ with no correlation detected. Therefore using prostate volume as a major parameter for assessing LUTS should be further investigated.

According to this research, prostate volume increases with total IPSS. Despite the above results there was no statistically significant difference among the mean prostate volumes in mild, moderate and severe IPSS groups. Because 80% of prostate size volumes ranged between 10-60 cm³ Therefore prostatic size should not be an only and important consideration; moreover, we should assess the impact of symptoms while treating the patients. As the correlation between the prostate volume and IPSS is nil, the size of the prostate should not be an important consideration to determine the need for therapy.

V. CONCLUSION

There is a significant positive relationship between IPSS total score and prostate volume. However there was no significant difference among mean prostate volumes in each IPSS severity groups. Therefore when considering both literature and current study, ultrasound prostate volume measuring is a useful investigation. But it should not be used as the sole investigation to assess the severity of LUTS.

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The Figurative Language to Express Kamini's Psychological Oppression with Special Reference to Punyakante Wijenaiké's Novel, Giraya

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Abstract- Punyakante Wijenaiké is a conspicuous Sri Lankan novelist who addressed the women's social issues of Sri Lanka throughout the previous six decades. *Giraya* is her second novel in which depicts the psychological oppression of a middle class woman who has been married to a man of high class and high cast.

The Psychological oppression of the Sri Lankan traditional woman after her marriage is usually brought out by her mother-in-law and husband. This usual Sri Lankan phenomenon is clearly presented in the novel and it has been a serious women issue in Sri Lanka for a long time. The Psychological oppression of the protagonist in the novel has been elaborated by a thickly decorated figurative language and this paper provides an in-depth analysis of its figurative language in respect with the protagonist's psychological oppression.

This paper is a content analysis and it collects the primary data from the printed book. The researcher gives a qualitative analysis by deeply analyzing the primary data. The qualitative analysis is purely based on the figurative language used in the novel. Therefore, it considers the figures of speech used in quantitative data as much as possible.

After the qualitative analysis is done, it is obvious that symbolism, imagery, and simile have given a considerable impact on presenting the fact of the protagonist's psychological oppression. Among those, symbolism has taken a significant place. It has been fertilized by the other literary devices and the figurative language has been purely enriched by the symbolism.

Index Terms- Psychological Oppression, Figurative Language, Symbolism

I. INTRODUCTION

The word "Woman" has a significant consideration in any civil society since one cannot deny the fact that no event is complete without the participation of women. In this regards, when an attention is given on the "Pearl of Indian Ocean", her role has been broad and variable with the factor of time. But, it won't be an exaggeration to say that her contribution in every field of Sri Lanka is titanic. While current population of Sri Lanka is about 21 086 797 and its female population is about 10 682 918. The female gender in the population as a percentage is 50.7%. Therefore it is very clear that woman has taken a prominence even in the population of the country.

This research paper addresses a pathetic side of a Sri Lankan woman in 1960s. The state of Sri Lankan woman has been changing with the moving time and her role in 1960s and later times were very woeful. Traditional Sri Lankan poor woman in 1960s had to psychologically oppress since major causes like poverty of families, alcoholism of husbands, responsibilities of considerable number of children etc. If a traditional middle class woman was married to a man of high caste and class, she happened to psychologically oppress a lot. It was very pathetic and sympathetic under severe circumstances. Novel *Giraya* is written based on this thematic idea and researcher aim is to elaborate the psychological oppression of the protagonist, Kamini, through the figures of speech.

Punyakante Wijenaiké, the author of *Giraya*, is an eminent Sri Lankan writer who spoke on women's issues through her novels. *The Third Women, The Waiting Earth, Uhulana Derana, The Betal vine, The Rebel, A way of Life, To follow the Sun, An Enemy Within, The Unbinding, That Deep Silence, When the Guns Fall Silent* are some of the embodiment novels of Sri Lankan women issues by the author. *Giraya* was published in 1971 and it is in its peak level from the perspective of women issues. Since this research paper is a revelation of women's psychological oppression through the figurative language used in the novel, the words psychology, psychology of women and oppression must be interpreted in an understandable way.

The earth, the third planet of the solar system, has been acquired a significant importance in the universe since it is the only planet where the life exists. The earth is home for around eight million seven hundred thousand species and they have spread all around the world in different types of habitats. The human being is one of the significant beings and their significance has been highlighted through their capabilities of brains. The human brain is a super natural gift and it functions remarkably in particular contexts. People are skillful enough to appropriately think and work accordingly. It is the most essential organ in the human body since it transmits millions of messages to perform different actions. The importance of brain has been emerged by different kinds of sciences in current world. Among that, psychology is on a top priority in nowadays.

Since this research paper is going to deal with a psychological side of a human being, it is better to have a common definition of psychology before reaching to the research proposition. Following definition would provide a basic clue on what psychology is.

Merriam Webster Dictionary defines psychology as 'The study of mind and behavior in relation to a particular field of knowledge or activity'. Your Dictionary is on the view of 'Psychology is defined as the science that deals with emotional and mental processes'

According to the above dictionary meanings, psychology is simply a study of mind and its behaviours. Even if it says 'a study of mind and behaviours', scholars have little struggled to decide whether it is about human mind and animals' mind. Therefore it has many definitions and they are not clear cut. Even among scholars, there is a dilemma whether it is an art or science. But, core scholars of psychology like James Williams and Sigmund Freud believe that the psychology is a science and it is a study about human mind and its behaviours. This research also follows that perception and it can be further developed by referring the Oxford Advanced Learner's Dictionary. It says 'The scientific study of the human mind and its functions, especially those affecting behaviour in a given context.'

As Oxford Advanced Learner's Dictionary suggests, it is able to finalize a basic definition of psychology where a scientific study of human mind and its behaviours under the different contexts. With that definition it is clear that human mind differs according to the existing environment. Further the fact that the showing of these variations through their behaviours is also revealed.

What has been found out throughout this research is a catastrophic psychological side of a woman from a literature perspective. Therefore a heavy weight has been put on the women's psychology. Women's psychology differs from men's because there are biographical differences between man and woman. Since these biological differences, the way they experience the life is different. The way they are looking for the life is different. Women's psychology relies on this key assumption and this can be understood from the perspective of experience. Nobody can have an experience of somebody. An experience is a self-own matter. Even if it is well explained to another, it cannot be done exactly. It has to be experienced by individually. In the case of women also, this is natural and women experiences of life are different from men's'. A man can never explain a matter of women's exactly since he is a man. Women are capable of explaining their experiences since they are in the same biological group. Therefore what is being prominent in the women psychology is the biographical differences.

When a deep consideration goes on women psychology, it has been found out that sex is inter connected with women's psychology. There is a close link in between these two components and the researcher has proved that this connection is clearly visible in the novel Giraya. Professor David. M. Buss has pointed out this fact as follows;

'Female sexual psychology touches every facet of human affairs, from cooperative alliances through strategies of hierarchy negotiation. Some women use sex to get along. Some use sex to get ahead. Sexual motives pervade murder. Failure in sexual unions sometimes triggers suicidal ideation. I thought the complexity of women's sexual psychology was finally starting to be captured when recent research revealed 237 reasons why women have sex, ranging from "to get rid of a headache" to "to get closer to God," from "to become emotionally connected with

my partner" to "to break up a rival's relationship.'

The protagonist of Giraya shows this discovery of sex to a certain level and absence of her sexual life has been a cause to her longing.

The psychology of women also differently shapes according to their aging. They experience the society in different ways with their different stages of age. This idea again reflects with the idea of biographical differences because their thoughts are matured when their organs are matured, especially sexual organs. Therefore people can study of women's psychology in respect with their different stages of age such as infancy, childhood, adolescence, pregnancy, childbirth and motherhood. The researcher of this research has paid his attention on this point and he has given an effort to fit the protagonist, Kamini, with this concept of age.

The word oppression also has taken a major important in this research. Oppression can be defined as follows;

Cambridge Dictionaries Online says oppression as 'A situation in which people are governed in an unfair and cruel way and prevented from having opportunities and freedom'. Merriam Webster Dictionary says 'unjust or cruel exercise of authority or power.' Oxford Advanced Learner's Dictionary has defined it as a 'Cruel and unfair treatment of people, especially by not giving them the same freedom, rights, etc. as other people'

According to above three dictionary definitions, it is obvious that there are two kinds of people where privileged and unprivileged people. As Oxford Advanced learner's Dictionary says privileged people always release a gigantic pressure on suppressed people by not giving them the freedom and rights where they are currently satisfied. With that basic understanding, the word psychological oppression has to be interpreted and it can be identified as an extension of oppression. People are psychologically oppressed when they are fed up of continuous suppression by privileged people. Anybody has a limitation of their own tolerance. When the oppression is continuously relied on people, it hurts to their psychology because they know that they are unable to get out of it. On the other hand, if the oppression is too much or severe that leads them towards the psychological oppression. Harsh words of privileged people are definitely a cause of psychological oppression and individual thoughts of the people are marginalized and blunt by the psychological oppression.

With these detailed interpretations of psychology, women psychology, oppression and psychological oppression, it is better to find where to fit the protagonist of this novel.

Kamini is a woman of twenty two years old and has delivered a son. To an extent, she is a matured woman and his psychological side is also matured. Her vision towards her husband home is very critical and her higher education shapes her psychological perception. The researcher has analyzed the psychological side of Kamini as a mother, wife, niece, sister. But it should be very clear that this researcher has not had the view of psychologist. What he has done was elaborating the psychological oppression of Kamini through the literary devices used by the original author.

According to the definitions of psychology cited above, this novel exactly describes the mind of Kamini and her behaviours in respect with the certain environments of her mother-in-law's home. According to the definition of Your Dictionary, emotional

and mental processes of Kamini under the psychological oppression also have been nicely described by a competent figurative language. Roots of her psychological oppression originated from her husband and her mother-in-law. Not only she describes her psychological oppression but also she has shown how it reflects on her physical behaviors. Psychological oppression of a young woman like Kamini can be observed by her sexual urge towards her husband. That prominent and essential fact also has been portrayed with an imaginative and figurative language. In additionally, the quantity of psychological oppression of Kamini has been spread by a thickly decorated figurative language.

At last but not least, *Giraya* is a flamboyant novel since it expresses the women's psychological oppression by an ideal figurative language.

II. OBJECTIVES

- To find out Kamini's psychological oppression in the novel.
- To analyze the figurative language used in the novel in expressing Kamini's psychological oppression.

2.1 SIGNIFICANCE OF THE STUDY

This research is an in-depth-analysis of the figures of speech used in *Giraya* in respect with women's psychological oppression. Two major topics have been illustrated in which the protagonist's psychological oppression and the quality of figures of speech within the Kamini's psychological oppression. The reader of this research will be able to get a sketch of protagonist's psychology. Further it will facilitate the readers that how her psychology is connected with oppression. By major examples of the novel, researcher tries to make the readers aware of protagonist's psychological oppression. Hence those who are interested in psychology, oppression, women's psychology may be able to refer this research as a new knowledge.

Being a literature research is the other important advantage of this research to the readers. They have been provided ample examples to show the psychological oppression of protagonist and those examples are thickly crowded with powerful literary devices in the English Language. The function and the forms of those devices have been analyzed according to the relevant cultural context. Therefore this research will facilitate to those who are interested in literature, especially from the perspective of figures of speech. Not only figures of speech but also they have been elaborated them according to the Sinhala culture. Therefore if someone is there to grasp the cultural values of Sinhala culture, this research would be an ideal resource for him/her.

By and large this research can be used as a resource of new knowledge to those who are interested in women's psychological oppression and literature.

2.2 RESEARCH QUESTION

Has the psychological oppression of protagonist been expressed by a competent figurative language in the novel *Giraya*?

2.3 LIMITATIONS

Since the novel was written based on the Sri Lankan cultural frame, its readers are minimum. Therefore earlier literatures on this novel are limited and when it comes to the fact of women's psychological oppression in Sri Lanka, people have rarely commented on the proposition. This was a huge limitation of gathering information for the topic.

III. REVIEW OF LITERATURE

The researcher has decided to have a research on the topic of the figurative language to express Kamini's psychological oppression based on few important reasons. Among those, one was very significant in which there were least number of available researches on this novel. Even though *Giraya* has touched one of the deliberative subjects, it was a matter of surprising that very few people have commented on this novel. Since that reason, researcher has understood that doing a research on a rarely commented novel is a new innovation and a challengeable task. Therefore this research can be studied as a new born child. Though the academic articles and researches are least for *Giraya* the researcher has used in the following some world literatures to show how this research is differentiated from the thematic perspectives from other literatures. In the following literatures the researcher has provided thematic ideas of most related novels for this research.

The *Yellow Wallpaper* is a great masterpiece of Charlotte Perkins Gilman. In this novel Gilman portrays one of the key realities of women life where the subordination of women in Marriage. Through that he has depicted the psychological oppression of women.

In "*The Yellow Wallpaper*," Gilman uses the conventions of the psychological horror tale to critique the position of women within the institution of marriage, especially as practiced by the "respectable" classes of her time. When the story was first published, most readers took it as a scary tale about a woman in an extreme state of consciousness—a gripping, disturbing entertainment, but little more. After its rediscovery in the twentieth century, however, readings of the story have become more complex. For Gilman, the conventional nineteenth-century middle-class marriage, with its rigid distinction between the "domestic" functions of the female and the "active" work of the male, ensured that women remained second-class citizens. The story reveals that this gender division had the effect of keeping women in a childish state of ignorance and preventing their full development. John's assumption of his own superior wisdom and maturity leads him to misjudge, patronize, and dominate his wife, all in the name of "helping" her. The narrator is reduced to acting like a cross, petulant child, unable to stand up for herself without seeming unreasonable or disloyal. The narrator has no say in even the smallest details of her life, and she retreats into her obsessive fantasy, the only place she can retain some control and exercise the power of her mind.

(<http://www.sparknotes.com/lit/yellowwallpaper/themes.html>)

The novel *Yellow Wallpaper* was written based on the respectable classes practiced in the nineteenth century. In this period, basically different types of classes were in practice and men were considered as first-class citizens and women represented the second-class citizens. Since males are actively engaged in working they belong to the first-class citizens. Most of the men in this period used to have their wisdom to earn money. John, the husband of story's protagonist, was used to show this typical character. As men were known as clever people in this period they were more respected than women. Society also tends to think that women are in need of helping of men since they are the reflections of wisdoms. Therefore women were helped by men thinking that they are helpless and they are not as clever as them. They were considered as a kind of ignorant people and since that reason they were framed only to domestic work. Framing only to domestic works is the psychological oppression of protagonist and *Giraya* is a bit different from this novel from few angles.

Even though class classification is available in *Giraya* it should be emphasized that it is the class division in the later part of twentieth century in Sri Lanka. The *Yellow Wallpaper* talks about the class division in nineteenth century in U.S.A. The *Yellow Wall Paper* expresses the class division based on American culture and *Giraya* shows it with Sri Lankan culture. So, cultural background has given a considerable impact on the final outcome of both novels. When an emphasis is given on the class division of both novels, contextual wise both are different. When it comes to *Giraya* it is the feudal system based on Sri Lankan coconut cultivation in 1970s and in the *Yellow Wall Paper*, the class division in nineteenth century is common to whole country.

While class division is not a big issue of Kamini's psychological oppression in *Giraya*, it has been a main reason of protagonist's psychological oppression in the *Yellow Wallpaper*.

According to *The Yellow Wallpaper*, woman has been portrayed as a character that had been oppressed by the patriarchal society in the nineteenth century. She had to be a slave of her husband and only the freedom she has was her own self thinking. Though psychological oppression is presented in this novel, that has not been created by the family members of husband. It was just created on protagonist by husband. Since this reason *The Yellow Wallpaper* differs from *Giraya*. It also differs from *Giraya* from the perspective of figurative language. While the success of *Giraya* relies on symbols this particular novel has used a fairly mixed figurative language. Since these contradictories a research on *Giraya* can be studied as a new knowledge of women's psychological oppression, especially under the Sri Lankan cultural context.

The novel, *The Awakening*, also has a considerable impact in world literature from the perspective of women's psychological oppression.

For Edna Pontellier, the protagonist of *The Awakening*, independence and solitude are almost inseparable. The expectations of tradition coupled with the limitations of law gave women of the late 1800s very few opportunities for individual expression, not to mention independence. Expected to perform their domestic duties and care for the health and happiness of their families, Victorian women were prevented from seeking the satisfaction of their own wants and needs. During her gradual

awakening, Edna discovers her own identity and acknowledges her emotional and sexual desires.

Initially, Edna experiences her independence as no more than an emotion. When she swims for the first time, she discovers her own strength, and through her pursuit of her painting she is reminded of the pleasure of individual creation. Yet when Edna begins to verbalize her feelings of independence, she soon meets resistance from the constraints—most notably, her husband—that weigh on her active life. And when she makes the decision to abandon her former lifestyle, Edna realizes that independent ideas cannot always translate into a simultaneously self-sufficient and socially acceptable existence.

Ultimately, the passion that Robert feels for Edna is not strong enough to join the lovers in a true union of minds, since although Robert's passion is strong enough to make him feel torn between his love and his sense of moral rectitude, it is not strong enough to make him decide in favor of his love. The note Robert leaves for Edna makes clear to Edna the fact that she is ultimately alone in her awakening. Once Robert refuses to trespass the boundaries of societal convention, Edna acknowledges the profundity of her solitude.

(<http://www.sparknotes.com/lit/awakening/themes.html>)

The woman in *The Awakening* has achieved a freedom from her pressure inside her home. She was bound inside the home only by expecting the taking care of family members, especially children. With the development of the plot she came to know about her own independence feelings and she releases her psychological pressure by enjoying her life. Women in *The Awakening* have been given minor rights even by law. Without considering these entire barriers, protagonist is searching the happiness of life. At last she got to know that even if she finds the happiness nobody accepts it. Her husband and society are not going to accept it because woman has been given a dark image by the social set up. In this novel also slightly the research topic is available. It is the psychological freedom of woman and her psychological oppression. Though it is there, the presentation of psychological oppression is different. The author, Kate Chopin, tries to show the psychological oppression of protagonist through her entertainment of life at the later part of the novel. But in *Giraya* this is the other way and she has no any roam to enjoy her life. By her thoughts readers are given a nature of her psychological oppression. So by this literature it is clear that different authors have expressed the women's psychological oppression in different ways. For that, existing social methods may have been a reason. The practiced social system in 1970s is feudal system and it is a byproduct of colonialism. The contextual background of *Giraya* is this feudal system and all the roots of Kamini's psychological oppression are tied with this system. But in the awakening this type of an area framed social system is not maintained and it is a common patriarchal society which is in that time period.

How Emma connects with the research topic is as the concept of marriage. Emotional and social obligations of marriage have been major issues of women measurement in Emma. Even though it doesn't reveal a psychological battle of a woman it shows the importance of the marriage to a woman. Since that idea it has a slight connection with *Giraya* because

Giraya reveals a pathetic side of its protagonist after her marriage.

The novel's limited, almost claustrophobic scope of action gives us a strong sense of the confined nature of a woman's existence in early-nineteenth-century rural England. Emma possesses a great deal of intelligence and energy, but the best use she can make of these is to attempt to guide the marital destinies of her friends, a project that gets her into trouble. The alternative pastimes depicted in the book—social visits, charity visits, music, artistic endeavors—seem relatively trivial, at times even monotonous. Isabella is the only mother focused on in the story, and her portrayal suggests that a mother's life offers a woman little use of her intellect. Yet, when Jane compares the governess profession to the slave trade, she makes it clear that the life of a working woman is in no way preferable to the idleness of a woman of fortune. The novel focuses on marriage because marriage offers women a chance to exert their power, if only for a brief time, and to affect their own destinies without adopting the labors or efforts of the working class. Participating in the rituals of courtship and accepting or rejecting proposals is perhaps the most active role that women are permitted to play in Emma's world

(<http://www.sparknotes.com/lit/emma/themes.html>)

When the consideration goes on women's psychological oppression from a Sri Lankan perspective, there is no other important writer as same as Punyakante Wijenaiké. Other than Giraya, she has written many novels based on Sri Lankan women's issues. Sri Lankan Woman is oppressed under many social contexts within the country. *The waiting earth, Amulet, the third woman, the betel vine, when guns fall silent* are some of the revelations of women's problems under deferent Sri Lankan social backgrounds. Amulet is one of the best by the author and it clearly reveals the psychological nature of woman in respect to the factor of sex.

Neshantha Harishchandre has written a lengthy essay on whole Punyakante Wijenaiké's writings with analyzing women issues. It has touched most essential status of women life such as marriage, pregnancy, childbirth etc. Even it was based on those sides it has not given a prominence of psychological sufferings of women characters in Wijenaiké's writings. This research has paid an attention on psychological oppression of those characters with figurative language used in the novel, Giraya. Therefore this research separately stands from the other literatures. The following is the conclusion Harishchandre's article.

Wijenaiké's portrayal of love, marriage, and female sexuality, and how far these issues propagate the oppression of women in Sri Lanka, is both sensitive and honest. Lokuge says that Wijenaiké's stories "reflect the aspirations of her time" (Lokuge, 164). Looking at Wijenaiké's stories in chronological order, one may discern her evolution as a writer of women's fiction. Part of this evolution has to do with her portrayal of issues regarding love, marriage, and female sexuality. For instance, if we were to analyze her stance on marriage, and see whether there seems to be a change in her outlook towards it, we might compare one of her earliest stories with a recent one. The girl who was married off in "My Daughter's Wedding Day" (1963) as a virgin, has given place to the lecturer who toys with the idea of living with her fiancé before marriage in "To Fall in Line ... " (1998). Even her individuality has evolved. Whereas

earlier, the girl was just a "daughter", with no name mentioned, now she has a name as well as a distinct personality. The only time the writer allows a voice to the former in the whole story, is when she "whispers" timidly in reply to her mother's crude questioning as to whether she has slept with any man: "No, Amme, no!" (The Third Woman and Other Stories, 118). On the other hand, Annekha has very definite views on love, marriage, and female sexuality, which she does not hesitate to voice before her mother. Yet in some instances, Wijenaiké seems to be still steeped in conventional prejudice. This can be seen even in her latest collection of short stories, *That Deep Silence* (2009). In "The Distant Dream", marriage is still defined as the "normal" life for a woman: "Yet I had been hazily aware that I may ... never know love, never marry, never have children, never lead the normal life intended for a woman (129)". In some depictions of the unmarried woman, too, the writer has not gone beyond her earlier characterizations of spinsterhood as given in Sappohamy in "The Tree Spirit" (1963) and Hewawathie in *A Way of Life* (1987). In "Tradition", the narrator says of her sister-in-law: "Being a spinster, she had a twisted mind and a narrow way of thinking" (132). Wijenaiké has succeeded in giving an authentic picture of love, marriage, and female sexuality in her fiction, moving along with society's changing attitudes to these issues, to a certain extent. Yet the occasional patriarchal biases seen along the way prevent the critic from seeing her as a champion of women's causes, as one would expect a writer whose world has been described as "a woman's world," to be. (http://dlib.pdn.ac.lk/archive/bitstream/123456789/2760/1/News_hantha%20Harishchandra%20-%20Vol.%20XXXV%20Nos.%201%20%26%20%202009.pdf) At last it is better to mention about a book of Rajiva Wijesinghe on essays on Sri Lankan writing in English. The book was named as *Breaking Bounds* and Giraya was introduced there as an artistic failure. Since the author has missed the logical connection of Sinhala month method when she was ordering the chapters of novel, prof. Wijesinghe is on this mind. But by and large it must be mentioned that this article also has not been addressed the women's psychological to a considerable level. Therefore researcher has strongly accomplished that revealing the psychological oppression of Kamini through a figurative language should be elaborated as a new research. Since that reason this research has come to the light.

IV. METHODOLOGY

The content of the printed novel, *Giraya* has been analyzed in respect with the suggested research topic. Therefore methodology follows the method of content analysis. In the content analysis, researcher has collected related quotations from the book and the book is considered as a source of primary data. Quotations have been presented by chapter wise. In the data analysis the competence of figurative language has been elaborated with its figures of speech. This evaluation has been done based on the collected quotations and they have performed a significant role in this research.

Even though *Giraya* is a novel, it has been written in the form of a diary. The narrator reads her diary for the reader which is in the first person point of view. In a diary, people put their

notes according to the dates and days. In the same way the book has been published as the author's diary. Therefore, the chapters are invisible in the *Giraya*. Instead of that it has been ordered according to the dates of the year. Hence one date is considered as one chapter. Dates of the years have been presented according to the Sinhala cultural pattern.

According to the number of days present in the novel, *Giraya* has 57 chapters in 151 pages. The women's psychological oppression has been weighted according to the dictionary definitions of psychology and definitions of psychological scholars. The researcher has assumed that the quotations given in data analysis express Kamini's psychological oppression in the novel. Even though they express Kamini's psychological oppression, most of them do not elaborate it by a figurative language. Therefore the researcher has selected 7 quotations to his analytical part.

V. DATA ANALYSIS AND RESULTS

Before the presentation of detailed analysis of data, a knowledge of Sinhala culture has to be spread out upon the readers' mind since it is a convenience to understand the research proposition ideally.

The novel, *Giraya*, has been written based on Sinhala culture. If the reader is born to Sinhala culture, he/she is capable of catching the thematic idea of the novel without any hard effort because they know almost everything about Sinhala culture. If the reader is foreigner or new comer to the Sinhala culture, he/she little struggles to understand the novel properly because their cultural background is totally different from the cultural background of the *Giraya*. They seem to catch only the literal meaning of the novel. If someone needs an in depth analysis of *Giraya*, he/she must definitely have studied about the cultural obligations of Sinhalese and their traditional objects.

The best example for this is the title of the novel "Giraya". There must be a strong reason within the author's mind to put the title as *Giraya*. It seems to be that the author has put the title by considering *giraya* as a traditional object in the Sinhala culture. Not only that, but also she may have considered about its cultural obligation with Sinhala People. Punyakante Wijenaiké has written a note on the back page of *Giraya* as follows.

"...a *giraya* is a familiar object in most Sinhala homes. Fashioned out of brass, steel, silver, or gold it comes in a variety of shapes and sizes according to the status of its owner."

The word "familiar" in the above quote gives an impression where *giraya* has been with Sinhala people for a long time. If somebody is familiar with someone they must have a longtime and strong association. So as to *giraya* with Sinhala people. *Giraya* is the arecanut-slicer and it can be visible even nowadays in Sinhala homes, especially in the rural set ups. Many people in the remote villages in Sri Lanka have a habit of chewing betels. It is a cultural custom rather than a habit. It comes from generation to generation and they believe that when they do so, they maintain the cultural obligation to the next generation. Betel chewers in the villages are more respected rather than those who don't do it since it has been a symbol of rural life.

For a chew of betel, villagers use betel, arecanut, white chunam, tobacco, cardamoms and cloves. *Giraya* is used to slice the arecanut which is a seed of hard surface. These companions of a chew of betel including *giraya* are more respected in Sinhala cultural functions. *Giraya* is used as a symbol of strength in many cultural events in Sinhala culture. When Sinhala people invite for a wedding, they offer a betel tray to the invitee. Betel tray is a symbol of invitation and it is filled with companion of a chew of betel. Moreover, the head priest of the buddhist temple is usually invited for religious functions by offering a betel tray. *Giraya* is often a part of this betel tray. Companions of a chew of betel are considered as the symbols of prosperity in Sinhala culture.

In additionally, exorcist who is considered as the physician of the village makes use of the *giraya* to cure the disease of the people by having a treatment called *Dehi kepima*-cutting lemons. With these basic cultural understanding of the object *giraya* it is better to have a consideration on women's psychological oppression present in the novel.

1. Chapter 1 (Paragraph 3: sentences 1-9)

THE GIRAYA, arecanut-slicer, lies motionless, its steel damascened legs spread wide open, its hands clasped in perpetual worship. Its face is stern, contemptuous with straight nose and firm chin. Its knot of hair is low at the nape of the neck. The blacksmith who created it must have had a certain woman in mind. Why did he make a *giraya* in the shape of a woman....The blade which grips the arecanut and cuts it now lies as motionless as the face.(2)

This is the first explanation of the *giraya* given in the novel. The author has been very careful to express it in the second page of the book because she is in need of making the platform for her intention on *Giraya* earlier. With that mentioning, readers are given a clue that writer has something special and strong with *giraya*. Great writers of literature make their platform by passing the clues to the readers in the beginning of their masterpieces. Readers are given a couple of information about the *giraya* by this explanation.

1. The outlook of *giraya*
2. The function of *giraya*

The outlook of *giraya* is explained up to the final dot as much as possible. Doubtless, a fine mental picture of a *giraya* is visualized on the readers' mind when this quotation is read. Therefore the language is imaginative and this explanation functions as a kind of imagery. It is very interesting to say that the word *giraya* is both bold and capitalized. Through that technique also, readers are proved the strong emphasis of author on *giraya*. At the same time, an imagination of women figure also begins to create in the mind of readers by the words like *legs, hands, face, straight nose, firm chin, knot of hair, nape of the neck*. Since then the word *giraya* starts to generate the clue of symbolism.

The beauty of writer is she symbolizes the Sri Lankan oppressed women through an extremely imaginative language. Through the imagination of *giraya*, readers tend to think of a woman figure. That woman figure is shown by the figure of *giraya* and readers are given the condition and status of the woman by explaining the outlook of *giraya*. This idea is more proved with the couple of words where *perpetual worship*. The

depicted woman figure is always worshipping and a question begins to generate within the readers mind where, to whom and why this woman is always worshipping. This question is solved in the following chapters for the readers.

Nevertheless, after all, the reader is able to have an idea that there is a close relationship in between woman and the giraya in the novel. It has been laid on reader's mind through a transformation of imagery into a symbol. This is a super quality of the author in which shows the beauty of her competent figurative language.

At last of this paragraph, function of the giraya is mentioned in a single sentence. It can slice an arecanut which is a seed with a hard surface. Before the slicing, the two blades of the giraya catch the arecanut and when it catches the arecanut, it can't go anywhere. Indeed, the blades of the giraya are very sharp and when it becomes blunt, blacksmith again gives it to a life by sharpen the blades.

After providing all information of giraya the narrator has an auto generated question where *why did the black blacksmith make a giraya in the shape of a woman*. Readers are given a clue to think further. Critical readers interpret this as the main message of the novel. Symbolism always stands for other meanings. Giraya symbolized the oppression of Sri Lankan traditional woman and this oppression is both physical and psychological. References are in large numbers to convince this symbol throughout the book. Some of the following quotations also prove this idea.

According to the quote, giraya is the arecanut slicer. Arecanut is a symbol which symbolizes the Sri Lankan traditional woman. Giraya is its slicer of oppression. Arecanut even itself is a seed of a hard surface and it reflects the idea of the strong tolerance of Sri Lankan traditional woman on oppression. Giraya is the slicer of that strong woman and the word *slicer* is also meaningful. This is different from cut. If something is cut, pieces are least. But if it is sliced, pieces are unimaginable and uncountable. That shows the pathetic psychological nature of Sri Lankan traditional woman which is given by her mother-in-law and husband. Two sharp blades of the giraya are symbolized this dual pressure and this symbolism is witnessed by the lots of following quotations.

2. NIKINI FULL MOON DAY– Chapter 18 (Paragraph 04 and 05)

'Let Sugath crawl more outside this room. Why must he be always with you?'

My heart stood still. Then it began to beat again.

'He must not expose himself too much' I said hastily.

'He's recovering from a cold'

Let's Lucia Hamy take him then and look after him. She will boil coriander water and cure his cold.'

My mouth is dry as I say: How can I give him to a mad woman?'

Lal flushed. 'You misunderstand Lucia Hamy just as you misunderstand everybody else in this house.'

I stand still. So they have spun the web strong around me already! Soon I will be caught like a hapless arecanut between the jaws of the giraya. My son will be taken from me and then what would happen to me? (62)

Women's psychology shapes according to their assigned roles in a particular system. It is also based on their stages of age. In the case of Giraya, Kamini is a mother of 22 years old. As a mother, her psychology is a significant factor been highlighted in the Giraya. The writer of the Giraya very beautifully depicts the nature of a mother's psychological oppression in this quote. Any mother of this world is very loveable towards her children. Affection of a mother is always with her children. To a mother, her everything is her children. Nobody can be expressed the value and the size of the mother's love by words. So as to Kamini. She has an eight years old son namely Sugath. He is the only relief to Kamini inside the waluwe amidst lots of pressure. Kamini cures all her psychological oppression by looking at her son's face. She locks always inside her room and she spends most of the times of her day with Sugath peacefully. If someone is ready to claught this priceless affluence in between this mother and son, how insane they are? If it is so, what would be the nature of psychological oppression of Kamini.

By considering all these factors, the author has put the above dialogue into the novel. According to the dialogue, Lal's effort is taking out Sugath from Kamini's room. He was forced to do so by Adelaine, mother-in-law of Kamini. For that, readers are given lots of references earlier. The beauty of Punyakante Wijenaikie is with the following sentence.

My heart stood still. Then it began to beat again

After the rude question of Lal, narrator says above sentence. It shows the readers how a mother suffers if she knows she is going to lose her son. If the heart of somebody stops that man/woman must be died. In the death of a being, heart stood still. Since Kamini expresses these utterances she becomes a dead body when she gets to know that her son is going to be taken away from her. That shows a mother's ascendant love towards her son. And also it shows the nature of the sudden shock which emerges within her mind.

The most important fact is that this shows her psychological oppression as well. If there is something which attacks seriously on a mother's psychology it should be about her children. It is better to give an attention on the sentence my mouth is dry as I say. Kamini indirectly says that spittle of her mouth is dried up until to the last drop. This expression again reflects the psychological oppression of Kamini. According to the definition of psychology, studying about the human mind and its behavior is psychology. At this time nature of Kamini's brain is visualized by her behavior. Her behavior shows how hard she is psychologically suppressed by this questions asked by Lal. Her behavior is drying up as her mouth. Human mouth is always wet with spittle unless she/he is not good health. In the other times if it is dried up it should be out of terror or shocking. Losing her son is the shocking moment of Kamini.

Thus the author very beautifully expresses Kamini's psychological oppression by this sentence. The author expresses the climax of Kamini's psychological oppression as a mother at the end of this quotation. In there readers are said by the narrator that there is a strong spread web around her which created by Adelaine and company. This web creates the psychological oppression of Kamini. The web is nothing but the plan of Adeliene to take out Sugath from the room.

Again the identity of Punyakante Wijenaiké emerges from these last two lines of the paragraph. The main symbol of the novel is used again and readers are convinced that giraya and arecanut are definitely used with the meaning of symbol. Narrator says that I will be caught like a hapless arecanut between jaws of the giraya. According to this statement, Kamini is the arecanut without any doubt. Jaws of the giraya are Lal, her husband, and Adelaine, her mother-in-law. They are the psychological oppression of Kamini and reader can think how the people slice arecanuts by giving a huge force on it. Nature of this force given by Adelaine is elaborated in the next quotation. At the end of the day, the arecanut is a pile of slices. So as to Kamini's psyche. At last of the quote readers are given an open ended question to think of her psychological oppression as a mother.

My son will be taken away from me and then what would happen to me?

This is a very serious and critical question which leads the readers to picture out the real psychological oppression of Kamini.

3. Vesak (May) 18th – Chapter 6 (Paragraph 8 : sentences 9-13)

I watch the giraya at work in Adeliane's hand. As she slices the arecanut she goes on talking to Lal. The hand is firm and hard upon the giraya, though her voice is silvery soft. Lucia and I are both unhappy. She, because she is not permitted to slice the arecanut, and I.....look at Lal and heave sigh.(25)

Anybody who pays a deep attention on giraya is able to have an impression that giraya is a highly symbolical novel. The author has been more creative enough with symbolical representation at a larger account. This second quotation is one of the best of her symbolical representations. Actually her success is not only on symbolical representation but also how she has expressed the psychological oppression of Kamini through symbols. Her competence on figurative language mostly relies on symbolism. Kamini has been portrayed as the protagonist of this novel and she represents whole traditional women of Sri Lankan society in 1960s. Once a traditional poor girl is tied up with a man who belongs to a rich and high cast family, this phenomenon is common to any woman. She has to be undergone so many oppressions under the roof of her husband's home. It is both psychological and physical. What Punyakanthe Wijenaiké has depicted with this novel is psychological oppression of that woman.

The word giraya in given quotation is a symbol and this is the most powerful symbol in the novel. The author tries to sum up the core idea of the whole novel by this symbol. According to the earlier explained symbolical expression, Kamini is oppressed by two persons inside the walauwe. The major pressure comes from Adelaine and the other is from her husband, Lal. This quotation shows how and in which way Adelaine gives her pressure on Kamini. The author has needed to show that Adelaine is a pretended character. Adelaine always shows her white face to those who outside the walawuwe. While she is talking, she wants to show the others that she has a clear vision

on what she is doing. And also she needs to show that she is a woman who has soft qualities. But Kamini only knows how soft Adelaine is. With a kind of sarcasm the author depicts these ideas by the words of *her voice is silvery soft*. The adjectives, silver and soft, give the quality of sarcasm. Though her voice is so, her hand on giraya is firm and hard when she slices the arecanut. By these two adjectives, firm and hard, readers are given an idea how hard Kamini is oppressed by Adelaine. She slices arecanut with hard and firm effort. As a result of that effort, small piece of arecanut can have. So as to psychological oppression of Kamini. Since giraya and arecanut are already symbols of this novel reader can think that Adelaine gives a rough pressure on Kamini as same as she gives a firm and hard effort of slicing the arecanut. Kamini's psychological oppression is in bit and pieces as same as arecanut becomes small pieces. It is because of her mother- in-law's firm and hard pressure on her. This is being done by various ways and taking out Sugath from kamini's room is one of the foxy ways of Adelaine's pressure.

At the end of the paragraph the author again tries to show the psychological pain of Kamini because her husband is still with her mother like a child. This is explained in the form of a comparison. The comparison is in between Lucia Hamy's love of slicing arecanuts and Kamini's love towards her husband. This is indirectly shown and it is obvious that writer says that Lucia Hamy is very upset because she was not given to slice the arecanut today. After that statement author has used *I.....*. These few dots may mean that Kamini is also very upset like Lucia Hamy because her husband is always a dutiful character to his mother. Since that reason she is being neglected and ignored by her husband. That is the reason Kamini heave a sigh by looking at Adelaine arecanut slicing. The word heave has a powerful hidden meaning of sorrow. People heave sighs when they are unable to bear their sorrows of mind. So as to Kamini.

4. Esala (July) 17th – Chapter 14 (Paragraph 11 : sentences 15-19)

She placed a hand on Manel's shoulder. I could feel those thin, strong fingers dig into my bones as if her hand was upon my own shoulder. I could feel the power of her will bending my will, breaking my strength like the giraya cutting arecanut into pieces. And she would get Lucia Hamy to sweep up the pieces that had once been an individual with a mind of her own, and hide them away in a drawer..... (53)

This paragraph is one of the best examples to show the women's psychological oppression in the novel. This shows the reader that Kamini is seriously psychologically oppressed by her mother-in-law. According to the human psychology, if somebody thinks about a man or woman continuously, that man/woman has a huge impact on his/her mind. So as to Kamini. She thinks more about her mother-in-law because Adelaine has created a huge resistance on Kamini's life by various actions inside the walauwe.

This whole paragraph is an imagination of Kamini and it is originated out of fear towards Adeliane. Even though nothing happens to Kamini by the actions of this paragraph, she thinks that if this (the hit given to Manel by Adelaine) would have given to her what would be? She says that thin, strong fingers dig into

my bones .If the hit got on Kamini, she gets it from strong and thin fingers. The author uses two different adjectives here where thin and strong. If one can think of the point of a needle, which is very thin. Once the point is thinner and sharp it can dig the things easily. Therefore Adeline's finger has that power of oppression which is thin and strong .That has been highlighted by the word thin and strong. The word bones and dig are also more figurative. Bones are the strongest parts of the body. *Dig* gives an impression of taking out something by making a hole. If there is something which is capable of digging strongest thing in a system, definitely it should be a super strong one. So as to power of Adeline on Kamini's life. This power is nothing but psychological oppression of protagonist, Kamini. This psychological oppression is further explained by writing the power of her will bending my will. Kamini has happened to keep back her every wishes on future since her oppression. Adeline influences on Kamini's will. When somebody is controlling one's willingness, it is directly affected to the psyche of relevant person

This imagination is further decorated by a simile called breaking my strength like the giraya cutting arecanut into pieces. In the case of a simile it always follows a comparison in which expresses the good and bad qualities of both the parties. Here the author remembers us the situation of slicing arecanut by the giraya. When giraya slices, an arecanut is parted into two parts first of all. The surface of the arecanut is hard and since this reason it needs the pressure from both the sides. The hard surface of arecanut can be referred to the energetic tolerance of pressure which is on Kamini from her mother in law. Even though she is more tolerable on that pressure she is no longer to survive. This idea is enriched by the phrase of the *giraya cutting arecanut into pieces*. Adelines pressure on Kamini is capable of perishing her strength in to pieces not even into two parts. The words pieces again shows the reader how powerful the pressure of Adeline on Kamini.

Even though this is a simile readers are again convinced this has a more symbolical power. Here readers are very clear that kamini is like the arecanut which is caught by the couple of blades of giraya and through that the author tries to show the size of the psychological oppression of Kamini. Readers are given the information of how hard she was oppressed by the mother in law. For that the author has used a competent figurative language.

5. Esala (July) 17th – Chapter 14 (Paragraphs 13,14 : sentences 7-10)

The blending of their voices came to me like the low murmur of the wind warning the trees of an approaching storm. 'Yes, my son,' said Adeline's silver soft voice. 'How true is the saying that when the kingfisher is away the small fish come to the surface.....You must be on your guard against her.....' (54)

This quote convinces the idea that readers should be a person of Sinhala culture to correctly understand the women psychological oppression present in the novel. Extremely the language used here is figurative and that is rich with an idiomatic phrase. This shows the quality of competent figurative language which is filtered by a Sinhala idiomatic phrase. That is the beauty of Punyakante Wijenaike and through that writer portrays the idea that how much this protagonist is psychologically suppressed by her mother in law Adeline.

These utterances are coming from the room of Adeline and she was having a chat with her son after his long journey to Colombo. Both mother and son meet after a long time and they have had lot of things to talk. During this talking, Kamini is heard this utterances which were made by Adeline. Idiomatic Phrase is included in that utterance and before that the author modifies the voice of Adeline by putting two words where silver and soft. These two adjectives show the beauty of language. Silver is a white and bright metal and it gives an impression of more clear. Adeline voice is very clear and if she says something silver voice that is direct and it has to be implemented by the householders, including her son. The word soft gives the light to the word silver and it strength the hidden meaning of silver.

Kingfisher is a bird which hunts the fish by having a smart strategy. The kingfisher is also very skillful of flying faster and it is also able to grab anything in the ground level at once since it is a faster. Since this inborn skill it is famous in Sinhala people as a skillful hunter. Its way of hunting is it rests at a branch of a tree which is too far away from the place of the fish. If it is a river, the kingfisher waits on a branch until fish come out from the water. Fish don't come out often and kingfisher has to be in patience until they come out. Once they appear on the water surface it flies faster and catch a fish by its beak. Then it flies away faster.

Within this kind of scenario, small fish comes out of water surface when the presence of kingfisher is not there. If they are aware of the kingfisher is too far away from their habitat they come to the surface of the water and enjoy with the sun light.

Punyakante Wijenaike uses this idiomatic phrase to show the readers that how adeline expects Kamini to be inside the Walawuwe. She should be like a small fish under the water without engaging with family matters. Adeline make use of her son to oppress Kamini and this oppression comes to Kamini psychologically. Adeline symbolically express this idiomatic expression. Readers can think of this line because of the last sentence of paragraph. You must be on your guard against her. The word *her* may be referred to Kamini because in this chapter readers are given references to think so. Therefore according to the idiomatic phrase Kamini is a small fish and Lal is the Kingfisher. Kamini supposed to be always under the Lal's observation and according to the Adeline's statement that has not happened for last days. Adeline does not bear this and she says indirectly Lal that she is too much when Lal's observation is lacking. Indirectly she asked to keep her under his ruling. It is a kind of order and the power of order is expressed by the auxiliary verb must. Therefore very beautifully author expresses the mother-in-law's oppression on Kamini. The way of expressing has been done delicately by using a competent figurative language.

Readers are given another beautiful figurative expression to show that How does this idiomatic expression of Adeline fell on Kamini. The first sentence of the above quotation is a best example of competent figurative language of the author to express women's psychological oppression. By that, the readers are able to realize that protagonist of the novel is seriously psychologically oppressed. Narrator says us the blending of their voices came to me Voices of Lal and Adeline are not clear to Kamini. That is the reason author has used the word blending.

They are actually not speaking but murmuring. That is another reason to use the word blending. After that, the author tries to relate this phenomenon with a natural incident by using a simile where the blending of their voices came to me like the low murmur of the wind warning the trees of an approaching storm. After the word like, the natural incident is mentioned. Before a storm the wind is natural. The wind is growing little by little before the storm. When this light wind touches the tress it is like a murmur. Eventhough it is a murmer, it is a hint of coming storm. In the case of Kamini this storm is nothing but her psychological oppression. After Kamini is heard about the statement of kingfisher she is completely psychologically flourished as she is going to take under the oppression of this son and mother.

6. Esala (July) 21st – Chapter 15 (Paragraph 05)

Lal, why do you not speak to me? My bare feet are bruised by the stones on the earth. I lighted a stick of incense and I saw your face upon the incense holder. I clasped my hands and looked up at the quivering leaves on the Bodhi tree and I saw your face like a pale moon so far away that I can never touch it. Why did you marry me Lal? I married you for security I admit: but you, why did you marry me? You saw me but once before the wedding. Did you not like me a little? I did not seek love in this marriage. And yet now it seems that love has become important to me. (55)

This is another symbolical representation of Kamini's psychological oppression. This paragraph is filled with different types of symbols which express Kamini's Psychological oppression towards her husband. The situation is set up in the temple yard. First of all the author has used the literary technique of apostrophe in the beginning of this paragraph. She addresses her beloved husband as Lal. These are not utterances, but imaginations. Speaking directly to an imagined listener is a good figure of speech and it shows her loneliness and absent mind to her husband. When an attention is paid on the sentence my bare feet are bruised by the stones on the earth the author symbolically says that Kamini is very helpless character and she is suffering. Kamini's feet are bare here because people usually don't wear the foot wears in a temple. Even though the real situation is this is so readers can interpret this idea from the perspective of Kamini's life. The life without any support of anybody is symbolized by the bare feet. Nobody is there to help Kamini, even her family members. Her mother struggles with life with another sister at home and father has passed away when she was at the last stage of her higher education. They have a very poor economic background as well.

Since this humiliation though there is an opportunity to go back to her home, Kamini cannot go home because she knows how hard they spend their lives. Inside the walawuwe also Kamini is helpless. Her mother-in-law does not accept her as the niece of the walawuwe. She is not involved with the family matters. She only feels that she made use to have a son to the walawuwe. So she feels all alone in Walawuwe. Not only Adelaine, but also Lucia Hamy, Old Loku, Manel do not treat her as the niece of this walawuwe. The devoted servant of her mother-in-law, Lucia Hamy, is the second burden of Kamini next to Adelaine. Since these all the reasons Kamini feels her life is

very helpless. That is why the author has symbolically used the phrase my bare feet.

Once the feet are bare they are open to be wounded and can be bruised by the stones. The word bruised symbolized her psychological oppression. When there is a bruise it is bleeding. Kamini is also psychologically bleeding by this wound of oppression. The stones symbolize the forces which crates psychological oppression. Stones are very hard. So as to psychological oppression of Kamini. Adelaine, Lucia are taken a prominence place among those forces. Therefore according to this full sentence, helpless life of Kamini is severely psychologically oppressed by her mother-in-law and her devoted servant lady, Lucia Hamy. Lal is the only one who can listen to this injustice because he is the husband of her. She thinks that Lal is the only assistance to her inside the walawuwe, even if it is not so. That is why the author has used the technique of apostrophe before this symbolical expression.

The author has used another beautiful symbol to show that Lal is like an effigy inside the walawuwe. Even though Kamini likes to have the admit of Lal, she is not getting it because Lal has been used by his mother, Adelaine. I lighted a stick of incense and I saw your face upon the incense holder. People usually light the stick of incense when they are at temples. So as to Kamini. Kamini sees the face of Lal on the incense holder. Incense holder is a nothing. Within few second it becomes as a pile of ash. So as to Lal. Kamini thinks that Lal is also like this incense holder. He is not given any alone authority to do anything inside the walawuwe. Adelaine runs everything and Lal says 'yes' whatever he is asked to do. In the case of Kamini also he follows instructions of Adelaine. He spends his marriage life according to his mother's instructions. This is not a good sign of a successful marriage and if this continues, Lal also has to become a pile of ash when his mother is dead. It is like the nature of incense holder. A good husband must be a man of strong spine in decision making. That is why Kamini sees Lal's face on incense holder.

Beauty of Punyakante Wijenaik in this paragraph is not only on symbolism but also on similes.

I saw your face like a pale moon so far away that I can never touch it

This is purely a simile and the word like shows the readers two words where the face of Kamini's husband and the pale son. A comparison on these two things is built on readers mind when this is read. Still the face of husband is a moon to Kamini. This means she sees a sign of compassion in his face. Even though it is so, the moon is pale. Pale means his good qualities are hidden by external forces inside the walawuwe. Author further says that moon is so far away. This means that even though Kamini and Lal are husband and wife, there is a long gap in between them both psychologically and physically. It is proved by the author in the following chapters as well. That I can never touch it means that this gap cannot be filled and it is a long lasting one.

After expressing all these symbolical presentations, Kamini asks a question from Lal where Why did you marry me Lal?, It is a direct and straightforward question. By this question readers are clear that all above symbols relies on this question. Moreover, readers can understand the psychological pressure of the Kamini. When a wife asks a question like this from her husband readers can think how pathetic the situation is. The

indirect meaning of this kind of question is she is getting sick of her marriage. For Kamini, it may be out of the humiliation of her husband and mother-in-law. Otherwise a good wife never asks a question like this.

A woman always expects a security from her husband. But when readers are given following sentence I married you for security I admit: but you, they can think that expected security hasn't been received to Kamini. That negative quality is generated by the couple of words but you. This shows language competency of author. She uses coordination conjunction *but* after the sentence which revealed her expectation of marriage. People use *but*

to express contrastive ideas. So as to with this but also. It gives an idea that Lal has not given the security Kamini expects from him.

After that technique again the author has put the same psychological question of Kamini why did you marry me? Placing the same question in two times shows how much Kamini is suffering from this oppression. At the later part of this paragraph the author has been able to make a pity feeling on readers mind about by putting did you not like me a little? The word little is more powerful and when a wife asks this question that is even more significant. Husband and wife are supposed to have a strong liking to each other. But this wife is asking her husband that did you not like me a little? This expression says the importance of husband's love towards his wife.

7. Vap(October)11th – Chapter 25 (Paragraph 07: sentences 2-10)

Why had Adelaine arranged my marriage? To show the world that she had done her duty? To have a grandchild to carry on the illustrious name? I know now that she is a woman who cannot bear to have her son happy with a woman other than herself. Yet she has to have a daughter-in-law to show the world that everything was as it should be, in a walauwe. And so she had chosen me, as Manel had put it, so that she could keep me in the background. And when she found she could not keep me in the background....It is the strength of her love for her son that frightens me. It is like an umbilical cord slowly strangling us to death....(83)

This quote is another expression of Kamini's psychological oppression. First of all author tries to show the psychological nature of Kamini as humiliation created by Adelaine. The sentences given in the quotes are thoughts of kamini. By those thoughts, readers can have an exact picture of her psychology. Actually Kamini is really worried about her marriage because she now knows that she was used to have a grandchild to walauwe . Adelaine had wanted to show the world she has done her duty for his son. According to all these idea what reader can see is that Kamini is considered merely a woman who was used for the task of reproduction. By these questions which generate inside the Kamini's mind readers are shown the status of Kamini's psychology. These questions show the destitute nature of Kamini life. After all she came to know that she has been used by the waluwe people. When somebody gets to know that he or she is used by the people that feeling is very pathetic. Actually that feeling cannot be expressed by words. Even if it cannot be

expressed, Punyakante Wijenaiké has tried to depicts that feeling on readers mind. For that, these self-generated questions of Kamini have been used as a strategy.

Moreover the author has needed to show the readers that Kamini's psychological battle is not to be over. And also she wanted to show the readers that her dark imagination of her life is everlasting lasts. For that author has used a simple technology. That is nothing but a few dots. It is a salient language technique used by the author. At the end of this quotation readers need the super quality of Punyakante Wijenaiké writings. It is nothing but her figurative language competency on women's psychological oppression.

In last two sentence readers are doubtful to interpret her figures of speech. In there first of all she has said that Adelaine's love towards her son is like an umbilical cord. It is very clear that since readers are given the word like it is a simile. Since in the case of simile comparison always follows, readers compare the umbilical cord and her love towards son. Punyakante Wijenaiké very beautifully converted this simile into a symbolical representation by putting slowly strangling us to death. Hence readers are now obvious that her love towards her son is symbolized by an umbilical cord. Umbilical cord is the living tube between mother and fetus before the delivering. If that umbilical is a cause to the death of baby how pathetic it is. So as to Adelaine's love towards her son. It will decide not only his destination but also the destination of others inside the walauwe.

VI. FINDINGS AND DISCUSSION

Ultimately this research shows that the success of figurative language in expressing Kamini's psychological oppression is mainly based on symbolism. All over the book symbolism has been presented in different forms which grip the spine of figurative language in the research. Though literary devices such as sarcasm, similes, metaphors are presented they seems to be all alone in expressing research proposition and their contribution in the novel is reinforcing the main literary technique symbolism. The complete novel is built upon a main symbol giraya. Everywhere this symbol performs a duty to show the psychological oppression of Kamini. To say that the giraya is the guised power of the novel, Lucia Hamy, the devoted servant of the walawuwe, always holds a giraya in her hands. As same as she has a giraya always in her hand, giraya exists in the novel also as the main symbol.

Being the giraya as the main symbol of the novel leads the readers to a cultural corner. That is nothing but Sinhala culture and it's because of giraya is a cultural object which can be seen in everywhere of Sinhala people's lives. As same as giraya is everywhere in Sinhala lives, Kamini's psychological oppression is also everywhere in her life. This could be the base of this research and this may be the logical connection between Kamini and giraya. Therefore most of the presented quotations in the data analysis touch this main symbol and through that psychological oppression of the protagonist has been explained. Within those explanations other language devices also are presented on and off.

According to first quotation presented in the data analysis, writer's greatest skill of imaginative language is obvious. At the

same time she tries to transform the main image in the quote into a symbol. That is a super quality of Punyakante Wijenaiké's writing. Even if she came with an image, it is landed on the land of symbolism. She may have had a special interest on the literary device symbolism. That is what the reason Giraya is filled with full of images. So, initially, in this paragraph also that is ultimately obvious even though it began with a powerful image. Image has the quality of grasping the readers mind without moving here and there. By carving the image of giraya on readers mind first of all, she takes the readers interest towards her piece of writing. Then she accompanies readers towards the symbolism by putting a simple question why did the blacksmith make a giraya in the shape of a woman. This question has thousand and thousand hidden meanings which she reveals at the later part of her novel. So, in the initial level itself it is explicit that how talented Punyakante Wijenaiké is, when she conveys symbolical ideas through other literary devices.

When Punyakante Wijenaiké elaborates the psychological oppressive nature of Kamini through symbols, her assigned positions of the walawuwe also has been considered. Though inside the walawuwe Kamini was given several roles to perform by her marriage after all she is a loveable mother to her son. When it comes to the second quotation in data analysis it is able to see how Kamini is oppressed as a mother inside the walawuwe. One of the deliberative components of this research is Kamini's psychological oppression under the different roles inside the walawuwe. This quotation is an ideal example to convince the giraya is the main symbol of this novel which holds her power full hidden meaning. That is obvious by the sentence I will be caught like a hapless arecanut between jaws of the giraya. So the pathetic psychological oppressive nature of our protagonist is given here by a symbolical sentence. It again shows us Punyakante Wijenaiké's strong interest on symbolism. Not only this sentence but also my heart stood still then it began to beat again is also highly symbolical. It is strong enough to show a lamentation of a mother when her children are separated from her. So the author's laudable talent of symbolism in expressing Kamini's psychological oppression is again explicit by a couple of successful symbols. Therefore repeatedly what is proved is that the beauty of symbolism in presenting the psychological oppression of Kamini.

In the third quotation the author seems to be getting out of her traditional literary technique symbolism. Instead of that she has followed the literary device sarcasm when she depicts the Kamini's psychological oppression. That is mainly revealed by the term her voice is silvery soft as analyzed in data analysis. Here is a good example to say that writer merely doesn't depend on symbolism. Instead of that her figurative is language decorated by some other literary technique like sarcasm. But the skill of Punyakante Wijenaiké is converting the using technique into a symbol. Here how it was done is that adding two adjectives firm and hard in the next sentence. These two adjectives are again comes with several hidden meaning and mostly they says about the Adelaine's pressure on Kamini. So again the author has been successful in symbolical representation.

Though this research is an attempt to analyze the figurative language used in expressing Kamini's psychological oppression at the end of the day it seems like an analysis of symbolism in

expressing Kamini's psychological oppression. It's because of two third of figurative language is consisted with symbols. Quotation no. 4 again gives us symbols as follows. Thing, strong fingers dig into my bones, the power of her will bending my will, breaking my strength like the giraya cutting arecanut into pieces. So step by step, this research comes to an idea that the author's fully success is on symbolism. Quotation no. 5 is an author's reflection on his culture. This particular quote follows basically the literary technique of simile and it has an idiomatic phrase in Sinhala culture. The beauty of author is this idiomatic phrase expresses as a symbolical expression and by that trick protagonist's psychological oppression is obvious. Therefore this is again witnessed us that Punyakante Wijenaiké is very skillful to convert a simple idea into a symbolical expression with the help of other literary devices.

When the story of giraya thickens to its deeper level, the author has needed to show thicken psychological oppressive nature of Kamini as well. For that the author has decorated her figurative language using the same literary device symbolism. But in this stage, she has come with some symbols which seem to be the most successful symbols in revealing Kamini's psychological oppression. The top level of Kamini's psychological oppression is given in the quote no. 6 by mentioning my bare feet are bruised by the stones on the earth. Apart from this, to develop this idea the author has used a same question twice why did you marry me Lal? It is a kind of repetition as mentioned in data analysis and this can be pointed out a place in which the author has deviated of her main track symbolism.

After considering of all the data presented in the data analysis it is able to see without any hard effort, symbolism is the key in presenting the research topic. All most all of them at least were consisted with single symbols and it was the most powerful language figure in each particular data. Therefore what has been found out basically at the end of this research is Kamini's psychological oppression is presented through symbolical representation. Even though the research topic is connected with analyzing the all the figures of speech in Kamini's psychological oppression, symbolism has been basically emerged since other devices are not effectively engaged in expressing the research proposition. Their contribution in the novel is giving the nourishment to main symbols.

VII. CONCLUSION

Even though Giraya had been written four and half decades ago, it is millions worth even for nowadays because it has addressed a long time lamentation of the Sri Lankan married women. It is nothing but her psychological oppression inside the husband's home and Giraya is its literature revelation. Presentation of women's psychological oppression in Giraya exceptionally has been done by a figurative language and the competency of that language is elaborated by this research.

Kamini, the narrator of this story, has been used to relate the women's psychological oppression in Giraya. The readers are figuratively shown that how she is psychologically oppressed as a wife, niece, mother within the institution of marriage. She was basically oppressed by her mother-in-law and her husband inside the walawuwe,. The author has shown this oppressed nature of her

psychology in Giraya. That has been brought out to the readers through a competent figurative language and it is decorated by considerable number of figures of speech. The researcher has had an in-depth analysis of that competent figurative language through this research.

To emerge the psychological oppression of Kamini, symbolism has been often used by Punyakante Wijenaikē. This is clearly shown in the samples and data analysis. Even though she has used some other literary devices like similes, images, apostrophes, they have not been individually performed to show the psychological oppression of protagonist. What they have done in most of the time is strengthen the figurative quality of main symbols. Therefore at the end of the day, Giraya can be referred as a highly symbolical novel in which expresses the women's psychological oppression. Symbolical representation in the novel has been nourished by the other figures of speech.

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Impact of Surface Treatment of Leaf Litter on Soil Respiration in a Jhum Fallow

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Abstract- Degradation of land mainly through jhumming cultivation or slash and burning agriculture is the main concern in the mountainous tracts of North-Eastern India. Removal of vegetation especially tree species leads to major changes in an ecosystem. Soil respiration is one such important aspect of soil. It indicates the activities of soil organisms and supplying of nutrients to the growing vegetation. The present study shows that removal of common tree species in three types of slope in a five year old jhum fallow leads to a decrease in soil respiration. It was found out by comparing with plots treated with leaf litter and untreated plots. In the present location the increase in soil respiration due to treatment of leaf litter on steeper slopes was more than the gentler slopes. The reason being gentler slopes are in the upper tracts where human disturbances are more.

Index Terms- Initial chemistry, jhum cultivation, leaf litter, slope angle

I. INTRODUCTION

Slash and burning agriculture is referred to as jhumming cultivation in the North-Eastern region of India. The fields which are abandoned after cultivation of crops for two to three years are known as jhum fallows. In these jhum fallows few trees are left by the farmers without cutting in the initial slash and burning period and some of them survives burning. However small the number is the role played by these trees on the soil is important in order to evaluate the impact of felling and burning the trees. In order to study change of soil characteristics due to such activities, soil respiration is an important factor. Soil respiration reflects the capacity of soil to sustain plant growth, soil fauna, and microorganisms. It indicates the level of microbial activity and soil organic matter content and its decomposition. It is one of the earliest and still one of the most frequently used indices for the estimation of biological activity of soil (Tulaphithak *et al.* 1985). Soil respiration can be used to estimate nutrient cycling in the soil and the soil's ability to sustain plant growth. Therefore the present study has been undertaken to evaluate the change in rate of soil respiration in soil due to removal of vegetation specially trees.

II. MATERIALS AND METHODS

Study Sites

A five year old jhum fallow was selected in Tanhril village which is about 17 km westward from Aizawl lying between 23° 43'25" N and 23° 45'37" N latitudes and 92°38'39"E and 92° 40'23" E longitudes. Three types of slopes 25-35 % (steep), 5-25% (moderate) and 6-10 % (gentle) slopes were selected in the jhum fallow. Three types of common trees in the three slopes were selected out of the five to six trees remaining. They were *Duabanga grandiflora*, *Callicarpa arborea* and *Rhus chinensis*.

Surface treatment of leaf litter

Freshly fallen leaf litter of the three species were collected from the study sites. They were air dried till constant weight and kept in plastic mesh bags separately for each species and placed on the three slopes each in three different plots. They were fixed with small bamboo cuttings so that they were not flown away by wind or water. This type of placing of the leaf litter on soil was taken as surface treatment of the leaf litter on soil.

Soil respiration

Soil samples were collected from beneath the litter layer monthly from different locations and soil respiration was estimated monthly for 19 months starting from August, 2013 till February 2015. Soil respiration was estimated by using Alkali Absorption Method outlined by Anderson and Ingram (1993). Soil samples were also collected monthly from selected plots in the three slopes where there was no placing of the leaf litters. These plots were taken as control plots. The change in soil respiration due to presence of the litter was evaluated by comparing with these control plots.

Results and Discussion

The trend of CO₂ evolved was lower in the initial months and gradually increases attaining a maximum in the month of May, 14 in all the treatments and slopes (Figs. 1-3). The treatment plots have more evolution of CO₂ compared to the control in all the three slopes.

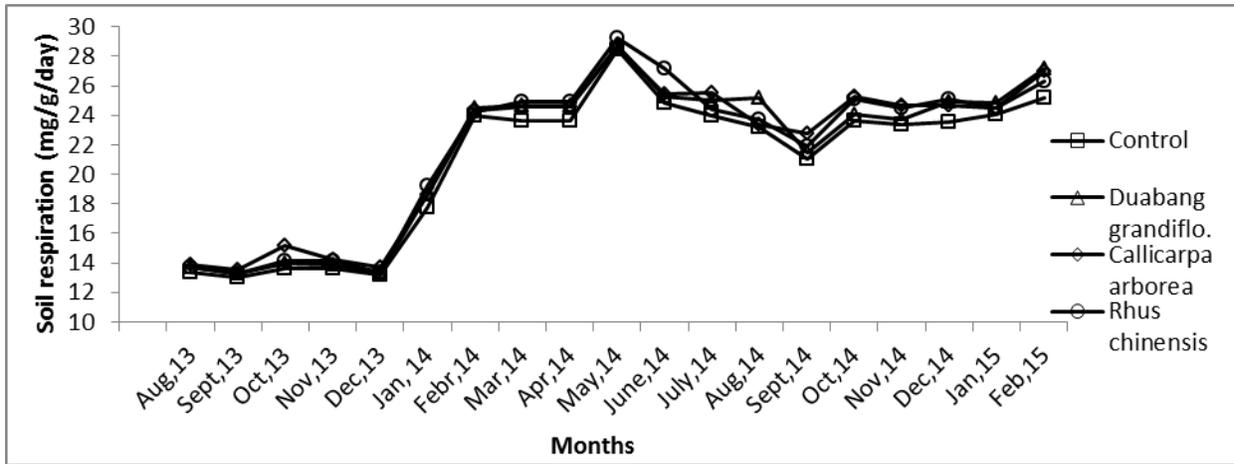


Fig.1 :Soil respiration in the leaf litter treated jhum fallow in the steep slope.

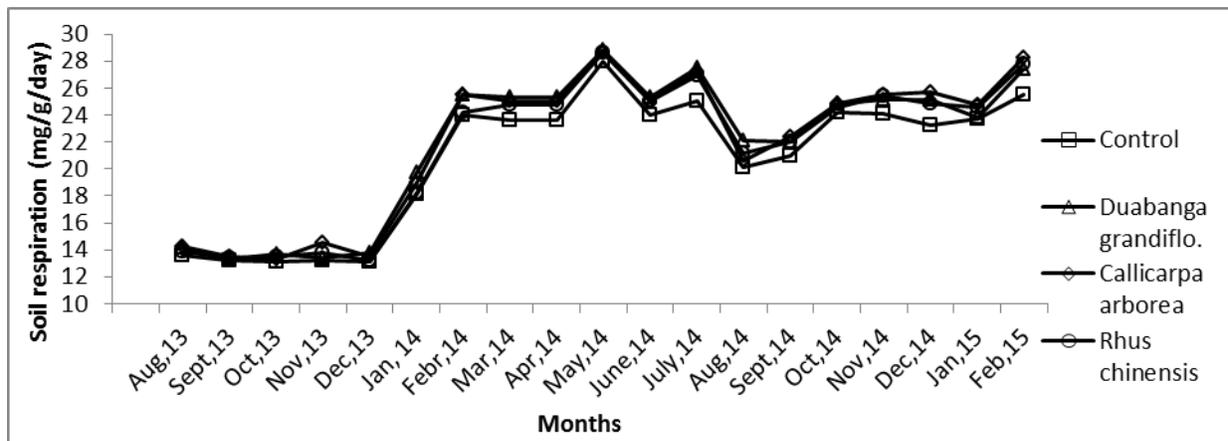


Fig.2 :Soil respiration in the leaf litter treated jhum fallow in the moderate slope.

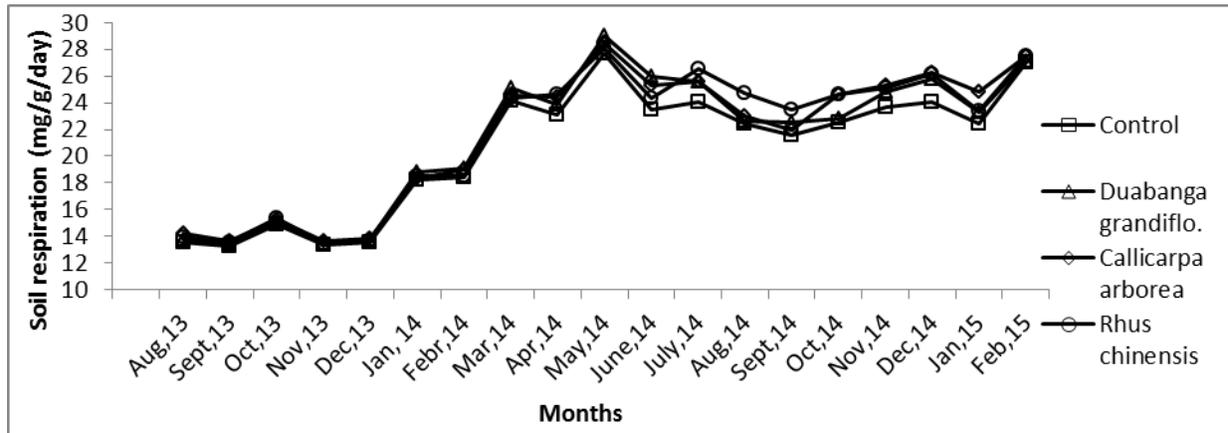


Fig.3 :Soil respiration in the leaf litter treated jhum fallow in the gentle slope

By comparing between the three control plots for the three slopes average soil respiration was higher in the steep slope (21.15mg/g/d) but the moderate and gentle slopes have the same average soil respiration rate (20.60 mg/g/d) (Table 1).

Table 1: Average soil respiration (mg/g/d) in the control and treated plots.

Slope	Species			
	Control	<i>Duabanga grandiflora</i>	<i>Callicarpa arborea</i>	<i>Rhus chinensis</i>
Steep	21.15	21.90	21.92	21.62
Moderate	20.60	21.35	21.92	21.62
Gentle	20.60	21.35	21.55	21.55

The initial substrate quality shows that *Callicarpa arborea* have highest C and N content followed *Rhus chinensis* and least was observed in *Duabanga grandiflora*. By looking at C:N ratio all the ratios are above 30. Among the three *Callicarpa arborea* have lowest and *Rhus chinensis* have highest C:N ratio (Table 2).

Table 2: Initial C, N and C:N ratio of the leaf litter.

Species	C(%)	N(%)	C:N
<i>Duabanga grandiflora</i>	41.23	0.75	54.32
<i>Callicarpa arborea</i>	51.01	1.08	47.15
<i>Rhus chinensis</i>	47.41	0.84	56.37

Due to treatment of the three types of leaf litter *Callicarpa arborea* treated plots leads to highest increase in the rate of soil respiration in all the three slopes 0.921mg/g/d in steep slope, 1.226 mg/g/d (moderate slope) and 0.963mg/g/d (gentle slope) (Table 3). These calculations were done by subtracting control values from treated values for different plots and treatments. After *Callicarps arborea* it was followed by *Rhus chinensis* having 0.873mg/g/d (steep) and 0.963mg/g/d (gentle). However in the moderate slope *Duabanga grandiflora* have more increase in the rate of soil respiration. The reason for highest increase in *Callicarpa arborea* treated plots can be attributed to its leaf litter having more initial C and N content and lesser C:N ratio (47.15). The correlation studies also shows negative and significant correlation between the change in soil respiration and initial C:N

Table 3: Average increase in soil respiration (mg/g/d) in treated plots.

Slope	Species		
	<i>Duabanga grandiflora</i>	<i>Callicarpa arborea</i>	<i>Rhus chinensis</i>
Steep	0.784	0.921	0.873
Moderate	1.152	1.226	0.868
Gentle	0.757	0.963	0.963

ratio in steep and moderate slopes (Table 4). There was significant and positive correlation between change in soil respiration with initial C and N in the steep and gentle slopes. By taking account C:N ratio only it was evident that treating with species having lesser C:N ratio leads to more rate of soil respiration in steep and moderate slopes. However in the gentle slope the relation was not evident moreover in the average soil respiration also steep slope was having the highest and least was found in gentle slope.

Table 4: Pearson's coefficient of correlation (r) between increase in soil respiration with initial C, N and C:N ratio.

Slope	r(n=3)		
	C	N	C:N
Steep	0.99	0.90	-0.61

Moderate	0.04	0.43	-0.80
Gentle	0.93	0.71	-0.30

The study also shows that removal of vegetation specially the present tree species leads to a loss on soil respiration rates. A principal mechanism by which vegetation may control soil respiration rates is via the production of plant detritus, which feeds soil organisms. Raich and Nadelhoffer (1989) found that soil respiration increased with increasing litterfall in relatively mature forest ecosystems. Raich and Tufekcioglu (2000) also conclude that litter production and soil respiration are positively correlated. They also stated that soil respiration rates are controlled primarily by climatic and substrate factors with vegetation having a secondary effect only. However plants produce the organic matter that feeds soil organisms and soil biota transform organically bound nutrients into forms that can be utilized by plants. The production and consumption of organic matter are inextricably linked processes that together are controlled by temperature, moisture availability and substrate conditions that are largely independent of the plants present (Raich and Tufekcioglu, 2000).

In between the three slopes between the leaf litter treatment plots the soil respiration was found to be highest in the steep slope followed by moderate slope. In the gentle slope least was observed in all the treatments. This shows that in mountainous region the role of steeper tracts are very important. Moreover in this landscape the gentler slopes are in upper tracts where human habitation is possible thereby more disturbances occurs in gentler slopes. The steeper and moderate slopes are the lower tracts below the gentler slopes where lesser disturbances occurs.

Therefore it can be conclude that steeper slopes are playing key role in maintaining the level of soil quality. The initial chemistry specially C:N ratio of plant litter in these slopes is an important indicator of the change in soil respiration due to change in vegetation. Overall rate of soil respiration was decreased by removing tree species.

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Labour Unrest at Manesar Plant of Maruti Suzuki in 2012, 18th July

Inna Yadav

Abstract- Maruti Suzuki India Ltd. Is India's leading and largest passenger car manufacturer which according for nearly 50% of total industrial sales. The company has produced and sold over 7.5 million vehicles in India and exported over 5 lac unit to Europe and in other countries. In year 2011 Maruti Suzuki rolled out its 1 crore cars and in year 2010 it has been ranked India's most trusted brand in automobile sector. Maruti Suzuki received awards as the manufacturer of the year 2012 in "Car Dekho" awards 2012. But last 18th July 2012, Maruti Suzuki face industrial unrest in his Manesar plant. Which lead to the murder of Senior HR executive and extensive damage of property.

The first objective of this paper to evaluate the reasons of this dispute, background of industrial relation and change took place in the management of Maruti Udyog Limited and secondary objective is to highlight the future implication of the unpleasant which took place at Maruti Udyog limited.

Index Terms- Labour management relation, Maruti Manesar, Industrial disputes.

I. A BRIEF HISTORY OF INDUSTRIAL RELATION AT MARUTI UDYOG LIMITED

Since its founding in 1983 Maruti Udyog Limited has experienced problem with its labour force. The labour locating hired accepted the Japanese work culture and the modern manufacturing process. In 1997 there was a change in ownership, and Maruti come under government control. Thereafter conflict between the United Front Government and Suzuki started. In 2000 a major industrial relation issue began and employees of Maruti went on an indefinite strike, demanding among other things, major revisions to their wages, incentives and pension.

In October 2000 the workers start slowdown to press the management, on this year after election new central government led by NDA and NDA promote pursuant to disinvestments policy. Along with much other government owned companies, the new administration proposed the sell a part of its stake in Maruti Suzuki in public offering. The worker's union opposed this sell-off plan on the grounds that the company will lose a major business advantage of being subsidised by the government and the union has better protection while the company remains in control of the government. The cold was continue between the management and company authority company pay does not accept any demands of labour union due to the increased competition and lower profit margins in automobile company.

The central government prevailed and privatize Maruti in 2002, Suzuki become the majority owner of Maruti Udyog Limited.

In late 2011 on dearly labour unrest stated in the Manesar plant with Sonu Gujjer former President of the unrecognised Maruti Suzuki employee union demanding to establish an alternative labour union due to alignment of large section of worker with an existing union.

Maruti Manesar violence 18 July 2012

The company has faced several incidents of employee protest, but never of such scale and violence the incidents Maruti Manesar violence July 2012 is the worst ever for Suzuki, since the company began operation in India in 1983.

On 18 July 2012, Wednesday on 3.30 pm Maruti Manesar plant was hit by violence workers at one of its auto factory. They attacked on supervisors and started a fire that killed a company official and injured 100 managers, including two Japanese expatriates. The violent mob also injured nine policemen.

The company's HR General manager Mr. Avinash Kumar Dev had both arms and legs broken by his attackers, unable to leave the building that was set ablaze and was charred to death.

This violence effect not only Maruti but also the industrial hub of NCR, loss due to this violence is 500 crore damage to Manesar plant, 75 crore Maruti's daily losses and 102 suspect arrested so far.

Impact on company situations

1. Operations stopped for a month.
2. Loss estimated to be over Rs. 1,500 crore.
3. Fear of insecurity to the employees and their families.
4. Maruti Udyog changed his recruitment policy.
5. Goodwill it is major loss of company.

REASONS OF MARUTI VIOLENCE:-

There are several factors have come into play in the labour unrest some of the followings are:-

1. Less of Indian connect

In 2007 to important changes happened in Maruti one Shinzo Nakanishi the current MD of Maruti Suzuki took over the reins current MD of Maruti Suzuki Jagdish Khattar. RC Bhargava who was a director, was made chairmen. Two Maruti and the Indian Maruti are also become increasingly important of Suzuki Motors. On till date Maruti contributed more than half of the parent's profits.

As Maruti's contribution to Suzuki has increased, the latter's tendency to control Indian operations has increased. It has an India chairmen but Bhargava is 78 years old. It does have many senior Indian executives who have been lifters at Maruti. Insiders who will speak on the condition of anonymity say the Japanese voice counts and often tends to dominate crucial decisions.

Indian and Japanese are far different there discipline, punctuality, employee connect are very different. They are some major points that are can't make connect with Indians.

2. Leaner Meaner Pressure

The challenges of running manufacturing outfits have surged. In the manufacturing industries cost and wages have increased but in other hand sales are poor and volatile. In this situation doing business is difficult and doing profitable business is more difficult, so each and every company trying to find out way to bring cost down and improving productivity. Most have recruit contract labour to bring in flexibility and reduce cost. In Maruti Manaser plant 40% workers hired on contract basis and their salary half of the permanent worker. Maruti is among the better pay masters. Amid all this competitive intensity in the market place for Maruti has never been as severe. Bring a volume player the only way for it to survive and flourish is to churn out more and more cars. All this translate into the relentless pressure to improve to productivity and margin at all level. Work pressure is very high in Maruti Manaser plant because this plant manufactures two top selling model's Swift and Dezire.

3. Young and Restless Workers

In Haryana, young blue-collar workers have been dramatic change around them. Now Gurgaon has become a commercial hub. Overnight people have become rich and their lives have transformed simply because they made a killing selling their land. They are less tolerant and fairly aggressive in their expectations and how they want to achieve it.

Sonu Gujjar, 27 years the leader of the labour unrest at Maruti. He is known as commando Sonu. He was too is ready to face the consequence. Unlike the older generation trade union leaders who looked for solutions through confrontation. Gujjar does not adopt an adversarial tone perhaps aware of the pitfalls of old style trade union functioning in a modern work environment. During the initial stages of the strike which started from small congregation at community centres and public parks, he has balanced his speeches and did not paint the management as an enemy.

4. Return of the Red Flag

From its peak in the 1980's Trade union have been on a decline in India. Trade union bodies across the boards from CITU to ALTUC – have been seeing a steady decline over the years. It does not help that a large percentage of workers in Indian factories are foot-loose contract workers.

Over 90% of the Indians are employed in the unorganised sector where the trade union have been finding it difficult to make inroads. They have made many effect to spread their network among white collar workers like BPO employees, but with little success. Expectedly, they are tapping into every possible opportunity they can get to grow their base. Their involvement in Maruti's labour unrest signals that.

5. Lack of Connectivity and Active Communication between Management and Workers

As explained above the Japanese industrial culture does not have any alternative in the lines of what took place of Manaser.

The management was clue less about the extent to which a section of workers were enraged. That means, there was no inkling of such a degree of discontent with the management.

6. Lack of intelligence and information.

Though the management was aware of those ring leaders and instigators, it did not have any concrete and actionable information about the intentions of the striking workers to kill and burn. It is evident that the action of breaking an executives limbs and leaving him to burn to death was a murder and it certainly was not an accident. Normally, such crimes are planned and within the group of several workers with criminal intentions, such plans are discussed. The management did not have any mechanism to collect informal information through its network of informants.

7. Workers, both permanent and contracted feel that they are not being given their due share of the huge profits Maruti Udyog is making with the highest market share in the car industry. Though the automobile industry in India is said to be in a temporary recession, the car industry is seeing an unprecedented growth in the last few years and for over 28 years, Maruti has been the market leader. The profits and balance sheets are in public domain. An educated and aware worker is also aware that his salary and allowances have not risen in proportion to the rise in profits of the company. They have been expressing this feeling for several years and there have been salary rises but never in the kind of scale and proportion which the workers were demanding. On the day of starting the strike, average Maruti Udyog, Manesar worker was still one of the best paid automotive factory worker in India, but not paid in proportion to what the management was earning through them.

Implication of the unpleasant incident which took few of the implication of this labour unrest are as under

i) Investor in labour intensive sectors will demand a protective and clear policy environment from the Indian government before entering into India.

ii) There is no place for physical violence and criminal act anywhere in running on industry. Assurance of exemplary punishment will be sought by the management for the workers caught in the act. In effect this will increase the distance between the management and the labour union even further.

iii) Given the state of Indian labour was which are highly biased towards the worker there will be pressure on the government to modify and tweak the laws in accordance with the need of their time. Labour union in the manufacturing sector have always been politically oriented and when the political orientation is absent then political leader and parties trying to hold the trade union since it is not against the law for workers to affiliate themselves to political parties, creation of multiple union.

iv) Other State governments have played a major role in creating a friendly environment for a business. Now each and every company try to move to shift base or start new venture on those states they have not history of any industrial dispute Maruti management also interested to this direction shift in plant Gurgaon to Gujarat.

Change took place by the management after Manaser unrest

2012		2014
900 (P) 1800 (C)	No. Of Workers	1011 (P) 600 (T)
No Paid Leave	Leave	4 Days in Three Months
Rs. 17,000/- (P) + Rs. 50,000/- (PA)	Pay	Rs. 25000/- (P)
2 tea breaks 7.5 minutes each Lunch break 30 minutes	Breaks	No Change
8.45 hours	Working Hours	No Change

P – Permanent, C – Causal, T – Temporary

Other necessary change done after the event

1. Hiring contract workers through company HR and not through a contractor.
2. Reopened the plant with 300 workers.
3. Fresh recruitment of permanent workers.
4. Terminate the services of 500 permanent (Include / involved in violence)

PERMANENT SOLUTION

FACILITY	PERMANENT	CONTRACT	APPRENTICES
Gurgaon	3,000	4,000	700
Manaser	2,000 + 1,000*	-	600
Manaser (Before July' 2012 violence)	1,528	1,869	NA

Numbers are approximate, * temporary
Sources : Company, industry

II. CONCLUSION

The main reason / cause Manaser dispute is lack communication of management and workers. The management and the union leaders are busy overtime to blame each. The management has strongly denied that there was an HR problem or has to do anything with the poor wages and the working conditions and claimed that both the issues in era being sorted out on the other hand the workers are blaming the management for various issue like lower wages, poor working condition, poor working environment and misbehaviour by superior etc. The Japanese companies have a history o paying poor wages even in their country.

There same labour unrest in recent year in Japanese companies and reasons are these disputes in bad working conditions and poor wages. Further Japanese companies have faced labour unrest in much other country and second major reason of this disputes is contract workers. These companies are routinely following the policy of recruiting contract labour which came very cheap, work culture is the third most important reason of this dispute Japanese companies believes that “only the Japanese can manage the Japanese companies even in overseas”.

“Japanese management lacks international outlooks Japanese do not want to manage their business operation in overseas in any new special way”. Group culture another common method of decision making process in Japanese company is Japanese subsidiaries in overseas.

These clashes with the individual decision making processes which is a common management practice in Indian and several European companies group decision is time consuming and requires approval from their head quarters

It is not clear what went wrong in the Manaser plant as the investigation is still in progress. In this incident everyone blaming each other i.e. stake holder, workers and the government.

In India is the general experience that the trade union leaders are arrogant, blackmail the management and behave like militants mainly because of their political affiliations. The need to the hour is to include professional approach in trade union so that the industrial relation remain cordial, industrial can work smoothly and prosper and management should make every effort has to be made to understand the nuances of the alien work cultures and local worker force should be trained in that direction. It is top management responsibility to ensure that he use the services of experts from the field of cross culture management where is need.

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Possible Solutions for the Drawbacks of Data Center Security Mechanisms

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Abstract- As the place that stores the brain in an organization, a Data Center centralizes the operations of the company, its equipment and stores, maintains, propagate the data that runs through the company. Data Centers may have a physical or virtual infrastructure and data which are stored in them provides the base for the successiveness of an organization since they are much valuable when making decisions in the business processes. In simple terms, the past, present and the future of an organization relies on the outcome of the analyzed data. Due to these reasons, it is one of the top priorities of a company to ensure the security and reliability of data centers and their information. With the advancement of the technology, securing the data centers to its best level has become a complicated task, due to the various possible attacks. Making an attack on a data center becomes easier when there are loopholes in the security mechanisms that are used in data centers. In this paper the authors describe about the existing security mechanisms which are specific to the physical data centers. Furthermore, this paper has discussed the possible solutions that can be used to ensure the security of data centers as a perspective to the current Information Technology (IT) industry.

Index Terms- Data Center, Data, Data Center Security, Security Mechanism, Physical Data Center

I. INTRODUCTION

The complexity of the world increases by the minute of the day, due to the effects of globalization which is a combination of the improvements made on information technology and telecommunication. The potential of globalization has generated a huge advancement in the industry of information technology and it has made the world a universal ground which keep people connected from all corners of the world. In simple terms, this rapid growth in the field of Information technology is a worldwide phenomenon experienced today.

The emergence of computer networking methodologies plays a key role in the global IT boost, unfolding a new era of communication technology. The global private sector was the first to explore the endless opportunities and networking by residing the business processes with the integration with data centers to have the competitive advantages in the business world. Today, the ability to achieve the organizational goals relies purely on the availability, efficiency and authenticity of the information. It is a well-known fact that such information should be protected by all means because in the present business world,

it can be defined as one of the most valuable assets in an organization since some of the future decisions that are to be made totally rely on them. Therefore, the security of the data centers falls to the topics that get the major attention and the concern in an organization.

As a highly dynamic and technical field, data center security deals with all the aspects of securing the data centers from intrusions. Hacking, Distributed Denial of Service (DDoS) attacks, physical attacks are some of the common issues that threatens the security of data centers and sometimes, well-designed, fully protective security mechanisms may not have what it takes to prevent such attacks. Confronted with this particular scenario, the authors has chosen to indicate a great diversity of data center security, more specifically the draw backs in the data center security mechanisms in the current IT industry.

Same as in every other concepts in life, globalization has its pros and cons. It bring the whole world together under one roof but at the same time it makes them vulnerable by exposing the sensitive data to unauthenticated, unauthorized parties who are eager to abduct, change or use those data in an unwanted manner. Ultimately, such acts can increase corruption, extortion, racketeering and violence and can be abused to launder money, to commit fraud and to enable illicit activity and irregular movement for organized crime purposes [1]. This is much dangerous than it is in the real world since the cyberspace is a borderless realm that anybody with an internet facility can put hands on.

Therefore, throughout this paper it is the intention of the team to discuss and present a perspective on the possible solutions that can be used to avoid these threats and vulnerabilities that data centers are facing in the current industry of IT while briefly going through the existing data center security mechanisms.

The rest of this paper is organized as follows. Section II has provided the existing related work. Section III describes the objectives of conducting this research and the Discussion of is given in Section IV. The Conclusion is presented in Section V. Literature Review

Kumar S. and Padmapriya S (2014) has presented a survey based conclusion regarding the varieties of clouds, common drawbacks of cloud storages, more specifically about the security threats that cloud storages face and its vulnerabilities [2]. It has described about the top nine security threats as identified by the Cloud Security Alliance (CSA) in 2013. According to that, Data Breaches, Data Loss, Account Hijacking, Insecure application programming interfaces (APIs), Denial of Service, Malicious insiders, Abuse and Nefarious Use, Insufficient Due Diligence, and Shared Technology Issues are the nine major security issues

that can threaten the cloud storages. Apart from that, it has mentioned several solutions to each and every security threat mentioned previously.

Juels A. and Oprea A. (2013) has provided a set of techniques that can be used to secure the cloud data [3]. It has proposed an auditing framework that gives the tenant visibility in to the correct operation of the cloud, which can help the cloud to enhance the security. At the end they have discussed about the remaining issues of cloud computing as directions to new research areas, such as performing computations over tenants' encrypted data, ensuring tenant isolation and geo-location of data.

Barroso L. Clidaras J. et al (2013) has lengthily discussed about the data centers and how it can be used as a computer [4]. It has stated that the large data centers that can be seen in the industry nowadays differs from traditional hosting facilities in the past. Such data centers are complex than the traditional data centers of earlier times and therefore they cannot be considered as a set of co-located servers and the security mechanisms that work on this kind of large data centers are critical and should be stronger as well.

Barron C. and Yu H. et al (2013) has mentioned about some of the cases happened regarding real world companies, who became victims of cloud storage attacks [5]. Under that they have vividly discussed about social engineering attack, Extensible Markup Language (XML) signature wrapping attack, malware injection, data manipulation, account hijacking, Synchronization (SYN) flood, and wireless local area network attacks. The solutions or the steps that the companies have been taken has also been stated in here, such as presenting an algorithm to detect malicious packets, and another algorithm to prevent such malicious packets spreading through the cloud network.

Kumar V. and Swetha M. et al (2012) has presented a survey based idea about the data security mechanisms in cloud computing [6]. It has described about the possible security issues that can combatively threat the cloud data, which may delay its adoption. It has high-lightened the security mechanisms that are enforced or invoked by the major cloud service providers such as International Business Machines (IBM), Institute of Electrical and Electronics Engineers (IEEE), Amazon etc. It has concluded that it is a need in a cloud service to analyze the data security risk before putting the sensitive or critical data in to a cloud storage environment.

Meixner F. and Buettner R. (2012) has provided an overview regarding the trust in cloud computing [7]. When surfing the online world, security and trust are mapped together and it states that those two components are integral parts in cloud computing which are needed for its adoption as well as the growth. It also has shown that using the existing technologies in the best manner can build the trust measuring tools and in the bottom line of this state, using such tools with the means of technologies can improve the security in cloud computing.

Ayoleke I. (2011) has mentioned that even though the concept and the practical aspect of cloud data storages seems enthusiastic, there are much facts to be cautious about [8]. It has vividly described about the security issues that Cloud Deployments Models, Private cloud, Public cloud, and Hybrid cloud could face, and the possible challenges against cloud computing regarding security, costing model, charging model

etc. in a detailed manner. At the end, it also has stated that cloud computing has the potential to become a prime-runner in the IT industry, as a secure, virtual and financially feasible IT solution.

Shaikh F. and Haider S. (2011) has mentioned that the only drawback of the cloud data storages is the lack of security [9]. The safety and security of the cloud data storages can be assured by the mutual interest and effort of the clients and the service providers. It has identified that the top security concerns of cloud data storages are Data loss, Leakage of Data, Client's trust, User's Authentication, and Malicious users handling. The researchers has proposed a new governance, risk management, and compliance stack for cloud computing called Cloud Security Alliance (CSA). These security tools can be downloaded by the organizations for free of charge and lead them to develop public and private clouds according to the industry standards in a secured approach.

Wang C. and Wang Q. et al (2010) has discussed about ensuring the data storage security in Cloud Computing, which is fundamentally a distributed storage system [10]. It has proposed an efficient and flexible distributed scheme that includes an accurate dynamic data support extending to block append, update, and delete in a secure manner. It relies on the eradication revising code in the file distribution preparation to give repetition equality vectors and grant the data perseverance. By using the homomorphic token with distribution verification of erasure coded data, the described scheme accomplishes and ensures the reconciliation of the accuracy in the storage, and data error localization. With the use of a descriptive and effective security and performance analysis they have showed that the schema presented is highly capable and strong towards the Byzantine failure, malicious data modification attack, as well as server intruding attacks.

Zhang Q. and Cheng L. et al (2010) has surveyed about the state-of-art in Cloud Computing its most important concepts, characteristics, architectural designs, key technologies, security mechanisms as well as the research areas [10][1]. Those facts are presented in a lengthy descriptive manner, providing the opportunity of better understanding about Cloud computing.

Gong C. and Liu J. et al (2010) has discussed about the characteristics of cloud computing including the methodologies that can be used to design, develop and adopt a cloud computing system [12]. The loose coupling and strong fault tolerant have given as the major technical characteristics. Briefly it describes about the security of cloud storages as well as how it can be used for an organization in their business processes.

Okuhara M. and Shiozaki T. et al (2010) has explained how the customers can get the full benefit of cloud computing without worrying, by implementing the proper security measures [13]. It also has mentioned about the security issues that threatens the well-being of the cloud storages and defined about the Fujitsu's security architectures that can be used to solve those issues. Fujitsu security architecture has the ability to support for drafting security policies and as a part of consulting menu for businesses which are moving on to cloud computing it has given the capability to develop the security strategies as well.

Yuefa D. and Bo W. et al (2009) has presented a security model for cloud computing while analyzing and describing the data security issues that matters to cloud data storages, and the importance of enhancing the security in data storages as well

[14]. By utilizing the Hadoop Distributed File System (HDFS) the researchers have gotten the requirements of the security of the data stored in cloud data storages and they have suggested a mathematically provable data model for cloud computing.

Greenberg A. and Hamilton J. et al (2008) has provided an approach to significantly improve data center efficiency in a cost effective manner [15]. The cost of a data center are concerned with the servers, infrastructure, power requirements, security methodologies and networking, and since the costs are steep, the use of a data center can be low. Due to this reason, the researchers have been provided a simple set of steps that can be taken, as a solution for this issue. Increasing the quickness of the internal data center network, in order to fight the resource fragmentation has given as the first step in that procedure. As a method of reducing costs it also plans to get more work from less number of servers. Secondly, the design of algorithms and market mechanisms should be considered to increase the efficiency of data centers. In order to improve the reliability in the event of failures, Geo-diversifying data centers can improve end to end performance which can be described as the third and the final step. To retrieve the financial profits from the Geo-diversity new systems should be built to manage its state, as well as the joint optimization of data center and network resources.

Yaar A. and Perrig A et al (2003) has described about a path identification mechanism called "Pi", which can be specifically used as a security mechanism against the DDoS attacks [16]. This mechanism has the components of IP Traceback methods which is concerned with marking the victim to attacker paths with unique markings rather than reconstructing that path. In that manner, the victim will be given the capability to identify and filter on a per-packet basis, any incoming packets that is similar to the pre-defined attacker marks.

II. OBJECTIVES

The following can be considered as the objectives that the authors are trying to achieve via this research.

- Identify the definition and the usage or the importance of data centers.
- Recognize the security mechanisms that are currently in use to ensure the security of the data centers.
- Analyze the drawbacks in the existing security mechanisms.
- Discuss the possible solutions that can used to overcome the issues identified.

III. DISCUSSION

Data Centers are typically large facilities that takes a huge space in a dedicated building (server farm) or else in a space that company paid for. Unlike cloud, it is in a physical surface, which makes it vulnerable to both internal and external attacks. Therefore it can be clearly stated that the security of them can be at a risk, along with the data that company stored in them.

Understanding the possible solutions to assure the security of the data centers can be an aid to minimize that risk. In the following content the authors have vividly described such techniques that can be used to ensure the security of the data centers.

Stage-wise provisioning

Network provisioning systems can be defined as intermediary tools that is useful when performing tasks like customer services, log transactions, carry out requests, and update files [17]. Implementing such provisioning system in a data center can give the permission to the customers to install the hardware before the connectivity of the network become to the state 'available', which means that the providers have enough time execute any initiations as the desire before they are given the capability to interact with different hardware from all corners of the world. A person who might try to dispatch this kind of assault would most likely do as such with the ambition of executing remotely. This brings the conclusion that the contracts that are being made for customers to facilitate the data centers should be defined in a manner which allows them to use it in a one or two weeks of provisioning period. During the given period, initiation of the hardware materials, and background checks can be carried out without any issue.

Facilitating in the tier-level

It is a known fact that the new clients who are at the very beginning of their business do not have range of requests as the large business owners do. The requirement of the volume of rack space varies from one to another but according to that, facilitating can be done in a separate manner. Due to that manner, the low-tier clients will be able to host the data center in a place that includes a less-critical framework. This gives the low-tier clients to host the data center in a low-profiled manner, or in other words outside the critical areas where there is a high possibility of commencing attacks.

Proper Maintenance Process

Proper maintenance is one of the significance methods that can be used to improve the security of the data centers. This evolves with several steps.

One is, providing the authentication levels to all the documents, telephone calls and other identification mechanisms related to the data center maintenance. It is necessary for the company to record all the telephone calls as a log, which allows them the opportunity to trace back in an event of suspicion. When interacting with the vendors, it is essential to ensure it is possible to reach the particular vendor using the number which is already on the file. It is true that reaching out via cellular is easier, but when it comes to security it is always better to accept maintenance requests unless it is a land line that can be traced back. When authenticating the documents, such documents should be checked with the formal documentations which will give them the opportunity to compare or check whether that it is already on the file.

The maintenance of the data centers should be done in a centralized manner. The maintenance appointments should be checked properly and should go through the data center manager to further clarification. The vendors who are in the supplement of maintenance services should be checked with the telephone, to

ensure whether they are already registered under the maintenance appointments. These teams should be provided with a unique identification mechanism such as a password or face recognition method to verify themselves before entering the data center.

Each and every entering to the data center should be scanned deeply, to ensure that there is no any entering of an explosive. This can be done by a well-trained K-9 or using a portable detection device that is capable of detecting the explosives. The people who are responsible to detect such should have a sharp eye that does not miss any entering that happens with a suspicious looking device or tool. The bomb radiation detecting devices can come in handy in a situation like this, which have the ability to scan all the incoming tools or devices. If the equipment come in a box they it should be unpacked and scanned in an internal manner and it is essential to note that the regular chasses usually has only a simple latch which can be easily opened.

The data center maintenance should be done in a supervised manner. A small group of people can be allocated for this purpose. It does not matter that the members in that group is rich with technical knowledge related to data centers but they should have the basics like the components of the data centers and the tools and equipment that is being utilized when there is a maintenance. The instinct of identifying unusual acts happen during the maintenance is the key qualification in this kind of role.

Relationships that comes in an informal manner should not be trusted, and also should not be encouraged. Avoiding such situations is always better when it comes to ensuring the security of the data centers. Being familiarized with the vendors is fine, but allowing vendors to bring guests is not a good idea unless the vendor has cleared them. As mentioned previously, the unique credentials given to each and every vendor should be check at each appearance they make.

Continuous Monitoring Process

Keeping the data centers monitored is another way to ensure that they work in their best manner, and also detect if there is an anomaly that works irregularly. When something goes off the rid of the regular pattern, it should be checked deeply. For an example, if a customer is pulling a little amount of data and if it shows a high traffic, it is something to be suspicious about. On the other hand if it displays an unusual traffic pattern in an irregular hour it is also something needs to be checked out. The common sense and the instinct is important in this task as well. Investigating the traffic in Internet Protocol (IP) level has the ability to recognize the number of unique hosts that are interacting with the tools and equipment of the customer. If there is a less number of hosts in comparison to the number of equipment, it is nothing to worry about.

Being Aware of the Customers

The company or the responsible parties should be aware of the customers who are attempting to enter to the data center facilities. The authority of entering or accessing the data centers should only be given to the regular customers, not just because their name is already in the file, but because the company received positive results regarding the profile of the customer during the background check that was carried out. The

relationship between the company front and the customer must always be conducted in an official manner, because it will avoid the attempts of the customers who are attackers behind the mask to build long term relationships in order to reach their targets.

The new customers should be interviewed properly, and their history must be reviewed as well. It is necessary to find out whether the customer company's need for this data center, not just in a general manner but in a specific manner. The company should go in to the root of that particular customer to realize whether the customer does not seem to be aware of the business, and ongoing projects it automatically sends an alert to the company that this customer should be examined thoroughly. The company should get an idea about the customer website, whether it exists or not, how they are willing to do the payments for the necessary services, whether the customer is a registered company, or whether they have a valid business license, and how long has it been from the first opening day of the company. If these questions are answered positively or if it is a known company for several years, with multiple branches or staffs instead of being a company that runs virtually or in the residence address, the risk can be considered somewhat lower. Even after giving the authority to access the data center, it is important to check them often and it is company's authority to dismiss the permission that is being given to the customer if they are making attempts to broadcast pornography, send spams etc. Justifying the customer as a responsible business is one way to accept the new customers.

Assessing the Company Externally

There is a pretty good chance that some of the issues that lies within the relationship between the data center facilities and the customers cannot be seen internally. As a solution for this scenario, the company can hire an external party, which they analyze the interaction that the customers and data center has, as well as how effectively does the management of the data centers takes place in the company. Apart from that, to inspect the strength or to evaluate the robustness of the defense mechanisms that is being used on the data centers, the company can hire another trusted party to send them a mock attack to check how adequately does the data center defense themselves, and the level of survival. This kind of assessments done by external parties with some misdirection will help the company to enhance the security of the data centers, as well as to recognize the weak areas of them which gives them the opportunity to apply new security techniques that were not there before.

Hardware Inspection Policies

The most fundamental policies should be added to the data centers, especially the ones specified for the hardware and equipment. Such policies must be introduced and stored in the data centers to prevent customers from suggesting harmful explosives and other devices. This should be added as a sector to the contract that company presents to the customer and it is important to note that the company owns the authority of checking the external devices or the hardware equipment that customer is attempting to introduce to the data center facility.

This situation also extends towards the behavior of the customer when they are utilizing the data center facility. The customer should treat the facility with care and responsibility,

and they are obliged to take the blame for any physical damage they cause. The customers cannot leave the data center with loose power cables, broken devices or with any other cause that brings physical damage to it. The policy should justify all of these matters.

As mentioned previously, there are many tools that can be used to detect the explosives and also a team can be given the k-9 training to detect 11 types of explosives separately. The close and continuous monitoring is the key to assure that the customer do their duty up to the hardware policy mentioned in the contract.

Preventing the Unauthorized Building Access

The office building should be protected by its all cost, therefore only the authorized parties should be allowed to walk in. It is always better to accompany them with some trusted officers of the company while the customers carry out their work because that may make the attacker behind the mask of a customer hesitate from doing something harmful.

In most companies, the rooftop is where all those antennas and satellite machineries are located. These areas should not be allowed to customers to simply walk in and make use of. If access given under some circumstance, it should be during the regular working hours and under the close supervision of a member in the company. Using this kind of technique will avoid the data center from being an easy target.

IV. CONCLUSION

Data Centers are one of the finest pieces of technology that takes the responsibility of storing the data in a company in an efficient manner. It is one place that a company can rely on when it comes to making decisions to the future, and that is what makes it critical as well. Due to the speediness of the technology around the world, these data centers has become another place that an authorized personal can attack, steal and utilize those data in an unnecessary manner. It is true that there are many security mechanisms that guard the data centers but, there are plenty of drawbacks in them as well. Therefore, it is important to be aware of the attacks that threatens the security of the data centers and the techniques or the possible solutions that can be taken to avoid such threats. Throughout this paper, the authors have explained about the existing security mechanisms in a descriptive manner and stated down the possible solutions that can be done to avoid their drawbacks as well.

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Containerizing Biogas: Design and development of portable low cost Biogas bottling system

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Abstract- Bottling biogas, a renewable energy using anaerobic digestion of organic waste, enhances rural economy by decentralizing biogas utilization. New opportunities emerge in rural area not just lowering their living cost via self-producible fuel. Bottled raw biogas can be marketable as a fuel or for upgrading the biogas. This lower cost bottling system costs less than five thousand Sri Lankan rupees (Rs 5000) and can be used with minimum technical knowledge especially about safety precautions. The bottled upgraded biogas can be used for various applications including electricity generation, fueling vehicles and heating. The side product - slurry is a good fertilizer, can be marketable too. The biogas bottling system motivates villagers to utilize their waste to produce biogas and enables new income opportunities while experiencing hygienic lifestyle through better organic waste management.

Index Terms- Biogas, anaerobic digestion, economy, catalyst and sustainable energy.

I. INTRODUCTION

Containerizing biogas overcome the key challenge of storing biogas and using it as an alternative energy in various application. It motivates biogas production both in domestic sector and industrial sector, and accomplish better organic waste management practices. As a result, there will be reduction on fuel import including natural gas, environment safety will be ensured and business opportunities will rise in alternative energy sector.

As a method for organic waste management, biogas technique facilitates number of benefits. First of all, the reduction of organic waste reaching landfills causes the production of methane which is 25 times more potent than carbon dioxide. According to Australia's national greenhouse inventory data, for every tons of food waste not sent to landfill, 0.9 tons of CO₂ is saved (Food | Learning and Teaching Sustainability, n.d.). Slurry, the digested organic part, side product of biogas plant, is used as fertilizer for agricultural needs. Scalability of the plant is entirely depending on investor. It reduces the cost of living and creates opportunity for new businesses.

This research, a simple low cost biogas portable bottling system/tool is designed for domestic purposes. This promotes containerized biogas business opportunity and other opportunities such as biogas power generation and biogas based heating system. The following section provides detail design of proposed tool. Then challenges on development are discussed.

After analysis, identified suggestions are discussed. Finally, significant of this research output is noticeably concluded.

II. BACKGROUND STUDY OF BIOGAS

Biogas is formed by microbiological process of decomposition of organic matter in the absence of oxygen called anaerobic digestion. Hydrolysis, acidogenesis, acetogenesis and methanogenesis are the main for steps in anaerobic digestion process (Reena Victor, S Shajin, R.M.Roshni & S.R.Asha, 2014). The rate of biogas yield depends on various condition including temperature, stirring speed, feed concentration and catalyst concentration (Reena Victor, S Shajin, R.M.Roshni & S.R.Asha, 2014).

a. SELECTION OF BIOGAS PLANT FOR FABRICATION

The general selection criteria of a biogas plant are based on availability of the amount of biomass and application area: domestic or in households, industries and agricultural areas and metropolitan area where sanitary sewer system available. Additionally, allocated budget, customer expectation are also influenced in selecting a biogas plant. Digester, a gas collector, an inlet for feeding waste material, an outlet for outlet for digested slurry and a system or outlet to release gas are the major components of a biogas plant. In our research, we identified three type of plant that is suitable for domestic areas, industrial and agricultural areas and metropolitan areas.

Domestic plants (or mini plant) are generally used in households to reduce the utility of firewood. The following figure shows a simple domestic usage. Kitchen waste is primarily used as the feed for the digester. These type of mini plant cost around Rs 1000 for construction.



Figure 1: A domestic biogas digester (Mini Bio-gas plant using food waste, decomposable organic material and kitchen waste, n.d.)

Ferro cement Biogas plant or plant using plastic material such as 1000 liter water tank as in figure 2 is more appropriate in agricultural areas and industrial areas. The Ferro cement plant is a cost effective design of fixed dome type biogas plant but the plant cost considerably higher than the second one for same capacity. In general 1000 liter biogas cement plant cost around Rs 400000 while the floating dome biogas plant construction costs between Rs 50000 – 75000.



Figure 2: (a) Floating-drum biogas plant using 15000 liter water tank (b) Ferro cement biogas plant at Mahadeva Achchiramam - Killinochi

The following figure depicts a typical plant for a metropolitan area. Other than producing biogas, the cost of solid waste management dramatically reduced for urban council. Urban council can generate income from biogas and fertilizer while treat the municipal waste environment friendly.

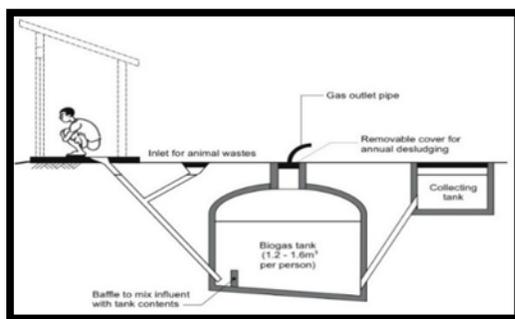


Figure 3: Biogas model for metropolitan area

b. INCREASE THE RATE OF BIOGAS PRODUCTION

The rate of biogas yield depends on various condition including temperature, stirring speed, feed concentration and catalyst concentration (2). Catalyzed biogas generation is a well-known technique to enhance the biogas yield of a plant. Other techniques are also used to increase the rate of biogas production including black coating for digester, recycling slurry and variation in operating condition.

Indian Institute of technology researchers (New Delhi) tried different techniques to enhance the biogas production including the application of various catalysts (Yadvika, Santosh, T.R. Sreerishnan, Sangeeta Kohli & Vineet Rana, 2004). In our research, we tested parthenium (natural catalyst), yeast and

vinegar with cow dung and food waste. Cow dung produce biogas effectively when parthenium is added.

c. PURIFYING BIOGAS

Biogas appliance are fabricated using metal and plastic which are vulnerable due to hydrogen sulfide when exceeds 100 ppm (Jerry Hughes Martin II, 2008). Biogas contains considerable amount of CO₂ and other substances as listed in the following comparison table (Michael Andrea, Jason Aspell, Peter Epathite & James Faupel, 2011). Raw biogas can't be directly used for vehicles or electricity engines due to presence of other substance in higher percentage. Therefore, generated biogas has to be subjected for purification process in order to improve the flammability by removing CO₂ and H₂S.

Substance	Biogas [%]	Natural Gas [%]
Methane (CH ₄)	50 - 60	97
Carbon Dioxide	34 - 38	2.6
Nitrogen (N ₂)	0 - 5	0.4
Oxygen (O ₂)	0 - 1	-
Water vapour-H ₂ O	6	-
Hydrogen Sulfide	Trace	-

Table 1: comparison of biogas and natural gas.

The amount of H₂S in raw biogas varies between 0 to 7000 ppm which depends on the type of waste. For example, hydrogen sulfide amount in biogas of swine waste is 600 to 4000 ppm and biogas from cattle manure contains 600 to 7000 ppm H₂S (Jerry Hughes Martin II, 2008). Thus, raw biogas must be upgraded to operate vehicles and power engines. As shown in the following figure, steel wool is a cheap and widely used technique to upgrade biogas by scrubbing hydrogen sulfide (Michael Andrea, Jason Aspell, Peter Epathite & James Faupel, 2011). Due to large surface area of steel wool, this method is more effective to absorb and remove hydrogen sulfide from raw biogas. Activated carbon impregnated with potassium iodide can also be used to remove H₂S from biogas (Government of Alberta, n.d.). Membrane technique is another technique for hydrogen sulfide purification. Removing hydrogen sulfide prolong the lifetime of biogas appliance and reduce the cost of maintenance.

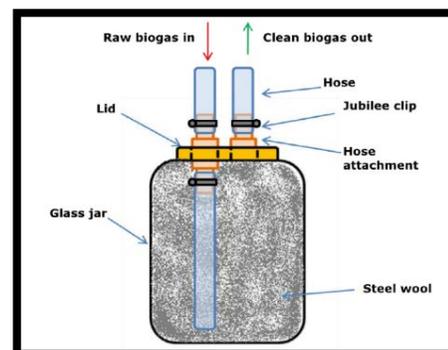


Figure 4: H₂S scrubbing unit.

Water scrubbing, pressure swing absorption (PSA), chemical and physical absorption and cryogenic processing are commercially available techniques to upgrade raw biogas (Rimika M K & Virendra K V, 2010). Water scrubbing is a cost effective and suitable technique to absorb CO₂ meanwhile it reduce H₂S even further (Rimika M K & Virendra K V, 2010). The major disadvantage of water scrubbing is the requirement and post treatment of large amount of water (Lenntech, n.d.).

d. BOTTLING BIOGAS

Bottling raw biogas decentralize the biogas production. Since biogas upgrading requires skilled labor, the bottled raw biogas can be collected and centralizing the purification process. Upgraded biogas can be bottled again in cylinder. Moisture can be removed using silica gel crystals. Raw biogas cylinders and upgraded biogas cylinder should not be mixed due to the presence of hydrogen sulfide in raw biogas. Domestic LPG cylinders are chosen for bottling biogas since they are available in the local market. According to ISO standards, domestic LPG cylinder can be filled up to 14 bar pressure level (Rimika M K & Virendra K V, 2010).

Masters students of university of Nottingham - Michael A, Jason A, Peter E and James F designed and developed a low cost bottling system as shown in the figure 5(a). Their prototype of biogas bottling system cost 75 sterling pounds which is equal to 15 000 Sri Lankan rupees. According to our study, compressor head with motor is used in most of the biogas bottling systems. The following figure 5(b) shows the low cost biogas bottling system constructed in Thailand (Rimika M K & Virendra K V, 2010). . Figure 6 depicts the low cost small-scale compression and bottling unit constructed at IIT Delhi and typical cost of the small-scale dispensing system is € 3500 (Rimika M K & Virendra K V, 2010).



Figure 5: (a) Biogas bottling system (Nottingham) and (b) Biogas upgrading and bottling system in Thailand



Figure 6: (a) Biogas dispensing system (IIT) and (b) Compressor head with motor

e. APPLICATIONS OF BIOGAS

Biogas is used for a number of applications both in domestic sector and industrial sector. Many countries focus on biogas related research including innovative biogas appliance and biogas powered vehicles. A picture gallery of innovative biogas appliance is presented in Appendix B.

Biogas can be used directly for cooking as a fuel using biogas stoves which works with biogas pressure range from 0.007 bar to 0.014 bar (Energypedia, n.d.). Hong Kong based company; Huamei International Green Energy Holding Co released their innovative product - biogas rice cooker for domestic purpose (Green Energy Huamei Int, n.d.). Biogas powered thermal radiant heaters are used to maintain certain temperature to raise young stocks. Biogas is used in incubators to imitate and maintain specific temperature for eggs (Energypedia, (n.d.). Biogas powered boilers can be used for heating during winter period.

Upgraded biogas can be directly used for petrol powered vehicle and biogas blended with diesel is used for diesel powered vehicles. The emission is lower than natural gas and diesel (Rimika M K & Virendra K V, 2010). Biogas powered bus and train is in use in Sweden (Rimika M K & Virendra K V, 2010). Biogas powered motorbike was developed in many countries including Japan.

Electricity can be generated in two ways: using biogas powered engines or using biogas fuel cell. In rural areas, biogas lamp can be used to fulfill lightning requirements. Additionally, through a catalytic chemical oxidation methane can be used in the production of methanol production.

III. PROPOSED DESIGN AND UTILIZATION OF BIOGAS BOTTLING TOOL

The following figure depicts the design of the biogas bottling tool. Raw biogas from plant's gas holder inflate into compressor via inlet valve and compressed and intake into cylinder via outlet valve. The valve system controls the biogas intake and compression.

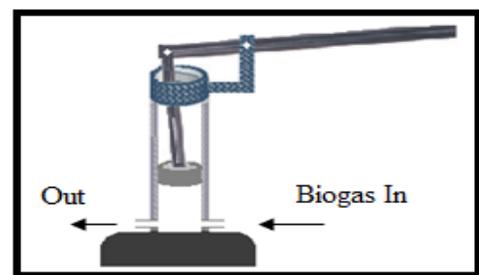


Figure 7: proposed design of the system

In order to maximize the utility of biogas, we identified that our low cost bottling system can be used to collect raw biogas from various household. The collected raw biogas can be upgraded and bottled again for various applications. As shown in the figure 7, centralized biogas purification center is more appropriate and effective approach because of the requirement of technical skills to upgrade raw biogas and the required capital for purification unit.

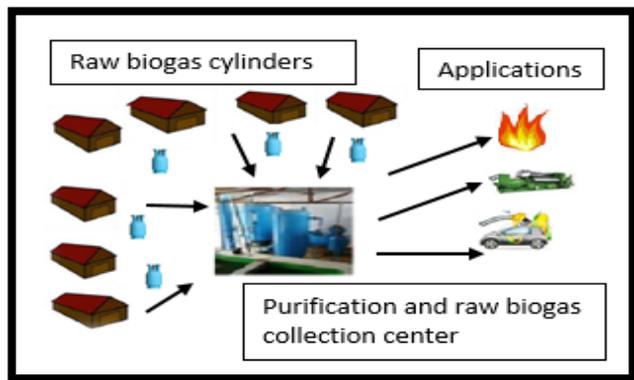


Figure 8: Proposed model for biogas utilization

IV. DEVELOPMENT OF BIOGAS BOTTLING SYSTEM

Actual development slightly differs from proposed design in order to reduce the cost by selecting locally available components. In our research work, a domestic biogas plant is fabricated as shown in figure 9 (a) for testing our bottling system. A 5 liter bucket with lid, a long PVC pipe, a short pipe, gas pipe, bag to collect gas, pipe fitting materials and a bolt tab is used to construct the plant. Using a funnel, sufficient amount of organic waste and water has to be inserted. The anaerobic process occurs inside and produces methane (biogas) inside the air tight plant. The released gas is collected in the bag. The slurry can be removed through the short wider PVC pipe and can be used as a fertilizer. The total material cost of this plant is less than Rs 1000.

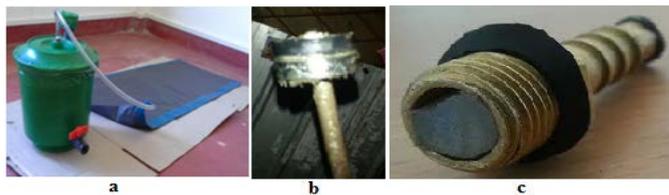


Figure 9: (a) Test biogas plant, (b) modified washer and (c) modified connector for cylinder



Figure 10: Low cost biogas bottling system

Implementation of biogas filler faces slight changes due to the availability of material as shown in the figure 10. A hand pump is converted by little modification to suck and release biogas under high pressure. Two washers are mounted as in figure 9 (b) and its holes are closed using silica. A valve system is developed to inlet the gas when the pump sucks biogas and to outlet the biogas during filling it into a cylinder. Modified connector is mounted to the cylinder which enables the gas cylinder to be fillable. A pressure gauge is mounted at the end of the pipe which is used to fill biogas into cylinder. The total material cost of the biogas bottling system is Rs 4740 as shown in the Table 2.

Component	Cost in Rs
Hand pump (450) + modification	750
2 Valve (1700) + 6 connectors (900)	2600
Connector modification	150
Pressure gauge (1000) + 8 feet pipe	1240
Total	4740

Table 2: cost of construction of bottling system.

V. RESULT AND ANALYSIS

There is no biogas generated during first three days when cow dung was used without catalyst. On the second day, hot water is used to maintain 67 degree Celsius as the surrounding temperature. The gas generation was not realized on the following day. Black coating for the plant doesn't show any improvement on the rate of yield of biogas. Finally, four catalysts were selected to test the best combination to use in the domestic plant.



Figure 11: In vitro plants (a) CDY, (b) CDP, (c) CDV and (d) FWY

CDY - Cow dung and yeast

CDP - Cow dung and parthenium

CDV - Cow dung and vinegar

FWY - Food wastes (all) and yeast

As shown in the figure 11, the four in vitro plants developed using 5 liter water bottle with the above mentioned combinations were placed in a room where the temperature was 27-32C. Thereafter in 3 bottles 2Kg of cow dung was added and in the last bottle 2Kg of food waste was added. Then 2 Liters of water was added to each bottle to maintain the experiment nature in equality. Yeast, Parthenium, Vinegar were added into their ordered bottles in a same amount which was about 20g. Thereafter balloon was placed in the open end of the 4 bottles to collect the produced bio gas.

On daily basis collected gas was measured and recorded for a week. The following table shows daily biogas yield result. Based on observation, cow dung and parthenium combination is selected for domestic plant since our primary research is bottling

the biogas; its rate of biogas yield is higher than other combinations.

Day	CDY (ml/Kg)	CDP (ml/Kg)	CDV (ml/Kg)	FWY (ml/Kg)
1	Very low	Very low	Very low	Very low
2	2.7	6.9	3	7.3
3	3.1	7.4	2.6	7.7
4	4	7.8	3.6	8
5	3	6.5	3.2	7
6	2.8	7	2.8	7.4
7	3.3	7.6	3.4	7.1

Table 3: Daily biogas yield for one week. (cm³)

Self-prepared air bag is repaired due leakage and it is important to make sure that the bottling process performed outside. The pressure level should not go beyond the recommended threshold pressure. Our device successfully transfers the gas from air bag to cylinder.

VI. FUTURE WORK AND RECOMMENDATION

Replacing the ordinary pump by the pump where pressure gauge attached cost an additional amount of Rs 200. In this case, pressure gauge is not required thus Rs 1000 can be saved. Substituting pressure gauge attached hand pump, the cost of production can be further optimized to Rs 3800. A nozzle with clipping feature on the connector enables the user to inflate the biogas easily into cylinder.

VII. CONCLUSION

Empowering energy economy directly impacts positively on national economy. Biogas is a sustainable energy source which enhances the economy of rural areas thus rural area will be developed and generates more opportunities in rural areas which directly impact the national employment. In contract, in urban areas, this technology significantly support for green waste management and its benefits. Our portable low cost biogas bottling system is affordable to anyone and promotes biogas production by effectively decentralizing biogas utility.

VIII. CONCLUSION

A conclusion section is not required. Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions.

APPENDIX

Appendixes, if needed, appear before the acknowledgment.



Figure 12: Complete system without pressure gauge

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Assessment of the Impact of Different Irrigation Regimes on Several Biometric Indicators for Celery through Mathematical - Statistical Analysis

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Abstract- The aim of the development is to analyse, with the help of a two-factor dispersive analysis, the impact of the factors “year’s character” and “irrigation regime” on the separate biometric indicators for celery. Data for the yield and its structural elements was received and used by a field experiment for examining the irrigation regime that was conducted during the period 2010 – 2012 at the Training Experimental Field of Agricultural University, Plovdiv. Five options were examined: irrigation with 130 % from m norm; irrigation with 100 % from m; with 70 % from m; with 50 % from m; with 30 % from m and without irrigation. It was statistically proved, at a high degree of reliability, the impact of the examined factors and their interaction upon the three observed indicators: mass of the root crop, leaf mass and yield. Strongest impact had the factor “irrigation regime” (94 %).

Index Terms- celery, irrigation regime, ANOVA

I. INTRODUCTION

Conduction of field experiments for examining the irrigation regime of the agricultural cultures usually involves different years of meteorological characteristics, which gives an opportunity for an analysis regarding the impact degree of the two factors (year’s character and irrigation regime).

Celery is a well known culture in many countries around the world and in Bulgaria. At home it is cultivated for leaf mass and heads. Its root system is situated shallowly – from 20 to 70 cm of depth [1-5]. Besides, celery has a very long vegetation period, which passes during the driest and hottest months of the year in Bulgaria – from the end of June to the end of September. It is also a significant factor for the culture’s cultivation. All this is a condition for the celery cultivation, obligatory with irrigation. Scientific research proves that the character of the year in relation to the climate, as well as the application of a disturbed irrigation regime, impact significantly the quality and quantity of yield [5-8].

The aim of the development is to analyse, with the help of a two-factor dispersive analysis, the impact of the factors “year’s meteorological characteristics” and “irrigation regime” on the plant’s biometric indicators. It must be determined their influence force in their separate action and in their interaction. Such an approach was used for the soybean [9].

II. MATERIALS AND METHODS

The experiment was conducted during the period 2010 – 2012 at the Training Experimental Field of “Meliorations and Geodesy” Department, AU – Plovdiv on an alluvial-meadow and former marsh soil with celery. The experiment was made with the method of long parcels in four repetitions [10]. The following options were tested: 1) irrigation with 130 % m; 2) 100 % m; 3) 70% m; 4) 50% m; 5) 30% m; 6) without irrigation (m – half norm). The irrigation norms for all experimental options were estimated regarding this for option 2, at which there was a pre-irrigating moisture 80 % from the FC (field capacity) for the layer 0-40 cm. The indicators “mass of the root crop”, “leaf mass” and “yield” were examined.

The received experimental data was set on a two-factor dispersive analysis. The factors “year” Factor A, “irrigation regime” factor B and their interaction A and B were examined. The force of factors’ impact was estimated with the method of Plohinski [11]. It was determined as a part of the intergroup variation in the common variance. It was worked with the sum of the squares and with the formula:

$$h_x^2 = \frac{D_x}{D_y}$$

Where D_x - sum of the factor’s squares x , D_y - total sum of the squares (SS).

Data was processed statistically with the computer program MS Excel.

III. RESULTS AND DISCUSSION

Meteorological characteristics of the experimental years

The three experimental years were very different from each other. In regard of the precipitation provision they were moist, average moist, and dry, respectively for 2010, 2011 and 2012. Precipitations for the three years were distributed uneven during the vegetation, and its quantity in 2012 was extremely insufficient for the cultivation of celery. In 2010 their sum was 287.5 mm, in 2011 - 198.3 mm, and in 2012 – 78,2mm. Regarding the temperature, the following tendency was observed – the three years differed significantly from each other: 2010 was

average warm, 2011–warm, and 2012 – hot (extreme). The sums of the average daily temperatures of air were: 2010 - 3048.6 °C, 2011- 3185.0°C and 2012- 3414.8°C (table 1).

Table I: Probability of meteorological factors in the region of Plovdiv during V – IX

factor		experienced years			
		rate	2010	2011	2012
ΣT°	°C	3041.1	3093.6	3185.0	3414.8
	P %	(for 88 years)	2.2	19.1	39.3
N	mm	221.4 mm	287.5	198.3	78.2
	P %	(for 88 years)	13.3	60.0	90.0
ΣT° – temperature sum; N – precipitations					
P% –probability of weather factors					

In 2010 there were the best conditions for the celery development – relatively big quantity of precipitations, lower temperatures and a lower deficit of air density with water vapors. 2011 was determined as average, and as most unfavorable – 2012. In the last year there were counted the smallest quantities of precipitations, regarding the whole three-year period, high air temperature values and low relative moist.

Irrigation Regime

During the first vegetation year 7 times of watering were realized, and in the second and third – 14. In 2012, during the first stage of the celery’s growth, two times of watering were given, which secure the beginning and the middle of the period, and in its end the soil moisture was provided with around 100 mm of precipitations. In the period of intensive growth of root crops in the same year, the realized times of watering were 3, at precipitation sum of 27 mm. For the third stage period there were two times of watering, they were realized at the beginning of the stage, and after that the water deficit was compensated by the fallen precipitations, which were over 120 mm until the end of the period.

For the second experimental year – from the moment of seedlings graft to the beginning of root crops forming (1 phenophase), the given times of watering were 3 at precipitation sum 16.5 mm. In the second stage of growth there were four times of watering. Precipitations in this period were near 34 mm, 28.6 mm from them fell one day after the second time of watering and were not used by the plants. From the intensive growth to the gathering of plants there were accounted 66 days, in 55 of them there were 3.4 mm of precipitations. This water deficit was compensated through handing 7 times of watering.

2012 was the driest and the hottest from the three years. Nevertheless, the number of watering times was equal to this of the previous year. Plants that were cultivated in such unfavorable conditions had difficulty in their growth, in their root system and root crop, and in their leaf mass. In a result, they remained quite small, with low consummation of water and with extended growth stages, in comparison with the other two years. From the moment of graft to the moment of root crops forming there were 9 times of watering. During this period (continuing 87 days) there were barely 21.4 mm of precipitations. During the intensive root crop growth the times of watering were 3, and during the last stage – 2. They were distributed in the beginning and middle, and in the end of the stage the moisture deficit in soil was compensated by precipitation sum over 32 mm.

In this year the plants had water stress, in result of the big drought, and the yields were extremely low. For low yields in result of water stress reported Pascale et al 2003.

Analysis of the Results

Data extraction options years and average period had been presented graphically in Fig. 1 and those for biometric indicators (average weight of a mass of roots and leaves of an root) are plotted in Table 2. The results of the dispersion analysis of the impact of Factors A, B and AhV on individual biometric indicators are shown in Tables 3, 4 and 5. The indicator "mass of root crop" (Table 3) was observed greatest impact factor B - irrigation, with proven reliability on p≤0.001 climate indicator and a dominant influence by 94%.The second is the factor A - year, with effect from 5% and 1% is the interaction of two factors.

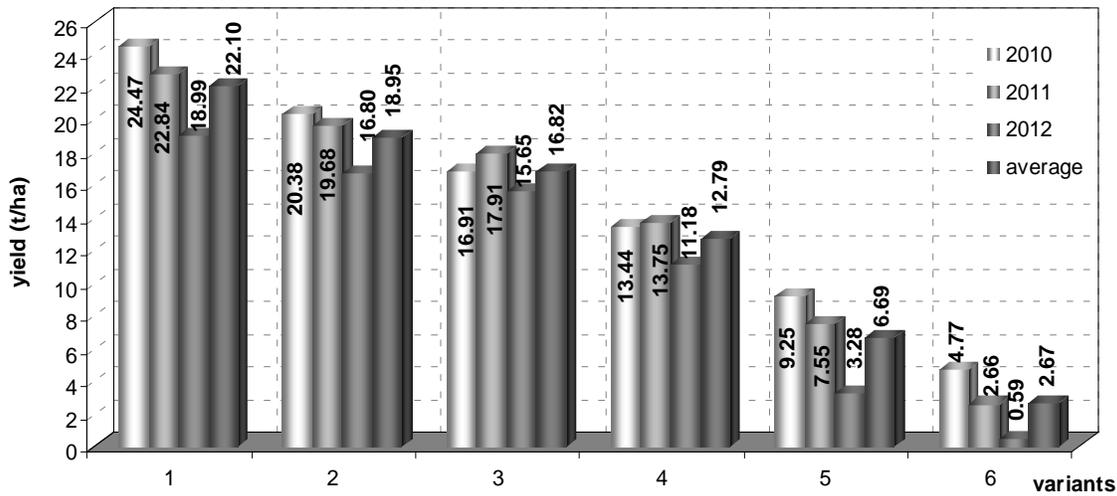


Figure 1. Yield of roots options and years

Table II: Data for biometric indicators variants and years

average weight of an one root					foliage of an one root				
year	2010	2011	2012	average	2010	2011	2012	average	
variants	1	152.9	142.8	118.7	138.1	42.0	42.0	54.1	46.0
	2	127.1	123.0	105.0	118.4	32.8	38.2	49.0	40.0
	3	105.7	112.0	81.5	99.7	29.0	27.2	38.2	31.5
	4	84.0	86.0	70.0	80.0	29.4	27.3	30.5	29.1
	5	57.8	47.2	20.5	41.8	28.9	22.2	24.1	25.1
	6	13.1	10.6	3.7	9.1	3.9	5.9	1.7	3.8

Table III: Influence of the factors: A -year and B – irrigation regime on extraction of root

Source of variation	SS	df	MS	F	P-value	F crit
Year (A) **	7838.99	2	3919.50	260.75	0.001	3.17
Variants of irrigation (B)***	140534.41	5	28106.88	1869.83	0.000	2.39
Interaction (AxB) *	1573.38	10	157.34	10.47	0.05	2.01
Errors	811.72	54	15.03			

The results of the biometric indicator "foliage" were shown with the greatest impact of 90% on climate indicators are variants of irrigation, followed by interaction year - variants of irrigation 6% and year factor was statistically significant with $p \leq 0.05$ (Table 4).

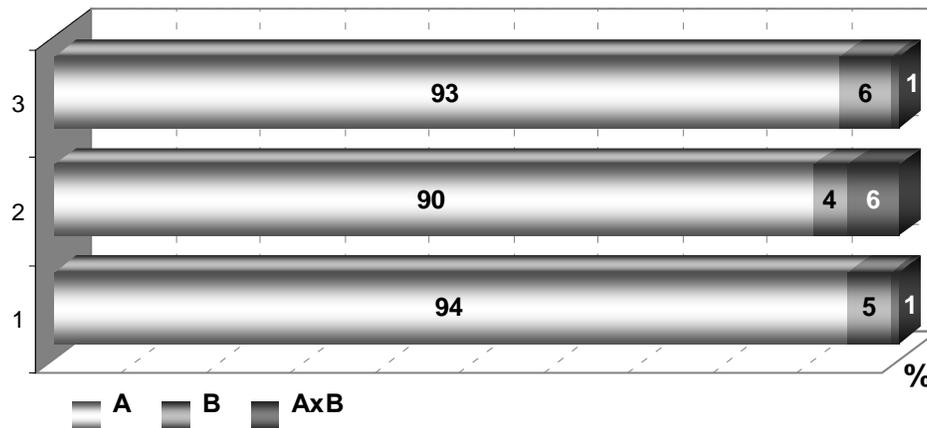
Table IV: Influence of the factors: A – year and B-irrigation regime on foliage

Source of variation	SS	df	MS	F	P-value	F crit
Year (A) **	506.34	2	253.17	93.60	0.001	3.17
Variants of irrigation (B)***	12902.74	5	2580.55	954.07	0.000	2.39
Interaction (AxB)*	865.91	10	86.59	32.01	0.06	2.01
Errors	146.06	54	2.71			

From the results for the indicator "yield" is significantly prevalence weight again factor irrigation. Dominant, with 93% of the power is the assessment of the impact of the irrigation system on the yield, while the nature of the year and the interaction of these two factors is significantly less - 6% and 1% (Table 5). The relative distribution of the effects of the factors year and irrigation, and their interaction were shown in fig.2.

Table V: Influence of the factors: A –year and B- irrigation regime on the yield

Source of variation	SS	df	MS	F	P-value	F crit
Year (A) *	204.34	2	102.17	610.02	0.08	3.17
Variants of irrigation (B)***	3290.36	5	658.07	3929.18	0.000	2.39
Interaction (AxB) **	35.35	10	3.54	21.11	0.002	2.01
Errors	9.04	54	0.17			



1. for weight of the root
2. for weight of the leaves
3. for the yield

Figure 2. Strength of influence (%) of the factors

IV. CONCLUSIONS

On the basis of the two- factor dispersive analysis were conducted that factor B-in irrigation regime has a dominant influence on all the three variables: the mass of roots and leaves and extraction, which is statistically proven at a very high level of reliability ($p \leq 0.001$). Strongest impact had the factor “irrigation regime” with strength of influence (94 %).

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Challenges to the Aspect of Development: Conditions of Health – A Study on Poor Pregnant Women in Assam

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Abstract- Development is the core concern for every government now a days. Millennium Development Goal gives emphasis on sustainable development. The Brundtland Commission's report defined sustainable development which meets the needs of current generations without compromising the ability of the future generations to meet their own needs. The Millennium Development Goal also emphasises on empowerment of women, reduce child mortality and to improve maternal health. Under Integrated Child Development Services (ICDS) and National Rural Health Mission (NRHM) several steps have been taken to improve the condition of mother and child. Then also maternal mortality ratio in Assam is 301 per one lakh and maternal mortality rate is 23 per one thousand and life time risks is 0.79% in Assam according to annual health survey. Therefore my study is based on the condition of health of poor pregnant women in Assam. For that purpose primary data is collected to know their condition, help of the medical practitioner also been taken. This study is going to deal with ground realities of the condition of health of poor pregnant women.

Index Terms- Maternal Mortality, Health, Women, Development, Poor, Pregnant

I. INTRODUCTION

The U.N. Human Development Report 2015, which was released on 14 December, ranks India in 130th position out of 188 nations. India's average life expectancy is 68 years. Even Bangladesh's position is better than us which is 71.6 years. India spent 4% GDP in health as against world average is 9.9 %.(Source: U.N. Report 2011-15) 190 number of Indian mothers die per 100000 live births. 47.9% malnourished children under the age of five in India

In contemporary world the concept of Human Security has changed a lot. The Human Development Report(HDR) 9UNDP, 1994 synthesized threats to human security in seven components, these are as follows- economic, food, health, environment, personal, community and political security:

1. Economic security includes poverty and basic income etc.
- 2, Food security includes hunger and famine, both physical and economic access to basic food. People often go hungry as they cannot afford to buy food, and not due to scarcity of food.
3. Health Security include injury, disease; require access to health care and health services, safe and affordable family planning. Threat of health issues are more acute in rural areas particularly women and children who are more exposed to disease.

4. Environmental security includes pollution, environmental degradation, resource depletion, and degradation of local eco systems, air and water pollution, deforestation, desertification, improper sanitization, natural calamities, man-made disasters, poorly build buildings.

5. Personal security includes threats of violence, violence, physical torture, wars, cross boarder terrorism, ethnic and religious conflicts, threats from individuals and gangs, street violence ,kidnapping, domestic violence, abuse , rape, prostitution, suicides, or motivating for suicides, drug abuse child labour etc.

6. Community Security includes threat to the integrity of cultural diversity, oppressive traditional practices, treating women harshly, and discrimination on the ground of culture and ethnicity or religion, problem of refugees, group rebellion and armed conflicts.

7. Political security includes political repression, violation of human rights, military dictatorship or abuse of power, political or state repression, practice of torture, ill treatment or disappearance, political detention and imprisonment.

Therefore concept of security has become multifaceted. Human Security also includes aspects of the health. Accessibility to health services is regarded essential to improve mortality rate. A healthy mother can give birth a healthy child. For a healthy society and for healthy nation the condition of maternal health must be improved. So many projects and schemes taken by international organisations and government to improve the condition of maternal health than also it is not improving, especially it is more acute among the poor pregnant women. Therefore this study is going to deal with ground realities about the condition of health of poor pregnant women.

II. METHODOLOGY

Area of study is the different areas in Assam. Which covers Agomoni, Ambari, Amingaon, Azara, Baihata Chariali, Balisatra, Baranghati, Barni, Barpeta, Mukalmuah, Basistha, Batadraba, Bejera, Baghmara, Borka, Chamata, Chandmari, Chaygaon, Dadara, Darrang, Dhubri, Dimu, Diphu, Dudhnoi, Tihu, Gobindpur, Hahara, Hajo, Hojai, Jagiroad, Kachamari, Kamalpur, Kamarkuchi, Loharghat, Mukalmuah, Nagarbera, Nalbari, Pacharia, Plashbari , Sualkuchi Satgaon etc. In selection of area it has been given importance that both urban and rural area must be area of concerned. Again areas also covered the backward and poor areas so that the real picture of poor pregnant women reflect properly. For the purpose of the study, primary data has been collected to know the condition of poor pregnant women, help of the medical practitioner also been taken. This study is

going to deal with ground realities of the condition of health of poor pregnant women cases registered in the case record of different hospitals in Assam in the year 2014.

Data sources: Both primary and secondary data has been collected for the study. Secondary data has been collected from various sources like journals, books, unpublished reports/ records of hospitals in Assam, published reports (research studies/ Case studies and so on), newspaper articles, other media coverage, information accessed through the Internet; personal memories if any.

III. REVIEW OF LITERATURE

Poor health status of women in Karnataka is inextricably inter-twined with the socioeconomic and cultural factors. Illiteracy, low education, early age marriage, rural residence and other cultural and economic factors constrain women in acquiring health service.(Sidramshettar, 2004)

The majority of women in India are anaemic. Iron deficiency is particularly pronounced among the women inhabiting in the eastern states (except Manipur)(Das ,2013)

Although there has been considerable progress in health centres after the implementation of NRHM in 2005, still the progress is not sufficient to provide health care services to the

Condition of Health of poor Pregnant Women in Assam:

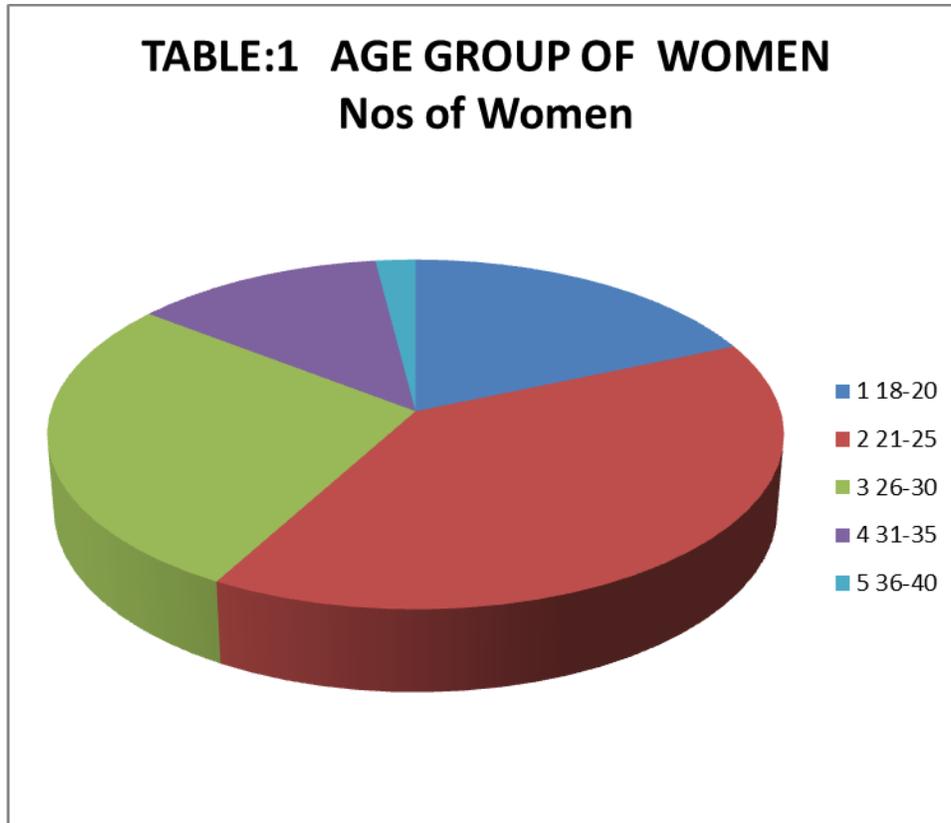
growing population. In fact there is acute shortage of Health Centres across the north eastern States. (Saikia and Das, 2014)

The prevalence of anaemia was 57.72% among ante- natal women who were in the age group of 17-21 years followed by the age group of 30 and above and 22-29 years. The prevalence of anaemia was 59.80 % among ante-natal women who get married below 18 years of age. This indicates that early marriage predisposes the risks for occurrence of anaemia in pregnancy. Higher prevalence of 54.36% anaemia was seen among women with education below 10th standard. Even the prevalence of anaemia among post graduate pregnant women was 33.33%. The prevalence of anaemia was 54.27% among ante natal women who belonged to low socio-economic status.(Bora, Barman and Barman, 2015)

Objectives: - Poverty has many aspects, it has become multifaceted and it adversely affects women and children at the most. Presently from the point of view of human security and development also, maternal health is an important issue. After reviewing of different literature it has come into light that condition of Maternal Health is great area of concern. Even hidden poverty comes out in focus when we take assessment about their health condition. Condition of poverty highly reflected in women's health. Therefore this study is an effort to reflect the ground reality and condition of health of pregnant women.

TABLE:1 AGE GROUP OF WOMEN

Sl No.	Age Group	Nos of Women	PERCENTAGE OF WOMEN	REMARKS
1	18-20	37	18.50	
2	21-25	79	39.50	
3	26-30	55	27.50	
4	31-35	25	12.50	
5	36-40	4	2.00	
6	Total	200	100.00	

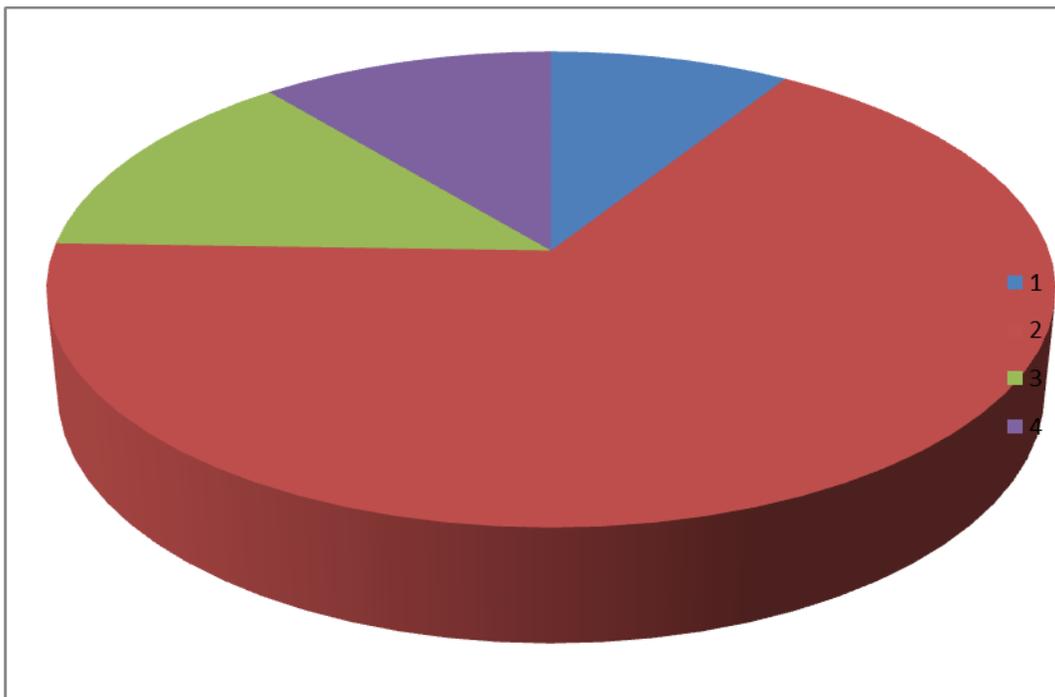


In this Study among the 200 samples 18.50% are of 18-20 years old, 39.50% are 21-25 years old, 27.50% are 26-30 years old , 12.50 % are 31-35 years old and 2 % are of 36-40% years. Therefore highest 39.50% belong to the age group of 21-25 years old and least 2% percent belong to 36-40 year.

TABLE:2 WOMEN SUFFERED FORM BLOOD PRESSURE

Sl No.	Types of pressure	No s of women	PERCENTAGE OF WOMEN	REMARKS
1	HIGH PRESSURE	18	9.00	
2	LOW PRESSURE	133	66.50	
3	NORMAL	27	13.50	

4	DATA NOT AVAILABLE	22	11.00	
Total		200	100.00	



Among the 200 women taken for the study 9% are suffered from High Blood Pressure and 66.5% suffered from Low Blood Pressure and 13.50 % has Normal Blood Pressure and 11 % data are not available. Therefore among the women highest 66.5 % are suffered from Low Blood Pressure and Least 9% women are suffered from High Blood Pressure. Remarkable is that among pregnant women very less number has normal blood Pressure level.

TABLE:3 HISTORY OF PRAGNANCY

SI No.	NO S OF COMPLECATED CASES	No. of Women	PERCENTAGE OF WOMEN	REMARKS
1	WOMEN WHO ARE PRAGNANT FOR THE FIRST TIME	94	47.00	

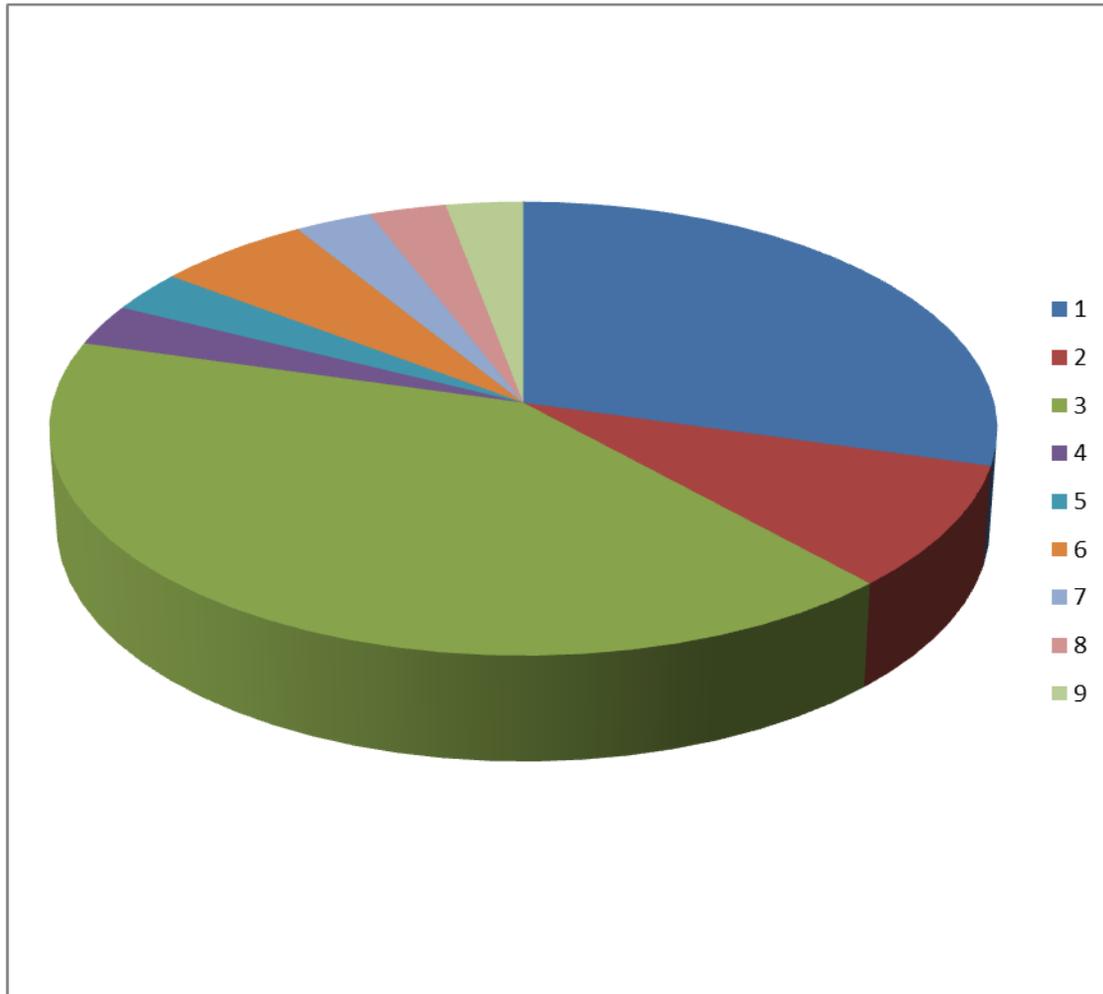
2	WOMEN WHO HAVE 1ST CHILD	84	42.00	
3	2ND PRAGNANCY	68	34.00	
4	WOMEN WHO ARE HAVING 2ND CHILD BUT AGAIN THEY ARE PRAGNANT	9	4.50	
5	3RD PRAGNANCY	14	7.00	

When analysing history of pregnancy, among them 47% are pregnant for the first time and going to deliver first baby, 34 % preparing for 2nd delivery. Among the women who have their 1st child is 42%. Women who are having 2nd child but again they are pregnant are of 4.5%. In the populous country like India preparing for third child is both burden for the family and for the society and as well as for the Nation as a whole. But in case both of the 1st and 2nd case of miscarriage or death of the children it is somehow acceptable. Here in this study 7% are having 3rd time pregnancy record.

TABLE:4 NOS OF COMPLICATED CASES

SI No.	NOS OF COMPLICATED CASES	Nos of Women	PERCENTAGE OF WOMEN	REMARKS
1	IST PRAGNANCY MISCARRIEGE	10	5.00	
2	2ND PRAGNANCY MISCARRIGE	3	1.50	
3	3RD PRAGNANCY	14	7.00	
4	ADMITED IN EMERGENCY	1	0.50	
5	DITACTED BREAST CANCER ON RIGHT SIDE	1	0.50	
6	ABORTED DUE TO UNDER AGE OF MOTHER,	2	1.00	
7	INFANT DIED DUE TO HIGH B P OF MOTHER	1	0.50	
8	WATER BREAK,	1	0.50	

	1ST PRAGNANCY ABORTION DONE BY MEDICAL CONDITION	1	0.50	
9		34	17.00	



Among the 200 samples this study reveals 34% pregnant women has complicity. As such, 5% are having of history of miscarriage of 1st pregnancy. 1.5% women also have history of miscarriage in the time of 2nd time pregnancy also. As discussed above 3rd pregnancy has become an issue for these poor pregnant women and percentage of them is 7%. Among the women 0.50% is in very serious condition and has to admit them in emergency. 0.50% are also detected of having Breast Cancer. 1% pregnant women has to go through abortion due to their under age. 0.5% women are having record of losing their child due to the High Blood Pressure. 0.50% was in very serious condition due to pre-term delivery. 1st pregnancy has to be aborted due to poor medical facilities is 0.50%. Therefore these are the issues come in front while this study is taken place. Hence, 34% women are

going through complications is not at all reflected healthy maternal health condition of these poor pregnant women.

Facts Finding of Annual Health Reports:

The Annual Health Survey 2012-13 reflected that in Assam Marriages among females below legal age(18 years) is in rural areas 8.1% and in urban area it is 3.9% and in total it is 7.4%. (Data taken based on marriages during 2009-2011).

Women aged 20-24 reporting birth of order 2 and above is in rural area 45.5% in urban 39.5% and in total 44.8%.

Women reporting birth of order 3 and above in rural it is 34.1% and in urban 20% and in totality 32.3%.

Currently Married Pregnant Women aged 15-49 years registered for Ante Natal Care is in rural 77.3% and in Urban 84.2% in total it is 78.2%.

Mothers who received any Ante Natal Check Up in rural 94.2% and in urban 98% in total it is 94.8%.

Mothers who consumed IFA for 100 days or more in rural 21.8% and in urban 31.4% in total it is 23.1%.

Crude Death Rate among male is 8.0% and among female 6.1% and all totally 7% in Assam.

Maternal Mortality Ratio in Assam 301 and Maternal Mortality Rate is 23.

IV. CONCLUSION

Development is the core concern for every government now a day. The Millennium Development Goal also emphasises on empowerment of women, reduce child mortality and to improve maternal health. Under Integrated Child Development Services (ICDS) and National Rural Health Mission (NRHM) several steps have been taken to improve the condition of mother and child. Then also maternal mortality ratio in Assam is 301 per one lakh and maternal mortality rate is 23 per one thousand and life time risks is 0.79% in Assam according to annual health survey. In my study it is come in to front that significantly 66.5 % are suffered from Low Blood Pressure and 9% women are suffered from High Blood Pressure. Remarkable is that among pregnant women very less number has normal blood Pressure level. Women who are having 2nd child but again they are pregnant are of 4.5%. In the populous country like India preparing for third child is both burden for the family and for the society and as well as for the Nation as a whole. 34% pregnant women have complicacy. As such, 5% are having of history of miscarriage of 1st pregnancy. 0.50% are also detected of having Breast Cancer.1% pregnant women has to go through abortion due to their under age. 0.5% women are having record of lost their child due to the High Blood Pressure. 0.50 % was in very serious condition due to pre-term delivery. 1st pregnancy has to be aborted due to poor medical facilities is 0.50%. Therefore these are the issues come in front while this study has taken place.

We are all are aware how anaemic our women and children are, early marriage is another big problem, and low education level is another problem and most of all poverty hampers maternal health. The concept of human security and the concept of development cannot be fulfilled without considering the issue of maternal health. Therefore it is the responsibility of the husband, family, society and the Government to take care of pregnant women. In this paper we have witnessed that 66.5% has Low Blood Pressure, it may be due to increase menstrual flow, repeated pregnancies or low iron level. For that diet should be good and balanced. Therefore improvement of their socio economic background is very much essential. In this way we can reach the goal of development. More quality Health Services must be available and accessible to every woman. Proper maternal health counselling should be provided at every door step. Pregnant Women and their family members should be

taught about importance of good and balanced diet, maintenance of hygiene and emergency consequences during pregnancy. They should also be aware about the regular medical check-ups and doses of vaccination to be provided during and after pregnancy. They should also be provided proper knowledge about neo-natal care and their following doses of vaccination . they should also be provided the knowledge about necessity of family planning and ways of Birth Control to support the same.

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Strategies of scaling up health workers distribution in rural public health facilities: A case of Kilifi County, Kenya

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Abstract- Health Workers constitute key component of the national health system thus central to planning, managing and delivering health services. Rarely do concerted efforts get made to address severe staff shortages in many Countries despite being of critical importance to the functioning of health service delivery. In addition to absolute shortage of Health Workers in Kenya, available workforce is often ill-distributed and attrition rates are high. Kilifi County, one of poorest rural Counties in Kenya experienced shortage of Health Workers. The goal of this study was to explore ways and means of scaling up Health Workers distribution in public health facilities to improve Health Workforce in Kilifi County, Kenya. The study was based on Human Resources for Health pillar. The objectives of the study included; to determine characteristics of deployment of Health Workers; and explore factors influencing retention rates of Health Workers. Information generated will be valuable to institutional planners in resolving mal-distribution of Health Workers and reinforce strengths in public health facility hence efficient and effective service delivery resulting to improved health. A descriptive cross sectional study design was used on four public health facilities with a target population of 232 Health Workers. Stratified sampling technique was used on health facilities by proportionately selecting the respondents in their stratified cadres. This resulted in a sample size of 109 health workers in total. Structured questionnaire and the Key Informant Interview guide were employed as data collection tools which attained quantitative and qualitative data respectively. Data analysis was done using SPSS version 20.0 and correlation analysis studied the relationship between staffing issues versus Health Workers distribution. The study found out that, only 35(35.4%) of staff applied tasks shifting while 43(43.4%) were not sure of satisfaction level with positions held. 48(48.8%) of staff disagreed that employees were recognized at individual levels and supportive policy frame work was missing. The study concluded that a supportive policy frame work to guide in job analysis, employee recognition and training needs analysis should be done. The study recommended that more task shifting be encouraged; skills training on retention methods and availability of supportive policy frame work should be put in place. The study also recommended that further research be done on the process of certification to highlight the degree of medical staff involvement in the process, value added to the facility and staff be accredited.

Index Terms- Distribution, health workers, scaling up, strategies

I. INTRODUCTION

The World Health Organization (WHO) identified six building blocks of a health system in its Framework for Action. One of those building blocks was a well performing Health Workforce (others being Health Financing, Leadership and Governance, Health Service Delivery, Pharmaceutical Management and Health Information Systems). Health Human Resources (HHR) also known as Human Resources for Health (HRH) or Health Workforce was defined as all people engaged in actions whose primary intent is to enhance health (World Health Report, 2006).

They included physicians, nurses, advanced practice registered, midwives, dentists, allied health professions, community health workers, social health workers and other health care providers. Also included in this definition are health management and support personnel who may not have delivered services directly but were essential to effective health system functioning, including health services managers, medical records and health information officers, health economists, health supply chain managers, medical secretaries, and others.

The field of human resources for health deals with issues such as planning, development, performance, management, retention, information, and research on human resources for the health care sector. Raising awareness of the critical role of HRH in strengthening health system performance and improving population health outcomes placed the health workforce high on the global health agenda. While many countries had HRH plans, a major reason countries remained in crisis was the lack of sustained implementation to achieve concrete workforce strengthening results (Karen A Grepin & William D Savedoff, 2009).

The World Health Organization (World Health Report, 2006) estimated a shortage of almost 4.3 million physicians, midwives, nurses and support workers worldwide. The shortage was most severe in 57 of the poorest countries, especially in sub-Saharan Africa. The situation was declared on World Health Day 2006 as a health workforce crisis the result of decades of underinvestment in health worker education, training, wages, working environment and management (World Health Report, 2006).

Shortage of skilled birth attendants in many developing countries remained an important barrier to improving maternal health outcomes. Many developed and developing countries

reported mal-distribution of skilled health workers leading to shortages in rural and underserved areas (Wafula J, et al. 2011).

Equitable health coverage depended on having the necessary human resources to deliver health care services. Kenya was among the African countries experiencing crisis in the area of human resources for health (HRH) (World Health Report, 2006). The major causes of the crisis included inadequate and inequitable distribution of health workers; high staff turnover; weak development, planning and management of the health workforce; deficient information systems; high migration and high vacancy rates; insufficient education capacity to supply the desired levels of health workers needed by the market; inadequate wages and working conditions to attract and retain people into health work, particularly in rural underserved areas. This shortage affected most of the available health worker categories. (Kiambati, Caroline & Toweett, 2013)

As a country, Kenya remained committed to making significant improvements in its human resources for health situation. However, the country had not achieved the ambitious health milestones set, including achieving the Millennium Development Goals, without improving the quality, quantity and distribution of the health workforce. Skilled providers, physicians, nurses and midwives, assisted in only 44% of births. Also noted was that there were great inequalities in access to health services across provinces (Obonyo B, 2010).

Kilifi being one of the poorest counties in Kenya was cited to have many serious health challenges. Achieving quality health care services in Kilifi County remained a challenge despite the many interventions put in place by the government and stakeholders (Mwatsuma Kitti Mwamuye 2014). Kilifi County had a total of 406 public health facilities at tier 2 and 3. The doctor/patient ratio was 1:42,625, clinical officer/patient ratio is 1:30,194 while the nurse/patient ratio is 1:3,396. (First Kilifi County Integrated Development Plan 2013-2017).

The most prevalent diseases included Malaria, Pneumonia and diseases of the digestive system. Furthermore HIV/AIDs was a major health and development problem in this County with a prevalence of 10%. The bed occupancy by people affected with HIV/AIDs related illnesses in the various health institutions was about 50%. (First Kilifi County Integrated Development Plan 2013- 2017).

II. PROBLEM STATEMENT

Efforts aimed at strengthening HRH ultimately aim to get the right health workers, in the right place, with the right skills,

doing the right things (World Health Report, 2006). Massive geographic and skill mix imbalances were reflected in the perilous undersupply of HRH in most rural areas. (Lemiere. C, et al 2011).

The mal-distribution of health workers within countries was a crucial problem felt most acutely in rural areas. Kenya was a case in point, where rural primary health care facilities were very understaffed (Wafula J, et al. 2011). According to the World Health Organization, one nurse should serve 285 residents. However, in Kenya, seven nurses served 4,000 residents with over 51,455 nurses needed to fill in the ever-growing demand (World Health Report, 2006).

Statistics in Kilifi County indicated that approximately 15 mothers delivered every night in Kilifi County Hospital at the watch of one or two nurses while the proposed number in the norms and standards for health service delivery by Ministry of Health, 2006 should be 12 nurses to serve delivery and maternal and child health (MCH). Overcrowding had put pressure on the County Government to address the shortage of skilled health workers in the County. (Mwachiro A, 2014).

The nurse patient ratio stood at 1:3,396 which in itself was a manifestation of staff shortages in Kilifi County as opposed to World Health Organization recommendation (World Health Report 2006) one nurse to serve 285 residents.

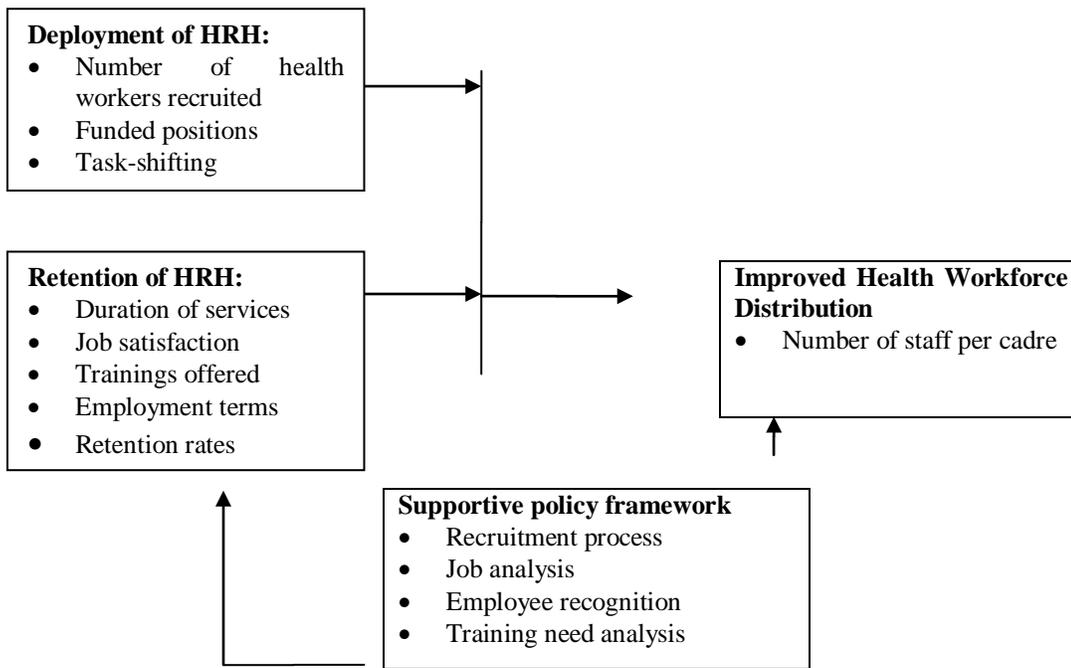
This research study aimed at determining how recruitment, deployment and retention were the strategies of HRH distribution in Kilifi County. The researchers were interested in identifying the selection criteria applied during recruitment and the efforts in human resource planning and management. Furthermore the researchers were interested in identifying the number of HRH recruited within a period of five years (between year 2010 to year 2014), the funded positions, duration of service by health workers, job satisfaction and training offered as well as supportive policy frame work in addition to sustained implementation.

III. STUDY OBJECTIVES

The main objective was to explore the strategies for scaling up health workers distribution in public health facilities to improve health workforce in Kilifi County, Kenya. Specific objectives included: To determine how deployment aspects of HRH affected health workforce distribution in Kilifi County and Explore how retention of HRH influenced distribution of health workers in Kilifi County.

Conceptual framework
Independent Variables

Dependent Variable



Intervening Variable

Figure 1: Conceptual Framework

IV. METHODOLOGY

The study involved descriptive cross-sectional research design where potentially related factors were measured at a specific point in time for the defined population. The strategies of scaling up human resources for health distribution in public health facilities in Kilifi County were described by including four public health facilities in the study.

The study took place in Kilifi County located in North Coast of Kenya which had a catchment population of 1,500,000 and a total of 406 public health facilities. The target population was a total of 232 health workers in different cadres who served

four public health facilities namely; Kilifi County Referral Hospital (County Referral Hospital), Malindi sub-County Referral Hospital, Gende Health Centre and Pingilikani Dispensary.

The researcher stratified public health facilities according to Tiers of health care system. The four health facilities were randomly selected to represent tier 2 and 3. The respondents were proportionate as per the facility and cadres and randomly selected. The sample size was 109 respondents calculated from a population of 232 health workers using Yamane (1967:886) formulae with a confidence level of 95% and a precision of 0.05.

Table 1: The sample size of respondent

Staff Cadre	Frequency	Kilifi County Hospital	Malindi Sub-Hospital	Gende Health Centre	Pingilikani Dispensary
Doctors	5	3	2	-	-
Pharmacists	3	1	1	1	-
Lab Technologist	6	3	2	1	-
Orthopaedics Technologist	2	1	1	-	-
Radiographer	1	1	-	-	-
Physiotherapist	3	2	1	-	-
Health Records and Information Officer	1	1	-	-	-

Medical Technologist	Engineering	3	2	1	-	-
Accountants		1	1	-	-	-
Administrator/In Charge		4	1	1	1	1
Clinical Officer		8	5	2	1	-
Nurses		68	39	21	6	2
Secretarial Staff/Clerks		4	1	1	1	1
Total		109	61	33	11	4

The questionnaire were administered to the staff to collect information on deployment and retention of health workers while two different key informant interview guide were used on in charge/administrators of the facilities and County health board to

collect information on recruitment, deployment and retention of health workers.

V. FINDINGS AND DISCUSSION

Table 2: Characteristics of Respondents

Characteristics	Variable	Respondents N (%)
Age Distribution	20-29	4(4.0)
	30-39	52(52.5)
	40-49	25(25.3)
	50-59	18(18.2)
Gender	Male	40(40.4)
	Female	59(59.6)
Level of Education	Diploma	57(57.6)
	Higher National Diploma	25(25.3)
	Graduate	14(14.1)
	Masters	3(3.0)

Deployment of health workers

Regarding task shifting the findings were that majority 64(64.6%) of respondent did not perform other tasks within the organization whereas 35(35.4%) were practicing task shifting. There is no clear guidance from the literature on what the ideal mix of health professionals might be. However, Buchan et al, 2002 concurred with this by indicating that Health care is labour-intensive and managers of health care provider units strive to identify the most effective mix of staff that can be achieved with the available resources.

The study found out that, majority (48.5%) of the staff in the industry were permanent employees, while contractual staff (27.3%) were second in the table. Respondents who were casual workers (24.2%) came in third while none mentioned on other forms of employment. This implied that the people interviewed were fully engaged with organization making them a better reliable choice of information.

Nandan et al 2012 agreed by implying that contractual staff in service delivery and managerial positions could improve the situation of health workers shortage in rural areas.

From the findings, the County does not recruit as per health facility requirements and this contributed to mal-distribution. These findings are supported by literature from Nandan et al. 2012 who noted that despite some improvement in the

deployment of HRH in India, the low performing states faced huge shortage of HRH in rural areas.

Respondent also indicated that they provided Skill flexibility. Two strategies were used to promote skill flexibility: role substitution and role delegation. Role substitution involved substituting one health professional for another fully qualified health professional in order to provide a service. This is possible based on the overlapping scopes of practice between many health professionals, as well as the evolution and expansion of scopes of practice over time. Examples include the use of physician assistants or nurse practitioners to provide services traditionally performed by physicians, or using health care assistants to provide non-clinical services that have traditionally provided by registered nurses.

The findings indicated that task shifting was the arrangement at the health facility level and the County directorate was not directly involved. The County directorate decides on the number of staff in each health facilities. The heads of the health facilities did not have a say about the hiring and firing of staff they were supervising, they could only highlight the areas of shortage of staff and request from the Directorate or the Ministry of Health to hire more workers, which usually was a request that was never answered or not answered according to the

requested profile. This negatively affected the productivity of the health centres.

Retention of health workers

Most of the respondents were nurses representing 60.6% whereas Clinical officers and laboratory technologist represented

each 6.1% of the respondents. Secretarial and clerk staffs were only four which is 4.0% of total respondents. Lastly 23 (23.2%) staff was on a different category list.

Table 3: Duration of employment

Years Worked	Frequency	Percentage
Less than 6 Months	4	4.0
6 Months to 1 year	14	14.1
1 to 3 years	23	23.3
3 to 5 years	33	33.3
More than 5 years	25	25.3
Total	99	100.0

As noted by Lemiere C et al 2011, among the factors contributing to staff imbalances in rural workforce are individual preferences for particular working and living conditions. Therefore those respondents who had served more than 5 years probably had preferences for these institutions. In addition Buck and Watson 2002 indicated that human resources turnover costs

an organization needless expense. The findings are in agreement since 33.3 % of respondents had served the same institution between 3 to 5 years whereas 25.3% had served more than 5 years.

Table 4: Level of Satisfaction

Factors to Consider	Frequency	Percentage
Very dissatisfied	2	2.0
Dissatisfied	21	21.2
Neutral	43	43.4
Satisfied	29	29.3
Very Satisfied	4	4.0
Total	99	100.0

Majority of the respondents were in the neutral position with 43.4%, closely followed by a group of those who were satisfied with 29.3%. Respondents who were dissatisfied came in third with 21.2%. Only a few more indicated to be very satisfied than those who were very dissatisfied with 4% and 2% respectively. This therefore indicated that majority of the staff were not sure of the satisfaction in positions they held.

Even for jobs that do not require high level of skills, a retention strategy can positively affect the engagement, turnover and ultimately financial performance, especially, for positions that involve interaction with customers as noted by Hinkin et al (2000). When a significant share of Human Resources only stays for a limited time with an organization that is a pointer toward underlying problems that need to be explored and addressed by determining the most adequate measures.

34.3% of the respondents were not sure if they could recommend their friends to work in the institutions they worked while 23.2% would probably recommend their friends. 21.2% indicated that they would probably not recommend their friends. Further results indicated that, 11.1% of the respondent pointed out that they would definitely recommend whereas 10.1% mentioned that they would definitely not advise them. This implied that since most of the respondents were not sure, there could be some challenges that people would not like their friends go through. This is in agreement with the empirical studies by

Kinnear & Sutherland, 2001; Maertz & Griffeth, 2004; Meudell & Rodham, 1998; which revealed that factors such as competitive salary, good interpersonal relationships, friendly working environment, and job security were reported by employees as key motivational variables that influenced their retention in the organizations.

The study found out that 48.5% of the respondents disagreed with the claim that they were recognized at individual levels while 30.3% neither agree nor disagree to be recognized at their work place. The study further found out that 15.2% of the respondents disagreed that they are recognized while 6% strongly disagreed. Surprisingly none of them strongly agreed to be recognized as individual. This implied that the employers needed to improve on employee recognition. As Richard Branson (October, 2015) suggested that one should take care of their employees, and they'll take care of their business.

The findings revealed that the nursing department had the longest serving staff. The possible reasons were that they were nearing retirement age and most of them were commuting from home. Doctors had the highest turnover rate and the possible reasons were career advancement. These findings are similar to the report by World Health Organization Country Office for India (2007) which indicated that doctors were reluctant to be posted in rural areas as they felt isolated and cut off from the medical mainstream.

VI. CONCLUSION

The main factors affecting health workers motivation and hence level of productivity were; lack of equipment, lack of incentives, the staff working environment, and patients' attitudes. These impediments prevented health workers from doing their jobs, and results in poor quality of health service delivery. Also revealed from the findings is the fact that staff needed to be recognized at individual levels. There is a need to create a conducive working environment for increased productivity. To reduce the burden of mal-distribution, all facilities are encouraged to embrace task shifting and introduce a career development path for individual staff members.

RECOMMENDATIONS

1. There is need for all health facilities to encourage more tasks shifting in all departments while ensuring that the daily routines are not compromised as well as look for funders and partnership to aid in training and development of staff.
2. Regular trainings on retention methods to all managers and supervisors are required to reduce attrition rates.

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Investigation of electromagnetic radiation emitted from mobile base stations in Khartoum state

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Abstract- The fast development of mobile communication systems all over the world has caused the appearance of many hundreds of mobile telephone base stations in every municipality. Mobile base station set up has produced concerns about health and in some cases has resulted in litigation in court. Hence, radiological hazard assessments due to electromagnetic radiation emitted from 50 mobile base stations GSM900-GSM1800 were carried out. The measurement was performed at different distances and directions from 50 mobile base stations using Aaronia Hyper LOG 4040 X instrument. The mean Power density (0.00595W/m^2) and Power Ratio (-52 dBm) were determined and compared with International Commission on Non-Ionizing Radiation Protection (ICNIRP), World Health Organization allowable limits and different countries. On the other hand, the investigation highlights the importance of radiation monitoring of [mobile phone antenna on a residential](#) building.

Index Terms- RF-EMF, Exposure, Residential building, Reference level,

I. INTRODUCTION

According to the wide spread used radio frequency (RF) in general field and communication As wireless communication and use of non-ionizing radiation is increasing we urge establishing the value of exposure of it from environmental far - near field sources in everyday life. Electromagnetic spectrum is the distribution of electromagnetic radiation according to frequency such as radio frequency, Microwaves, infra-red, visible light, ultra-violet, X and γ rays. With developing technology communication tools are became an indispensable part of our daily life. Most of those tools use the Radio Frequency Radiation (RFR) which is a part of the electromagnetic spectrum .TV and radio transmitters, base stations, radar systems, mobile phones, cordless phones, remote control systems are all RFR generators. Most of TV and radio stations are typically located in one antenna tower or a few towers that are close to each other. Mobile phone base stations also exist between TV and radio stations [1, 2].

This increased use of mobile phone has led to increased deployment of base station. There are two sources of radiofrequency radiation exposure from the mobile telephone system: base station antenna and mobile phone or hand set .Exposure from base station antennas is continuous, irradiates the whole body and expose an entire community in different ways according to position and separation distance. The mobile phone system works as a network containing base stations within each cell, a base station can link with number of handsets. The mobile phone and base stations communication with each other, sharing a number of operation frequencies [3].

So antenna farms arise as complex areas in cities. Consequently, this situation has created unease feelings to the people that they may be affected by the radiation from those antennas. Public concern about potential health effects of human exposure to electromagnetic field from RF communication facilities are increases every day. These circumstances make the electromagnetic field (EMF) [1, 2]. In the many documents the Basic restrictions are defined to protect the general public and workers from the adverse health effects of exposure to EMF by different commissions all around the world. However in some countries e.g. Switzerland or Italy exposure limits are determined by their own national authorities and more strict levels are valid [4]. The main differences are that they integrate the exposure over time and have different criteria for the definition of damage and adverse health effects International Commission on Non-Ionizing Radiation Protection (ICNIRP) was launched as an independent commission [11, 3]. The main differences are that they integrate the exposure over time and have different criteria for the definition of damage and adverse health effects International Commission on Non-Ionizing Radiation Protection (ICNIRP) was launched as an independent commission [11, 3]. American National Standards Institute (ANSI) operates as a part of Institute of Electrical and Electronics Engineers (IEEE) for safety standards on EMF exposures, World Health Organization (WHO) and Federal Communications Commission (FCC) are some of the other regulatory boards .Generally ICNIRP and ANSI/IEEE standards are most widely accepted all over the world [13, 4].These regulations occupied the standards for frequency range of the EMF exposure limits as recommended by ICINRP. The gross measurement of radiation from the antenna in the designated area compared with global measures [13, 3].

Assessment of Exposure around base station

Electromagnetic is combination of electric and magnetic field in the environment [21]. The electric field and magnetic field oscillate in time phase and direction is both mutually orthogonal and orthogonal direction of propagation. [5]

The power density is rate of the flow of electromagnetic energy per unit area used to measurement the amount of radiation at a given from transition antenna. [6]

$$S = \frac{1}{2} \operatorname{Re} [E \times H] S = \frac{[E_{\text{rms}}]^2}{Z_0} = Z_0 [H_{\text{rms}}]^2 \quad (1)$$

E, H is electric and magnetic field intensity
 Z= impedance of free space

The ratio between electric field strength and magnetic field strength is constant outside the reactive near field .In the free space the ratio is known as the intrinsic impedance of free space and takes the value 377 .consequently, equation 1 may be rewritten [5].

$$S = \frac{E^2}{377} \quad (2)$$

Near-field power density evaluation

In the near field region of antenna the energy is largely confined within a cylinder pattern of diameter D. The power density in the region can reach a maximum before it begins to decreased with distance and extent of the near field can be theoretically calculation by using the following equation: [7] [23]

$$R = \frac{D^2}{4\lambda} \quad (3)$$

Where:

R= extent of near field, D= maximum dimension of antenna, λ = wave length

The corresponded maximum value of power density is given by the following equation:

$$S_{nf} = \frac{16\eta P}{\pi D^2} \quad (4)$$

Where

S_{nf} = Maximum near field power density , η = aperture efficiency

P =power field to antenna D = Antenna diameter

Far-field power density evaluation

The transition region extents from the end of near field and goes up to beginning of far field. Power density in the transition region decreases inversely with distance from antenna .To calculation the distance of the transition region we can use following equation:

$$R_{ff} = \frac{0.6D^2}{\lambda} \quad (5)$$

R_{ff} = Distance to beginning of far-field D=diameter,

λ = Wave length

The total power density can be given by the following equation:

$$S = \frac{S_{nf} \cdot R_{nf}}{R} \tag{6}$$

S= power density in transition region

S_{nf} = Maximum power density for near field

R_{nf} =extent of near field

R= Distance to point of interest.

If the total power density field into an antenna is known as well as the antenna gain to calculate the power density in the main beam by assuming an inverse law dependence upon distance at all distances from the antenna. The following equation is valid for power density in the far field use power density, S, in this way [5].

$$S = \frac{P_{rad} G}{4\pi d^2} \tag{7}$$

Where d is the distance from the antenna P_{rad} is the total radiated power and G is antenna gain (in liner units). The magnitude of far – field radiated by the base antenna system is determine by using the ray algorithm base on the geometrical optics method. Thus, the total electric field can be express as superposition of incidence and reflection compound. [8, 9].

$$E_{Total} = E_{incidence} + E_{reflection}$$

$$E_{incidence} = E_o (\phi, \theta) e^{-j\beta R}$$

$$E_{reflection} = \rho \cdot (\phi^-, \theta^-) E_o \frac{(\phi^-, \theta^-)}{R^-} e^{-j\beta R}$$

Where:

ρ =is the approximation reflection coefficient.

E_o = is the magnitude of incidence wave.

(ϕ, θ) =are spherical coordinate angles, β is constant.

R= is distance from the base station.

Types of exposure Zones

Base on the reference level specified by ICNIRP, the compliance distance from base station antenna could be calculated with the help of equivalent Iso-Tropically radiation Power (EIRP watts) in the direction of the maximum gain of the antenna .hence ,three types of exposure zones can be identified

Compliance Zone

Where potential exposure to EMF is below the applicable limits.

Occupational Zone

Where positional exposure of EMF is below the limits for occupational exposure but exceeds the limits for general public exposure. Here occupational refer to operational and maintenance staff.

Exceedance Zone

Where potential of EMF exceeds the limits for both occupational and general public exposure [10]

Method Materials

Study area

The State of Khartoum area (22,142 km²) lies between latitude 15-16 N and longitude 31.5 -34 East, located in the heart of Sudan at the confluence of the [White Nile](#) and the [Blue Nile](#), where the two rivers unite to form the [River Nile](#). The population census estimates the population of Khartoum state to be about 5,274,321 in year of 2008.

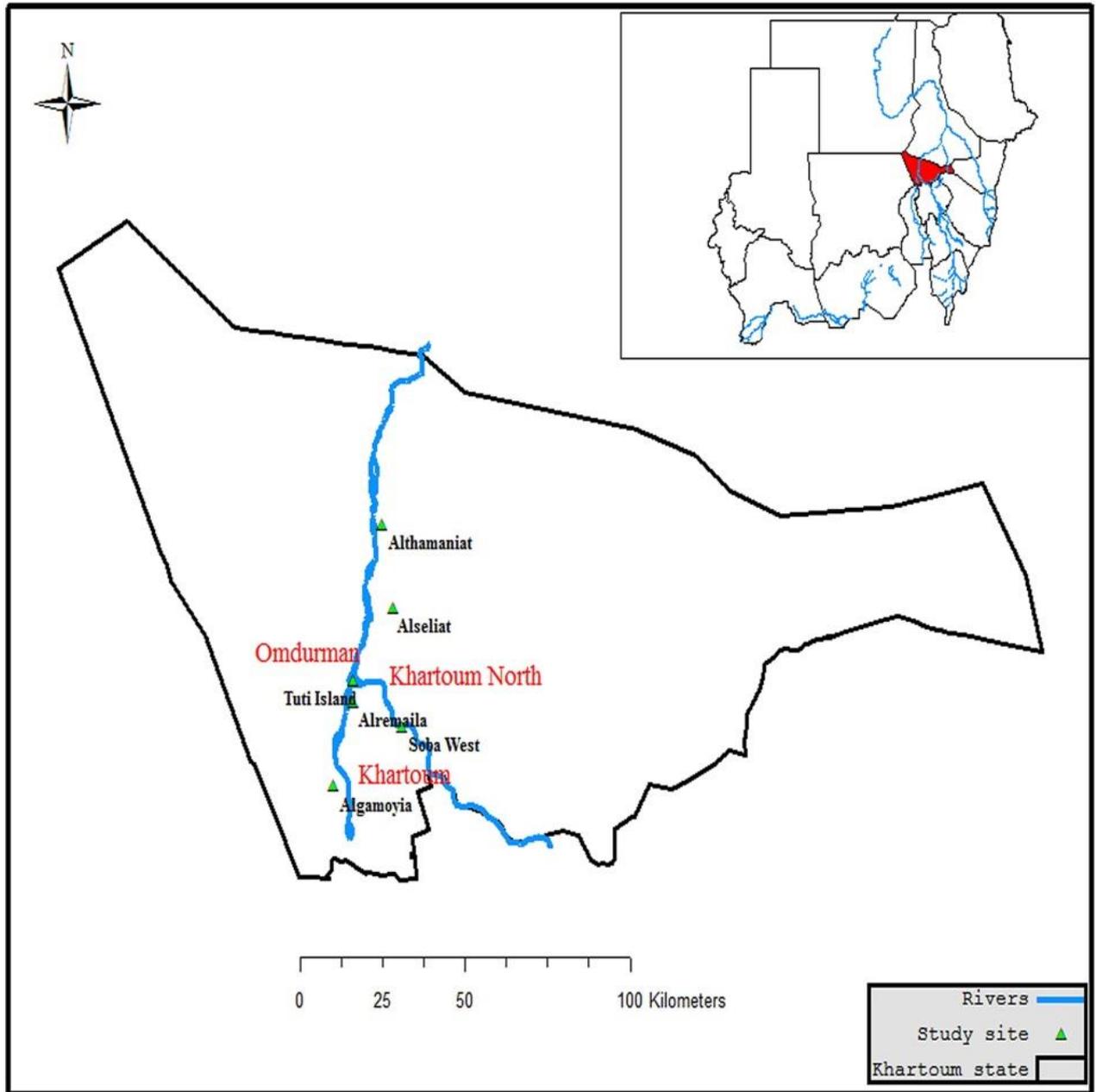


Figure 1: map show the study area

Measurement

Aaronia Hyper LOG 4040 X” detector have been used for electromagnetic radiation measurement. It has possible analysis and measurements within frequency range (400MHz - 4GHz) Coverage of various mobile radio frequency ranges Suitable for field-strength and EMC measurements due to high precision Can be used in the lab and for open-field application . The area of was selected for the present study which demonstrates the use of various types of antennas and measurement at difference distance. In the survey, a GPS device was used to locate the coordinated of antennas. Measurements were performed up to 10-100m far from the antenna. At each location, the type of antenna is determined using accompanied software (AaroniaLcs analyzer). The measuring devices (Hyper LOG 4040 X) are connected to a laptop for calibration purposes and to analyze the spectra. For each antenna the following data is obtained: exposure, electromagnetic electric field. In order to obtain more accurate values, many measurements are normally performed at every location. The following data is also recorded: power density, electric field and magnetic field. Figure shows display of spectrum and result of typical measurement. [12]

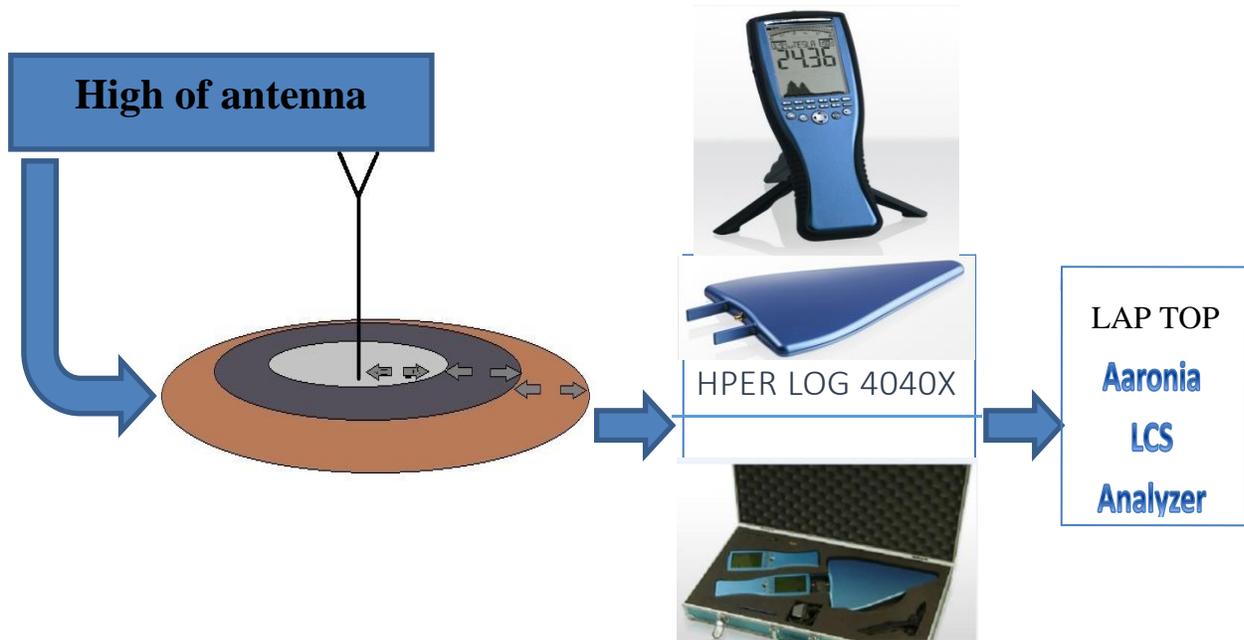


Figure 2: Schematic diagram show the principle of measurements

II. RESULT AND DISCUSSION

1. The calculation of power density radiation at distances ranging from (1m to100 m) from base station for different transmitting power and difference antennas and estimated the maximum power density from result from(1 to 10m) the mean was found value (18.121W/m²) near of antenna .After that that we take the value of power density from distance (10,20,30,40,50,60,70,80,90 and 100),the mean Power density (exposure) was (0.00590W/m²)0.000590% at 50m radius from antenna . According to the result the Sudan is no violation of power density (exposure).

Table (1) Power density with respect to distance and power ratio (1-10m)

Distance (m)	Latitude	Longitude	Power Ratio (dBm)	Power density (W/m ²)
1	32.53773	15.55633	-74.1	18.121
2	32.53703	15.55589	-53.64	2.0254
3	32.53645	15.54510	-48.91	1.9273
4	32.54601	15.54107	-53	0.9562

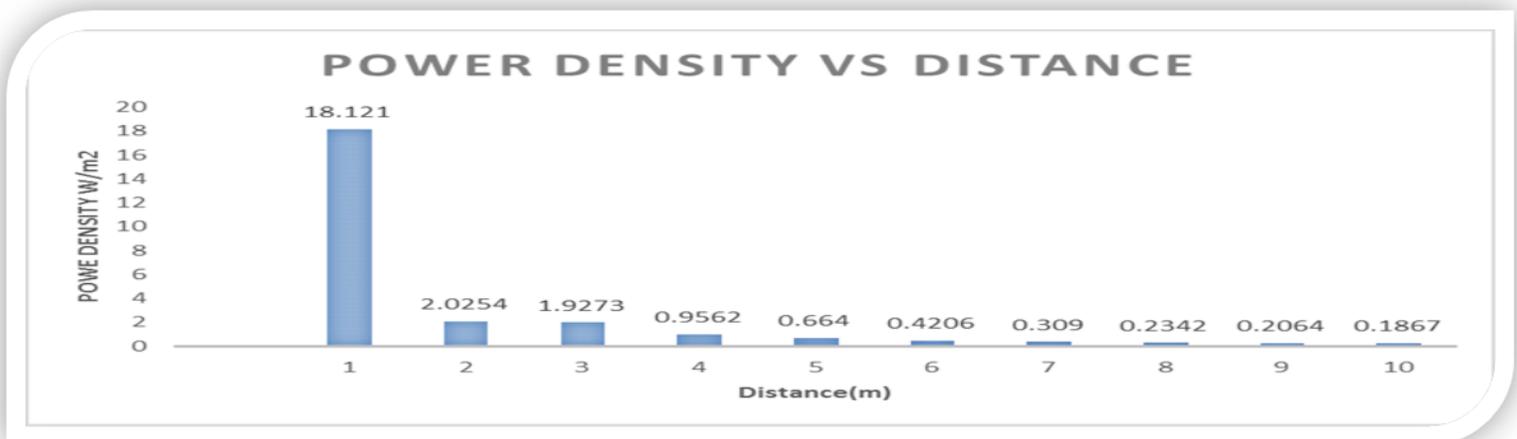
5	32.54097	15.54922	-49.56	0.6640
6	32.54089	15.55796	-56.51	0.4206
7	32.55329	15.53219	-60.59	0.3090
8	32.55246	15.54133	-60.59	0.2342
9	32.55151	15.54103	-61.21	0.2064
10	32.54597	15.54161	-53	0.1867

Table (2) Power density with respect to distance and power ratio (10-100m)

Distance (m)	Latitude	Longitude	Power Ratio (dBm)	Power density (W/m ²)
10	32.54597	15.54161	-53	0.1867
20	32.57156	15.53944	-56	0.0479
30	32.57634	15.53629	-60.56	0.0196
40	32.57512	15.53620	-66.5	0.0193
50	32.55320	15.53055	-64.66	0.0059
60	32.55011	15.52783	-63.18	0.0049
70	32.55748	15.52602	-67.45	0.0041
80	32.56577	15.52702	-39.21	0.0039
90	32.57189	15.53456	-47.66	0.0022
100	32.53402	15.53322	-44.8	0.0013

2. Figure 1, 2 the represented the power density dramatically decline when we far for the antennas and the power density in the result is proportional to the square of the distance from antenna. If, for example the distance from antenna increased by two times, the power density increasing four times.

Fig (1) Power Density Virus Distance from (1-10 m)



3. In Figures 3,4 show the relation between the Electric field and power density (exposure) virus International guideline levels, The Electric field and Power density in the Sudan were found (0.826V/m),(0.00590 W/m²) respectively. Represented about 0.08%, 0.000590 % of total value of guideline there are no risk of electromagnetic radiation in Sudan also said the Sudan is safety area of electric field and power density.

Fig (2) Power Density Virus Distance from (10-100m)

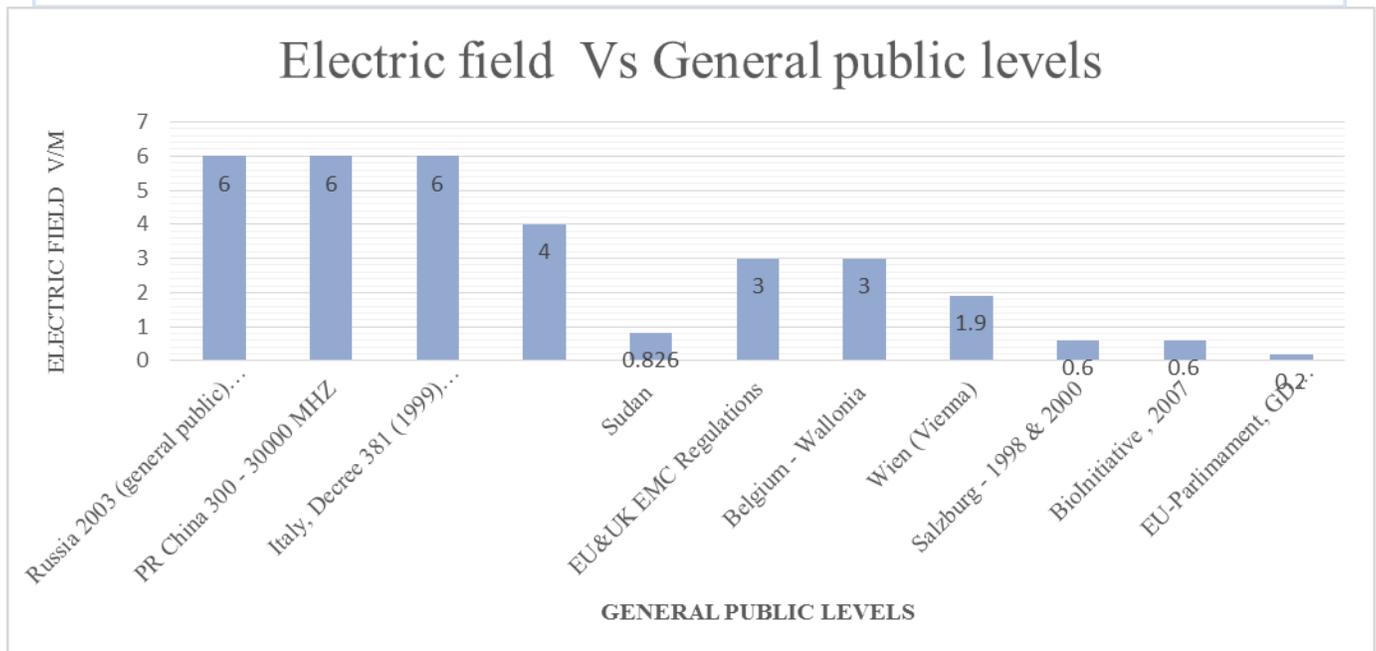
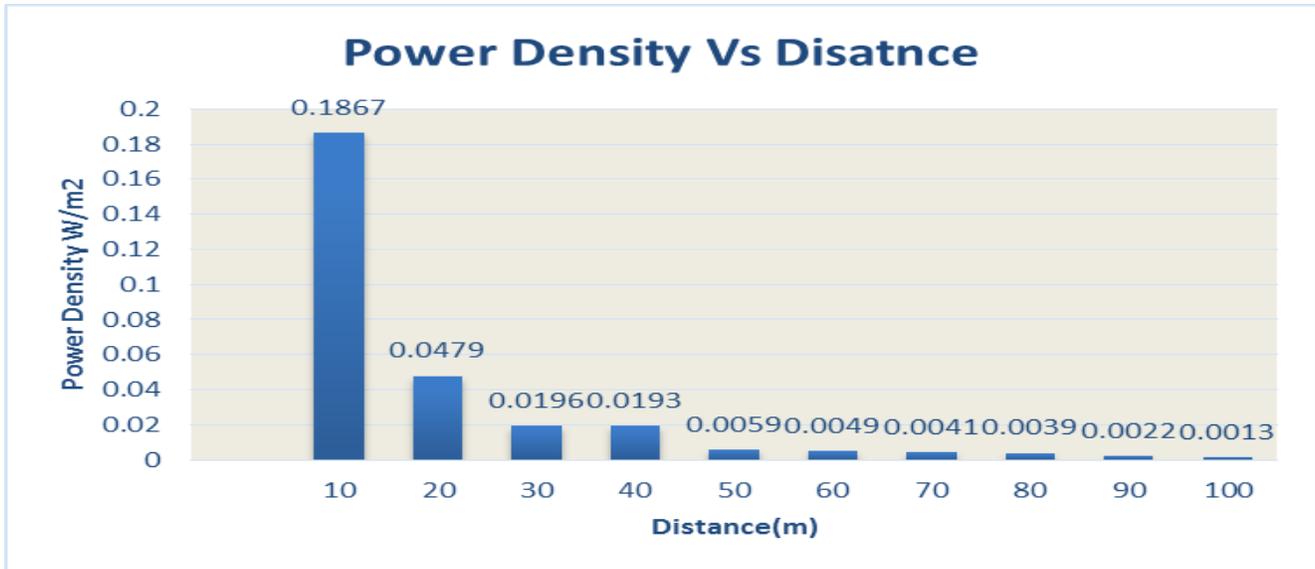


Fig (3) Electric field Vs General public levels

Table (3) General Public levels and Electric Field

General Public Levels (Frequency)	E field V/m
Russia 2003 (general public) 300 - 30000 MHZ	6
PR China 300 - 30000 MHZ	6

Italy, Decree 381 (1999) 300 - 30000	6
Swiss Ordinance ORNI,rms values 900 - 1800	4
Sudan	0.826
EU&UK EMC Regulations	3
Belgium - Wallonia	3
Wien (Vienna)	1.9
Salzburg - 1998 & 2000	0.6
BioInitiative , 2007	0.6
EU-Parlimament,GD Wissenschaft,STOA GSM(2001)	0.2

Table(4) General Public levels and power density

General Public levels(Frequency)	Power density(Exposure) W/m ²
Russia 2003(general Public	0.1
Rf china(200-3000MHz)	0.1
Italy, Decree381(1999)(300-3000MHz)	0.1
ICNIRP2010(400-2100MHz)	10
Belgium-Wallonia(900-2100)	0.024
Wien(Vienna)	0.01
Sudan	0.00590
BioInitiative,2007	0.001
EU-Parliament,GDWissenschaft,STOA GSM(2001)	0.0001

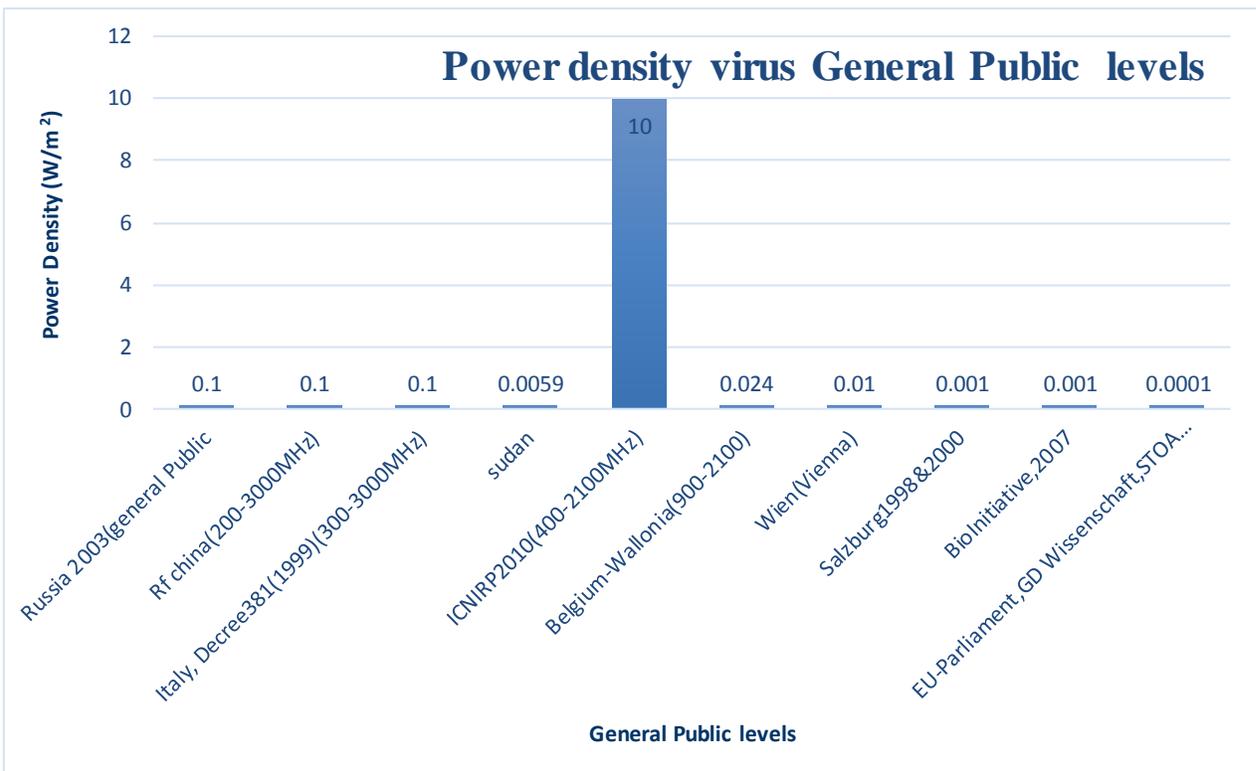


Fig (4) Power density Virus General Public Level

III. CONCLUSION

In this papers, the power density level over distance from base stations are investigated, the result of the calculations are summarized as follows:-

1. The permitted levels are exceeded within a distance of 10 m directly in front of the antennas radiating surface, this is, in many case within the areas where people living around the base stations and; therefore ,the expose to radio wave .Compliance distance in other directions ,such as above and below the antenna, would be smaller. During measurement the maximum power density levels from the antennas never exceed the reference level. Power density was in the range (0 W/m² - 0.00590W/m²) at distance 50 m
2. In Sudan, the use increasing used cellar mobile phone dramatically, we establish the central laboratory to perform basic studies of non- ionizing radiation and effects of RF of any countries in African and other studies is necessary.
3. Obviously, the guideline for EMF radiations from BTS and mobile handset in Sudan are very low when compared to developed countries like USA, Canada, Japan, Russia, China and Australia. In addition the Sudan are very stringent power density when it the adopted by some international organizations like WHO, HPS, SRSA, NIPH.
4. In order to lower exposure for people living nearby the antennas are suggested here. These include setting minimum distance of 30-40 m from the nearest house and > 50 m for safety buildings. Such as the schools, Hospitals.

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Development of Extractive Spectrophotometric Determination of Cobalt (II) with [N - (O - Hydroxy Benzylidene) Pyridine - 2 - Amine]

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Abstract- A simple, rapid and sensitive spectrophotometric method has been developed for the determination of Co (II) by using N - (o - hydroxy benzylidene) pyridine - 2 - amine (NOHBPA) as an analytical reagent. NOHBPA has been synthesized and characterized by elemental and spectral analysis. NOHBPA extracts Co (II) quantitatively (99.78%) into ethylacetate an aqueous solution of pH range 8.5 – 9.5. The ethylacetate extract shows an intense peak at 520 nm (λ max). Beer's law is obeyed over the Co (II) concentration range of 0.1 - 10 $\mu\text{g/ml}$. The sandell's sensitivity and molar absorptivity for Co - NOHBPA system is 0.007142 μgcm^{-2} and 8250.82 L mole $^{-1}\text{cm}^{-1}$ respectively. The composition of extracted species is found to be 1:2 (Co: NOHBPA) by Job's Continuous Variation and Mole Ratio Method. Interference by various ions has been studied. The proposed method has been successfully applied for determination of Co (II) in Pharmaceutical samples.

Index Terms- Extractive Spectrophotometry, Cobalt (II), N - (o - hydroxy benzylidene) pyridine -2- amine (NOHBPA).

I. INTRODUCTION

Cobalt is one of the most important seven trace elements essential for biological system. It is a constituent of vitamin B₁₂. It plays a very important role in animal nutrition. Animals suffering from cobalt deficiency usually show marked improvement in appetite and other conditions within 3-7 days after cobalt is supplied. It is obvious that the study of the role of cobalt in trace quantities in various matrices is very much dependent on rapid and selective method of its separation from other elements and its determination in trace quantities^[1-2]

A solvent extraction is becoming important separation technique in chemistry. For the determination of cobalt at trace level solvent extraction coupled with spectrophotometry provides a good selective method^[3-5].

Many reagents have been used widely for the extractive spectrophotometric determination of cobalt^[6-8].

In present communication [N - (o - hydroxy benzylidene) pyridine - 2- amine] (NOHBPA) has been found to be a sensitive reagent for the extractive spectrophotometric determination of cobalt in pharmaceutical sample and high speed steel alloy.

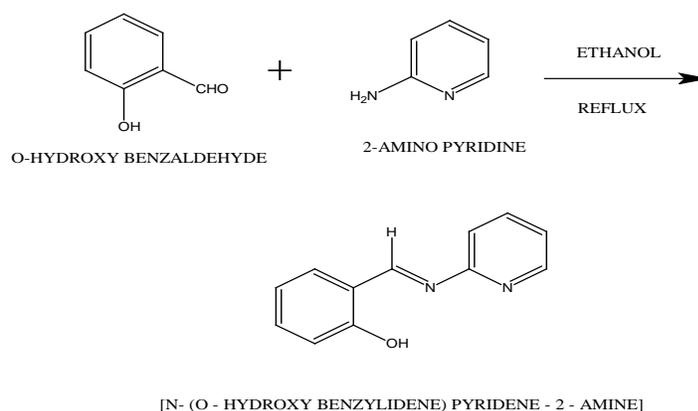
EXPERIMENTAL

ELICO - SL 159 spectrophotometer with optically matched quartz or glass cells of 1cm path length was used for

absorbance measurement. An ELICO LI 127 pH meter was employed for pH measurements.

General procedure for preparation of [N - (o - hydroxy benzylidene) pyridine - 2 - amine] (NOHBPA)

The reagent NOHBPA was synthesized by refluxing equimolar amount of ethanolic solution of o - hydroxy benzaldehyde with 2 - amino pyridine for 6 hours. On cooling the reaction mixture, a sharp yellow crystal product separated out (yield 80%, m.p.70⁰-71⁰C) which was collected by filtration. The resulting NOHBPA was recrystallised using aqueous ethanol as the procedure recommended by Vogel^[9].



Procedure for preparation of Cobalt stock solution

A stock solution of Co (II) was prepared by dissolving accurately weighed amount of cobalt sulphate in double distilled water containing sulphuric acid and it was standardized by Nitroso Salt method^[10]. Working solutions of Co (II) were made by diluting the stock solution to an appropriate volume. All other reagents used were of AR grade and all the solutions were prepared in doubly distilled water.

Spectrophotometric Determination of Co (II) To an aliquot of aqueous solution containing 1.0 -100.0 μg of Co (II), 2ml of buffer solution (0.1 M disodium hydrogen phosphate) of pH 9.2 and 1ml of 2% solution of NOHBPA prepared in DMF were added. The volume of solution was made up to 10 ml with distilled water followed by heating on boiling water bath for 10 minutes. The solution was first cooled at room temperature and then equilibrated for 1 minute with 10 ml of ethyl acetate and the phases were allowed to separate. The ethyl acetate extract was collected in a 10 ml measuring flask and made up to mark with ethyl acetate, if necessary. The absorbance of ethyl acetate

extract was measured at 520 nm against a reagent blank prepared under identical conditions. The measured absorbance was used to compute the amount of Co (II) present in the sample solution from predetermined calibration curve. To study the effect of other ions, the respective foreign ions were added to aqueous phase before the extraction and adjustment of pH.

Determination of Co (II) in pharmaceutical sample

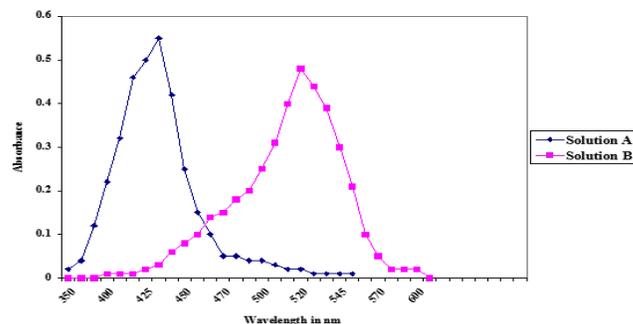
0.5g of pharmaceutical sample of was dissolved in boiling with 10 ml of aquaregia. The solution was evaporated to dryness and the residue was dissolved in 10 ml of 1MHCl filter, if required and solution was diluted to 100ml with doubly distilled water. To an aliquot of this solution 1ml was analyzed for Co (II) by the procedure as described earlier.

Determination of Co (II) in High-speed steel alloy

Sample of high speed alloy (0.1-1.0 g) was dissolved by boiling with aquaregia (10 ml). The solution was evaporated to dryness and the residue was dissolved in 1MHCl (5 ml) and resulting solution was diluted to 100 ml. An aliquot of this solution was treated with 2 ml of 0.5 M sodium tartarate solutions to mask Cr (III) and 2 ml of 0.5 M sodium citrate to mask Fe (III). The aliquot of this solution(1ml) was analyzed for Co (II) by the procedure as described earlier.

RESULTS AND DISCUSSION

Co (II) could be extracted quantitatively (99.78%) by NOHBPA into ethylacetate from an aqueous solution of pH 8.5 to 9.5 in the presence of 2ml of buffer solution (0.1 M disodium hydrogen phosphate) of pH 9.2 and 1 ml of 2 % solution of NOHBPA prepared in DMF. Solvents used for extraction of Co (II) can be arranged on the basis of their extraction coefficient values as ethyl acetate > n-amyl alcohol > toluene > chloroform > carbon tetrachloride > xylene > benzyl alcohol > n-butanol > nitrobenzene. Ethyl acetate was found to be the best extracting solvent (99.78%) hence; it was selected for the extraction throughout the work. The ethyl acetate extract of Co - NOHBPA complex showed an intense peak at 520 nm [Fig - 1]. The absorbance due to the reagent is negligible at this wavelength, so the absorption measurements were taken at this wavelength. The result shows that the system confirmed to Beer’s law at this wavelength over a Co (II) concentration range of 0.1 - 10.0 µg/ml [Fig -2]. The molar absorptivity of the extracted complex on the basis of Co (II) content was calculated to be 8250.82 L mole⁻¹ cm⁻¹. It was found that 1ml of 2% solution of NOHBPA prepared in DMF was sufficient to extract 100 µg of Co (II). The colour of the ethyl acetate extract was found to be stable at least 24 hrs. at room temperature.



**Solution A: Absorbance spectra of NOHBPA
Solution B: Absorbance spectra of Co -NOHBPA complex
Fig – I ABSORTION CURVE**

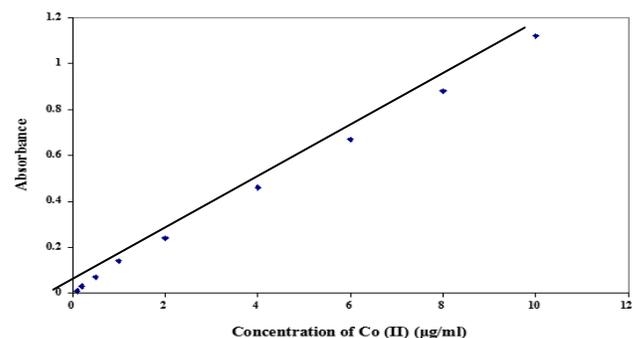


Fig - II Calibration Curve for Co (II)

Effect of Other Ions

Co (II) (40 µg) was determined in the presence of various ions. The following ions in the amount indicated, did not interfere in the spectrophotometric determination of Co (II) (40 µg): 10 mg each of Mg(II), Ca(II), V(V), Ni(II), Cu(II), Co(II), Zn(II), Mo(VI), Ce(IV), Be(II), Ba(II), Bi(III), Li(I), Zr(IV), Pd(II), Pt(IV), Ce(IV), Sn(III), Th(IV), W(VI) and 1mg of Cr(III); 20 mg each of chloride, bromide, iodide, fluoride, chlorate, bromate, iodate, carbonate, sulphate, thiocyanate, phosphates, acetate, citrate, persulphate and thiosulphate and 1mg of oxalate. Interference by the various ions were removed by using appropriate masking agent hich

TABLE 1 : Masking Agents.

Interfering ion	Amount added in mg	Masking Agent 2ml of 0.5 molar solution
Hg(II)	10	Potassium Iodide
Ag(I), Ru(III) and Rh(III)	10	Thiourea
Pb(II)	10	Sodium thiosulphate
Mn(II)	10	Thiocyanate
EDTA	10	Copper sulphate

Cd(II),	10	Potassium Iodide
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Composition of the Extracted Complex

The composition of the extracted complex was found to be 1:2 (Co : NOHBPA) by Job's continuous variation [Fig - III] and Mole ratio methods. [Fig - IV]

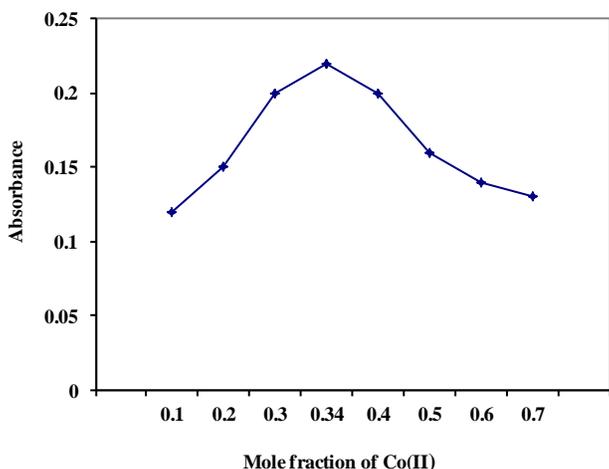
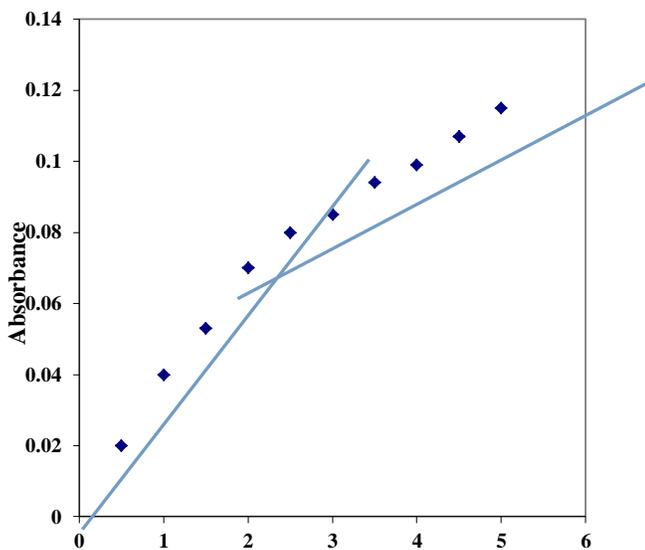


Fig III Job's Continuous Variation Method



Mole ratio [NOHBPA] / Co (II)

Fig IV Mole ratio Method

Precision, Accuracy, Sensitivity and Applications of Method

The precision and accuracy of the method were tested by analyzing the solution containing a known amount of Co (II) following the recommended procedure. The average of 10 determination of 10 µg of Co (II) in 10 cm³ solutions was 10.05

µg, which is varied between 10.318 and 9.7682 at 95% confidence limit. Standard deviation and Sandell's sensitivity of the extracted species is found to be ±0.1361 and 0.007142µgcm⁻² respectively.

confidence limit. Standard deviation and Sandell's sensitivity of the extracted species is found to be ±0.1361 and 0.007142µgcm⁻² respectively.

The proposed method has been applied for the determination of Co (II) in pharmaceutical samples.

The results of the analysis of the samples were comparable with those obtained by the standard method¹⁰ for Co (II)

Commercial Samples	Cobalt(II) found *	
	Present method (µg)	Reported value (% / (µg))
Pharmaceutical (Becosules capsule)	14.55	14.61
High-speed alloy	46.134 %	46.182 %

Table - II. Determination of Co (II) in High speed alloy and Pharmaceutical Samples

*Average of three determinations

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Synchronization of Signalized Intersection from Rasoma to High Court in Indore District

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Abstract- The control of traffic at highway intersections is of fundamental importance to traffic engineers engaged in finding ways to achieve efficient operation of only highway system. When traffic conditions warrant it, signalization may be considered an effective means of control at intersections since the number of conflict points at intersections could be significantly reduced with signalization. However, that an attempt to significantly reduce the number of conflict points will increase the number of phase required, which may result in increase delay. For signalized isolated intersections proper signal phasing and cycle time is very important to reduce the accidents, to allow safe crossing of traffic as well as pedestrian flow and reduce the overall delay. In the present work an attempt has been made to synchronize signal from Rasoma to High court via Patnipura in Indore district.

Index Terms- synchronize, cycle time, intersection,

I. INTRODUCTION

The signal synchronization program requires that travel time studies be conducted before and after the implementation of signal timing changes to determine how effective these changes have been. The purpose of a travel time study is to determine the average time it takes to traverse a corridor segment, street or highway facility. There are different methods to obtain travel time data. The travel time is obtained by adding the travel time corresponding to each run and dividing the result by the total number of runs.

In the near future, the implementation of intersection capacity, pedestrian and access management improvements (Sound Transit project) and signal timing optimization will result in even better traffic conditions in the corridor for all users including transit and pedestrians.

The importance of transportation in the development of country is multidimensional for example; one of the basic functions of transportation is to link residence with employment and producers of goods with their users. From a wider view point transportation facilities provide options for work, shopping and reaction, and give access to health, education and other amenities.

The increasing vehicular traffic on urban road network demands effective measures of traffic control on road-network, especially at the intersection, where turning movement and mixed traffic create congestion, traffic jam and chaotic scenes. Big cities like Indore face this problem in its acute form as the intercity and intercity traffic both have remarkable existence with mixed traffic conditions.

The provision of signal at the intersection is one of the methods to control the traffic at an intersection. For signalized isolated intersections proper signal phasing and cycle time are very important to reduce the accidents, to allow safe crossing of traffic as well as pedestrian flow and to reduce the overall delay.

For the design of signal cycle time and finding capacity of signalized intersection there are various method , these methods are useful and effective for homogeneous traffic like in western countries. But where mixed traffic is running on roads, as in India these methods cannot be effectively applied. As the presence of heterogeneous traffic and having no lane discipline, measurement of saturation flow and delay are also required special consideration in Indian conditions.

In the present study an attempt is made to find the lost time, saturation flow through video graphic technique. Then capacity analysis for the identified intersection has been done. Under the synchronized system, all the signals along a given street always display the same indication to the same traffic stream at the same time. As for as possible division of the cycle time is the same at all intersection a master controller is employed to keep the series of signals in step.

II. OBJECTIVES OF STUDY

The following are the objectives of the present study:

- 1) To design the signalized intersection at Patnipura chouraha in place of existing rotary
- 2) To design the signalized intersection at Malwa mill chouraha.
- 3) To find optimum cycle time for intersection
- 4) Synchronize the signalized intersections from RASOMA (A. B. ROAD) to HIGH COURT via Patnipura.

III. METHODOLOGY

The following methodology has been adopted:

- 1) **RECONNAISSANCE SURVEY:** In order to work out details for the final survey to be carried out first a reconnaissance survey was carried out. The whole intersection area of Patnipura and Malwa Mill Chouraha was studied in detail. The traffic trend, traffic composition, Geometric features and other features like turning movements were keenly observed. The cycle time and Phase System of High Court and Starlit Intersection were keenly observed. The measured distance from Rasoma, A.B Road to High Court Intersection are as follows:

1. Rasoma, A.B Road to Patnipura Chouraha	1.80 Km.
2. Patnipura Chouraha to Malwa Mill Chouraha	0.90 Km.
3. Malwa Mill Chouraha to Starlit Intersection	1.10 Km.
4. Starlit Intersection to High Court Intersection	0.45 Km.
- 2) **GEOMETRY OF INTERSECTION:** Malwa Mill Chouraha has five leg intersection and Patnipura Chouraha, Starlit Intersection; High Court Intersection has four legs. The detail physical measurements required for analysis are taken by direct measurement.
- 3) **SIGNAL TIMING DETAIL:** At present to control and regulate the traffic at intersection automatic pre-timed signals are provided at Starlit Intersection and High Court Intersection. Existing phasing system at all intersection are identified and green time, red time and cycle time are noted.

Signal Timings at High Court Intersection

Phase 1		Phase 2		Phase 3		Total cycle time(sec)
Green Time(sec)	Amber Time(sec)	Green Time(sec)	Amber Time(sec)	Green Time(sec)	Amber Time(sec)	
22	2	24	4	30	2	84

Signal Timings at Starlit Intersection

Phase 1		Phase 2		Phase 3		Phase 4		Total cycle time(sec)
Green Time (sec)	Amber Time (sec)							
21	3	25	3	15	3	15	3	88

- 4) **TRAFFIC SURVEY AT INTERSECTIONS:** Measure the classified and directional traffic volume on each approach of Patnipura Chouraha and Malwa Mill Chouraha manually. For each approach traffic flow was recorded by manually for 3 hrs daily in evening with 15 minutes intervals.

IV. ANALYSIS AND SYNCHRONIZATION OF SIGNALS

Having collected the data as mentioned in previous chapter, the acquired data have been put into detailed demand analysis for the estimation of saturation flow and design of signal timings. Following paragraphs present a detailed analysis and computational procedure for the present study.

- 1) **ESTIMATION OF SATURATED FLOW:** The method of measuring the saturation flow is described in a Road Research Laboratory publication. The following formula devised by Webster (1966), have been used to estimate the saturation flow.

$$S = 525 \times W \quad \text{PCU/Hr.}$$

Where,

S = saturation flow,

W = width of approach in meters

The above formula is valid for widths from 5.50 m to 18.0 m. for lesser widths the value may be obtained from following table.

Width (W) in meters	3.00	3.50	4.00	4.50	5.00	5.50
Saturation Flow (S)	1850	1890	1950	2250	2550	2900

When the approaches are in a gradient, the saturation flow needs some adjustment. Approximately this can be done by decreasing the saturation flow by 3 % for each 1% uphill gradient and increasing the saturation flow by 3 % for each 1 % of downhill gradient.

- 2) **DETERMINATION OF OPTIMUM CYCLE TIME:**

The optimum cycle time for minimum delay can be determined by using the below relationship given by Webster.

$$Co = 1.5 L + 5.0 / [1 - (Y1 + Y2 + \dots + Yn)]$$

Where,

Co = optimum cycle time in sec,

L = total lost time per cycle in sec,

Yi = observed volume/Saturation flow ratio for critical lane group in each phase,

n =no of phases.

For Evening Peak Hours

- 3) **DETERMINATION OF YELLOW TIME**

Yellow period for each phase can be estimated by using below equation.

$$A = t + Vs/2a + (WI + 1)/Vs$$

Where,

A = Yellow Period in Sec

t = Perception Reaction Time = 1.0 Sec.

Vs = 85th percentile speed of clearing vehicle in m/sec.

WI = intersection width in meters

l = length of standard vehicle = 6.0 m

- 4) **DISTRIBUTION OF GREEN TIME TO EACH PHASE**

Green time for each phase may be determined from equation.

$$Gi = [(qi/Si) / \Sigma(qi/Si)] c - A$$

Where,

(qi/Si) = Ratio of flow to Saturation flow for ith lane

c = total cycle time in sec.

V. SYNCRONIZATION OF SIGNALISED INTERSECTIONS FROM AB ROAD, RASOMA TO HIGH COURT VIA MALWA MILL

Assumed Speed for Synchronization = 30 Kmph.								
S.No	Movement	Speed in m/sec	Distance in Mts.	Vehicle Acceleration Time in Sec	Movement Time in Sec	Any other time in Sec	Total Movement Time in Sec	Remarks
1	2	3	4	5	6	7	8	9
1	High court intersection to Starlit intersection	8.33	440	7	52.82	0	59.82	
						Say	60.00	
2	Starlit intersection to Malwa Mill intersection	8.33	1100	0	132.05	0	132.05	
						Say	132.00	
3	Malwa Mill intersection to Patnipura intersection	8.33	900	0	108.04	8.00	116.04	Speed is reduced due to less road width
						Say	116.00	
4	Patnipura intersection to Rasoma intersection	8.33	1800	0	216.09	0.00	216.09	
						Say	216.00	

Total time required to High Court to Rasoma = 524.00 Sec
 Total Distance from High Court to Rasoma = 4240.00 Mts.
 Therefor average speed of movement = 8.09 m/sec i.e.,
 =29.13 Kmph

VI. CONCLUSION & FUTURE SCOPE

The following are the conclusions drawn from the present study:

- 1) 4 – Phase signalized intersection is designed for Patnipura intersection and obtained Optimum Cycle Time is 58 sec.
- 2) 5 – Phase signalized intersection is designed for Malwa Mill intersection and obtained Optimum Cycle Time is 66 sec.
- 3) An attempt is made to synchronize the signalized intersection between AB Road, Rasoma to High Court intersection for speed of 30 Kmph. with -out disturbing the cycle times of High Court intersections.
- 4) For synchronization the cycle times of Starlit intersection is reduce by 4 sec i.e. proposed cycle time of Starlit intersection become 84 sec in place of 88 sec. The movement in phase – 3 at Starlit intersection is observed less as compared to time provided for it, hence reduction of 4 sec is proposed in phase – 3.
- 5) For synchronization, the phase system of Starlit intersection must start 60 sec later than phase system of High Court intersection, the phase system of Malwa Mill Intersection must start 66 sec later than phase system of Starlit intersection and the phase system of Patnipura Intersection must start 58 sec later than phase system of Malwa Mill intersection.

The following points can be taken note for future work:

- 1) Synchronization of signalized intersections can be done with modification in cycle time for different speeds.
- 2) Synchronization can be done for other important streets of Indore city.

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We would like to acknowledge our parents for their continuous support and motivation.

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Google reCaptcha (with ASP.NET MVC)

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Abstract- This paper talks about
•Why Google reCaptcha?
•Description about old and new Google reCaptcha?
•How to use?

Index Terms- Why Google ReCaptcha, old Google reCaptcha, new Google reCaptcha, how to use;

INTRODUCTION

Dear Readers,

First of all, I would say this paper is just for ASP.net developers.

Google reCaptcha protects us from spam and abuse. You may have heard of the word Electronic Spamming, it is the use of electronic messaging systems to send unsolicited messages, especially advertising, as well as sending messages repeatedly on the same site. So Google reCaptcha save us from such spam by forcing user to verify that he/she is not a robot.

reCaptcha is a free google service and uses an advanced risk analysis and adaptive Captchas to keep away automated software from engaging in abusive activities on our site and allow valid user pass through with ease.

There are software that can increase the number of hit to the server which can impact the server functionality and if number of request rises above the server capacity, it can cause server down. Google reCaptcha can prevent such conditions.

Now in this paper I have consolidated both old and new Google reCaptcha and how to use them. I have also included code for each reCaptcha as well.

Description about old and new Google reCaptcha:

Old Google reCaptcha: the old reCaptcha's are either text based verification or image based verification where user has to type the text or select the images from the given images to prove that they are human not robot. The major problem with old reCaptcha is that they are not user friendly and kind of frustrating.

New Google reCaptcha: they are more user friendly, the user just has to check the checkbox and they are good to go. If without checking the checkbox you submit the request validation failed. If verification failed multiple times than verification will changed into image based verification, where user has to choose that matches the criteria to validate the request. Hence this also increase the verification strength.

How to Use:

Step 1: First you need to sign up for reCaptcha. Go to <https://www.google.com/recaptcha/intro/index.html>

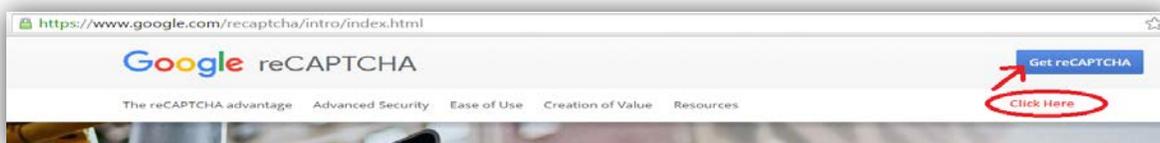


Figure 1: Sign Up for ReCaptcha

Old reCaptcha:

- In your mvc application open view (.cshtml file) where you want to use reCaptcha and add the following code. Replace Site/Public key with your Site key.

```
using (Html.BeginForm("FormSubmit", "Recaptcha", FormMethod.Post))
{
    <div class="editor-label">
        <script type="text/javascript" src='https://www.google.com/recaptcha/api/challenge?k=Site/Public Key'>
        </script>
        <noscript>
            <iframe src='https://www.google.com/recaptcha/api/challenge?k=Site/Public Key' height="300" width="500" frameborder="0"></iframe><br />
            <textarea name="recaptcha_challenge_field" rows="3" cols="40"></textarea>
            <input type="hidden" name="recaptcha_response_field" value="manual_challenge" />
        </noscript>
    </div>
    <p>
        <input type="submit" value="Create" />
    </p>
}
</fieldset>
<span style="display:inline-block;margin:20px;font-size:20px;padding:20px;border:1px solid #030303;">
    @ViewBag.Message;
</span>
```

Figure 4: reCaptcha View

- Open the controller of the above view and add FormSubmit method which is going to validate your reCaptcha. Replace Secret key with your secret key

```
[HttpPost]
0 referencas
public ActionResult FormSubmit()
{
    bool flag = false;
    string Message = "";
    string[] result;
    HttpWebRequest request = (HttpWebRequest)WebRequest.Create("https://www.google.com/recaptcha/api/verify");
    request.ProtocolVersion = HttpVersion.Version10;
    request.Timeout = 0x7530;
    request.Method = "POST";
    request.UserAgent = "reCAPTCHA/ASP.NET";
    request.ContentType = "application/x-www-form-urlencoded";
    string formData = string.Format("privatekey={0}&remoteip={1}&challenge={2}&response={3}", new object[]{
        HttpUtility.UrlEncode("Secret key"),
        HttpUtility.UrlEncode(Dns.GetHostEntry(Dns.GetHostName()).AddressList[1].ToString()),
        HttpUtility.UrlEncode(Request.Form["recaptcha_challenge_field"]),
        HttpUtility.UrlEncode(Request.Form["recaptcha_response_field"])
    });

    byte[] formByte = Encoding.ASCII.GetBytes(formData);
    using (System.IO.Stream requestStream = request.GetRequestStream())
    {
        requestStream.Write(formByte, 0, formByte.Length);
    }
    try
```

```
{
    using (WebResponse httpResponse = request.GetResponse())
    {
        using (System.IO.TextReader readStream = new System.IO.StreamReader(httpResponse.GetResponseStream(), Encoding.UTF8))
        {
            result = readStream.ReadToEnd().Split(new string[] { "\n", "@\n" }, StringSplitOptions.RemoveEmptyEntries);
            Message = result[1];
            flag = Convert.ToBoolean(result[0]);
        }
    }
}
catch (Exception ex)
{
    flag = false;
}
if (flag)
{
    ViewBag.Message = "Google reCaptcha validation success";
}
else
{
    ViewBag.Message = "Google reCaptcha validation failed";
}

return View("Index");
```

Figure 5: reCaptcha Controller code

- Now browse your site to check reCaptcha. On click of create if captcha is valid Google reCaptcha validation success message will be shown otherwise reCaptcha validation failed message will be shown.

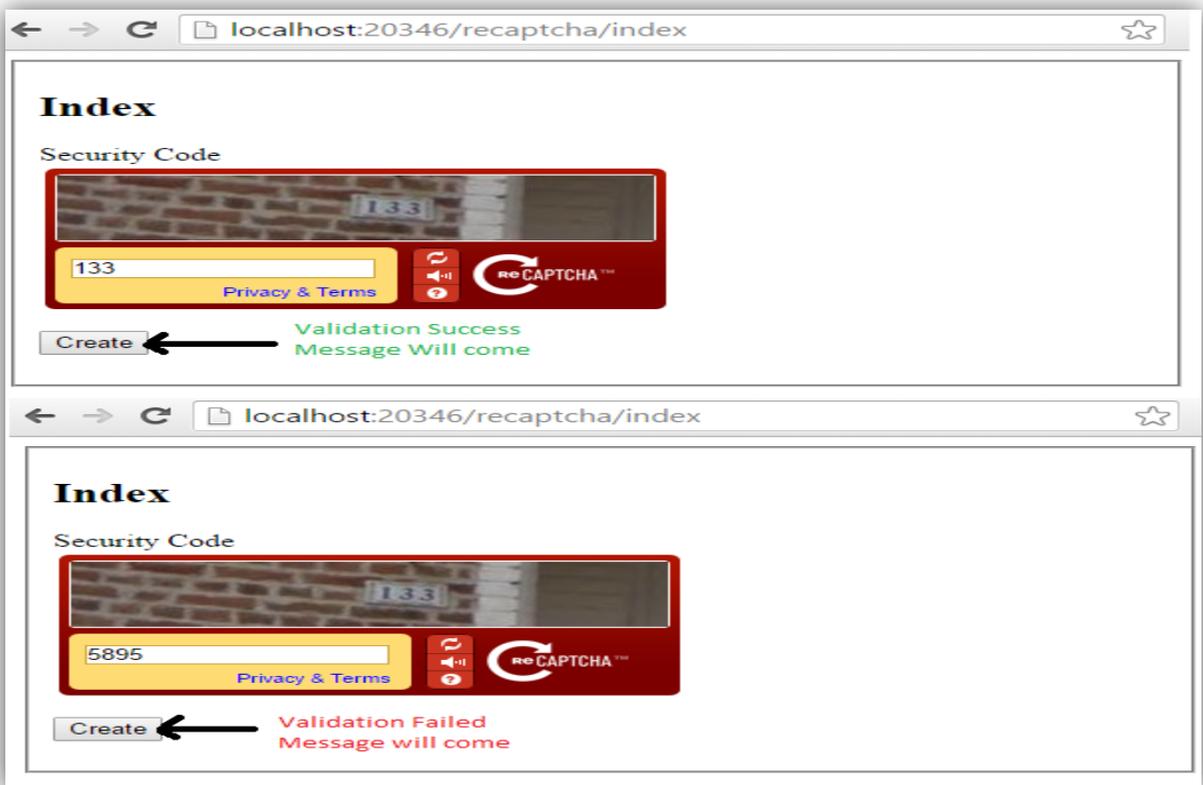


Figure 6: reCaptcha Validation

New reCaptcha:

- In your mvc application open view (.cshtml file) where you want to use reCaptcha and add the following code. Replace Site/Public key with your Site key.

```
<div>
    @using (Html.BeginForm("FormSubmit", "Recaptcha", FormMethod.Post))
    {
        <div class="g-recaptcha" data-sitekey="Public/Site key"></div>
        <input type="submit" value="Submit" />
    }
</div>
<span style="display:inline-block;margin:20px;font-size:20px;padding:20px;border:1px solid #D3D3D3;">
    @ViewBag.Message;
</span>
<script src='https://www.google.com/recaptcha/api.js'></script>
```

Figure 7: reCaptcha View Code

- Open the controller of the above view and add FormSubmit method which is going to validate your reCaptcha. Replace Secret key with your secret key

```
[HttpPost]
0 references
public ActionResult FormSubmit()
{
    var response=Request["g-recaptcha-response"];
    string secretkey = "secret key";
    var client = new System.Net.WebClient();
    var result = client.DownloadString(string.Format("https://www.google.com/recaptcha/api/siteverify?secret={0}&response={1}",secretkey,response));
    var obj = JObject.Parse(result);
    var status = (bool)obj.SelectToken("success");
    ViewBag.Message = status ? "Google reCaptcha validation success" : "Google reCaptcha validation failed";
    return View("Index");
}
```

Figure 8: reCaptcha Controller code

- Now browse your site to check reCaptcha. On click of Submit if checkbox is checked Google reCaptcha validation success message will be shown otherwise reCaptcha validation failed message will be shown.

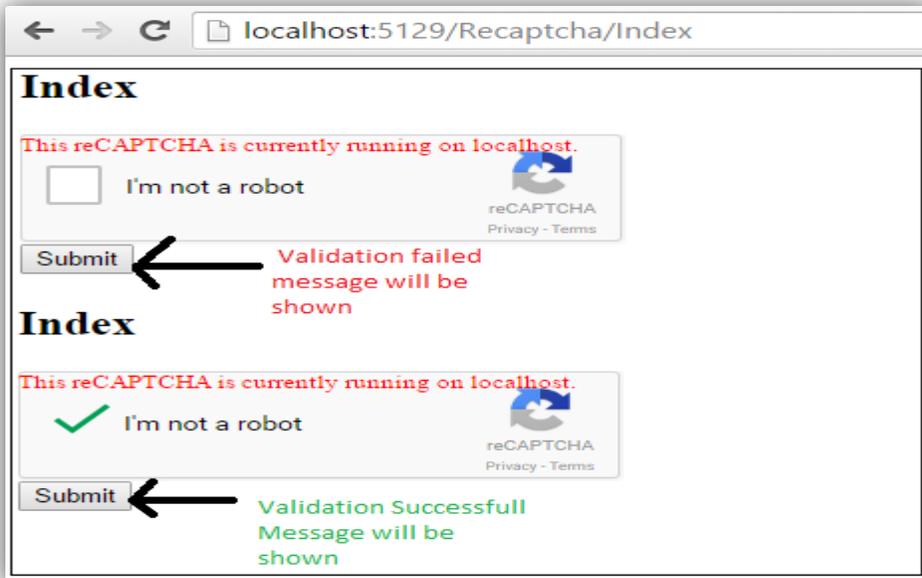


Figure 9: reCaptcha Validation

- If validation failed multiple times now on checking the checkbox security measures will increase by increasing the strength of verification through selection of Images.

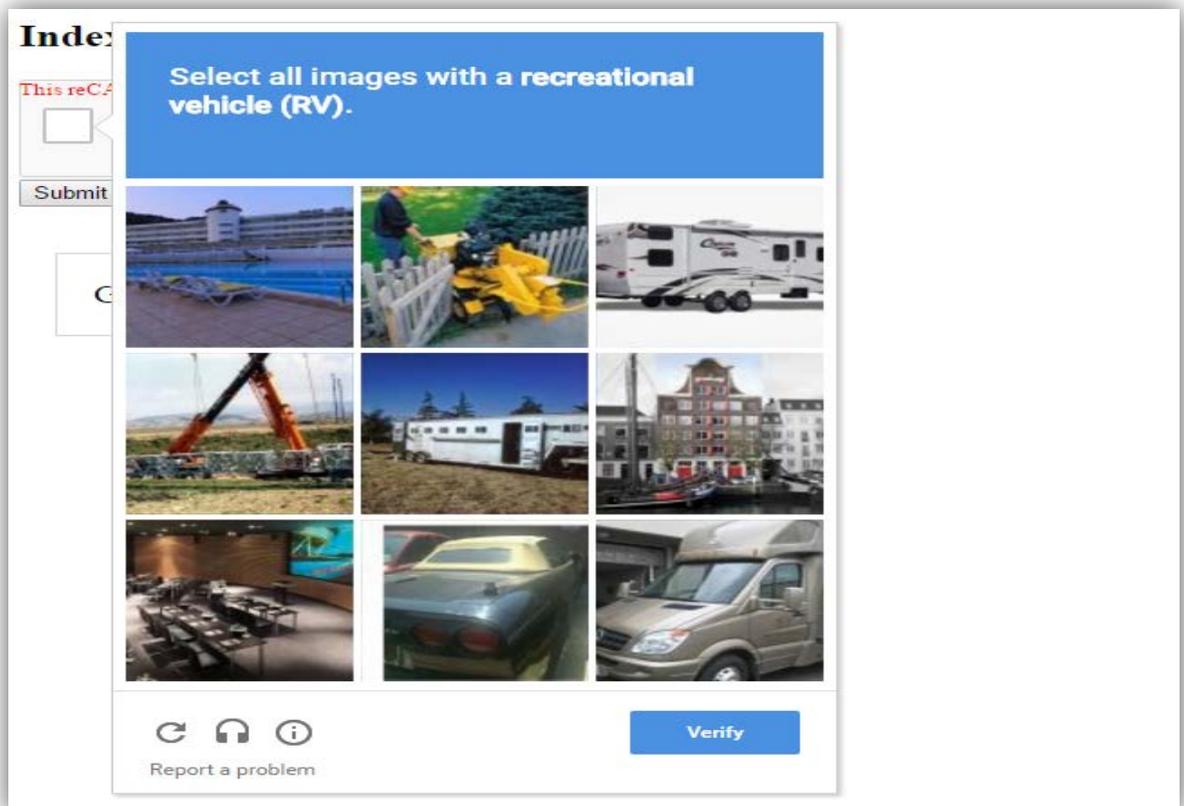


Figure 10: reCaptcha Validation

IV. CONCLUSION

Google reCaptcha is very useful to developer as well as server administrator, it prevents invalid request to the server which can hamper the server functionality. It keep your site safe and functional.

Thus a server become more functional and can handle multiple number of users.

Google reCaptcha prevents spam and are easy to implement.

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Financial challenges in immunization and role of Health Technology Assessment as a Tool for Assessing New Vaccines in Developing Countries

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Abstract- Despite the advances in vaccine development, vaccine preventable diseases still add to the burden of childhood morbidity and mortality across the globe, particularly in developing countries. One of the major barriers preventing the access to sophisticated vaccines is the high vaccine price, the same factor that is preventing their implementation in developing countries with limited resources and funds. So, it is imperative that financial breaches and funding resources for the future are stringently appraised to strengthen immunization programs and expedite financial sustainability. Health Technology Assessment (HTA) presents an inventive and efficient approach by facilitating decision makers with a valid tool to improvise the allocation of limited resources in immunization programs. Hence, in this article we have attempted to address and suggest measures that can be implemented on a collaborative basis to mitigate the financial challenges faced in immunization programs in developing nations. The article also explores the potential and advantages of HTA as a tool for introducing new vaccines as part of immunization programs in developing countries.

Index Terms- Vaccines, Cost, Health Technology Assessment

I. INTRODUCTION

Past evidence validates the benefits of immunization in terms of cost-effectiveness and ease of implementation when evaluated against other forms of health interventions. Vaccinations prevent an estimated 2.5 million deaths each year [1]. Mortality caused by traditional vaccine preventable diseases (diphtheria, measles, neonatal tetanus, pertussis and poliomyelitis) have declined from an estimated 0.9 million in 2000 to 0.4 million in 2010 [1]. However, despite advances in vaccine development, vaccine preventable diseases still add to the burden of childhood morbidity and mortality. Out of the 8.8 million, estimated number of all deaths in children (0-59 months) under five in 2008, about 17% were vaccine preventable [1]. Based on WHO reports, 21.8 million children under one year of age did not receive DTP3 vaccine worldwide in 2013. Of these, about 70% children belonged to developing and resource stricken countries.

Even though the relevant vaccines are readily available, several reasons contribute to the poor vaccination coverage of children. In addition to issues involving immunization coverage and vaccine supply chains, a major obstruction to the access to

sophisticated vaccines in developing countries is the high cost of vaccines, which is a key factor inhibiting their implementation in nations with shortfalls in resources and funding. Also, this throws into the limelight the potential negative public insights that can be inferred about large pharmaceutical organizations. The costs of new pharmaceutical products, including vaccines, generally include high mark-ups to recover research and development investments. But, it is not justifiable to have an antagonistic approach towards manufacturers making profits since each product goes through rigorous research and development investments before entering a market. Still, there needs to be a balance between access and return on investments that companies reap. On the other hand, goals of immunization programs are generally supported through fund mobilization in such a manner that along with minimal administrative costs there are no additional burdens on the poor and timely and reliable resources are made available with the highest level of self-sufficiency. In decisions related to financial matters, it is essential that decision makers evaluate how to utilize available options based on equity, efficiency, timely provision of adequate and reliable resources, accountability and self-sufficiency. Therefore, as mentioned earlier the financial gaps and future funding resources need to be stringently evaluated and novel paths need to be found to strengthen immunization programs and ensure financial sustainability.

Hence, in this article we have tried to address and suggest measures which can be implemented on a collaborative basis to mitigate the financial challenges encountered in implementing immunization programs in developing nations. Also we intended to discuss and explore the potential and prospects of health technology assessment (HTA) as a tool for introduction of new vaccines in immunization program in developing countries.

II. CURRENT COSTS OF THE IMMUNIZATION

Table 2 depicts the price per dose and the price of vaccine meant per person for various vaccines which are procured by UNICEF for children and adolescents in developing countries [2]. The addition of hepatitis and haemophilus vaccines was solely responsible for raising the price by approximately 5.4 USD. However many of these vaccines have been discounted by negotiations for GAVI eligible countries (Table 2). Although the unit cost of BCG, DTP-Hep B-Hib, OPV, HPV (quadra or bivalent) Measles, Pneumococcal (10 or 13 valent) and Rotaviral

(mono or penta valent) vaccines per person costs about 40 – 44 USD, excluding associated expenses such as infrastructure development, supply chain management, surveillance, training and educational related expenses. Moreover, the costs mentioned in the table 2 are applicable only when the vaccines are procured through UNICEF/GAVI for GAVI eligible countries (that includes India). In 2011, due to inflation and other concerns, GAVI restricted the eligibility for cheap vaccines to nations whose GNI per capita income was USD 1,500 or less, which decreased the number of eligible countries to 58 from 72 [3]. GAVI eligible economies would have to procure vaccines on their own and so would be exposed to market prices and pressures.

The resultant surge in spending and budgetary constraints produces an urgent need for sustained financial vaccination support. Eventually choice of funding and payers will have a major impact on economic evaluations related to vaccines that include cost (GAVI-negotiated prices, country co-payment levels or market prices) and also related benefits. Hence, in these regards several measures/models currently being practiced to mitigate financing issues related to immunization across the globe have been discussed.

Measures to Mitigate Financing Issues

1. Vaccine purchase through UNICEF or vaccine procurement cartel

Introduced in 1991 by UNICEF and WHO to assist the developing countries in vaccine procurement, advantages associated with the Vaccine Independence Initiative (VII) includes delivery of pooled procurement of vaccines which drives down the costs; use of local currency as mode for payment for vaccines, and payment post vaccine delivery which effectively increases the limited time credit. So, the concept generally proposed incentives for the nations who utilized it. UNICEF supported the cause by absorbing the risks concerned with issues related to nonpayment for vaccines by reassuring the manufacturers in such scenarios. However, subsequent to recovery with GAVI support, nations encountered escalating prices for the same vaccines. Forming vaccine procurement cartel with regional countries was an option for minimizing these associated risks. Such cartels that provided pooled procurement put nations in a better position for low price negotiations. Furthermore, bulk/long-term orders as an effect of this initiative was an added advantage for the manufacturing industry. In future, these procurements may be stretched in terms of technical assistance, sharing of technology, and exchange in currency etc., guaranteeing a sustained vaccine supply to these nations. Example includes Pan American Health Organization (PAHO) in Latin American and Caribbean countries and the Gulf Cooperation Council in Middle East countries [4].

2. Vaccine purchase through advanced marketing commitment (AMC)

AMC, generally a binding contract offered by a government or any financial organization on successful development of a new vaccine or any other drug is a new type of financing model which subsidizes a fixed volume of vaccines for a fixed period in exchange of commitments to buy the same.

Subsequent to the lapse of the AMC period, low cost is charged for a long duration depending on previous negotiations which decrease manufacturer risk at various stages of immunization from development, production and marketing of the vaccine in developing geographies. Also, this commitment saves the transfer of production to third parties or local manufacturers in developing nations hindering low cost production [3]. Introduced by the GAVI countries to finance a pneumococcal conjugate vaccine AMC has made it possible for the pharma companies to provide 10 million doses of Prevnar-13 and Synflorix (pneumococcal conjugate vaccines) respectively per year for 10 years.

3. Vaccine purchase through tiered pricing model (differential pricing)

In this, varied classes of buyers are subjected to different cost for the same technology. With reference to vaccines, prices levied at LMICs (Lower middle income countries) are lower in comparison to the open market rate by bulk procurement systems recognized by UNICEF and PAHO. This decreases financial hurdles to access related to vaccine for the developing economies and facilitating manufacturers with profit in richer economies so as to invest in adequate production capacity and research and development of new vaccine. In this model, the vaccines are priced according to the GDP per capita income with the mutual agreement of the manufacturer as well as the buyer. Though this mitigates risk for manufacturers associated with handling vaccine orders on long term, there exists conflicts of interest arising from multiple procurement channels. Eg: UNICEF's AMC is lower priced as compared to PAHO for pneumococcal conjugate vaccines [3]. Considering the fact that it would be challenging for substantiating decision with the stakeholders and promoters, such a model is hard to implement for the pharmaceutical companies. Although the unambiguous modification of ex-factory costs with respect to 3 – 4 tiers of GDP (GAVI) is a reasonably rational approach, but it goes against the general European Union framework of the Transparency Directive (national regulation of pricing and reimbursement decisions). Other solutions for differential pricing include Ramsey (differential) pricing which consists of adjustment of ex-factory prices according to the local purchasing power (ancient method), restrictions on international price referencing (e.g. according to the GDP) and parallel trade; confidential rebate mechanism (i.e. discount, rebate, claw-back); risk-sharing (i.e. patient access schemes) in developing countries.

4. Vaccination through insurance model

An insurance based model either in the form of national health insurance, social health insurance, community health insurance or even private health insurance which pays other health services apart from regular vaccinations is most applicable in immunization in developing countries due to high OOP (Out of Pocket) and inability to pay for health expenses including immunization. Immunization at reduced costs which decreases the financial load of the government as well as citizens and families is most appropriate in developing countries. In comparison to other interventions related to healthcare, immunization based services are lower in cost and their

efficiency in health protection is well documented. Hence, it would be more suitable for inclusion in insurance [4]. Different countries have already incorporated this model to immunization processes. In Bulgaria, general practitioners receive vaccines, purchased by the Ministry of Health and are compensated by the National Health Insurance Fund for their services. Also, the Social Security Administration is supposed to fund resources for immunization from the fund gathered by contributions of payroll and tax revenues, in Costa Rica [4].

However, a major drawback with this model is that the vaccines may not cover those children who are not under the coverage of insurance. As the general public is not fully aware of the benefits of vaccination, acceptability of vaccines is subjected to decline. In the fifth Board meeting GAVI decided to recommend countries to do away with charging user fees for national immunization campaigns, as this would hinder the acceptance of immunization services. Following this many other organizations like, the Commission for Africa, Department for International Development (DFID), UNICEF, Save the Children-UK, and the World Bank also have also supported and recommended the same. However in contrast, the World Bank recommends the use of insurance or other pre-payment mechanisms to finance immunization programs [4].

5. Domestic production or contract manufacture of vaccines

The cost of a new vaccine generally depends on investment in research and development and production costs including setting up and maintaining a manufacturing plant. Vaccine prices are not linked to the costs of production, but on costs saved by a vaccine in protecting against a disease from a health economic standpoint. This raises the cost of vaccines dramatically and the resulting price value is often excessively expensive for a developing economy. Hence forth, a number of independent vaccine manufacturers emerged in Asia and Latin America buoyed by low cost raw materials and labor and were able to produce vaccines at a much lesser cost as compared to traditional manufacturers. Subsequently, in terms of volume, about 14% of vaccines that are catered globally are from suppliers in industrialized countries; while bulk of remaining 86% are dispensed by manufacturers from the developing countries.

Presently, domestic manufacturers contribute the bulk of vaccines produced and distributed globally. In 2007, about 60 % of vaccine doses were procured by UNICEF and WHO from new manufacturers [5]. Some of these include public sector firms in Brazil, China, Indonesia and some private sector firms from India which have been responsible for supplying basic vaccine that are technologically easier to produce and have trusted on the cost for their growth. These firms firmly believed in their cost strategies impacting their future growth. Gradually, with increasing investments, some of these firms also produce additional vaccines (for hepatitis B, pentavalent vaccine of DTP-HepB-Hib etc.) and are currently in phase of promoting more advanced vaccines like rotavirus vaccine, HPV vaccine and pneumococcal vaccines, which would eventually raise the supplier base and bring down costs.

6. Vaccine purchase through other forms of funding

In few nations (like Bhutan) the immunization programs are funded by National Trust Funds, which are specialized funds created for particular purposes usually generated through different resources (taxes, donor funds, and private sources through incentives and regulations). This type of funding is supposed to be more secure as it assures financing stability for immunization programs without excessive burden on the national budget. In Bhutan, the Health Trust Fund was established by the government and taxation was removed as the funds were held by UN agencies in which government contribution was nearly 50 %, while the rest of the funding was generated from other public and private agencies. Different countries raise revenues from different sources for funding national immunization program. For example, Mexico uses fixed portions from oil revenues; Costa Rica from lottery sales; Tajikistan, Vietnam, and Haiti from luxury goods. These nations utilize these revenues for health programs. Revenues generated from sin taxation that includes taxes levied on goods proven to be health hazards, like tobacco, alcohol, and habit forming drugs are earmarked for the health of masses.

The funding level for the health programs would survive on the sales and revenues of such products, which at times could be devastating, especially in times of an economic downslide. Also, at other times funds are allocated on need basis for other projects of national importance, limiting the government's contribution in immunization programs. Other forms of financial and non-financial resource allotments, termed project assistance can be in different forms such as financial assistance, technical assistance, merchandise assistance (essential vaccines, cold chain equipment), training, monitoring and evaluation which are usually provided by UN agencies or by other international donor agencies. However, such assistance can never drive a health project like immunization program; instead it has to be driven by the host country while absorbing available assistance. Another form of funding immunization funding is through development loans from leading international banks. Countries like India, Pakistan and Nigeria have taken huge loans to finance their polio eradication campaigns. However, there are a lot of limitations while opting for development loans, as all the loans need to be re-paid although there are also processes where the country's debt is relieved or restructured based on mutual negotiations. However, such processes do not directly provide any financial support for immunization programs, instead they tend to have a soothing effect on the overall budget constraints and help to increase the investment [4].

Health Technology Assessment - a Tool for Assessing New Vaccines in Developing Countries

In the last ten years, in several countries more sophisticated vaccines such as pneumococcal vaccine, rotaviral disease vaccine and human papillomavirus vaccines are being introduced in routine immunization programs [1]. But, especially in developing countries, primary issues that hamper every aspect of immunization process, right from introducing and buying vaccines, delayed timeframes in their availability in developed countries as well as research related to study and investigation of new vaccines by manufacturers and researchers includes paucity of funds, limited resources and reduced access to vulnerable subjects thwart the progress of immunization programs. In

addition, these factors also make it difficult for the government in the developing countries to finance all vaccines. Therefore, it becomes obligatory to assess ways to make best of the available limited resources as per the needs and requirements of the countries. Also, for introduction of new vaccine in developing countries, a well-defined, transparent and extensively applicable process is an essential requisite that is robust enough to appraise the new vaccine and technology in every aspect. To explore the best possible strategy to launch them, a HTA approach could be beneficial, keeping in consideration the need to transform the presentation and mode of delivery of the present available vaccine [6]. In recent few years, interest for pursuing HTA has been rather promising in developing nations. Several practical evidences justify the necessity and scope of HTA in developing countries. For example study conducted in Asia on governmental decisions for introduction of new technologies (that evaluated diffusion pattern of the MRI machine) had observed visible problems with regards to efficiency, equity, and quality of technological services and henceforth advocated and recommended purchasing and regulatory bodies to be endowed with skill and knowledge of HTA [7].

The added prospective of HTA is that it serves as a multidimensional tool which evaluates social, legal, organizational and bioethical aspects along with the disease epidemiology; clinical (effectiveness, emergency, indications of use) and economic evaluation of different consequences of the new vaccine (technology). In contrast to present decision making process for vaccines which includes mostly evidence based medicine, cost-effectiveness evaluation and is subjected to political predilections, HTA incorporates Evidence Based Vaccinology (EBV) that deals with identification and utilizing best evidences for decisions throughout all development and introduction stages of vaccines. HTA potential on new vaccine introduction can support in decision making at national public health levels, company levels and even on a daily scale for economic resource allocation and improvisation of healthcare services and thereby facilitates the evaluation of new vaccines globally. Though HTA exists both formally and informally in some of the Asian and South American low and middle income countries, for example, Thailand, China, Laos, Pakistan, Bangladesh, Sri Lanka, Malaysia, Taiwan, Bhutan, Mongolia, Cambodia, Indonesia, Brunei, Maldives, Philippines, India, Nepal, Korea, Vietnam, Chile, Argentina, and Brazil [8], literature with respect to vaccine and HTA is lacking with reference to developing countries and also whatever data is available avails from developed countries which appears limited as well [6]. Due to this scarcity of information in developing countries, we evaluated the various prospects of HTA in immunization particularly in developing countries. Overall, the following research might be of potential interest to individuals and organizations pursuing for promoting HTA in any explicit perspective, and that too especially in developing countries.

HTA framework applied to vaccine

WHO, Global Alliance for Vaccine Initiative (GAVI) and UNICEF have been trying to implement vaccines for Streptococcus pneumonie infections, rotaviral diarrhea and human papilloma viral infections (PCV). PCV vaccines are in non-GAVI planning introduction phase and several developing

countries including India are yet to introduce the vaccine in their immunization schedule. IAP (Indian Academy of Pediatrics) had been recommending the inclusion of the pneumococcal conjugate vaccine in the government's immunization program since the last two years, but it has not yet materialized. When it comes to the introduction of PCV in developing countries, a potential framework for HTA which has been specifically modified for PCV vaccine for pneumococcal infections includes the following steps [6]:

- i. Literature searching, secondary desk research including systematic reviews, meta-analysis, data banks, hospital records etc. for evaluating:
 - a. Epidemiology of pneumococcal infections in specific developing country including disease burden (use of healthcare services for pneumococcal infections including hospitalization, mortality, morbidity etc.)
 - b. Current treatment practices in healthcare for the pneumococcal infections
 - c. Preventive measures to avoid pneumococcal infections (PCV immunization currently and past evidences)
- ii. Mathematical modeling of the pneumococcal disease's course. Mathematical modeling of reduction in the incidence of pneumococcal infections within 10 - 15 years, taking into account the estimated ageing of the country.
- iii. Evaluating for remuneration: an in-depth detailed survey involving patient suffering from pneumococcal infections to evaluate the readiness to pay for the treatment and modalities to prevent disease development.
- iv. Evaluating the impact of the PCV vaccination on the epidemiology of pneumococcal infections that includes the pre-vaccination and post-vaccination data through SDR.
- v. Evaluating the effectiveness, efficacy and safety of the PCV vaccine: by utilizing highest quality data evidences that includes systematic reviews, meta-analysis, RCT (based on quality assessment tool - low risk of bias) on its effectiveness, efficacy and safety.
- vi. Elaboration of a mathematical model predicting economic impact of vaccination.
- vii. Economic evaluation of immunization by means of cost-benefit and a cost-effectiveness analyses; using a cost-effectiveness analysis expressing the final results in terms of quality adjusted life years gained (QALYs);
- viii. Evaluation of the impact of PCV vaccination on the health system (the relationship between industry and the government; surveillance system of those vaccinated);
- ix. Organizational aspects of PCV: - Study of the organizational aspects and the impact of PCV vaccination on the healthcare system i.e. relationship amongst the different national as well as regional decisional levels.

- x. Investigation of biotechnological aspects and manufacturers' view on PCV introduction.
- xi. Evaluation of ethical, legal and social issues of the PCV immunization.

Another approach: transferability of the successful implementation of immunization strategies

Poor health status, restricted healthcare budgets, analytical resources, limited data availability along with the fact that the prices for globally traded goods (e.g. pharmaceuticals) are adjusted to large (high income) markets limiting the availability, force developing countries to pay even greater consequences for inappropriate reimbursement decisions in comparison to developed countries. For decisions concerned with provision and reimbursement of new healthcare technologies that includes vaccines as well, information regarding the cost effectiveness is an indispensable requisite for the decision makers. However, in developing countries there appear inadequate analytical resources that can facilitate the provision of the data for such decisions. Hence, in such situations, transferability of existing economic evaluation data to these countries could serve as a sound valid alternative. The decisions makers can conserve potentially a large amount of scarce evaluation resources and take more timely decisions, if the clinical as well as cost effectiveness related analysis can be efficaciously utilized, recalculated or reapplied to satisfy requirements that are specific geographically [9].

There exists a large amount of variation in data related cost effectiveness internationally and also lack of understanding on the various factors related to this variability. Hence, it becomes obligatory to evaluate which causes and factors concerned with this variability in international cost-effectiveness can be associated with the degree of economic attainment of the specific nation of interest in relation to transferring of data to the developing countries [10]. For assessing the transferability of the successful implementation of immunization strategies prevalent in developed countries to developing countries, specific criteria mainly depends on perspective, discount rate, medical cost approach, productivity cost approach, absolute and relative prices in healthcare, practice variation, technology availability, disease incidence/prevalence, case-mix, life expectancy, health-status preference, acceptance, compliance, incentives to patients, productivity and work-loss time and disease spread of the country [11]. For nations that qualify these criteria, one has to gaze at the availability of local data to evaluate and analyze the requisite for modeling based adjustment (e.g. sensitivity analysis) for improvising the transferability quotient. Alternatively, application of local cost as well as utility data can also be considered to populate the model by applying results from published clinical effectiveness review. However, availability of data that is country-specific, fundamental variations and disparities across the healthcare systems, access to decision model that has an effect on assumptions related to decision models, can restrict the practicality of these strategies during transferring of data to developing countries.

Each nation is different with regards to social, cultural and historical elements that mould the population's and system's readiness to pay for technologies. These in turn also affect the infrastructure, readiness and ability to apply HTA methodology as well. Together with equity, these may also govern whether

HTA applies cost effectiveness analysis, includes indirect comparison, considers subgroups, availability of risk sharing schemes etc. These factors that vary across countries apprise and influence HTA decisions and recommendations. Hence, a technology reimbursed in full in a certain nation can be rejected, or only accepted with conditions, in another. Henceforth the developing countries have a positive prospective for using HTA to judiciously improve use of restricted resources may at times be least able to conduct HTA.

If HTA is to propose a convincing proposition for policy making related to healthcare including immunization, it may demonstrate a positive impact and value. But the fact that persists is how one measures impact; change in practice; cost saving including direct and indirect costs from immunization (any technology); whether impact is likely to be more in structured systems with reimbursements list as compared to open system without guidance; whether impact is affected when the processes of HTA is too far from the decision makers and budget holders (national, regional, local). The HTA impact is improvised if there is a policy process with regulation while in systems where the incentive does not facilitate or support HTA (fee for service), the HTA impact is reduced. Henceforth, any immunization decision based on HTA recommended in two different countries may have a dissimilar impact on practice in each depending on variations in the fit between HTA and decision making processes.

Assessing the impact of health technology assessment and its barriers

There have been studies in the past evaluating HTA impact on setting healthcare priorities [8–11]. Past evidences including 21 reports, covering 16 topics, reported that all but three HTA reports had an influence on policy decisions and about an annual saving of \$16 million and \$27 million were reported by the cost-minimization studies through HTA [12]. Also a commentary has stated that while the earlier ten years has been well spend on constructing HTA infrastructure and evidence base, the coming ten years should focus on the outcomes [13]. Though HTA has been influential in healthcare priority setting in few healthcare systems, observers do approve that the impact on priority setting has been modest at best [14].

The HTA's traditional emphasis on health service level than the public health level along with its struggle in integrating political as well as public health levels has been a major barrier for HTA. Though it has helped inform healthcare priority setting in practice, it has been not so successful to deliver in this arena due to restrictions implemented by their policy implementation level as noted previously.

III. RECOMMENDATIONS AND CONCLUSIONS

HTA, thus rather being a tool for containment of cost, can encourage public debate on control of cost and assist healthcare systems to resolve rapidly expanding requirements with more slowly expanding resources in immunization programs. In summary, HTA will need investments in terms of time, human and financial resources with special emphasis on various social, scientific and political aspects. Country population does affect the implementation of HTA as in the case of countries with population ~ 10 million. Prioritization is required with respect to

application of HTA in immunization procedures in such countries. While in smaller counties with population lesser than three million, international collaboration is needed with countries with similar healthcare system preferably (eg EUnetHTA Core Model). Also for the success of HTA in immunization processes, the acceptance of multiple key stakeholders is an indispensable requisite, which will need the involvement of healthcare professionals, patient advocacy groups, and medical technology firms coupled with open, consistent and transparent HTA processes with respect to selection of technology to be assessed, its conduct and application of the results of assessment to access and reimbursement [15].

Thus, availability of human and financial resources, capacity building and training programs to perform/run HTA, previously existing good practices and examples from other countries, international networking, support and collaboration, compatibility to adopt and/or adapt foreign evidence in the local context along with the rising interest and demand for EBM and/or HTA, have been potential motivation to promote HTA to produce a positive health impact in immunization, particularly in developing countries. However, conflict of interest, questionable data quality, rigidity of the health system, existing practice routines and culture to change, absence of real world application, HTA viewed as an obstacle to acquisition of new technologies

have served to be major barriers to HTA in immunization processes [16].

Thus, over the past two decades, scientific research has led to the development of new technologies related to healthcare including the introduction of new vaccines in the immunization schedule. The decision process with regards to these developments would be an area of concern in the coming years as well and a useful valid tool for orientation of the decision making toward the best allocation of limited resources is the need of the day, particularly in the developing countries. HTA's multidisciplinary aspects in immunization could definitely serve as an innovative and effective decision supporting approach [17]. The mainstream approach of developed countries may not deliver the desired results in developing countries, but one can still learn from their experiences. Creative and consistent local HTA implementation can deliver success over years. While the benefits of vaccines are difficult to measure as they are preventive in nature unlike curative interventions, making decisions on the suitable financing models on immunizations is a difficult task. As the low and middle income countries progress, their economies also would progress, giving them extra financial muscle to fund immunizations and other health related programs. As HTA systems are refined and exported to countries developing HTA system infrastructure, more research on the structure, process and outcome of HTA systems is warranted.

Tables:-

Table 1: Vaccine procurement cost for immunization of a single person

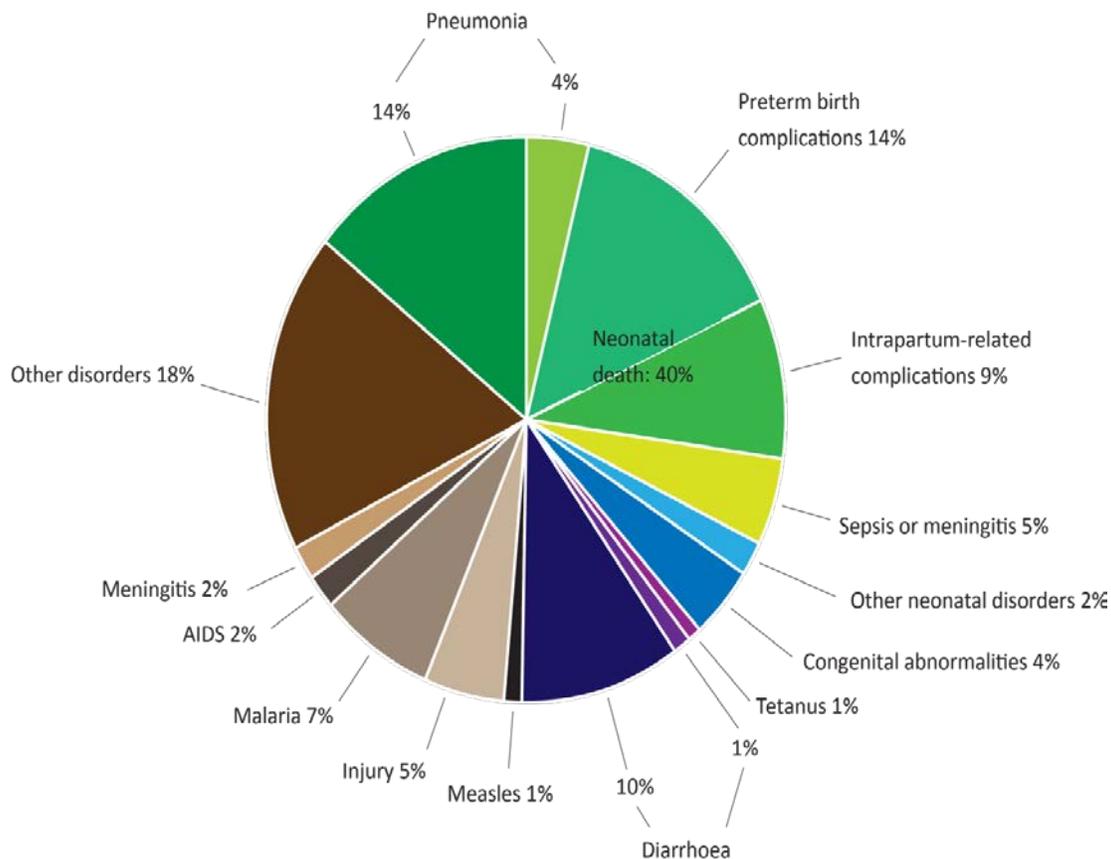
Sl no	Vaccine	Most recent lowest procurement price per dose (USD)	Doses (EPI)	Cost of vaccine per person (USD)
1	BCG	0.068	1	0.068
2	DTP vaccine	0.197	4	0.788
3	HepB vaccine	0.16	4	0.64
4	DTP-HepB-Hib	1.55	4	6.2
5	Trivalent OPV	0.1235	4	0.494
6	Bivalent types 1 and 3 OPV	0.12	4	0.48
7	Inactivated Polio Vaccine (trivalent) For GAVI supported countries	0.855	4	3.42
8	Pneumococcal (13-val) vaccine	3.3	4	13.2
9	Pneumococcal (10-val) vaccine	3.4	4	13.6
10	Rotavirus vaccine (monovalent)	2.14	3	6.42
11	Rotavirus vaccine (pentavalent)	3.5	3	10.5
12	MMR vaccine	1.077	1	1.077
13	Measles vaccine	0.225	2	0.45

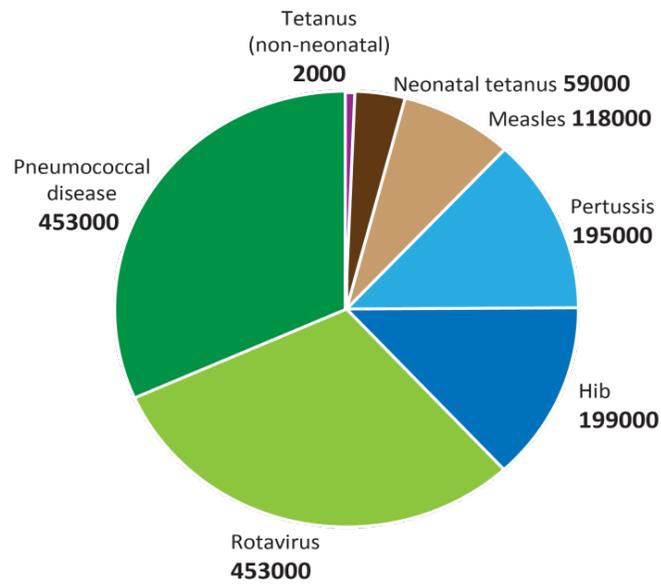
14	Meningococcal A conjugate vaccine	0.621	2	1.242
15	Bivalent Human Papilloma Virus (Types 16 and 18) vaccine	4.6	3	13.8
16	Quadra valent Human Papilloma Virus (Types 6, 11, 16 and 18) vaccine	4.5	3	13.5
17	Td vaccine	0.105	2	0.21
18	TT vaccine	0.05	2	0.1
19	Yellow Fever vaccine	0.769	1	0.769

* Data based on UNICEF purchase prices (Conversion factor 1USD=1.14 Euro) [2]

Figures:

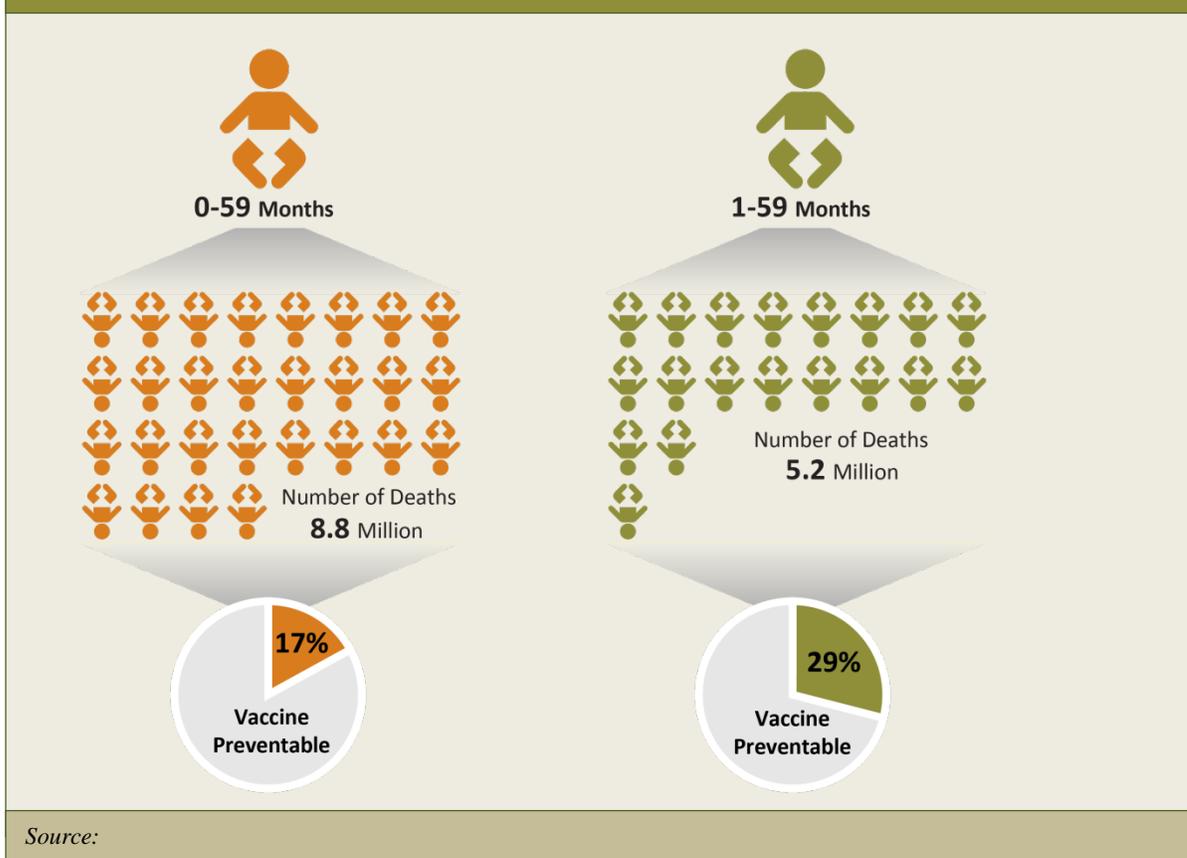
Figure 1: Global cause of child death





Title	Title
Tetanus (non-neonatal)	2000
Neonatal tetanus	59000
Measles	118000
Pertussis	195000
Hib	199000
Pneumococcal disease	476000
Rotavirus	453000

Figure 2: Global vaccine preventable deaths (2008) in children below 59 months



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Using Local Materials in Traditional Storage of Mango (*Mangifera indica* L.) Fruits in Sudan

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Abstract- This investigation was carried out at the Department of Agricultural Engineering, Faculty of Agricultural and Natural Resources, University of Bakht Er-Ruda, Ed Duiem, Sudan. The objectives of this investigation were to design two stores from local materials for mango fruits and study the effect of these stores in prolonging the storage period and fruit firmness and colour of fruits. Among traditional stores, Jute store showed the lowest temperature. Furthermore, the store made from jute material obtained the highest value of the relative humidity compared with the other stores. Mango stored in Jute showed significant increase in storage period and fruit firmness and delay colour change.

Index Terms- Mango, Jute, Bamboo, Temperature, Relative Humidity, Storage period

I. INTRODUCTION

Mango fruit (*Mangifera indica* L.) is an important and very popular tropical fruit throughout the world and India is leading world production [1]. In Sudan the total mango cultivated area was 0.03 million hectares produced 0.64 million tons in 2012 [2]. Sudanese cultivates more than 40 varieties of mango [3]. The largest producing area is Abu-Gepaha in western Sudan. Mango is the leading Sudanese horticultural export crop [4].

Mango fruits are classified according to its respiratory behavior, as a climacteric fruits as stated by [5]. In mature green mango, after harvesting, the ripening process takes 9-12 days [6], during which, the fruits should be stored at temperatures of 10°C -12°C and relative humidity 85%-90% [7]. Mango fruits have highly perishable and possessing a short shelf life which limits the long distance commercial transport [8].

The basic principle of storage fruits and vegetable is that the products are cooled through evaporation units. When water evaporates, it draws energy from its surroundings, producing a considerable cooling effect. There are many different types of evaporative coolers stores designed used on the available materials to store fruits and vegetables such as straw, wire mesh, saw dust, burlap, brick, sand, bamboo gunny bags and lofa (bath brush) as a filling material [9, 10]. The evaporation processing done as simple technology and practices without using fan if the unit is kept shaded and used a well-ventilated area to reduce losses and extend storage life of fruits and vegetables. There are many storage methods to preserve or extend the shelf life of fruits, like natural or field storage, forced air cooling, hydro-cooling and cooling storage room [9].

Due to poor post-harvest practices and lack of proper storage facilities, mango losses are estimated between 20%-35% and sometimes jumped over 60% [10]. Techniques of prolonging shelf life of mango fruits are costly and may not be readily available to local farmers [11]. Furthermore, cold-storage is potentially problematic due to high cost and lack of electric energy in many production areas. Therefore, there is a great need to develop affordable means for prolonging the shelf life of mango and reduce the quality losses. This work is aimed to design two traditional stores made from Jute and Bamboo and compare them with ambient temperature. Furthermore, study the effect of these stores in prolonging the storage period and fruit firmness and colour change in mango fruits.

II. MATERIALS AND METHODS

This study was carried out at the Department of Agricultural Engineering, Faculty of Agriculture and Natural Resources, University of Bakht El Ruda, Elddium, Sudan. Two stores were designed from traditional materials (Jute and Bamboo) to store mango fruits. The stores were constructed with a wooden frame with an entrance door. One store was covered with Jute, while the other was wrapped with Bamboo sheets. The walls of the store were wetted twice daily at 07:00 and 19:00 with a predetermined amount of water (500 ml). Two environmental factors, air temperature (°C) and relative humidity (%) at three different locations of store at the entrance, middle and exit inside the stores were measured. The measurements were made during the day at 7:00am, 11:00 am, 15:00 pm and 19:00 pm using a digital Thermo-hygrometer. All the readings were triplicates and the average value at each temperature and relative humidity were determined.

Fruits at the mature green stage of Kitchener cultivar were sorted for uniform size and absence of mechanical damage. Fruits were washed, air-dried and placed in carton boxes and divided into three equal groups. The boxes were kept inside the two traditional stores and third group of boxes was kept outside at the room temperature as a control. The experiment was arranged in a completely randomized design with three replications. The storage period was recorded. Color was visually assessed using a scale of 1 to 4 as follows:

1: Yellow, 2: Light yellow, 3: Light green and 4: Light green.

Firmness was evaluated by measuring the resistance of fruit to hand pressure using a scale of 1 to 4 as follows:

1: Very soft, 2: soft, 3: fairly soft and 4: Fairly firm.

Data were subjected to analysis of variance using MStatC computer program.

III. RESULTS AND DISCUSSION

Environmental Factors Affecting the Traditional Stores:

a. Temperature:

The mean values of the air temperature, (°C) measured at the three different locations entrance, middle and exit for inside the traditional stores are shown in Figure (1). There were no a clear difference in location data. The lowest value was obtained from jute store at different times throughout the experiment mainly at 7:00 am and 19: pm (22.8° C and 29.5° C), respectively, after wetting operation, while the highest values were observed at 15:00 pm time for all the stores designed. The bamboo and control stores were attained the higher values compared with jute store (38.6 C°, 39.9 C°36.8C°), at the same time.

Comparison between the different traditional stores regarding the temperature factor determined as presented in fig. 2 indicated that Jute store was the lowest one. This result indicates a lower temperature had effectiveness on quality of mango samples. Similar results of evaporative cooling unite designed were observed in storage different types of fruit and vegetables[9, 10].

b. Relative humidity:

The store that made from wetting jute material reached the highest value of the relative humidity at the different locations and during the experiment compared with the other stores as presented in fig.3 and fig 4. This result showed that the evaporative cooling store increased the relative humidity to a satisfactory level that suite the storage life of mango fruits for nine days, compared to the outside as control store the fruits damaged after 5day.

Using the conditioned air for the wetting walls of jute material at least twice daily preserved the quality of fruits. This finding is similar to results reported by [9] and [10] who worked on traditional materials used in different stores to storage some fruits and vegetables.

Storage period:

Different local materials in mango storage showed a significant increase in storage period (Fig. 5). The highest storage period was obtained when fruit stored in jute made store.

This is due to decrease of temperature and increase of (RH%) inside jute made store. This finding is in agreement with findings that obtained by (12) who reported that decreasing of temperature increasing the storage life of mango fruit.

Product temperature, an important factor that affects post-harvest life has a

A profound effect on the biological reactions. Low temperature storage is usually used to prolong the storage period of fruit and vegetables. For every 10 °C reduction in temperature, the shelf life, in general, double [13]

Fruit firmness:

The different storage materials showed significant increase in fruit firmness (Fig.3). Control showed deterioration in fruit firmness while fruit stored in jute showed retention in fruit firmness. Firmness is one of the important quality parameters that play a significant role in fruit selection by the consumer. This trend of fruit firmness is due to the cell wall digestion by pectin esterase, polygala cturonase, and other enzymes and this process were decreased by decreasing in storage temperature [14].

Fruit colour:

In the present study, the color of the fruits was significantly different regardless of the storage materials (Fig. 3). Ambient temperature showed a less colour change compared with other storage materials. This may be due to decrease of temperature and increase of relative humidity in these materials. This finding is in line with [15] reported that the rate of skin color development differs between the variety and the maturity of the fruit, and depends on the storage conditions, particularly temperature.

IV. CONCLUSIONS

The use of jute material in the present study showed a significant increase in mango storage period and reduced firmness and colour change. The jute is affordable material and easy to use in small-scale farm to prolong the shelf life and retain the fruit quality due to reduce the temperature and increasing the relative humidity by watering the jute regularly. More research must be done by using jute to study its effect on weight loss and chemical attributes.

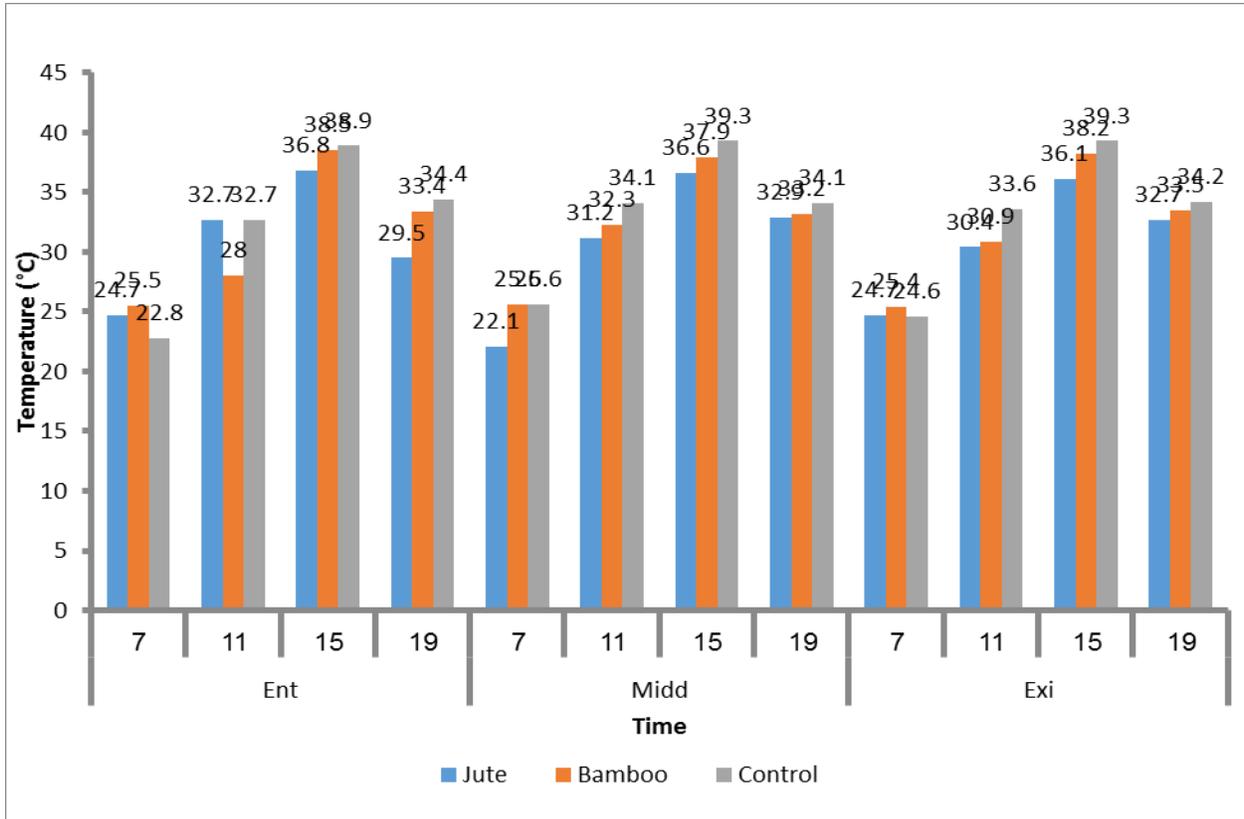


Fig. (1) Temperature at different time on the three traditional stores.

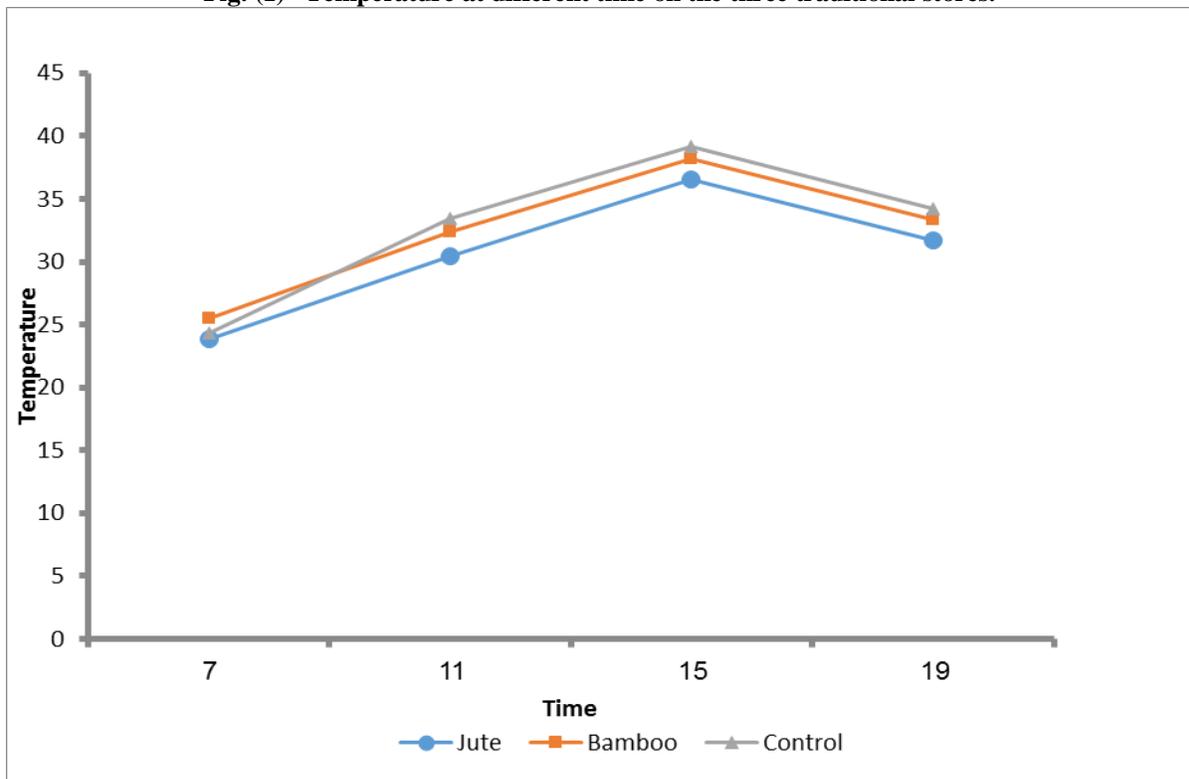


Fig. (2) Temperature in different traditional stores

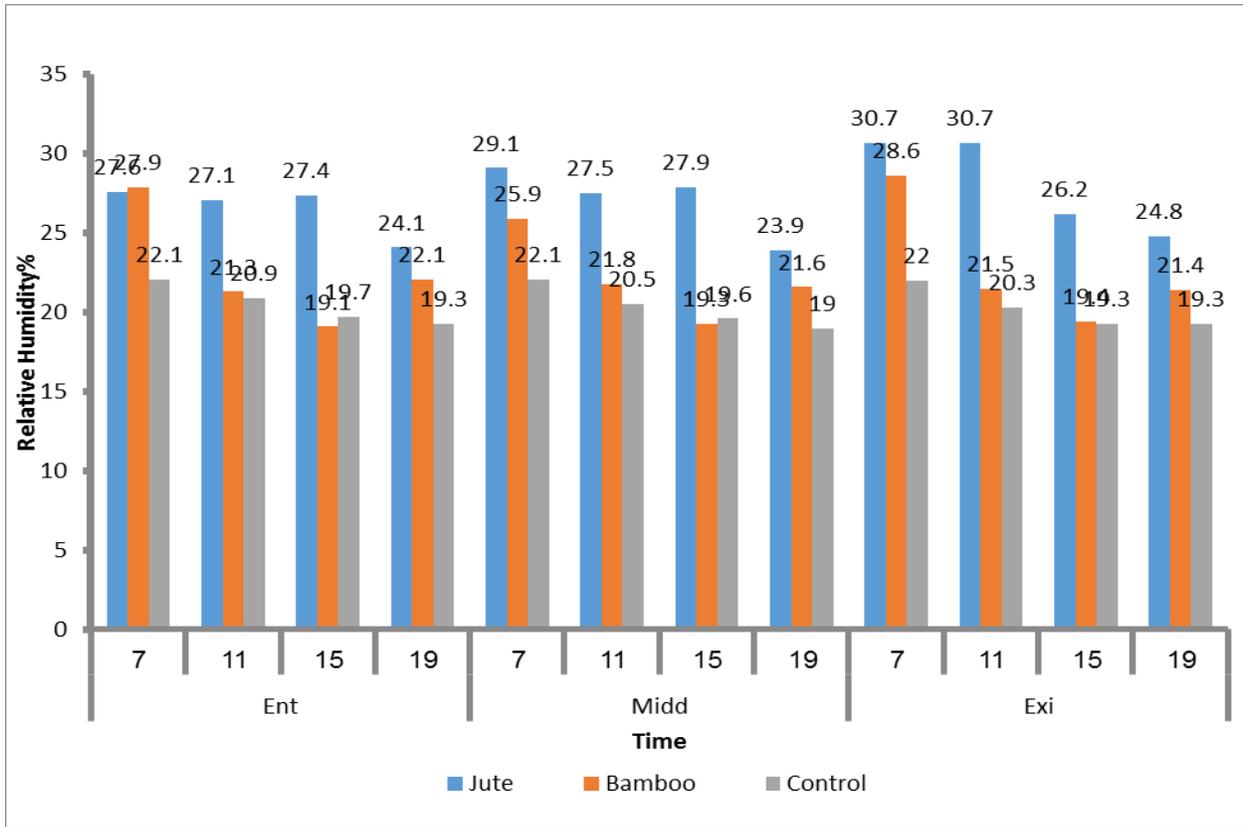


Fig. (3) Relative humidity (%) at different time on the three traditional stores.

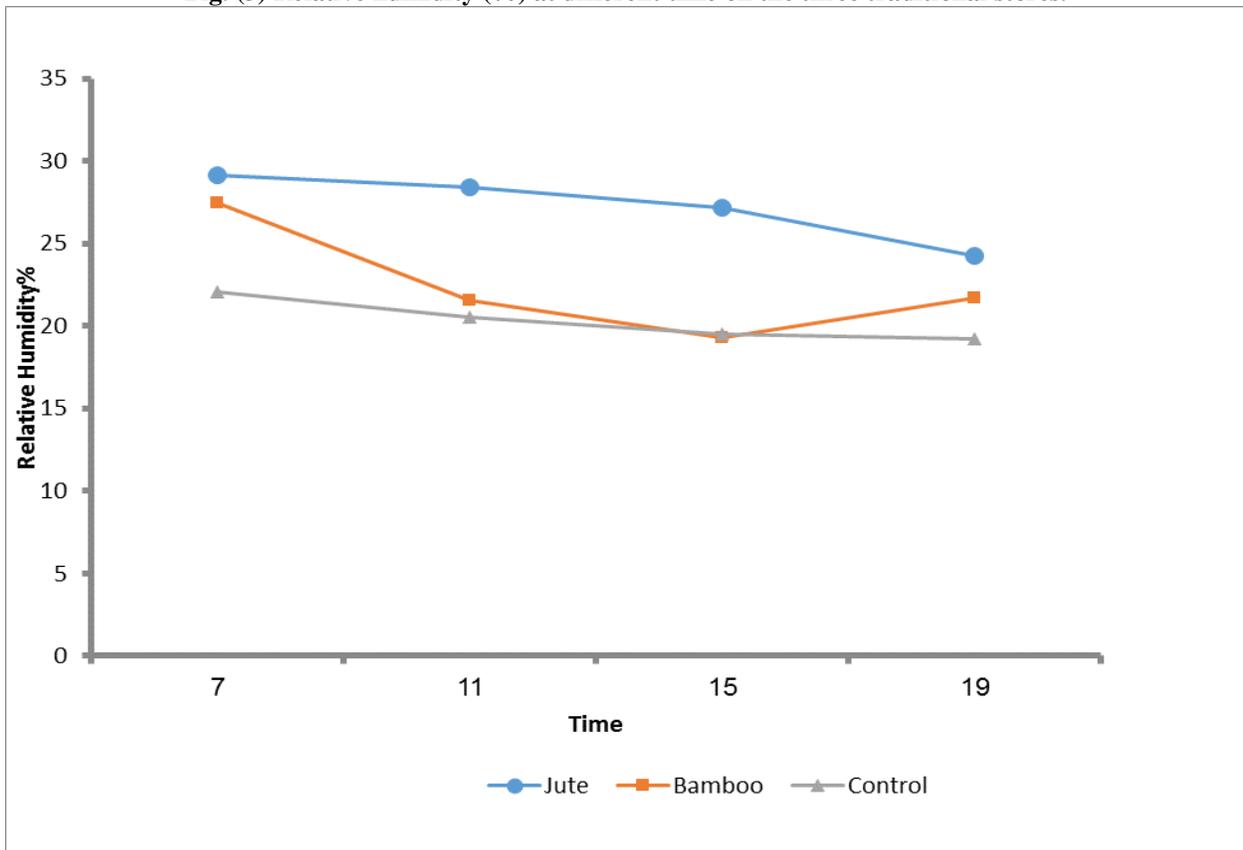


Fig. (4) Relative humidity (%) in different traditional stores.

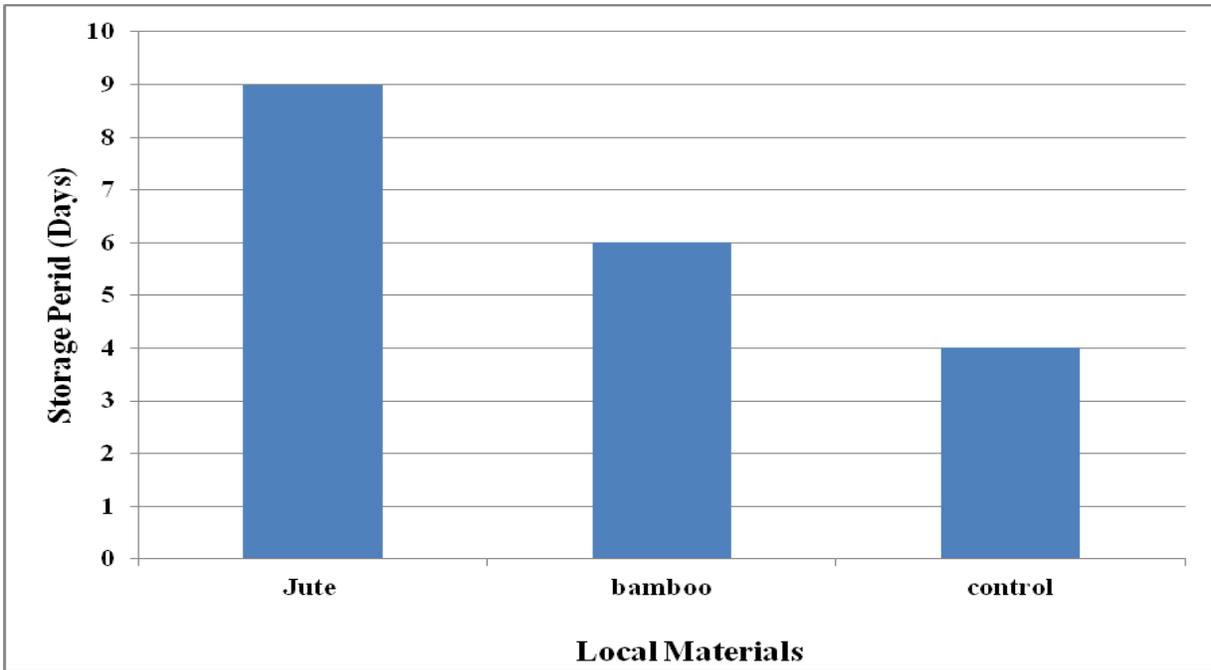


Fig (5): Effect of different local materials on storage period of mango fruit

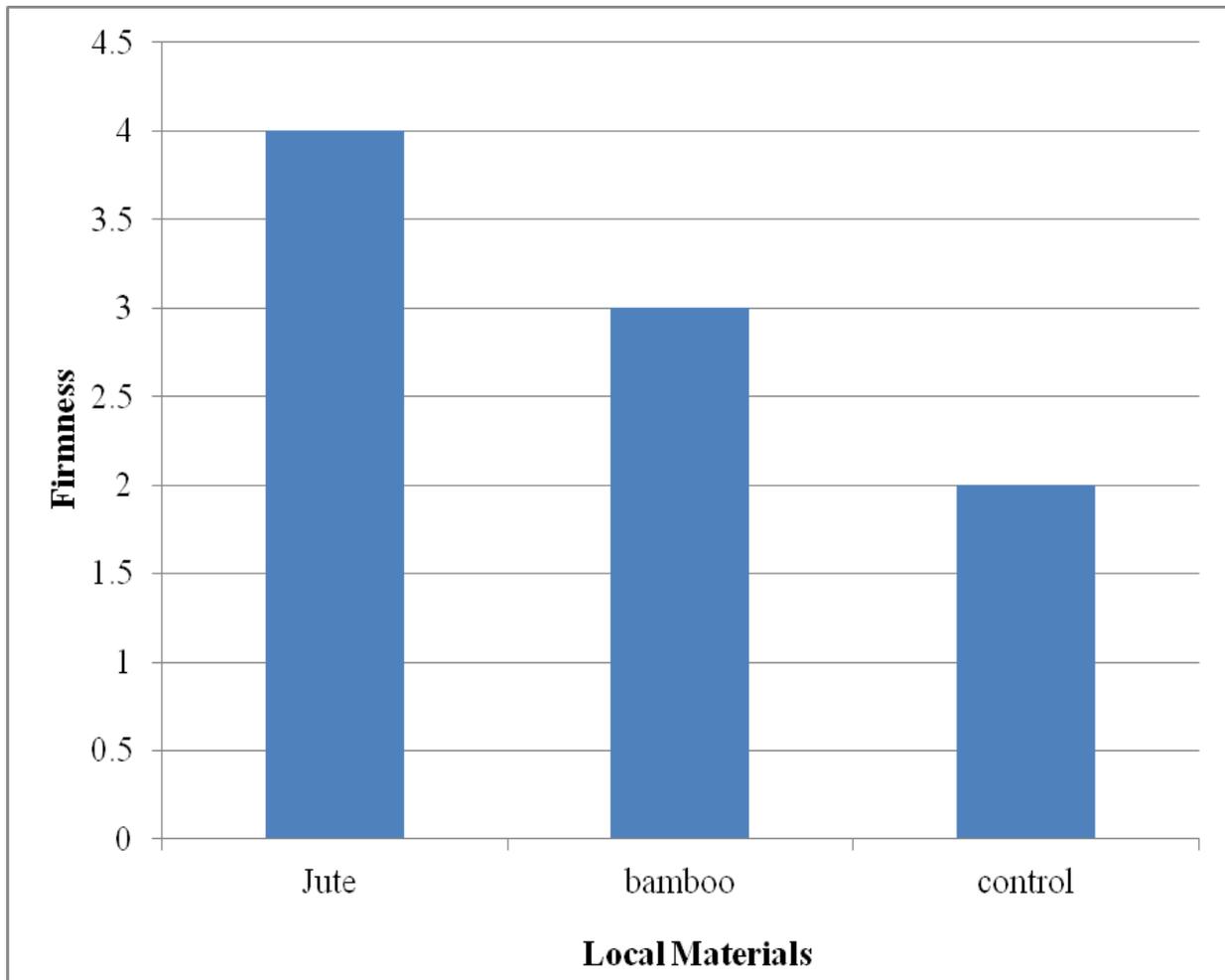


Fig (6): Effect of different local materials on mango fruit firmness at the last day of storage

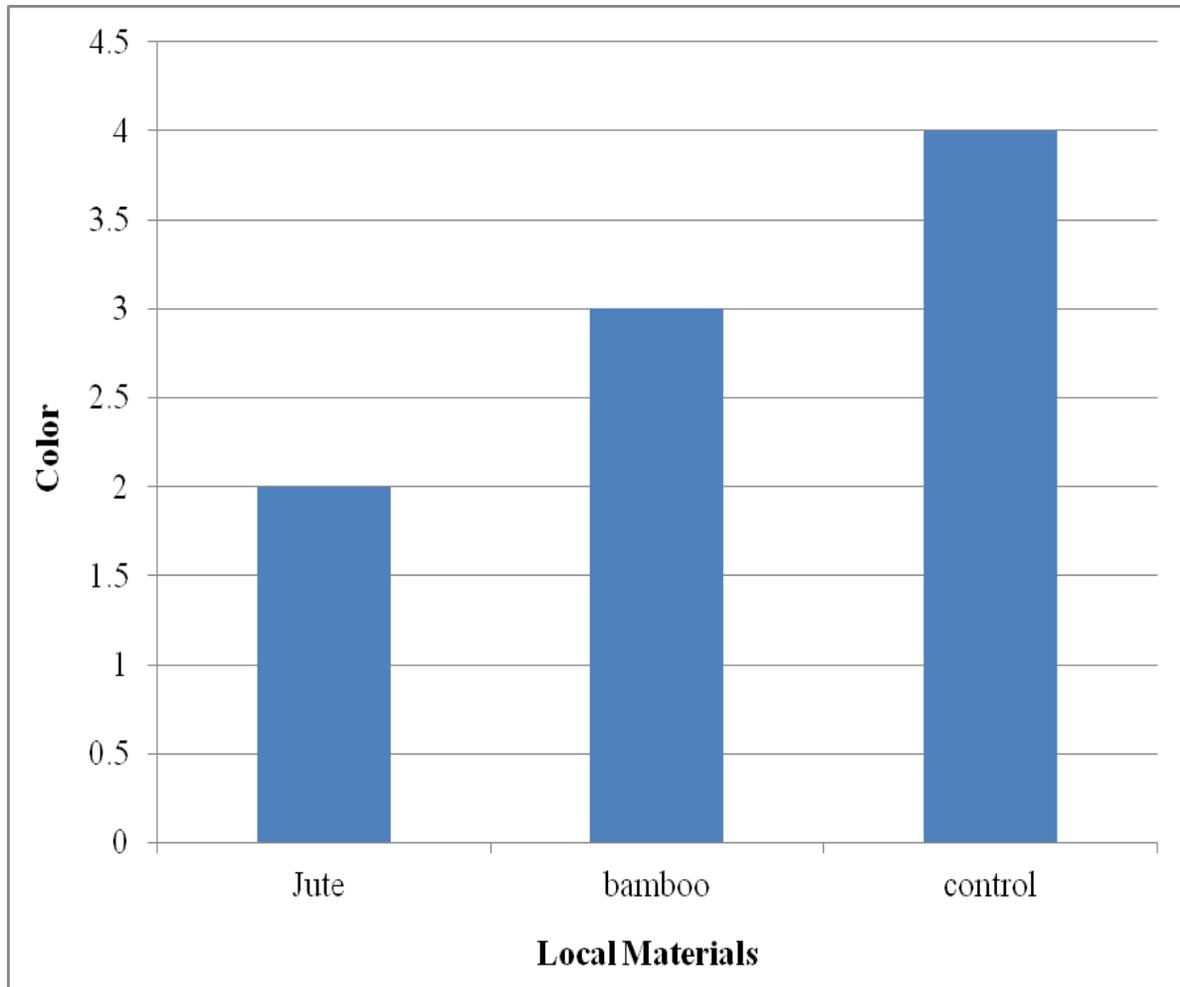


Fig (7): Effect of different local materials on mango fruit colour at the last day of storage

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Isolation, Characterization and Antibiotic Susceptibility Patterns of *Pseudomonas Aeruginosa* and *Staphylococcus Aureus* from Hospital Environment in Kaduna Metropolis, Kaduna State

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Abstract- Background: Hospital acquired infections are serious problems in patient care, and adversely affect the mortality and morbidity; despite antimicrobial therapy and advances in supportive care. The environment can serve as a source of infection. The aim of this work is to evaluate contamination of the inanimate hospital environment by bacterial agents, particularly *Staphylococcus aureus* and *Pseudomonas aeruginosa*; and to determine the susceptibility of the bacterial isolates to various antibiotics.

Methods: Four different hospitals were included in this study. These are General Hospital Sabo, St. Gerard Catholic Hospital, Barau Dikko Specialist Hospital, and Yusuf Dantsoho Memorial Hospital. Between October 2014 to January 2015, 160 swabs samples (40 each) were taken from environmental surfaces of the four hospitals. Bacterial identification was carried out using routine biochemical tests, and confirmed with polymerase chain reaction. Susceptibility testing for the bacterial isolates was done using the disk diffusion method.

Results: One hundred and seventy (170) bacterial pathogens were isolated, of which 138(81.2%) were identified as *Staphylococcus aureus*, and 32(18.8%) were identified as *Pseudomonas aeruginosa* and all were confirmed with polymerase chain reaction. The total percentage distribution of this pathogen on the surfaces was 53.12%. *S. aureus* was isolated from sinks (43.8%), floor (90.6%), bedrails (96.9%), door knobs(100%) and table tops(100%). *P. aeruginosa* was isolated from sinks (59.4%), floor (34.4%), table tops (6.3%) with none isolated from door knobs and bedrails. The statistical analysis showed that there was significant difference in the prevalence rate of the organisms on the surfaces. ($P=0.000^*$). Of all the *Staphylococcus aureus* isolates, 41.3% were found to be multi-drug resistant (MDR), while 21.9% of the *P.aeruginosa* isolates were MDR.

Conclusion: Lack of a universal procedure for surveillance of nosocomial infection, presence of pathogenic bacteria with multidrug resistant organism, poor hygiene practices and heavy contamination of some important surfaces are the most important problems in our hospitals.

Index Terms- Hospital acquired infections; *Staphylococcus aureus*; *Pseudomonas aeruginosa*; Antibiotic susceptibility patterns; hospital environment.

I. INTRODUCTION

Hospital acquired infections are serious problems in patients care and adversely affect the mortality and morbidity despite antimicrobial therapy and advances in supportive care (Anton and David, 2010). It is a major public health concern these days and a cause of substantial mortality and morbidity for hospitalized patients (Thapa *et al.*, 2009). Nosocomial infection caused by the nosocomial pathogens has pose a problem of enormous magnitude globally, hospital localities have proven favourable in transmission of infection due to existing suitable pathogens-host-environment relationship (Samuel *et al.*, 2010).

The occurrence of multi-drug resistance in hospital-associated pathogens has resulted in the emergence and re-emergence of difficult-to-treat nosocomial infections in patients depicting the pre-antibiotic era. These infections are difficult to eradicate due to resistance to many antibiotics, thus major cause of morbidity and mortality, leading directly and indirectly to an enormous increase in cost of hospital stay for the patients and also emergence of new health hazards for the community.

Hence, this research is aimed to investigate the occurrence, distribution and determine the antibiotic susceptibility pattern of most common potential nosocomial bacteria particularly *Pseudomonas aeruginosa* and *Staphylococcus aureus* in some selected hospital environment in Kaduna metropolis, Kaduna

II. METHODS

Study population and ethical approval

This study was conducted in Kaduna, with specimens collected from the hospital environment in four different hospitals spread across Kaduna metropolis.

Before samples were collected, information regarding the study was explained to the individual hospital managements and consent for participation in the study was gotten following approval by the ethical committee of Kaduna state Ministry of Health.

Sampling design and techniques

A total number of one hundred and sixty (160) swabs samples for the studies were collected from floors, door knobs, table tops, bedrails, and sink using sterile swab sticks for the purposes of isolating microorganisms from these sources and

transported to the laboratory for analysis within one hour for a period of four months (October 2014 –January 2015). These samples were inoculated into two different selective media, to make a total of three hundred and twenty culture plates.

Isolation and characterization of isolates

Organisms were identified by Gram stain, catalase, coagulase test oxidase test. And confirmatory test done by using microgen Gram negative (GNA + GNB) and microgen STAPH identification kits. molecular characterization of the isolates done using PCR

In-vitro determination of antibiotic susceptibility

This was done using the agar disc diffusion method

III. RESULTS

A total of one hundred and sixty (160) samples were collected from the environments of four different selected hospitals in Kaduna metropolis for this study. Eight (8) swab samples from each of the five different surfaces that is, sinks, floor, door knobs, table tops and bed rails in each of the hospitals making a total of forty swab samples per hospital, the swab samples were inoculated each into two(2) different selective media for the purpose of bacterial isolation.

One hundred and seventy bacterial pathogens were also isolated in all. These include General hospital Sabo 36 (21.17%), Saint Gerard hospital 41 (24.11%), Barau Dikko Specialist hospital 43 (25.29%) and Yusuf Dantsoho memorial hospital 50 (29.41%), with the highest number of isolates from Yusuf Dantsoho memorial hospital as shown in table 4.2.

Of all the isolates a total of 138(81.2%) were tested positive for *S. aureus* of which Yusuf Dantsoho is having the highest number 37(26.8%), followed by Barau Dikko Specialist hospital with 35(25.4%), St. Gerard 34(24.6%) and GHS 32(23.2%). 32(18.8%) were tested Positive for *P. aeruginosa*, following the same pattern with Yusuf Dantsoho having the highest number 13(40.6%), followed by Barau Dikko Specialist hospital 8(25.0%), St Gerard 7(21.9%) and GHS 4(12.5%).

The total percentage distribution of this pathogen on the surfaces was 53.12%. *P. aeruginosa* was isolated from sink (59.4%), floor (34.4%), table tops (6.3%) with no *P. aeruginosa* isolated from door knobs and bedrails. 43.8% of *S. aureus* was isolated from sink, 90.6% on floor, 96.9% from bedrails and 100% from door knobs and table tops. The statistical analysis showed that there was significant difference in the prevalence rate of the organisms on the surfaces of the four hospitals $P < 0.05$.

Table 4.5 shows the Prevalence rate of *S. aureus* isolated from various surface in the four selected hospitals with 138 pathogens isolated from the 160 samples screened. At the General Hospital Sabo 6.3, 21.9, 25.0, 25.0, and 21.9 % of *S. aureus* was isolated from sinks, floor, door knobs, table tops and bed rails respectively and the percentage distribution for this hospital among the four hospitals is 23.2%. In St. Gerard the percentage isolated was 12.5, 18.8, 25.0, 25.0, and 7.0% from sinks, floor, door knobs, table tops and bed rails respectively with the percentage distribution of 24.6%. Barau Dikko Specialist hospital has sinks, floor, door knobs, table tops and bed rails with 9.4 and others 25% respectively. The percentage

distribution was 25.4% .Yusuf Dantsoho has 15.6, and others equal of 25% from sinks, floor, door knobs, table tops and bed rails respectively. The percentage distribution of the pathogen is 26.8%.

Table 4.6 shows the Prevalence rate of *P. aeruginosa* isolated from various surface in the four selected hospitals with 32 pathogens isolated from the 160 samples screened. At the General Hospital Sabo, 9.4 and 3.1% of *P. aeruginosa* was isolated from sinks and floor respectively with none from the door knobs, table tops and bed rails and the percentage distribution among the hospitals is 12.5%. In St. Gerard the percentage isolated also was 12.5 and 9.4% from sinks and floor respectively while none from the other surfaces with the percentage distribution of 21.9%. Barau Dikko Specialist hospital has 15.6 and 9.4% isolated from sinks and floor, while door knobs, table tops and bed rails have none isolated. The percentage distribution was 25.0%. Yusuf Dantsoho has it isolated from sinks (21.9%), floor (12.5%), table tops (6.3%) while none from door knobs and bed rails. The percentage distribution of the pathogen is 40.6%.

Different antibiotic tested against *S.aureus* were shown in table 4.9. The pattern at the GHS shows resistance rates were high in the use of ampicillin (100%) and amoxicillin (96.9%), The number of strains resistant to tetracycline were 2 (6.3%), Chloramphenicol 5(15.6%)and erythromycin 3(9.4%) . A good sensitivity rate of 100 and 93.7% were recorded with vancomycin and streptomycin respectively. Some were sensitive to erythromycin 25(78.1%), Tetracycline 20(62.5%), Gentamycin 17(53.1%), and chloramphenicol 12(37.5%).

Isolates from St. Gerard also showed high resistance of *S.aureus* to both ampicillin 31(91.2%) and Amoxillin 30(88%), the sensitivity rates were high with Vancomycin 34(100%), Streptomycin 34(100%), chloramphenicol 30(88.2%), Tetracycline and erythromycin 85.3% each while chloramphenicol sensitive to 24(70.6%) of the isolates. Barau Dikko Specialist hospital has similar pattern with Ampicillin and Amoxillin resistance to *S.aureus* 97.1 and 91.4 % respectively. 100% were susceptible to Vancomycin and streptomycin, Tetracycline 31(88.6%), Chloramphenicol 30(85.7%) with erythromycin and gentamycin 71.4% each.

The resistance rates follow the same pattern in Yusuf Dantsoho hospital with Ampicillin 35(94.6%) and amoxicillin 34(91.9%). Vancomycin also showed 100% susceptibility with good number susceptible to streptomycin 34(91.9%), erythromycin 33(89.2%), chloramphenicol and Gentamycin 81.1% each and Tetracycline 27(73%).

DISCUSSION

The results of this study showed that a total of 170 *Staphylococcus aureus* and *Pseudomonas aeruginosa* were isolated in four different hospitals environment in Kaduna metropolis. *Staphylococcus aureus* 138 (86.3%) is the most frequently occurring bacteria isolated, then *Pseudomonas aeruginosa* 32(20.0%). Isolation of more Gram positive organisms is consistent with previous reports (Neely and Maley, 2000; Chikere et al., 2008 and Aminu et al., 2014). Similar study done in selected hospitals in Akoko, Ondo State Southwest Nigeria (Alabi et al., 2013) showed that the frequency of isolation of gram positive bacteria was higher than the gram

negative which also corroborate the findings of this study and agree with the statement that Gram-positive bacteria have overtaken the Gram-negative as the predominant bacteria isolated from fomites (Inweregbu et al., 2005).

The result of this study is also consistent with Jalalpoor *et al.* (2009) who reported that *Staphylococcus species* (54.7%) was the most frequent bacteria isolated in hospital environment; same with 55.6% reported by Anyadoh-Nwadike et al. (2011) in Owerri, Imo State South Eastern, Nigeria. It also correlates with the findings of Atata (2008) among hospitals in Ilorin, North central Nigeria with similar result from Onche and Adeayi, 2004; Oguntibegu and Nwobu, (2004). Also previous studies in this environment confirmed *Staphylococcus aureus* to be the leading organism on surfaces of hospital environments. The result of this study is similar to the report of Okesola and Oni (2009) which showed that *Staphylococcus aureus* is the most frequent bacteria isolated in the hospital environments. It is also quite similar to the result of Ijioma *et al* (2010) which reported that *Staphylococcus aureus* was the most prevalent bacteria isolated in the environment of labour ward of Umuguma and Umezuruike general hospital, Owerri, while Bouzada *et al* (2010) reported that *coagulase negative Staphylococcus* was the most prevalent accounting for 43.7% of the total isolates in tertiary health care hospital, Brazil. Also the result of this study correlates with the report of Chikere *et al* (2008) which showed that *Staphylococcus epidermidis* and *Staphylococcus aureus* were the most prevalent bacteria isolated in the hospital environments. It is also consistent with the report of Swain and Otta (2012) who showed that *S. aureus* was the most prevalent pathogen isolated in hospital specimen (Wound).

In contrast, the result of this study did not agree with the work of Orji *et al* (2005) which showed that *Staphylococcus aureus* was the least among the isolated bacteria in his study. However, the prevalence rate gotten in this study for *Staphylococcus aureus* and *Pseudomonas aeruginosa* is still higher than the rate noted by Jalalpoor et al (2009), rates of 30.2% and 12.0% by Muhamad et al (2013) from some hospital surfaces in Sokoto. A study carried out in some selected hospitals in Abeokuta Southwest Nigeria (Okonkwo et al, 2009), recorded prevalence of 20.0% and 13.3% respectively comparatively lower than that obtained in this study.

The high level of recovery of these pathogens could also be as a result of inadequate decontamination of the microbial load from the surfaces (Addy *et al.*, 2004) even though statistically, there was no significant association between organisms isolated from the surfaces and the hospital environment that is at $P > 0.05$

This finding corroborates earlier report of Hassan *et al.* (2004) and Page *et al.* (2009) that surfaces can act as reservoirs of microbes which could in turn lead to the spread of infection upon being touched, by either healthcare workers, patients or visitors. Carvalho *et al.* (2007) reported 46.1% cases of *Staphylococcus aureus* from hospital surfaces and Weber *et al.* (2010) also in their work have reported the role play by hospital surfaces in the transmission of emerging healthcare-associated pathogens. Crowded conditions within the hospital, frequent transfer of patients from one unit to another, and concentration of patients highly susceptible to infection in one area (e.g. newborn infants, burn patients, and intensive care) all may contribute to development of nosocomial infections due to contaminated

surfaces. Microbial flora may contaminate surfaces of objects, devices, and materials which subsequently contact susceptible body sites of patients (Chikere *et al.*, 2008). The role of hospital environment in the distribution of nosocomial pathogen cannot be overemphasized.

The prevalence of *Staphylococcus aureus* on table tops of the four hospitals that is, 100% of the isolates is greatly higher compared with 14.3% as reported by Ekrami *et al.* (2011). This finding is corroborated by the report of Carvahlo *et al.* (2007) that the surfaces of hospital environments serve as a secondary reservoir for multi-resistant microorganisms, such as MRSA.

Also, 38% of *Staphylococcus aureus* reported on door handle by Carvalho *et al.* (2007) is lower to the prevalence of the pathogen on door knobs of 100% from all the four hospitals. Similar prevalence of 100% of *Staphylococcus aureus* on door knobs in all the selected hospitals confirms the early report of Nworie *et al.* (2012) for Abuja metropolis that the contamination of door knob/door handle can be as a result of poor hand hygiene after using toilet. Bhalla *et al.* (2004) and Boyce (2007) reported that environmental contamination in healthcare settings occur when healthcare workers touch the surfaces with their hands or gloves especially after their routine patients care or when the patients come in direct contact with the surfaces.

High prevalence rate of *Staphylococcus aureus* on bedrail, 96.9% with GHS has 87.5% and others 100% is in agreement with 100% prevalence on bedrail as reported by Boyce (2007). The prevalence of 90.6% on the floor with 87.5, 75, 100, and 100% each from GHS, St. Gerard, Barau Dikko Specialist hospital and Yusuf Dantsoho memorial hospital respectively is higher than 8.6 and 16.7% reported by Hammuel C et al (2014) in two different hospitals' environment in Zaria likewise 30.8% by Boyce et al. (1997) and 50.0% by Carvalho K.S (2007) in Brasil probably different environmental hygiene in these locations could be the reason for this variation.

The lowest prevalence is from the sinks and it's 43.8% with the percentages of 25%, 37.5%, 50% and 62.5% of all the samples screened in GHS, St. Gerard, Nursing home and Yusuf Dantsoho Memorial hospital respective.

The high prevalence of *Pseudomonas aeruginosa*, 59.4% in sinks of the four hospitals is also higher compared with a work reported by Pal *et al.* (2010) that 4.47% of the pathogen was isolated from sinks in hospital environment in Iran. The isolation of this pathogen from the sinks confirms the report of Udeze *et al.* (2012) that sinks are the most common place in hospital environment were *P. aeruginosa* are predominantly found. The finding also confirms the report of Silva *et al.* (2003) that hospital surfaces have been implicated in the outbreaks of *P. aeruginosa* infection.

The prevalence of 9.1, 27.3, 27.3 and 36.4% of *Pseudomonas aeruginosa* from floors of GHS, St. Gerard, Nursing home and Yusuf Dantsoho respectively is higher compare to findings of Ekrami *et al.* (2011) which in their report stated that only 4.47% of this pathogen was isolated from floor in a hospital environment.

Pseudomonas aeruginosa was not isolated from door knobs and bed rails of the four hospitals. This corroborates the report of Sabra (2013) that *Pseudomonas aeruginosa* are mainly isolated from moist environment in hospitals.

Infections caused by *Staphylococcus aureus* and *Pseudomonas aeruginosa* are increasing both in hospitals and in general community (Hauser and Sriram, 2005; Maltezou and Giamarellou, 2006). The efficacy of many antibiotics for treatment of severe infections has become quite limited due to the development of resistance. High resistance of *Staphylococcus aureus* to ampicillin; that is 100% resistance from GHS, 91.2% from St. Gerard, 97.1% from Barau Dikko Specialist hospital and 94.6% from Yusuf Dantsoho Memorial hospital is in agreement with 97.0% of *Staphylococcus aureus* resistance to ampicillin as reported by Terry-Alli *et al.* (2011) from south western Nigeria and also substantiate previous study of Adegoke and Komolafe (2009). This research confirms the earlier report of Dudhagara *et al.* (2011) that a high percentage of *S. aureus* were resistant to ampicillin and other β -lactam drugs, and is also agreement with research work carried out by Akindele *et al.* (2010) that of the 100 total number of *S. aureus* isolated from hospital environment 90% of them were resistant to ampicillin. Amoxicillin also shows similar pattern with resistance ranges from 88.2%, 91.4, 91.9 and 96.9% of the isolates at St. Gerard, Barau Dikko Specialist hospital, Yusuf Dantsoho and GHS respectively which also corresponds to findings at Aminu Kano Teaching Hospital, Kano by Gbonjubola *et al.* (2012).

The resistance of *Staphylococcus aureus* to these antibiotics may be as result of the ability of β -lactamase enzyme to break the β -lactam ring of the antibiotic and render it ineffective because *S. aureus* produces β -lactamase in the presence of ampicillin (Oncel *et al.*, 2004). Akindele *et al.* (2010) reported in their work that β -lactamase production by staphylococci is the recognized mechanism of resistance to β -lactam antibiotics such as ampicillin and penicillin. Penicillins and Cephalosporins are the β -lactam antibiotics which inhibit cell wall synthesis. Resistance against these antibiotics revealed that the resistance is purely plasmid based since β -lactamase production is plasmid based (Rigby, 1986). Kondo *et al.* (1991) had reported good activities of streptomycin against all tested strains of MRSA.

Staphylococcus aureus resistance to antibiotics, especially methicillin is a serious medical problem worldwide (Felten *et al.*, 2002; O'sullivan *et al.* 2003; Darini *et al.*, 2004). The high rate of methicillin resistance and that observed with other beta-lactams with our isolates notably Ampicillin and Amoxicillin corroborates earlier reports (O'sullivan and Keane, 2000; Mi-Na *et al.*, 2002; Liu and Chambers, 2003; Kesah *et al.*, 2003; Taiwo, 2004;). The pattern of resistance observed might be due to the fact that beta lactams are used in auto-therapy in this locality, which may result in a multitude of antibiotics used at sub therapeutic levels heralding the emergence of resistant strains. Although we did not investigate the production of β -lactamase by our strains, it is also likely that the enzyme maybe playing a role in the observed resistance.

The 100% susceptibility of *Staphylococcus aureus* to vancomycin from the four hospitals in this finding agreed with the findings of Terry-Alli *et al.* (2011) and Anyanwu *et al.* (2013) in Zaria. Vancomycin is a glycopeptide and is currently a drug of choice for *Staphylococcus aureus* infections, especially MRSA infections (Stevens *et al.*, 2005). The range of 91.9 to 100% susceptibility to Streptomycin is in agreement with 100% susceptibility of *Staphylococcus aureus* to streptomycin as reported by Kaleem *et al.* (2010) that 100% of the isolates of

Staphylococcus aureus were susceptible to vancomycin and streptomycin and slightly higher than 93% susceptibility pattern as reported by Seza and Fatma (2012). This is in agreement with previous studies (Kesah *et al.*, 2003; Shittu and Lin, 2006). We speculate that the effectiveness observed with the drug might be due to its high cost in our environment making it less readily available and hence less misused. However, regular monitoring of the drug's sensitivity is of importance because resistance has been reported in the USA, Japan and Korea (CDC, 2002; Classen *et al.*, 2005; Shittu and Lin, 2006).

According to the findings of this investigation, *Staphylococcus aureus* was found to have good percentage susceptibility to erythromycin between 71.4 and 89.2% and similar to report of between 80-82.5% at Ile-Ife Southwest, Nigeria by Akindele *et al.* (2010), It should also be noted that erythromycin was found to be the best antistaphylococcal drug in that study. Also this result is in consonance with the study of kesah *et al.* (2003). However, Kesah *et al.* (2003) and Brooks *et al.* (2001) recommended vacomycin for empiric therapy in life threatening staphylococcal infection.

The 13.5% resistance in Yusuf Dantsoho and 0.0% in other hospitals of *Staphylococcus aureus* to gentamicin in this finding is not similar with report of Akindele *et al.* (2010) that 39% of this pathogen was resistant to gentamicin.

Ceftazidime, Cefipime, Amikacin, and imipinem exhibit 100% effectiveness against *P. aeruginosa*. The resistance of *Pseudomonas aeruginosa* to ciprofloxacin from GHS (25.0%), 28.6% in St. Gerard and Barau Dikko Specialist hospital (37.5%) is in agreement with earlier report of Pal *et al.* (2010) where they reported 36.2% resistance of *Pseudomonas aeruginosa* to this antibiotic unlike an exceptionally high resistance to quinolones that was reported by Enabulele *et al.*, (2006) in Benin, Edo state. Apart from the findings in Benin, similar resistance pattern have also been reported in *Pseudomonas aeruginosa* isolated from other parts of Nigeria (Oguntibeju & Nwobu, 2004; Anupurba *et al.*, 2006). This goes to show that regional differences probably play a role in the resistance profiles of bacteria and further justifies the need to undertake antibiotic susceptibility studies on bacterial isolates from different parts of Nigeria on a regular basis.

Otherwise, the quinolones were found to be effective against *Pseudomonas aeruginosa* isolates tested except in few resistant cases; Norfloxacin have excellent response to the isolates and Levofloxacin were effective with few strains from Nursing home 1(12.5%) and Yusuf Dantsoho 2(15.4%) resistant to it. This is in consonance with a study done in Kano Northwest, Nigeria by Adamu *et al.* (2009) where there was generally a low level of resistance to quinolones to both *Staphylococcus aureus* and *Pseudomonas aeruginosa* isolated.

Also, the resistance to Gentamycin in both GHS (25%) and Yusuf Dantsoho(15.4%) is not unexpected since *Pseudomonas aeruginosa* is a Gram negative bacterium coupled with their well known complex cell structure that has been reported to enhance their innate resistances to antimicrobial agents. In other words, Gram negative bacteria as a group are inherently resistant to a number of important antimicrobial agents that are very effective against Gram positive organisms. One logical reason for this has been found in the differences in structural and chemical compositions of the outer layers of the cells (Russell & Gould,

1988). *Pseudomonas aeruginosa* as reported by Harris *et al.* (2010) is resistant to most antibiotics because it is found naturally in soil; it has developed many resistances to naturally occurring antibiotics produced by bacilli, actinomycetes and moulds and their resistance to most antibiotics is attributed to efflux pumps which pump out some antibiotics before the antibiotics are able to act.

The multidrug resistant *Staphylococcus aureus* 41.3% was not higher than 87.75% multidrug resistant *Staphylococcus aureus* as reported by Fagade *et al.* (2010). This finding has corroborated the report of Seza and Fatma (2012) that among the Gram-positive microorganisms, staphylococci are the most frequently resistant pathogen to antibiotics. The surfaces of the hospital environment can serve as important secondary reservoir for multi-resistant microorganisms, such as the MRSA as reported by Carvahlo *et al.* (2007); this has to be emphasized because of the apparent ability of these pathogens to survive on dry surfaces. Therefore, the spread of multidrug resistant *Staphylococcus aureus* in this research can be a great threat to everyone in these selected four hospital environments and the public.

The multidrug resistance of *Pseudomonas aeruginosa* from the selected hospital 7(21.9%) confirms the report of Hota *et al.* (2009) that outbreaks of multidrug-resistant *Pseudomonas aeruginosa* colonization or infection occurred in urology wards, a burn unit, haematology/oncology units, and adult and neonatal critical care units and that various medical devices and environmental reservoirs was implicated in the outbreak. *Pseudomonas aeruginosa* has been increasingly recognized for its ability to cause significant hospital-associated outbreaks of infection, particularly since the emergence of multidrug resistant strains. Infection caused by *P. aeruginosa* are often severe, life threatening and difficult to treat because of limited susceptibility to antimicrobial agents and high frequency of emergence of antibiotic resistance during therapy (Carmelli *et al.* (1999).

The resistance mechanisms include the acquisition of extended-spectrum B-lactamases, carbapenemases, aminoglycoside-modifying enzymes and 16S ribosomal ribonucleic acid methylases. Mutational changes causing the up-regulation of multi-drug efflux pumps, depression of ampC, modification of antimicrobial targets and changes in the outer membrane permeability barriers are also described. Moreover, the propensity of *P. aeruginosa* to exist in vivo and in the environment as slow growing organisms embedded in its extracellular matrix adds to its resistance mechanisms.

The widespread use of antimicrobials, especially over or inappropriate use of antibiotics, has contributed to an increased incidence of antimicrobial-resistant organisms. Hospital-acquired infections are often caused by antimicrobial-resistant microorganisms. Resistance to antimicrobial agents is a problem

in communities as well as health care facilities, but in hospitals, transmission of bacteria is amplified because of the highly susceptible population. Factors that could be associated with transmission of resistant strains of these microorganisms include poor attention to hygiene, overcrowding, lack of an effective infection control program, and shortage of trained infection control providers.

IV. CONCLUSION

The result of this study showed that inanimate surfaces near infected patients and those frequently touched surfaces within the hospital environment are contaminated by *Staphylococcus aureus* and *Pseudomonas aeruginosa* following the isolation and confirmation with polymerase Chain Reaction. This suggests that contaminated environmental surfaces are reservoirs of these pathogens. Some of the isolates of pathogen were multidrug resistant and are common but Vancomycin and Cephalosporin may present a unique opportunity in the management of infections caused by these pathogens. Regular surveillance of hospital and community associated *S. aureus* and *Pseudomonas aeruginosa* and their susceptibility to antibiotics is necessary to prevent an outbreak and spread of resistant strains in the locality.

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Table 4.5: Prevalence of *S. aureus* isolated from various surface in the selected hospitals

Surface	No. of sample screened	Total Number of Organism Isolated	GHS n(%)	St Gerard n(%)	Nursing home n(%)	Yusuf Dantsoho n(%)	χ^2	P value
Sinks	32	14(43.8)	2(6.3)	4(12.5)	3(9.4)	5(15.6)	2.540	0.468
Floor	32	29(90.6)	7(21.9)	6(18.8)	8(25.0)	8 (25.0)	4.046	0.257
Door Knobs	32							

Evaluation of Nurses' Performance of Family Health Nursing Practices at the Primary Health Care Centers in Al-Muthana Health Directorate

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Abstract- Objective(s): To evaluate nurses' performance of family health nursing practices at the primary health care centers in Al-Muthana Health Directorate and to determine the relationships between these nurses' performance and their demographic characteristics of age, gender, years of employment and training.

Methodology: A descriptive design using the evaluation approach is carried throughout the present study from the period of March 25th 2015 through June 30th 2016. A purposive sample, of (26) Diploma nurses, is selected through the use of non-probability sampling approach. The sample of study includes nursing staffs who are working at primary health care centers in Al-Muthana Health Directorate in Al-Muthana Governorate. Through an intensive review of relevant literature, an observational tool is constructed as a mean of data collection. Content validity of the study observational tool is determined through the use of panel of (11) expert. Inter-observer reliability is computed for the determination of the equivalence of the study observational tool. Data are collected through the application of the study instrument and the structured observation technique as means of data collection. Data are analyzed through the application of descriptive statistical data analysis approach (i.e., frequency, percent, total scores and cumulative percent) and inferential statistical data analysis approach (i.e., Pearson correlation coefficient and multiple regressions).

Results: The study results depict that the majority of nurses' responses to the studied items are inadequate which is accounted for (92.3%) of the whole responses. Staff nurses' years of employment is found to have highly significant impact upon their performance at p-value less than 0.01. In addition, the study results indicate that staff nurses' age has significant impact upon their performance of family health nursing at p-value less than 0.05, while the remaining characteristics of staff nurses' gender and training have no impact upon their performance at p-value more than 0.05.

Recommendations: The study recommends that Family Health Nursing Program Based Education Program should be designed and implemented to staff nurses in order to improve their performance of practices in the area of family health services. Further studies can be conducted on these nurses to determine the effectiveness of the Family Health Nursing Education Program on their performance of such practices.

I. INTRODUCTION

The Family Health Nurse (FHN) concept is introduced by the World Health Organization Europe as a possible means of developing and strengthening family and community oriented health services (1). Within the Health-21 health policy framework it was proposed that this new type of nurse would make "a key contribution within a multidisciplinary team of health care professionals to the attainment of the 21 health targets set in the policy." The full definition of the new role states that "The Family Health Nurse will: help individuals and families to cope with illness and chronic disability, or during times of stress, by spending a large part of their time working in patients' homes and with their families. Such nurses give advice on lifestyle and behavioral risk factors, as well as assisting families with matters concerning health. Through prompt detection they can ensure that the health problems of families are treated at an early stage. With their knowledge of public health and social issues and other social agencies, they can identify the effects of socio-economic factors on a family's health and refer them to the appropriate agency. They can facilitate the early discharge of people from hospital by providing nursing care at home, and they can act as the lynchpin between the family and the family health physician, substituting for the physician when the identified needs are more relevant to nursing expertise" (1).

Family health nurse can assist family members in identifying actual or potential areas of health risk, establishing health goals based on the family's needs and interests, and developing an effective lifelong plan for health protection. The family health nurse plays a vital role in developing and fostering health protective behaviors within the family. A family-centered approach is particularly important for health protection because many of the diseases or health conditions to be prevented have a genetic basis or are related to lifestyle. It is vital that the entire family address its potential risks and work together to implement protective behaviors (2).

According to (3) the aim of family nursing is "to provide holistic care for individuals and family units". This implies a practice orientated approach where the family is seen as the unit of care (4).(5) define family nursing practice more comprehensively, referring to it as a perspective focusing on family strengths that is health orientated, holistic, systemic and interactional. The primary goal of family nursing is viewed by some as the promotion of the health of the family as a whole and of each of its members (6) (7). Much of family nursing is

associated with theoretical developments in the US and Canada (8). (9) Refer to these developments as the nursing of families, the implication being that ‘family nursing’ became the adopted descriptive, interchangeable label in North America. Recent years have seen international advances in practice and research in this field of nursing (7).

Based on the early stated facts, the present study ought to evaluate nurses' performance of family health nursing practices and determine the relationships between such performance and their demographic characteristics of age, gender, years of employment and training.

II. METHODOLOGY

Descriptive design using the evaluation approach is carried throughout the present study from the period of March 25th 2015 through June 30th 2016.

A purposive sample, of (26) Diploma nurses, is selected throughout the use of non-probability sampling approach. The sample of study includes nursing staffs who are working at primary health care centers in Al Muthanna Health Directorate in Al Muthanna Governorate.

An observational tool is designed through the use of (3) levels type Likert Scale for the evaluation of nurses' performance relative to family health nursing at the primary health care centers. The rating and scoring system of the scale is consisted of (3) for adequate performance, (2) for acceptable performance, and (1) for inadequate performance. Adequate performance is considered when (3) correct episodes of performance are observed; acceptable performance is considered when only (2) episode of performance is done; and inadequate performance is considered when there is (1) episode of performance is observed. Total scores for nurses' performance of (131- 217.3) is considered inadequate; (217.4-304.6) is considered fair; (304.7-393) is considered adequate.

The observational tool is comprised of (16) statements that deal the major domains of the family health nursing education program. The first statement is measured through (20) items which is dealing with **Family Nursing Roles**, the second statement is measured through (4) items which is dealing with **Family Structure**, the third statement is measured through (6)

items which is dealing with **Family Function**, the fourth statement is measured through (3) items which is dealing with **Family Development**, the fifth statement is measured through (3) items which is dealing with **Family Coping**, the sixth statement is measured through (3) items which is dealing with **Family Assessment**, the seventh statement is measured through (4) items which is dealing with **Assessing Family Dimensions of Health**, the eighth statement is measured through (5) items which is dealing with **Family planning**, the ninth statement is measured through (8) items which is dealing with **Family Interventions**, the tenth statement is measured through (4) items which is dealing with **Family Evaluation**, the eleventh statement is measured through (10) items which is dealing with **Family as A Caregiver**, the twelfth statement is measured through (4) items **Family at risk or with health problem** which is dealing with **Family as A Caregiver**, the thirteenth statement is measured through (6) items which is dealing with **family health promotion**, the fourteenth statement is measured through (3) items which is dealing with **Impact of culture and society upon family health**, the fifteenth statement is measured through (7) items which is dealing with **Social influences on health and well-being**, and the sixteenth statement is measured through (7) items which is dealing with **Ethical issues related to care of family**. It comprised of (131) items which are concerned with the domains of the performance of family health nursing at the primary health care centers.

Content validity of the study observational tool is determined through the use of panel of (11) expert. Inter-observer reliability is computed for the determination of the equivalence of the study observational tool. Pearson correlation coefficient is computed for such reliability and ($r=0.78$) which is considered satisfactory.

Data are collected through the application of the study instrument and the structured observation technique as means of data collection. Data are analyzed through the application of descriptive statistical data analysis approach (i.e., frequency, percent, total score and cumulative percent) and inferential statistical data analysis approach (Pearson correlation coefficient and multiple regressions).

III. RESULTS

Table (1) Overall Evaluation of Nurses' Performance of Family Health Nursing Practices

Overall Evaluation of Nurses' Performance	Frequency	Percent	Cumulative Percent
Fair 217.4-304.6	2	7.7	7.7

Inadequate 131-217.3	24	92.3	100
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This table shows that the majority of nurses' responses to the studied items are inadequate which is accounted for (92.3%) of the whole responses.

Table (2) Multiple Regression for the Relationship between Nurses' Performance and Their Demographic Characteristics

Demographic Characteristics	R²	Sig.
Age/ Years	0.446	0.022 S
Gender	0.289	0.153 NS
Years of Employment	0.533	0.005 HS
Training Session	0.315	0.117 NS

Df= Degree of freedom, F=F-statistics, R²=Regression coefficient, Sig.= level of significance, S=Significant, NS=Not significant, HS=Highly Significant.

This table presents that staff nurses' years of employment is found to have highly significant impact upon their performance at p-value less than 0.01. In addition, the study results indicate that staff nurses' age has significant impact upon their performance of family health nursing at p-value less than 0.05, while the remaining characteristics of staff nurses' gender and training have no impact upon their performance at p-value more than 0.05.

IV. DISCUSSION

Part I: Discussion of Overall Evaluation of Staff Nurses' Performance of Family Health Nursing

Evaluation of such performance has indicted that nurses' performance for the majority of the group is inadequate (92.3%) (Table 1). This finding has emerged due to the fact that nurses' performance presents deficiencies relative to most items in the observational scale. So, these nurses require any sort of family health nursing based education program. Such program may create improvement to their performance of such practices.

The key elements of the role of the family health nurse should be outlined in the policy document, which stresses that they need to be educated and trained in such a way as to ensure that they acquire the necessary underpinning knowledge and skills (10).

Part II: Discussion of the Relationships between Staff Nurses' Performance of Family Health Nursing and Their Demographic Characteristics

Analysis of the relationships between nurses' performance of family health nursing practices and their demographic characteristics through has revealed that staff nurses' age has significantly affect their performance and years of employment has highly influenced their performance (Table 2). These findings support the fact that staff nurses with different age groups and different years of employment may definitely perform practices of family health nursing. So, we can confirm that the younger the age of the staff nurses the better their performance and the lower the years of employment the more adequate their performance is being.

Age as predictor of nurses' performance has been explored in a descriptive study. Data which are gathered from (222) nurses undertaking 'the pre-registration diploma in nursing' program at a university in the North West of England are analyzed. The study finds that nurses' age is significantly predicted performance. The young nurses (aged < 20 years) are identified in the study as being at risk in terms of their performance whilst the oldest nurses (aged > 34 years) are found to predict better overall performance (11).

The impact of nurses' employment status upon their work-related performance is examined in a descriptive study which is designed to investigate the employment status of contract versus

full-time nurses at a public hospital. Samples are recruited from a public hospital in Taiwan. The investigation is carried throughout the use of a regression model that includes the variables underlying the study. The findings indicate that performance levels for full-time nurses are significantly higher than those of contract nurses (12).

V. RECOMMENDATIONS

1. Family Health Nursing Program Based Education Program should be designed and implemented to staff nurses in order to improve their performance of practices in the area of family health services.

2. Nurses, who are performing family health nursing in the primary health care centers, should be presented with greater opportunities of being involved in courses of continuing education and training to increase their capacity of learning up-to-date knowledge and acquiring new skills.

3. Further studies can be conducted on these nurses to determine the effectiveness of the Family Health Nursing Education Program on their performance of such practices.

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Mobile Intelligent Shopping Guide

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Abstract- “Mobile Intelligent Shopping Guide (ISG)” system is a mobile browser based application that will give difference experience to the customers as well as the supermarket managers. This document provides a complete description of all the functionality and specifications that is in ISG as a project for Comprehensive Design and Analysis of Projects course by project group (P2011-129). This document provides an in depth overview into the extensive research carried out and the collective effort put by the team to develop the system. ISG system will be give difference experience to the customers as well as the supermarket managers. The system would provide facility to upload the customer daily shopping list and provide the price lists, notifications and the sales details to the mobile. In managers side give different kind of trend reports to improve their business. Mobile based Intelligent Shopping Guide will make shopping more convenient by cutting down time. Furthermore it will slash away the unwanted wasteful spending which takes place while shopping. It will also make it easier to for the super market to keep track of its regular customer base. Finally for marketing firms, they can use the ISG to identify customer trends/patterns which would help in promoting new products, sales and the promotions. At present there are systems which assist shoppers and high-end retail supermarket chains but the difference with ISG as opposed to the systems mentioned earlier is that the support for the two user types are integrated into one system. Another key feature of the ISG is the intelligence it holds which the other systems don't provide. But the most important feature of ISG is the portability of the system as it will be available to the user in every mobile browser. The document describes the background of the research project as well as providing a comprehensive analysis on its implementation various issues encountered, solutions provided as well as possible future extensions.

Index Terms- Face Detection, Feature extraction, Image Processing, Segmentation, Mask, Thresholding

I. INTRODUCTION

The next phase in wireless technology revolution, smart phones with killer applications, is certainly going to change our way of life. Ranging from online banking to home automation applications is useful and powerful. These are convenient, attractive and cost-effective as well. Mobile based Intelligent Shopping Guide (ISG) is focus on to find a solution to current complex and time wasting shopping behavior of the people. And also supermarket owners can gain the maximum use of sales data. We developed this system for the customers and the supermarket managers. The system will help to reduce their work load and makes easy day today life.

This system is a mobile browser based application that will give difference experience to the customers as well as the supermarket managers. The system would provide facility to upload the customer daily shopping list and provide the price lists, notifications and the sales details to the mobile. In managers side give different kind of trend reports to improve their business. When a customer wants to buy their shopping list without wasting time he or she can know price list and details from anywhere. First he can log to the system and upload the shopping list. Then supermarket will response its price and where they located at the supermarket. Mainly ISG is supports to the customer to plan his or her shopping from any ware. So it means the customer can do shopping very easily from any supermarket branch without having any previous experience in that branch.

In managers side he can get a better idea of the business, and recover the weak areas of his business using Intelligence reports. The Business Intelligence Report is a nationally distributed, quick-read resource that provides business professionals with the latest strategies, trends, tips and news for today's business. These reports will give,

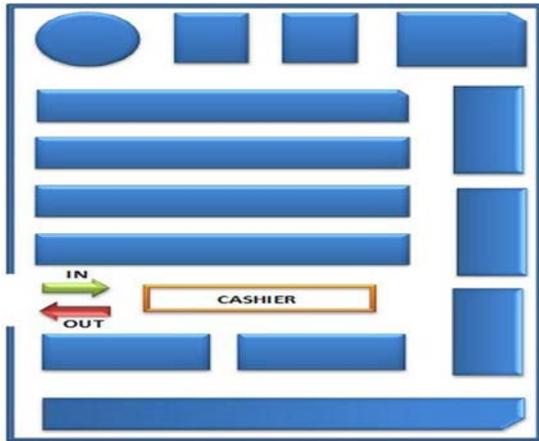
- Help to managers run their businesses more effectively.
- Gained the maximum use from existing data for the future.
- Cutting edge trends and legislation information to keep them aware of the changing business climate.
- Help marketing persons with their promotions and new product launches.

First part of this document describes about related researches, uniqueness of the ISG team research and its problems. In body part document will describes the methodology of the project, research findings and the overall product.

In the beginning of the research ISG team focused on data cube and the mining structures for reporting generating.

But executing a mining structure to such a huge data collection would not be a good solution. So the team came up a new solution called “Temporary Tables”. This kind of tables selects the exact data for the relevant report on a relevant time. ISG is not handling the billing part of the supermarket checkout flow. But in the internal report portal is using the supermarket existing data base. So team need to have customized the mining structures according to that data base. Main research problem that related to reporting was developing the “Sales forecasting” report. Because in today world there is hundreds of forecasting technics related to sales. So the team faced difficulties on choosing a correct equitation that suite to the application and the supermarket domain.

Another critical question in terms of the project was determining the process that goes in a customer's mind before purchasing a product and factors which makes a customer choose a certain brand from another one of the same product. This is



important as the system is more focused in predicting what the customer would do also these factors will be taken into consideration when

Figure 1.2: Supermarket map in mobile browser.

writing the business logic for the system, therefore gaining valuable insight to customer's thought process. Mainly ISG supports the customer to plan his or her shopping from any where. So it means the customer can do shopping very easily from any supermarket branch without having any experience in that branch.

Our main goal is to design and develop a mobile solution that will guide the customer to plan grocery items and speed up the system the current systems. Mainly the Mobile based Intelligent Shopping Guide (ISG) will have the following characteristics compared to other existing supermarket system.

- We use two techniques as data mining techniques. First one is the temporary table technique. This is very useful one to speed up the system because there are no any physical tables. Tables are created in run time and give the output within short period of time. Finally tables are destroyed after execution. Data are extracted from the physical table to prepare the temporary tables.
- Another technique we use as data mining technique is MDX queries. At present people are familiar with supermarkets therefore transaction of the supermarket will be exceeded. For this kind of data store, most fruitful data store technique is data warehousing. MDX queries are the technique used to extract data from a data warehouse.
- This system guides the customer to plan their shopping list. Once customer login to the system user navigates to the "My Profile" page and here user is supported to prepare the shopping list and customer can view their previous shopping lists. Once the customer prepared the shopping list customer can submit the list then

customer is received the minimum price list associated to the submitted primary price list. At this moment customer is able to finalize the shopping list examining minimum price list, previous price lists and submitted price list. Once customer finalized the shopping list and he can submit the finalized shopping list. As the response to the submitted finalized list system will be sent map of the supermarket which containing details of the submitted finalized shopping list.

- ISG provides set of reports that will be useful for supermarket owners managers to take their organizational decisions and be aware of business. These reports are RDLC reports this is high level technique.
- We send notifications to the customer informing the customer about special offers and discounts.

II. RESEARCH ELABORATION

There is a lot of research gone through this research area. But lots of them are failed due to various reasons. But ISG system will be a unique one than those projects. In the wide spread of the internet, online shopping became one of famous shopping type. But still there are lots of problems that the customers faced. Mostly online shopping facility is provided to high level products for rich people.

According to our research we found different projects done in all over the world. In 2005 Fujitsu introduced a revolutionary shopping concept with the advent of their U-Scan Shopper. The U-Scan Shopper which was developed by Fujitsu was wireless, trolley-mounted computer that gives shoppers information and scan-as-you-shop convenience as they move through a store. This alerts shoppers to specials and reminds them what they bought on their last visit.

With built-in scanners, digital store directories and wireless communication has been around a while, but hasn't really caught on in a big way. For one thing, the carts tend to be pretty expensive. For another, there hasn't exactly been a huge demand for this from consumers. It cost nearly \$1,200 per-cart. IBM came up with "Wireless web page" that allowed users to upload their shopping lists from home and view them at the store using the device-mounted shopping cart. The cart would assist consumers in locating the items by the means of a map displayed upon the specialized display unit.

Notably these systems despite their high costs were in fact rendering the simple but useful service of displaying product related information and location of products. Assistance for the shoppers, in the form of suggestions, and decision-making support was not found on the above mentioned systems. The more feasible solution for the above mentioned smart shopping cart problem was to develop a system that bypassed the biggest obstacle in the existing systems eliminate the use of special hardware. In other words the display and barcode readers had to be replaced with cheaper alternatives. The most feasible option was to develop a system that would run on a device that belonged to the customer so this will not effect to the business and the supermarket owners. In this research project we focus on

mobile phones. It is the uniqueness of the “Mobile based Intelligent Shopping Guide” system. At present there may be a large number of mobile phones that support web browsing. So implementing a mobile-based system seems to be a cost effective and feasible solution.

Our team found another related research was done by “Computer and Information Science and Engineering Department” of University of Florida, USA. This application is bit similar to our research as well. It calls as “iGrocer”, a mobile application that runs on a Smartphone equipped with a bar-code reader. Customers can use the bar code reader to scan item barcodes and allows the customer to view the product information. Importantly it has a list of useful features such as nutrition profiling, personalized product categories etc. “iGrocer” architecture is a classic example of the client-proxy server architecture with the proxy server handling all the intermediate communication. Users can create a profile on “iGrocer” from either the phone client or the through the iGrocer website. The new user information is then sent to the proxy, which then stores the information in the database. Also stored in the customer database are nutrition profile, wish list, recipes, expense history and the shopping list. So this is the point “iGrocer” gave new idea to use data mining and warehousing techniques to our project. This will be the main research part of ISG system. Another such project was the Mobile Shopping Assistant this too is a mobile application that uses XML for data transfer between the mobile device and the server, whilst displaying promotions, product descriptions, and providing product search and location. These applications however lack a sound framework to assist customers in the more intricate process of selecting which product to buy according to their own standard. Furthermore there is a certain amount of binding as the systems can be implemented on a certain section of mobile devices only. Decision making support for customers was available in another form though in e-commerce; suggestions for customers having purchased a particular product were generated very much in the same way as an employee of a food outlet recommends another item to a customer based on the purchase. Macy’s is one of a huge company which use the concept “users who bought x also bought “y” to suggest items to their customers, by using techniques such as item to item correlation and person to person correlation. However collaborative filtering can be seen as a feature that could be extremely useful when applied to the brick-and-mortar shopping domain. This creates recommendations by computing similarities in personal preferences. A large group of people’s preferences are registered and using a similarity metric, a subgroup of people is selected whose preferences are similar to the preferences of the person who seeks advice. In the simplest of terms it emulates the scenario when a shop owner, knowing what type of customers she/he has promotes products that people with a similar background. This can be seen as an automated version of “word-of-mouth” promotion of products. Other than implementing a device mounted shopping cart is economically not feasible, so mobile based solutions are cost effective ones.

III. METHODOLOGY

Mobile based Intelligent Shopping Guide (ISG) is a system mainly has two components. But these two parts will not handle

the checkout and the billing parts. Main thing is that the internal report portal is using existing supermarket data base for report generating. Customer mobile web applications also refer the same data base and the tables which is having customer registration details, products and promotion etc...

ISG team research is focus on enhancing the performance of reporting portal. Teams used data mining techniques and introduce new methodology for data mining. ISG is a shopping planning mobile browser based web application which is a new concept to the world. Before going to the supermarket customer can know the cost of his or her shopping list and the least cost that he can buy all the items in the shopping list.

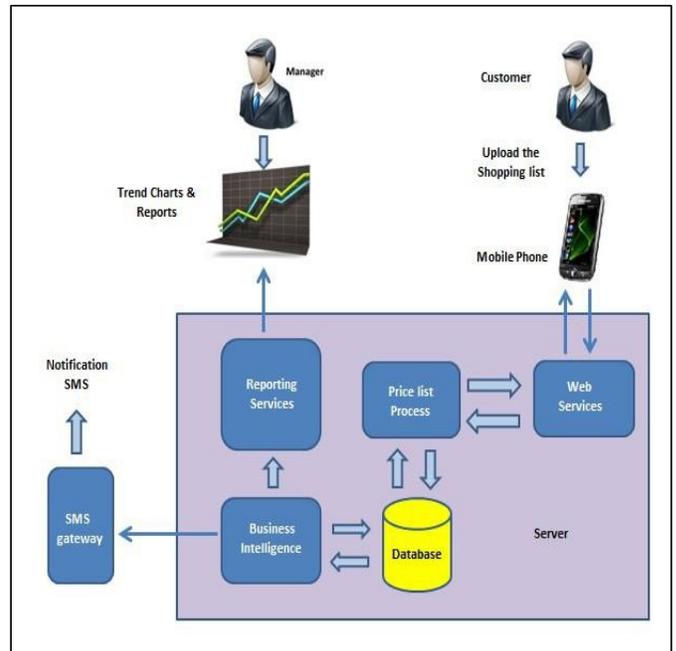


Figure 3.1: Overall Systems

Another facility that the ISG provide to the customer is supermarket map. It will help them to shop any branch of the all over the country. Actually this kind of feature is very useful for supermarkets which have huge scale. (E.g.: Macy’s, Walmart (USA) and TESCO (UK))

3.2.1 Customer Application

- Customer registration

When new customers want to use this application that person want to register in the application using mobile browser. This registration will include personal details (such as First name, Last Name, Address, age, email address, Mobile number, Gender, Number of family members, Mutual status) His or her mobile number will be the user name.

- Login to the system on entrance

Customer can log in to the system by giving their username and the password through the mobile phone. Then these details are sent to the server for validation and if they are valid, the customer can start shopping with the help of ISG.

- Uploading shopping list

The customer can upload his/her shopping list using mobile phone. After filling all the names and the quantity of the shopping list customer can upload it to the supermarket server. This shopping list must be in correct format and the correct spellings. It is a must to mention quantity if not ISG will provide a relevant error messages.

- Your price list and lowest price list

After uploading the shopping list the supermarket server will provide two types of item lists. First one is "Your price list" and the other one is "Lowest price list". In your price list section customer can know the exact cost for his/her shopping list. And also this will include all the prices item by item, total and the availability of those items. The second list is a kind of a suggest list for the customer and it will helps to manage their budget. As an example if a product is too expensive in his price list he can change his choice and buy the cheap product from the lowest price list. So is would be a grate support to customers to buy all the items from money in hand.

If that particular customer does not want to change his/her list simply can check out the list. If he wants to buy the lowest price list then also customer can simply check out it. If customer wants to buy items in both lists he/she has to create the final list.

- Final shopping list

This is the final list that the customer creates with the help of above mentioned two lists. Customer can add items form both lists to the final list. Application will provide "Add" and "Remove" features to do this. So customer can manage the budget with the help of this feature. At last this will be the final shopping list the customer going to check out.

- Daily offers

Customers can view any special offers and sales for items that they usually buy using the mobile application. This can be access by date drop down. So the customer can get the details of the offer on that day. This will be helpful to the customers as well as the supermarket managers. Customer never misses offers, special discounts, promotions that are in the supermarket. And supermarket staff does not need to put additional effort for advertising about the offer.

3.2.3 Internal Report portal

- Report generation

Mobile based Intelligent Shopping Guide (ISG) is produced number of valuable reports to manager and owners of the business. These are very helpful to take administration decisions and administration can design business future goals. We use SSIS, data mining, cube and profiling technologies. To create data cube following are the main steps,

- Create Data Source
- Create Data Source View
- Create Cube Dimensions
- Create OLAP Cube

After creating the cube the reports are generated based on it. Basically four reports are providing by the ISG system. Those are,

- Product Interest by age
- Revenue report
- Sales forecasting report

But with the use of data cube it is possible to provide existing data to make new knowledge. Above mentioned reports are can view in any time periods. As an example Revenue report can view for a month, quarter or a year. The time period can be customized according to the user interest. And also these reports can be exported to excel format to farther analysis. This exported data sheets containing data table and the data plotted chart.

The next method of the report generation is using temporary tables. Because executing mining structure for a huge data collection is not a good solution. So ISG team decided to create temporary tables according to the relevant report. Then the mining structure is focus on that table and generates reports more efficiently.

- Product Interest by age report

In customer registration part system will profile them according to various measures. One of them is age. "Product Interest by age" report will give the information to the managers who are the interested people to every product specifically. As an example "X" brand beer is popular in men below 23. So this kind of knowledge is very useful to managers to hold sales, launch new product and sponsor to a correct activity.

- Revenue report

The income of the each product is providing against the time period. Time is a dimension that can be selected for OLAP date cube. Selectable time periods are Year, Half Year, Quarter, Month, Ten Days, Week and Date. So manage can change the time period according to their preference. This report is help to know the sales in different time period of the year. This knowledge is very useful to expand the business limits.

- Sales Forecasting report

This report is generated using aggregated average sales in each product. This information is plotted against the time. The time period is very large one. To get maximum use of this report it is a must having huge time period. Using this report manager can predict the future sales. Managers can plan their buying patterns according to the time. In that time period focus on those products.

3.2.4 Main Server

ISG system usesthe supermarket main server as its main server. Mobile browser based client application and the internal report portal is host on this server. ISG is also can host in a single server if it accesses the chain of branches in a same supermarket. Client will register on the server remotely using ISG mobile web application. Those registration data will use for customer profiling and the SMS notification functionality. If a customer buy the uploaded item list from the supermarket those are saved in the data base under his or her profile. So analyzing this kind of checkouts in long period of time ISG can select the exact potential customers for the SMS notification list.SMS's are generated for daily offers, special offers, Promotions, new

product launches and etc. But these short messages are not going to send for every customer, those are send to the relevant customers whose names are selected from above analysis.

So the main server is containing main database, internal report portal, customer web application and the SMS gateway. A large amount of customer and product related information as well as purchase history is stored on the database of the main Server. Microsoft SQL Server 2008 is used for database management.

3.2.5 Data Mining Module

At the beginning of the project it was decided that only Data cube should be used as the only method of making reports and selecting customers. But executing mining structure on huge data collection spends lot of time. To overcome this problem team decided to do mining using temporary tables. However digging deeper to create a data cube to get the different view-points from data, dimension and measure tables were needed to be created. Even though these tables can be created through SQL Server Integration Services best method was to create data cube according to a cube schema such as star. Data cube can be made using the existing tables which were available in the database.

In our system, we use two techniques to mine data and speed up the system. One of them is temporary table technique. Temporary Tables are short-lived tables, only exists for the duration of a database session. When a database session terminates, its temporary tables are automatically destroyed. Temporary tables are only visible to the session that creates them. They remain invisible to other users. In fact several users can create Temporary tables under the exact the same name, but each user will only see his or her version of the table. Temporary tables are used widely in a situation where queries become more complex because when queries become more complex the system performance will be go down.

One of the major advantages of temporary tables is the decrease the amount of locking and logging. It is because the current user is the only user that interacting with the table. Table gets cleared up automatically when current procedure goes out of scope, but you should manually clean-up the data when you are done with it. Temporary

Tables are ideal for holding intermediate data used by the current SQL session and it also creates a temporary index on temporary table.

Another technique we use is data CUBE concept. This is multi-dimensional structure called the data cube. It is a data abstraction that allows one to view aggregated data from a number of perspectives. Conceptually the cube consists of a core or base cube id surrounded by a collection of sub-cubes that represent the aggregation of the base cube id along one or more dimensions. We refer to the dimension to be aggregated as the measure attribute while the remaining dimensions are known as the feature attributes. Thus far in the report generation and notification sections, we have written informally about a multi-dimensional structure called the data cube. In short we have described it as a data abstraction that allows one to view aggregated data from a number of perspectives. Conceptually, the cube consists of a core or base cube id, surrounded by a collection of sub-cubes that represent the aggregation of the base cube id along one or more dimensions. We refer to the dimension to be aggregated as the measure attribute, while the remaining

The following figure depicts a small, practical data cube example from our Mobile based Intelligent Shopping Guide (ISG). This particular data cube has three feature attributes Price, Quantity and Date and a single measure attribute sales. (Sales are computed with the sum function). By selecting cells, planes, or sub cubes from the base cube id, we can analyze sales figures at varying granularities. Such queries form the basis of OLAP functions like roll-up and drill-down. In total, a d-dimensional base cube is associated with 2d cuboids. Each cube id represents a unique view of the data at a given level of granularity. Not all these cuboids need actually be present, however, since any cube id can be computed by aggregating across one or more dimensions in the base cube id. Nevertheless, for anything but the smallest data warehouses, some or all of these cuboids may be computed so that users may have rapid query responses at run time.

One final note is in order at this point. We have described the data cube as a conceptual model. This is certainly true. However, in the case of a MOLAP server, it is also the physical model, as MOLAP stores the cube structure directly as a multi-dimensional array. Conversely, ROLAP servers must map this representation to a relational design. Customer profiling categorized customer by using any important field (e.g. customer shopping list, age of the customer, etc.). These details are very valuable when sending notifications to the customer and generating reports to the administration.

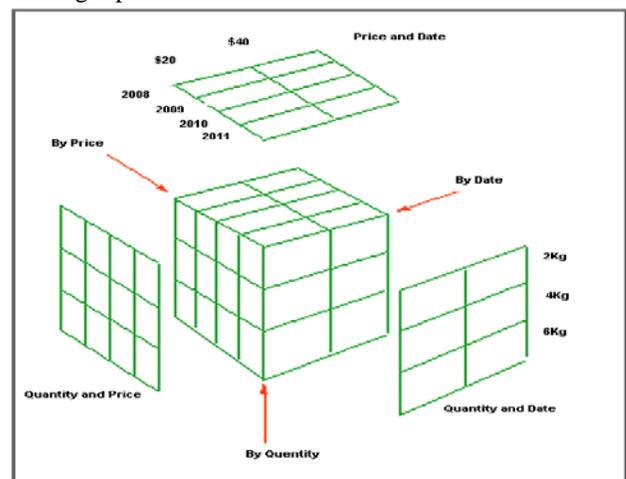


Figure 3: Data cube concept

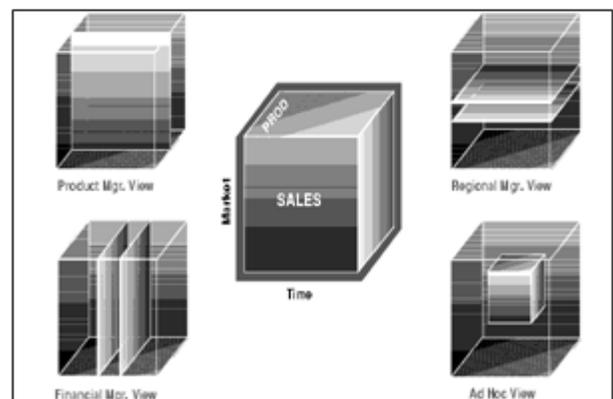


Figure 4: Logical Cubes and Views by Different Users

3.3 Research findings

Conducted research was make huge impact on implementing this kind of a shopping technique. To address a real world problem from our research is not an easy task. . The facts gathered were very interesting and useful for future developments in this area. Our research focused on introducing such kind of a mobile based shopping planning and guidance method and report portal to supermarket management. Remarkable amount of literature survey was done using techniques like research papers, relevant books, web resources, expert human resources. Students and lectures are also set as important shareholders of the research as their information was vital.

According to our customer profiling part we found that lot of facts are affected to their buying patterns. After carrying out some research on marketing and advertising we came to the conclusion that factors that predominant than others in deciding customer buying patterns are budget, age, gender and marital status. Most of the rules in the business intelligence module are based on these factors. But in ISG report portal team only focus on age of the customers. Analyzing huge data collection of past checkout of the customers ISG Reporting and SMS portal select the details of the interested customers. Actually that data will help to the marketing managers to launch a new product or a promotion. To gain this kind of knowledge it is a must to analyze the existing data. Data cube and warehousing is the methods that the people use for this kind of an analysis. The real advantage of data warehousing is when the database has records in the range of 10000 records in its tables which are un-related yet with warehousing it would be possible to derive relations between the fields of the tables which are known as dimensions in a cube.

Product	Province		Total
	Central	Western	
Milk	9,597	124,224	133,821
Biscuits	61,202	638,201	699,403
Total	70,799	762,425	833,224

Table 1: Simple Report for province product sales

At the planning stages of the system it was decided that only Data Mining should be used as the only method of making reports and selecting customers. However digging deeper to create a data cube to get the different view- points from data, dimension and measure tables were needed to be created. Even though these tables can be created through SQL Server Integration Services best method was to create data cube according to a cube schema such as star. Data cube can be made using the existing tables which were available in the database.

You can retrieve slices of data from the cube. These correspond to cross-tabular reports such as the one shown in Table. Regional managers might study the data by comparing slices of the cube applicable to different markets. In contrast, product managers might compare slices that apply to different products. An ad hoc user might work with a wide variety of constraints, working in a subset cube.

Answering multidimensional questions often involves accessing and querying huge quantities of data, sometimes in millions of rows with in small time period. Because the flood of detailed data generated by large organizations cannot be interpreted at the lowest level, aggregated views of the information are essential. Aggregations, such as sums and counts, across many dimensions are vital to multidimensional analyses. Therefore, analytical tasks require convenient and efficient data aggregation.

- **Optimized Performance**

Not only multidimensional issues, but all types of processing can benefit from enhanced aggregation facilities. Transaction processing, financial and manufacturing systems and all of these generate large numbers of production reports needing substantial system resources. Improved efficiency when creating these reports will reduce system load. In fact, any computer process that aggregates data from details to higher levels will benefit from optimized aggregation performance.

- These extensions provide aggregation features and bring many benefits.
- Simplified programming requiring less SQL code for many tasks.
- Quicker and more efficient query processing.
- Reduced client processing loads and network traffic because aggregation work is shifted to servers.

Nevertheless there are some opportunities for caching aggregations because similar queries can leverage existing work.

IV. RESULTS AND DISCUSSION

4.1 Evidence

The progressions of the achievement of the objectives of this project are going to prove by analyzing the quantitative and qualitative measurements. Quantitative measurements are objective measurements to understand about unknown criteria. Qualitative measurements are the subjective measurements that depend on the person. The quality and the accuracy of the system are concerned in order to ensure the performance. To achieve this objective we conduct the testing process. The software testing phase was carried out in order to ensure that the system conforms to its specification and meets the needs of the user there for software testing was done to validate and verify the software system. This testing process focuses on both logical internals of the software, ensuring that all statements have been tested and on the functional externals, to uncover errors and ensure that defined input test data will produce expected results.

4.1.1 Peer evaluation

To proof that our project meet specification, should do some testing parts. For that we followed set of testing methods like unit testing, integration testing and system testing.

4.1.2 User evaluation

Our Team hopes to deploy this product on a supermarket existing server and give the opportunity to customers and the

managers to use ISG application. In this case, we tried to improve the simplicity and user friendliness of the system.

4.1.3 System Evaluation

ISG is a web application that interacts with customers (Via mobile phone) and supermarket managers. Therefore the system availability, accuracy, efficiency, reliability is very important. For that at any time and any location, multiple users can access the ISG system to plan and get the guidance for shopping. Managers should able to view reports according to various time periods and export them to local PC s. This section will describe the testing performed to measure the accuracy of the implementation. The testing was completed according to the main modules in the application. Only several test cases were included here that shows the main functionalities working as expected.

V. CONCLUSION

Mobile based Intelligent Shopping Guide (ISG) system is a mobile browser based application that will give difference experience to the customers as well as the supermarket managers. In customers' perspective ISG is shopping planning and guidance application. But in managers' point of view the internal report portal is business managing and decision making application. When the team was about to start the project the members went through many existing researches done ondeveloping ISG and Smart Shopping Carts, where most of them were unsuccessful due to various issues pointed out below,

- Need high technical knowledge.
- Systems will not be able to change according to the technological changes.
- Most systems are tightly bound to the user front end.
- Overall costs of the systems were high due to hardware recourses used etc.

Therefore it is hard to reuse such systems when new technologies are available or when technology becomes cheaper in future. The Mobile based Intelligent Shopping Guide has been developed to grip the control tactic by accessing the consumer preferences and buying patterns in cooperating corresponding functionalities. The entire system is using a one data base which is located at the supermarket, so mining, profiling and report generating are depending on this.

Furthermore security of the customer information is ensured since the central database will contains confidential information on the customers. As far as our concern is to accommodate any front end application on a specific mobile device if the technology becomes cheaper since we have used XML and web services to communicate between server and client web. However the implementation of this kind of an application is an additional functionality to the existing checkout system. So ISG can attach to the existing checkout system and can refer the same data base for its use. So it makes the supermarket owners life easier.

With the proper application of software engineering methodologies we were able to develop an efficient system in the given time duration. The team members acquired various skills in constructing the artifacts that made up the final system. The

success of any system lies in the completion of tasks assigned to each individual. Thus we were privileged to work in a team where each individual took up the burden assigned to them and completed each task in a satisfactory manner. Furthermore we were able to obtain a thorough understanding of various new technologies through the background researches conducted. All these activities taken together facilitated in the development of a successful system.

5.1 Anticipated Benefit

- Customers allow knowing the price list and ordering remotely using their own mobile phone.
- Shopping list plotted supermarket map help to save the time and encourage the customer to shop in any branch if he had an experience there or not.
- SMS notifications inform customer about special offers, new products.
- Help to customer to manage their budget and give high customer satisfaction in minimum cost.
- Help management and Owner to easily take decisions by referring reports generated by the system.
- Research on the common issues faced by mobile phone users regarding the portability of browser.
- Giving the programmers the choice of developing in their preferred programming language, other than being concerned of how to make the application available for multi platforms.
- These systems help customers to save their time. Make the daily shopping activities an enjoyable task by minimizing the time spent on making shopping lists and comparing items. The system assists to make most suitable and cheapest shopping lists.
- Aid customers to purchase the most suitable goods and minimize unnecessary purchases, while reminding to purchase essential products.
- Alerts will remind customers to find out discounts and special offers. Assist the customer in cost cutting by notifying low cost alternatives. Allow customers to plan their buying process.
- Avoids the major disadvantage of the developed shopping systems. Tight coupling to devices are the major disadvantage of all earlier implementations of mobile shopping systems by having a highly independent back end powered by web services, the system provides a higher degree of freedom and is supported over multiple platforms.

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ATM Security

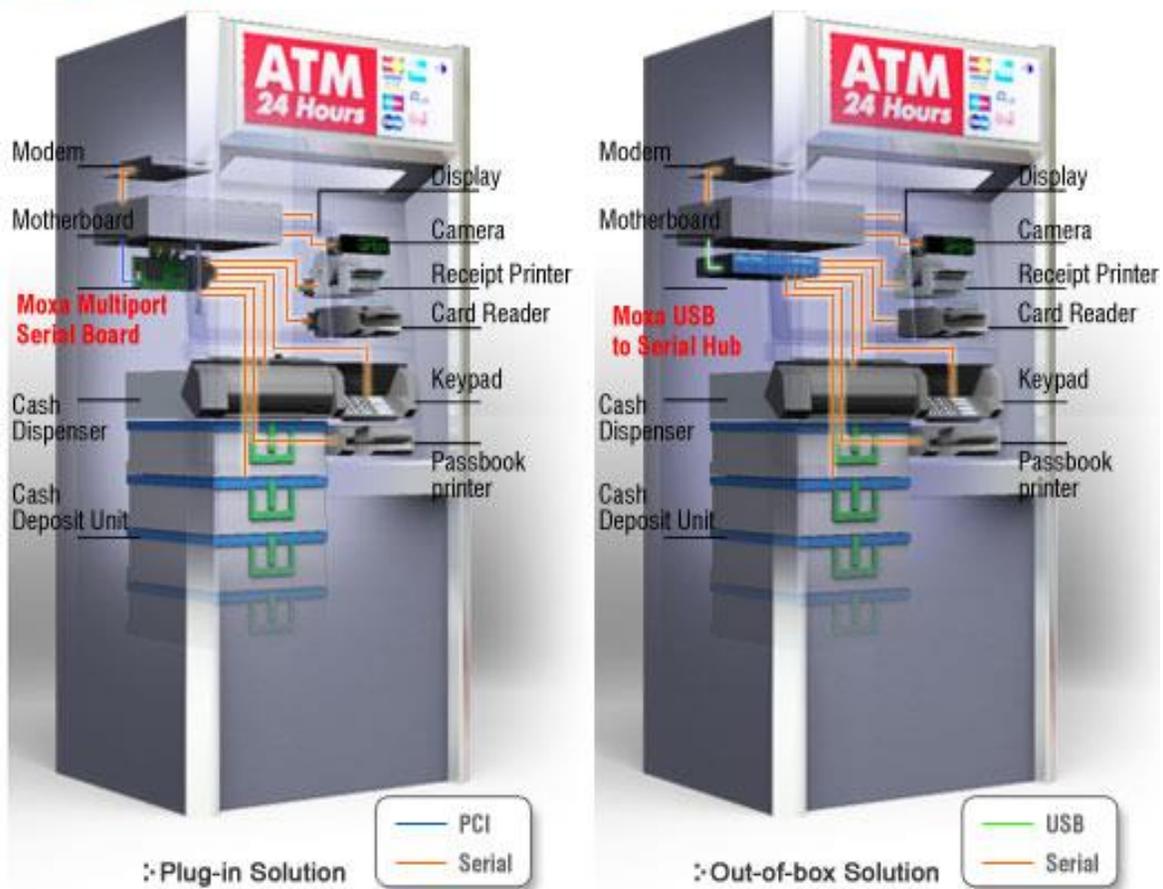
Kavita Hooda

Abstract- ATM is an automated teller machine which is a computerized telecommunications device that provides the customers of a financial institution with access to financial transactions in a public space without the need for a human clerk or bank teller. In ATMs the customer is identified by inserting a plastic ATM card with a magnetic stripe or a plastic smartcard with a chip (that contains a unique card number and some security information). The first ATM was installed in Enfield

town in London on June 27, 1967 by Barclays Bank. ATMs are known by various other names as Automated Transaction Machine, Automated Banking Machine, Cash Point(at Britain), Hole in the wall, Ban comet(in Europe and Russia) and Any Time Money(in India)

Index Terms- Skimming, Biometric, database, Decomposition, User Case Diagram, Simulator and state chart.

Multi Function ATM



I. INTRODUCTION

In modern world, numerous of people are dependent on computers for keeping major record of data. Data are transferred in a cost-effective manner across wide area. ATM is one of the automatic systems being used since 1967 by many of us. ATM was invented by John Sheppharden on June 1967 at United Kingdom. It first came in India in 1968. Today, many people have PIN's and password for operating multiple devices like car, mobile, ATM machines ; herein using PIN's without

safety results in a major difficulty faced by customers like usability, memorability and security. Some people used to write their PIN and password on some paper or diary which is not at all secure. As, it can be easily attacked and hacked by someone, resulting the account holder can suffer.

With the growing sector of banking, everyone is using ATM machines as these machines are located in different places and the customer can access his account anytime anywhere.

A customer holding a bank account can access the account from ATM systems by getting a PIN or password confidentially

from bank. By scratching the ATM card into the machine and entering PIN number, one can easily perform transaction, transfer money, etc. PIN number is a crucial aspect used to secure information of customer's account, thus should not be shared with others.

In this regard, an intuitive approach is to introduce biometric authentication technique in ATM systems, i.e., face recognition technique from 3 different angles using high resolution camera. Although various biometric technique like- fingerprint, eye recognition, retina and iris recognition, etc have been devised as an authentication method for ATM machines, still there is need to enhance the security in ATM systems to overcome various challenges. This paper focuses on security of ATM system i.e., how to

augment security

of transaction using face recognition from 3 different angles at a time. The study aims to design a module of an ATM simulator based on face recognition from 3 different angles in order to minimize frauds associated with use of ATM systems.

Skimming Off the Top

Debit-card hacks at automated-teller machines are on the rise. They often involve thieves installing devices on an ATM to 'skim' card numbers and pins. Here is one example:

1

Thieves install a device into the card reader to capture data from the magnetic stripe.

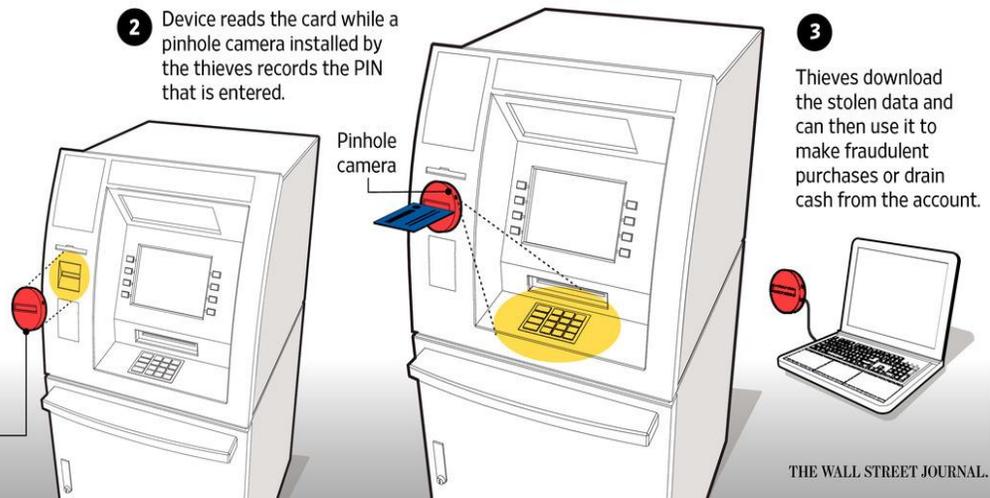
Source: news reports

2

Device reads the card while a pinhole camera installed by the thieves records the PIN that is entered.

3

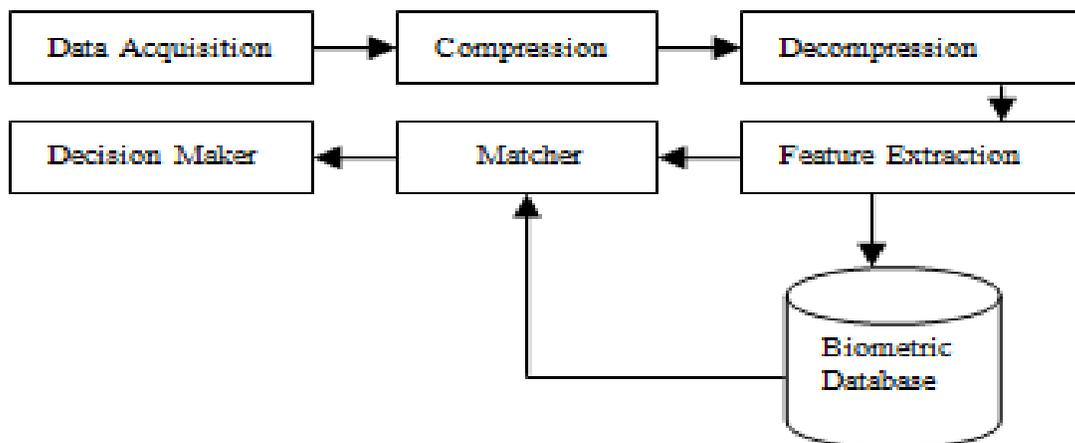
Thieves download the stolen data and can then use it to make fraudulent purchases or drain cash from the account.



II. BIOMETRIC

The word "biometric" is a Greek word that is derived from 2 words- bio (life) and metric (to measure). Biometric can be stated as measure of behavioral and physical characteristics that are

captured and stored in database and further compared with an instance for verification purpose.



Here, Data acquisition, compression, decompression, Decision Maker, Matcher terms are used to provide security by

using Biometric database which stores the necessary elements and information for security.

III. LITERATURE REVIEW:

Security Experts says that Automatic Teller Machine (ATM) in future will have biometric authentication techniques to verify identities of customer during transaction. In South America, there are companies that have introduced fingerprint technology as a embedded part of ATM systems, where citizens have already started using fingerprint in place of PIN or Password for general identification with their ID cards. Gregg Rowley said- "Banks will move to smart cards and biometric will be next step as fingerprint verification and face identification technique. Bank has already been moved to smart cards and now is the time to implement biometric authentication approach in ATM systems.

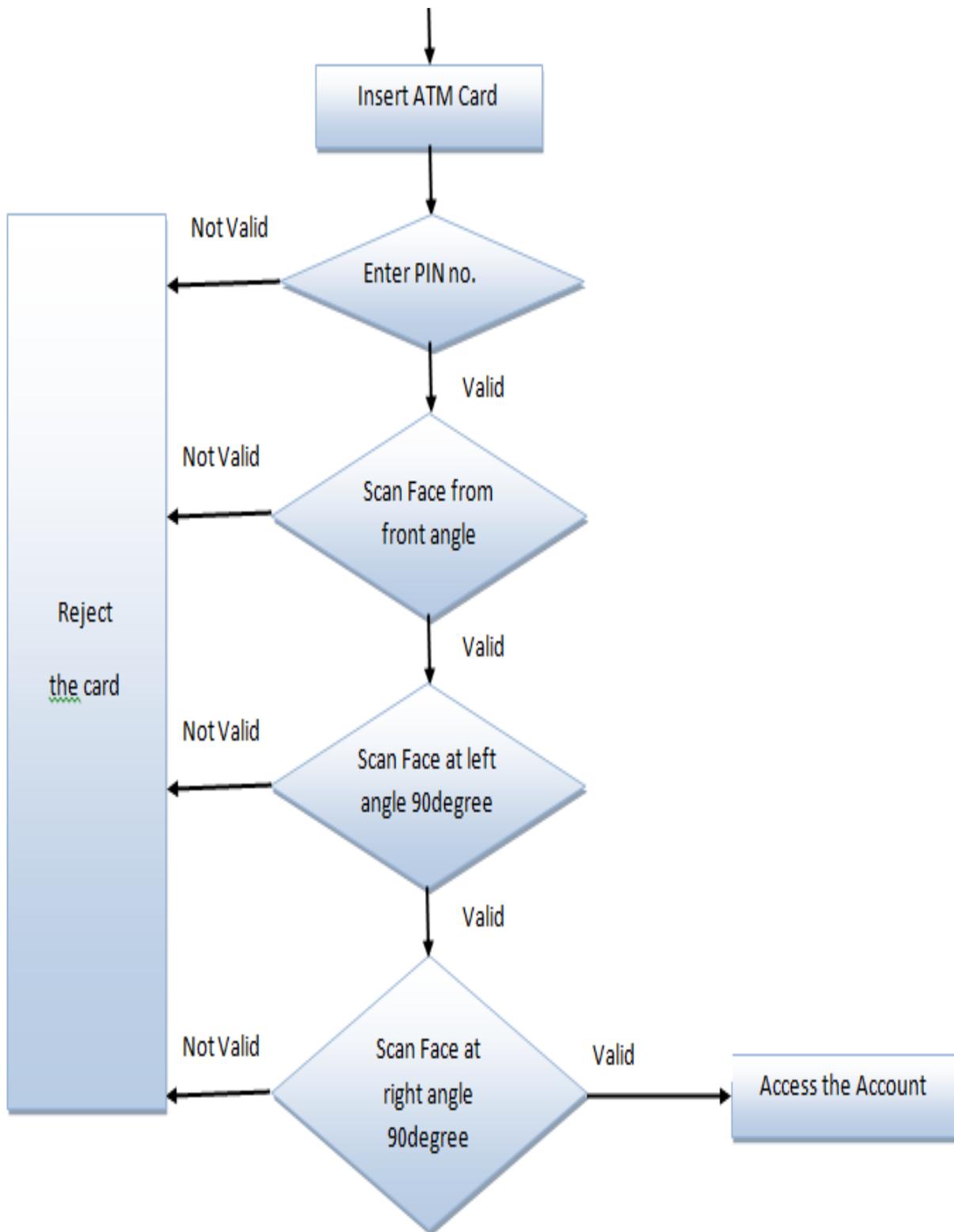
Nowadays, there are devices to perform biometric identification and authentication of following: fingerprint, hand, retina, iris, face, and voice. Rowley says,"Most insecure is a magnetic stripe with a PIN, more secure is a smart card with a PIN, and even more secure is a smart card with biometrics. India is still lacking in implementing biometric with smart card as a safety approach. Various ideas are given by researchers for biometric authentication including- fingerprint, iris and retina, voice, etc. Fingerprint approach for identification given by Oko S. and Oruh J. (2012) not proved efficient as when citizen will move to ATM system, fingers may become dirty from natural environment and will not be able to access his account with ATM system, since fingerprints will not match from the one that was traced during identification. Secondly, a iris and retina approach proposed by Bhosale S. and Sawant B.(2012) as a identification method, but citizens might not want a laser beamed into their eyes for retina scan at every time he wants to access account through ATM. Thus, iris and retina as identification authentication proved inefficient. Vibration detector sensors were

also proposed as a security system for ATM machines by Ajaykumar M. And Bharath Kumar N.(2013). Voice was also proposed for security in ATM systems as a biometric with smart card. The cons were there at the same time as two citizens can have same voice and one can easily hack and can fraud with another's account. Thus, this paper came with an idea of face recognition technique with 3 different angles as a biometric authentication that cannot be lost, stolen, harmful, dirty, copied, forgotten and is always available. Thus, biometric device is ultimate attempt in trying to prove who you are.

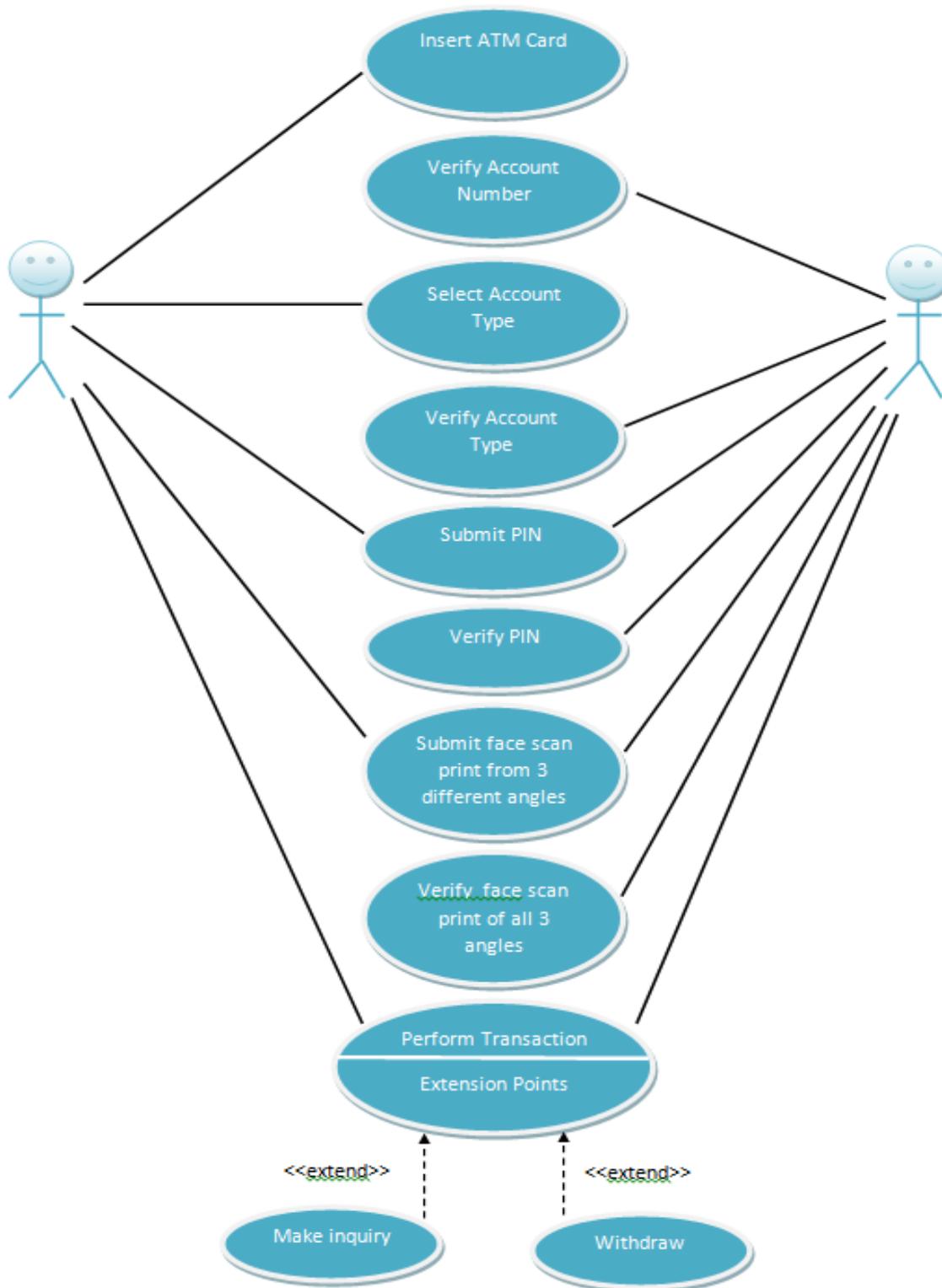
IV. DESIGN METHODOLOGY:

Face Recognition is a biometric scan technology. Face Recognition includes face scan system that can range from a high-resolution camera, workstations, software and back-end processors. Face scan technology is used to analyze and capture facial characteristics such as distance between eyes, mouth or nose, and face cut of person. The ATM system will consist of embedded camera in machine that will recognize the face standing about 2 feet far in front of system and perform matches against the facial database. The system will usually come to a decision in less than 5 seconds. It is very important that the face is at proper distance from camera or system, at proper angle and lighting is appropriate, otherwise distance from camera will reduce facial size and thus resolution of image. Facial-scan technology has unique advantage, over all other biometrics in the area of surveilling large groups and the ability to use pre-existing static image.

Biometric device works in order to capture human characteristics, such as fingerprint, iris and retina, voice and face. Many devices are there that can be used for biometric authentication like hand print detectors, voice recognizer, high resolution camera and identification patter in the retina.



System Flow Diagram for ATM using Biometric



Use Case Diagram for ATM Simulator

In working of Biometric authentication, a database is maintained by banks in which sample of user's characteristics are stored as identification information. Thus, while using ATM system, during authentication, the user is required to provide

another sample of the user's biometric characteristics. The below diagram represent the details as

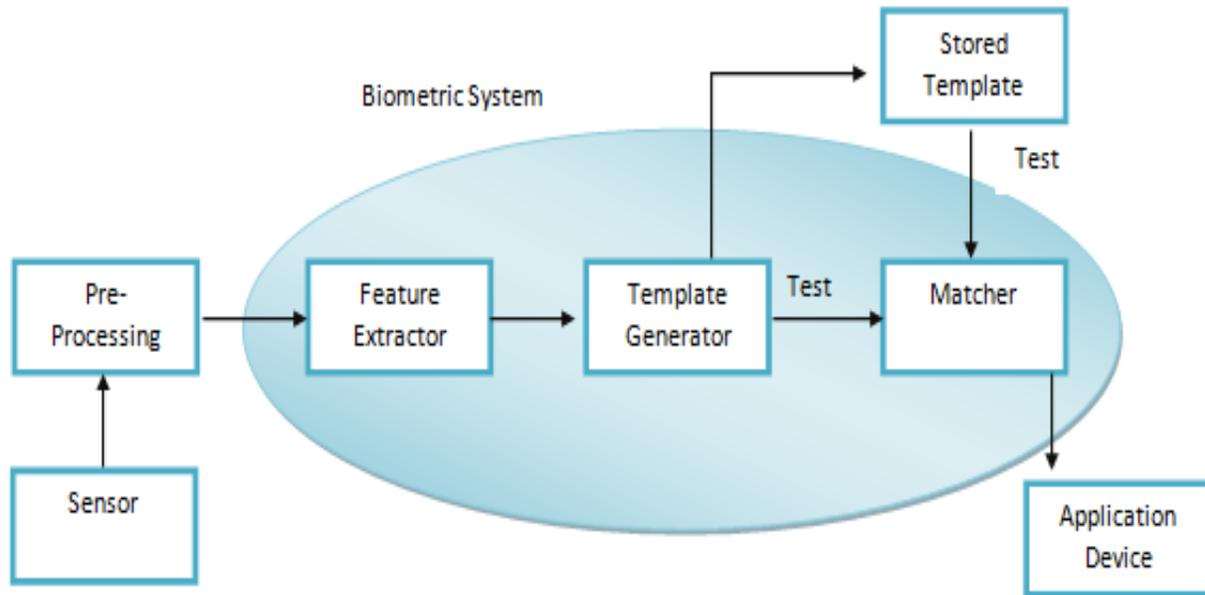


Fig. Working of Biometric Authentication

Biometric Authentication process involves: the matching of extracted feature with the sample feature already stored in database. When user provides a sample of same nature i.e., face scan etc. with its PIN in ATM system, then the system sends grid points of user's face to database as algorithm of numbers through a network to server. On server side, the user's current sample is matched after decryption and compared with the one stored in database. As soon as, the sampled images match the current

image, the user is allowed to proceed further as an authenticated user for transaction, deposit, transfer, etc., else user is considered as invalid user and session is terminated.

Working of ATM system with biometric authentication can also be explained using state chart diagram. It shows the state in which an ATM system can be at any point in time. The diagram depicts the flow from one state to another with conditions denoted with arrows.

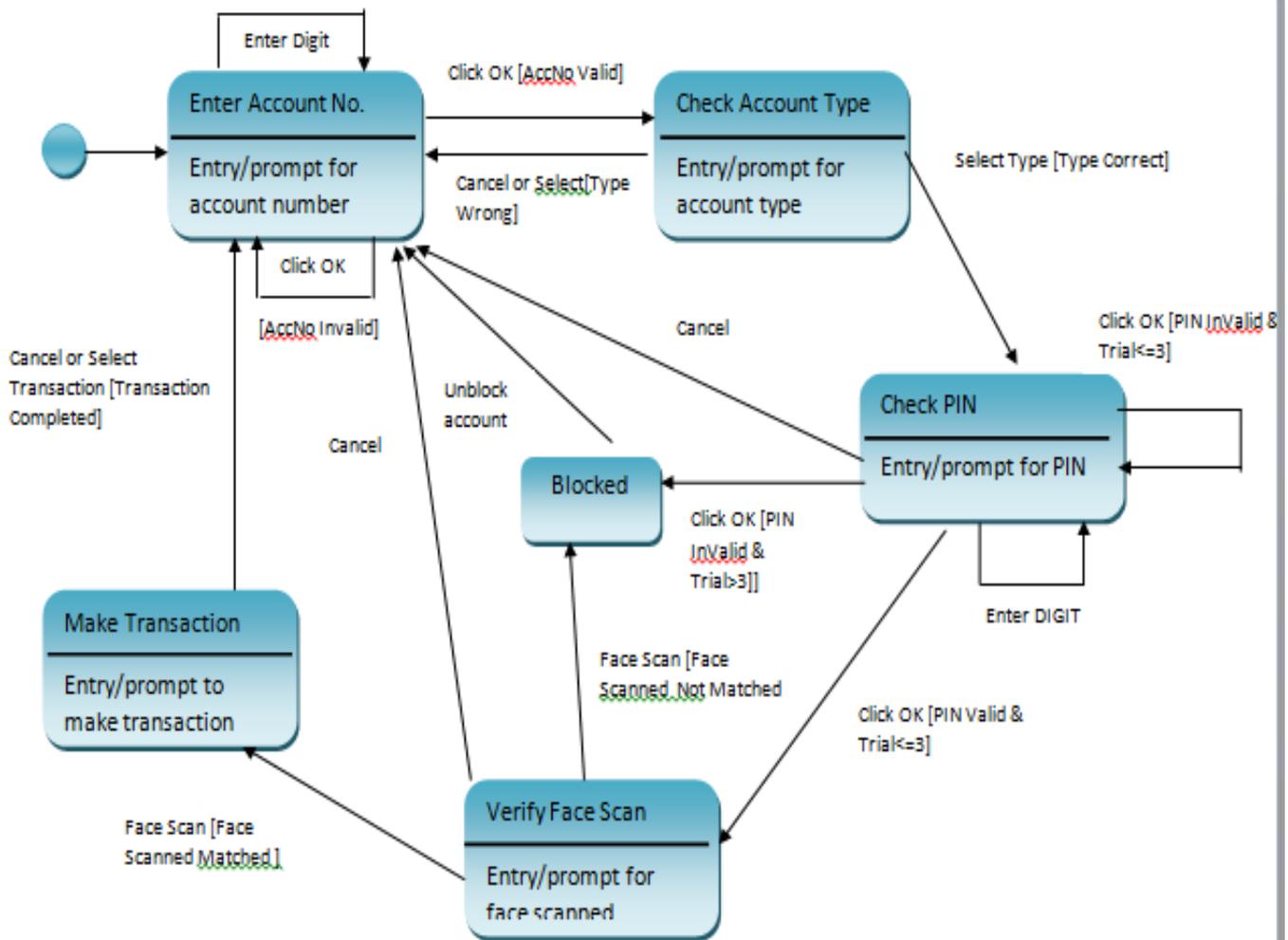


Fig. State Chart Diagram

V. CONCLUSION

From the above proposed conceptual model, it has been concluded that biometric ATM systems is highly secure as it provides authentication with the information of body part i.e., face recognition from 3 different angles. Biometric Authentication with smart cards is a stronger method of authentication and verification as it is uniquely bound to individuals. It is a viable approach, as it is easy to maintain and operate with lower cost. In this paper, a new authentication technique for ATM system is introduced for secure transaction using ATM's. Devising a face grid algorithm and an effective ATM simulator forms the main focus of our further research.

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Motivational Issues for Lecturers in Tertiary Institutions: A Case of Bulawayo Polytechnic

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Abstract- Motivation plays a key role in employee job performance. Principals most often fulfill their organizational goals through the work of employees. Thus Principals need to have highly efficient and productive staff members. Although many factors contribute to productivity, job performance is viewed to be the most influential one. This paper therefore established factors that motivate lecturers at Bulawayo Polytechnic to perform efficiently and effectively at the institution. The study utilized a descriptive survey. The research used a cross sectional analysis study employing a mixed method approach based on a combination of qualitative and quantitative techniques to analyze data. Questionnaires and in-depth interviews were used to collect data from respondents. Data from interviews was analysed by using thematic analysis and questionnaires were analysed by using SPSS version 16. Findings reflect that although remunerations and benefits are important factors like work load, work environment, recognition and empowerment or decision making participation an important factors motivating lecturers in tertiary education. Lecturers work load was noted as too high, some respondents were of the view that their efforts were not recognised and communication is poor in the organisation. The researchers recommend that there should be fair and consistent treatment of lecturers by the institution's management.

Index Terms- Motivation, Lecturer, Tertiary Institutions

I. INTRODUCTION

Managers most often fulfill their organizational goals through the work of employees. Thus, managers need to have highly efficient and productive staff members. Although many factors contribute to productivity, job performance is viewed to be the most influential one. Job performance itself is a function of four variables: ability, understanding of the task, environment, and motivation (Schraw, 2006). Accordingly in order to perform well, employees need to have the knowledge and tools that are required for the job as well as the will to do what is asked from them. Therefore, motivation can be generally equated with action and the understanding of motivation unfolds to be a key to the success of any private or public organization. For that reason, motivation has long been a central topic for scholars and practitioners. An abundance of theories and approaches were developed in order to explain the nature of employee motivation (Wellingham, 2007).

Another handful of studies were conducted in an attempt to discover whether public sector employees have different motivation antecedents than their private sector counterparts.

And indeed a special motivation theory, called Public Service Motivation (PSM), was conceptualized to explain how public employees differ from private workers in the level and type of their intrinsic desire to work and serve (Taylor, 1997). Yet, grasping motivation should not be limited to theoretical aspects alone. Managers do not live in ivory towers and they need applicable ways to transfer the concepts of motivation into everyday life practice. This is especially pertinent to the public sector where the latest financial crisis presented governments with an exacerbated situation. On the one hand, economic meltdown has increased the demands on public services, while on the other it has led to a collapse in taxation revenues and, in turn, a retraction in funding of public services (Public Affairs Ireland, 2010:2). Thus, public sector managers must motivate their employees to perform at the highest levels of productivity and effectiveness and get "more for less" (Porter, 1982:89).

The problem is that motivating public employees is easier said than done. Public workers have a reputation for being lazy and lethargic (Wright, 2001:560) and managers' room for maneuver is ostensibly very little, due to rigid civil service laws. Moreover, the public sector suffers from aging and plateauing employees, who are especially hard to motivate. The study is therefore aimed at researching into the motivational strategies that exist at Bulawayo Polytechnic.

1.1 THEORETICAL FRAMEWORK

Herzberg's Motivational Theory

Frederick Herzberg studied how a work environment would affect the work environment by causing satisfaction or dissatisfaction. His idea was that if people were satisfied at work, they would be motivated to work. He interviewed employees about their feelings at work and then published his findings in his book called "The motivation to work".

His theory is also called the motivation-hygiene theory because he considered the factors that satisfied employees to be motivators and those factors that were dissatisfying to be hygiene factors. Hygiene factors being present does not avoid job dissatisfaction, but if you take them away you will find that they can de motivate an employee (Werner, 2006). Examples might be the loss of a regularly expected pay rise or some decrease in how you perceive your work environment. Herzberg identified the top six factors leading to dissatisfaction and the top six factors leading to satisfaction in the work place (Vandenabeele,2007). These are listed in order from highest importance to lowest importance in Fig 1 below on factors affecting job attitudes

LEADING TO DISSATISFACTION	LEADING TO SATISFACTION
-Institutional Policy	- Achievement
- Supervision	- Recognition
- Relationship with boss	- Work itself
- Work conditions	- Responsibility
- Salary	- Advancement
- Relationship with peers	- Growth

There is one important distinction to notice when it comes to self motivation and motivating others. Steers (1987) notes that the factors that tend to bring us the most satisfaction at work and therefore it is assumed that the most motivated people are the ones that have control over and that are most motivation, are the ones that have control and that are most related to our own job performance. If we do something we enjoy that alone can provide satisfaction. Taking on more responsibility, advancing and growth are all ways to be satisfied at work (Willingham, 2007). People can volunteer for additional responsibility, look for ways to grow skills and discover what would be necessary in terms of our performance to take advantage of opportunities for advancement. Perry (1990) argues that workers might not be able to control company policy or the other factors that can lead to dissatisfaction, but we can certainly control our own work performance.

If you happen to be a manager, this information is also important is also important because it shows you how different decisions you make may affect your employees. If you focus on motivation by putting in place factors on the left hand side, you might relieve dissatisfaction, but you won't necessarily create satisfaction and motivation (Werner, 2006). Failing to provide opportunities for growth, advancement, additional responsibility, achievement and recognition and you will have a team lacking satisfaction and motivation. This is important to realize that you have a better chance of achieving motivation when you focus on the individual, not on the traditional "carrots" (salary, benefits, prestige etc).

1.2 LITERATURE REVIEW

Identical to every organization, lecturer's motivation in higher education institutions is one of the imperative and inevitable objectives of institution management. Lecturers in higher education level play an important role in the institution's success and its good will among students and academia (Taylor, 1997). Again motivation is significant contributor in lecturers' performance in delivering knowledge and grooming their students as the global citizens and masters of their specialized areas.

As Filak & Sheldon, (2003) put their opinion that motivation is crucial to the long term success and performance of any educational system. Similarly, Porter et al (1973) stressed that lecturer's motivation is important for several different reasons. It is important for lecturers self satisfaction and accomplishments, and for the reason that motivated lecturers more probably work for educational reforms and progressive legislation particularly at higher education level and finally it is the motivated lecturers who assures the completion of reforms that are originated at the educational policy making level (Perry, 1990). They further emphasized that lecturer's job satisfaction

and motivation is associated with decreased number of institutional absenteeism and turnover.

Ololube (2004) explored the same point of view that increased motivation of lecturers' leads to an increase in productivity that gives boost to the educational systems; hence the function of educations motivational methods cannot be underemphasized. Different theories of motivation like Maslow's hierarchy of need theory, Herzberg's motivation hygiene theory and Adam's Equity theory are been stated in literature (Schraw, 2006). These theories provide fundamental basis of motivation that help describing the motivation of employees in a systematic way and in understanding the contemporary theories of motivation like goal setting theory, reinforcement theory and expectancy theory etc. Maslow's (1943) need-based theory of motivation is the most commonly known theory of motivation according to which there are five fundamental needs of a person i.e., physiological, security, affiliation, esteem, and self-actualization.

On the contrary, Herzberg (1959) has described motivators as internal motivating factors which always stimulate the employee's motivation to put his best efforts. These motivators for lecturers include recognition from departmental head, empowerment, students' achievement or career advancements (Willingham, 2007). As lecturers play the mentoring role for their students, their primary motivation is associated with students learning achievement. The more students will grow and learn the more satisfaction of task achievement and job involvement would be increased among these mentors. Furthermore viewing the previous literature on lecturers motivation, different authors have explored various issues of motivation for lecturers in higher education institutions which can be valuable contribution in enhancing lecturer's job satisfaction and involvement in particular and for organizational growth as whole (Steers, 1987).

As Adams et al (1989) highlighted in their study that student achievement can be a factor of motivation for lecturers, i.e., if students are hardworking, talented and high achievers, lecturers will be more motivated as a strong relationship between teacher satisfaction and student achievement not only will raise lecturer's job satisfaction but also will prompt him to put his best.

Clarke et al (1995) have also found same relationship between student lecturers' relationship and have asserted that students can be more satisfying aspect for teachers than an administrative support. However, Bohlender et al (2001) stressed compensation as one of the important considerations in human resource management. They emphasized that it is a tangible reward to the employees for the services; therefore compensation must be in accordance to the need fulfillment of employees.

Along with compensation Fuhrman (2006) pointed out that job descriptions are important factors in motivating or de motivating employees. As unclear job description, stressful working environment, irrelevant administrative assignment can create overburden upon lecturers and lead them to job dissatisfaction. Similarly, as Davidson (2007) concluded in his research that high workload, large number of students in classes and burden of non teaching activities are the problems in creating a good job design for teachers in higher education institutions. On the other hand Ofoeqbu (2004) established that a lecturers

needs different resources like technology (computers, projectors, multimedia and internet etc) and facilities (pens and financial aids etc) for effective classroom management and institution's improvement.

Institution's support in providing class aids and academic resources can prove to be effectual motivators for lecturers in order to have their extreme efforts. Hughes (1991) in his research found professional growth as fundamental motivators for lecturers. He further described that teacher's professional learning is a component of their career development that gives them effectiveness and satisfaction in teaching. (Hughes, 1991). Likewise, Lynn (2002) supported the idea that educational leaders should provide professional learning and growth opportunities in order to motivate teachers and to enhance their performance. Wright (1985) asserted that satisfaction of lecturers is closely related to recognition. He further explains that lecturers get motivation from the recognition of their achievements and accomplishments by their head, when they get appreciated for their valuable contribution or receive constructive feedback in order to correct their flaws. This open feedback and appreciation not only compel lecturers to perform better but also allows the organization to grow in a collective manner (Werner,2006).

As Memmott et al (2002) stressed that organizations must provide feedback to its employees in order to create open communication in the organizational set up. Martinez (2006) makes the same point describing that the lack of feedback leads to increased frustration in lecturers and this disturbance impacts negatively on lecturers performance. Similarly, Armstrong (2006) is of the opinion that training is one of the most important activities that can be used as a motivational program for employees' development. Training programs are one of those different input factors that give motivation to teachers' for their performance enhancement. (Woodward, 1992). Hall et al (1997) examined in his research that autonomy is the most imperative factor of lecturer's motivation. They further added that teachers when given due authority or autonomy while designing their courses, class management and scheming evaluation mechanism, feel more confident and self-initiators as compare to those who are always instructed for the said tasks. The same as Praver et al (2008) found that teacher's empowerment is having academic freedom, i.e. planning lessons, formatting syllabus and selecting text books to recommend their students by their own and not by the department.

Moreover, Short et al (1994) found that lecturer's empowerment is a process in which lecturers develop the capability to grow and to resolve their problems. They explained that decision making, professional growth, status, self-efficacy, autonomy and impact are the six dimensions of lecturers' empowerment. The above mentioned factors are giving a quick glimpse of major contributors of lecturer's motivation. The major task of human resource management in universities or higher education institution is always centered to enhance the job satisfaction level, particularly of lecturer as they are building blocks of institution as well as society at large.

1.3 Materials and Methods

1.3.1 Research Design

A descriptive survey research design was used in the study. As noted by Rwodzi, Muchenje and Bondai (2011) surveys allow

for the collection of detailed description of existing phenomena with the intent to repeal current practice.

1.3.2 Population and Sample

The population of this study was made up lecturers at Bulawayo Polytechnic. There were 25 lecturers in various divisions/ departments who were identified for the study. This population included both males and females with different qualifications, experience and age.

1.3.3 Instruments For Data Collection

This research used a cross sectional analysis study employing a mixed method approach based on a combination of qualitative and quantitative techniques to analyze data. Questionnaires and interviews were used to collect data from respondents. Data from interviews was analyzed by using thematic analysis and questionnaires were analyzed by using SPSS version 16.

1.3.4 Data Analysis and Data Presentation

The collected data was analysed using SPSS version 16 and thematic analysis which developed themes and categorised the patterns in the data. Tables, pie charts and graphs were used to show information collected and how it was expressed. Comments and analysis were given after presentation of data on each table and graphs. Percentages were used where ever possible to come out with findings, conclusions and recommendations emanating from the study.

1.4 Results

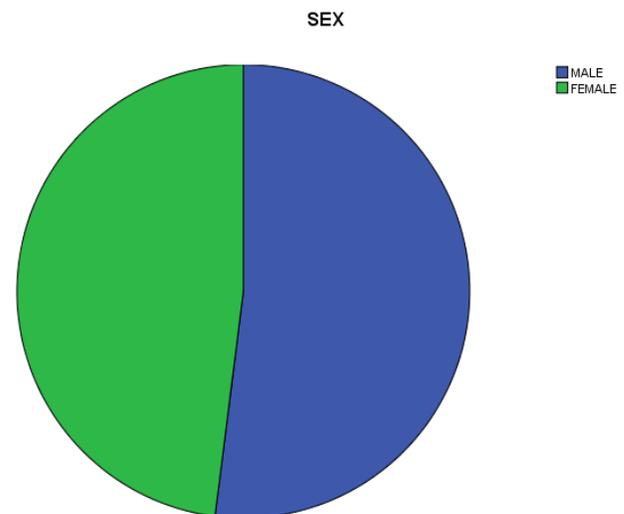


FIG. 2- Sex

Fig. 1 is a pie chart on sex of the respondents who participated in the study. The pie chart reflects that 52 percent of the respondents were male and 48 percent were female. In this regard it can be noted that there was almost a balance in number between the study respondents.

II. AGE GROUP

The least number of respondents who participated in the study was above 51 years. This age group had 12 %.

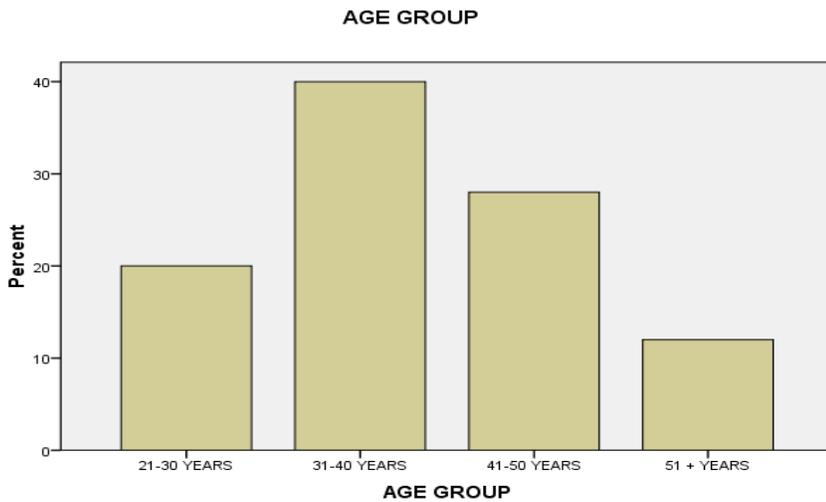


Fig 3 - Age Group

Fig 2 reflects the age range of the respondents who participated in the study. It can be noted that the majority of the respondents (40%) were between 31 and 40 years. This was followed by 28% whose age range was between 41 and 50 years.

LEVEL OF EDUCATION

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	DIPLOMA	7	28.0	28.0	28.0
	HND	7	28.0	28.0	56.0
	DEGREE	5	20.0	20.0	76.0
	MASTERS	6	24.0	24.0	100.0
	Total	25	100.0	100.0	

Table 1- Level of education

Table 1 shows the level of education of the respondents. The majority of the respondents 56% had either diplomas or higher national diplomas. The researcher noted that the respondents were mostly in engineering courses who had diplomas and HNDs. Twenty percent of the respondents had degrees and 24 percent of the participants had masters degrees. It can thus be noted that the majority of the respondents had diplomas and higher national diplomas which therefore gives an opportunity for further advancement in studies for respondents in this category.

III. LEVEL AS LECTURER

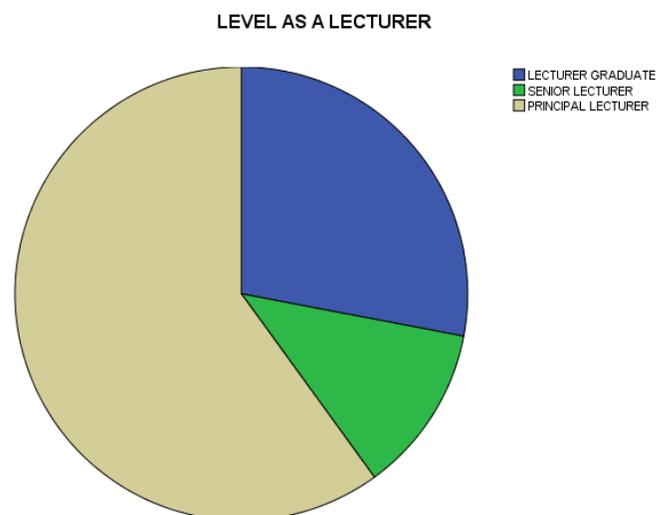


FIG. 4 - Level as Lecturer

Fig 3 shows the level of the lecturer. The majority of the lecturers (60%) who participated in the study were principal lecturers. This was followed by lecturer graduates who had 28%. 12 % of the respondents were Senior lecturers. It can therefore be

noted that the majority of the respondents were experienced lecturers as the majority were either senior lecturers or principal lecturers.

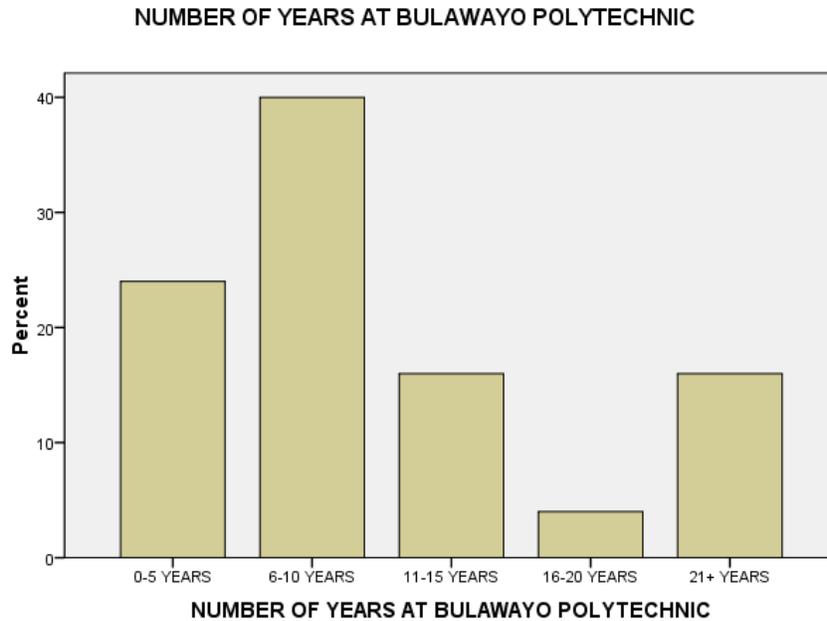


FIG.5 - NUMBER OF YEARS AT BULAWAYO POLYTECHNIC

Fig 4 shows the number of years that the respondents have spent at Bulawayo Polytechnic. 40 percent of the respondents had 6-10 years at Bulawayo Polytechnic and this was the majority. This was followed by 24% which had under five years

at Bulawayo Polytechnic. The least percentage had four percent and the respondents in this category had 16- 20 years at the institution.

Motivational Strategies At Bulawayo Polytechnic

ARE YOU AWARE OF THE MOTIVATIONAL STRATEGIES AT BULAWAYO POLYTECHNIC?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid YES	15	60.0	60.0	60.0
NO	10	40.0	40.0	100.0
Total	25	100.0	100.0	

Table 2 - Motivational Strategies at Bulawayo Polytechnic

Table 2 reflects the perceptual view of the respondents with regards to the motivational strategies at Bulawayo Polytechnic. The majority of the respondents (60%) noted that they were aware of motivational strategies at the institution. 40% of the respondents noted that they were not aware of any motivational strategies offered at Bulawayo Polytechnic.

IV. MOTIVATIONAL STRATEGIES AT BULAWAYO POLYTECHNIC

Fig.4 shows the perceptual view of the benefits of motivational strategies at Bulawayo Polytechnic. The majority of the respondents (60%) noted that they were aware of motivational strategies at the institution. 40% of the respondents noted that they were not aware of any motivational strategies offered at Bulawayo Polytechnic.

HAVE YOU BENEFITED FROM THE MOTIVATIONAL STRATEGIES AT BULAWAYO POLYTECHNIC?

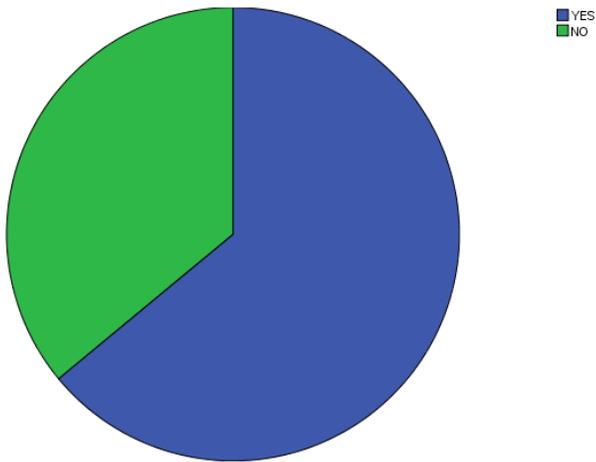
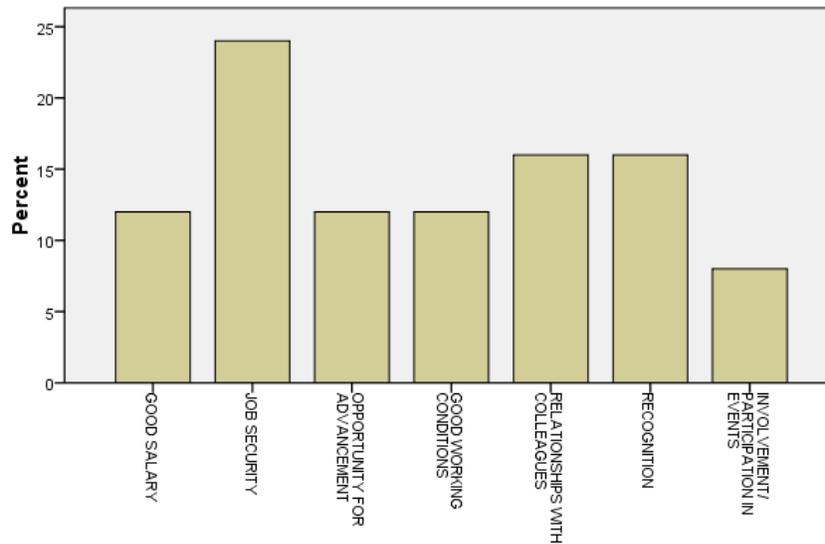


Fig. 5 - BENEFIT OF MOTIVATIONAL STRATEGIES AT BULAWAYO POLYTECHNIC

V. RANKING OF MOTIVATIONAL FACTORS

RANKING OF MOTIVATIONAL FACTORS



RANKING OF MOTIVATIONAL FACTORS

Fig 6- Ranking of motivational factors

Fig 5 shows motivational factors and how they have been ranked by respondents who participated in the study. The majority of respondents (24%) noted that job security was a motivating factor for them at Bulawayo Polytechnic. On the other hand, 16% apiece of respondents were of the view that relationships with colleagues and recognition were motivating

them to stay at the institution. This was followed by opportunity for advancement and good working conditions which had 12% apiece as well. It can thus be noted that job security is a motivating factor which most respondents value at the institution.

RANKING OF MOTIVATIONAL LEVEL

RANKING OF MOTIVATIONAL LEVEL AT BULAWAYO POLYTECHNIC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	VERY HIGH	2	8.0	8.0	8.0
	HIGH	5	20.0	20.0	28.0
	FAIR	12	48.0	48.0	76.0
	LOW	6	24.0	24.0	100.0
	Total	25	100.0	100.0	

Table 3- Ranking of motivational level at Bulawayo Polytechnic

Table 3 reflects the motivational levels of respondents at Bulawayo Polytechnic. The majority of the respondents (48%) were of the view that motivational levels at Bulawayo Polytechnic were fair. 24% of the respondents were of the view that there was low morale at the institution. 8 percents of the respondents were of the view that the morale was very high at the

institution. It can therefore be noted that the institution has a fairly fair to very high motivational level.

MOTIVATIONAL STRATEGIES RELATIONSHIP TO PRODUCTIVITY

ARE THE MOTIVATIONAL STRATEGIES RELATED TO PRODUCTIVITY

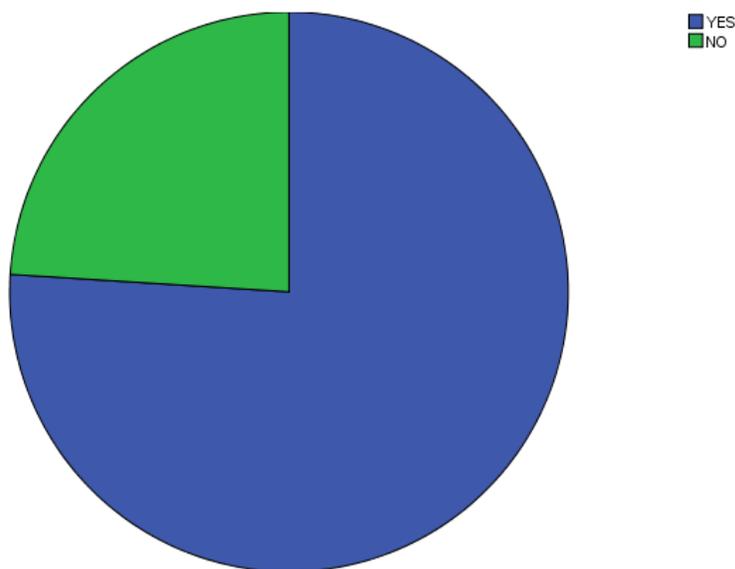


Fig. 7 - Motivational strategies related to productivity

Fig. 6 shows the percentage for motivational strategies related to productivity at Bulawayo Polytechnic. From the pie chart, it can be argued that 76% of the respondents were of the view that the motivational strategies at the institution were related to production while 24% were of the view that the motivational strategies were not linked to productivity.

Employee's Motivation

Based on the interviews the respondents noted of good salary for the employees as well paid employees are more motivated and more disciplined. It is easier to control an institution well paid employees than when they are not well paid. One respondent noted that employee motivation as based on their

bonuses. The more employees have regular incentives, the more their commitment. Another respondent went on further to highlight the underpins thus the psychological state of the employee's (what they actually want) as a bolster to motivate them for better performance.

One respondents in an interview underscored some motivational factors which include internal promotion system for the employees, organizing workshops for the employees, organizing contest for best worker of the year and having a balanced work load for each worker. In this regard, it can thus be noted that the above motivational strategies are necessary to increase employee's performance.

Communication with employees

Respondents interviewed noted that communication is vital for organizational set up. Respondents called for enhancement of communication which they noted that it would help the HODs in their technical planning as well as development of new strategies.

Institution's celebrations

Based on interviews conducted, 75% of the interviewed respondents noted that institutional celebrations are important when the institution has achieved desired target objectives. This will be an indication to let employees be aware of the fact that they are on focus, sign of company appreciation to the staff. It can therefore be noted enhancing communication gives opportunity for the lecturers to interact most closely to each other and it boosts the moral of employees. On the other hand, 25% of the employees acknowledge that institutional celebrations are not necessary to them. They noted that the institution should put their resources on gainful company activities and company celebrations don't acknowledge individual efforts.

Decision making

Employees interviewed were of the opinion that it is vital for involved in decision making within the institution. This is because the employees are closer to the students and they can best give feedback about the reactions of clients to the services rendered by the institution. This could be achieved by the employee's attending and participating in general meetings thereby contributing their ideas on how to improve customer's relationships. This creates a situation where employees become an integral part of the decision making process of the institution.

1.6 DISCUSSIONS

From the findings, some employees are motivated when they meet their target goals while other employees are more motivated when they are working under pressure. Yet, other employees were more motivated when they have challenging task. Furthermore, some employees enjoy working in a company were they have job satisfaction. The above findings are consistent with Frederick Herzberg two factor theories for motivation. Herzberg contends that employees are influenced by two factors: the motivators. Furthermore, most of the respondent are motivated when there are operating in favorable working condition which include: having daily communication with the boss to note their progress, having a verbal and written appreciation from the boss will increase their motivation for high performance. Therefore, these survey finding are underpinned by the theoretical consideration of Frederick Herzberg hygiene factors. To Herzberg, these hygiene factors will enhance employee dissatisfaction if not fulfilled. (Saiyadain 2009: 158)

The survey findings shows that majority of the respondents are more motivated when they take part in general meetings and are given the opportunity to contribute their opinion on the overall company policies. The findings equally illustrates that it is the responsibility of the managers to motivate the employees which creates an enabling ground for high performance within employees. This view has a direct correlation with John Adair's fifty-fifty theoretical reasoning on how employees can be motivated for higher performance within a company. John Adair presupposes that fifty percent of motivation comes from within a person and the remaining fifty percent comes from the environment. To him, within these external factors; the nature

and quality of leadership within a company is very important . This therefore justifies the fifty-fifty theory of John Adair. (John 2006:41)

Employee's motivation for better performance is so vital in order for the company to attend its goals. The management of the company should understand the diversity that exists within the company. To summarize this finding, employees at Ultimate companion limited have an overall fair job satisfaction. The employees are not satisfied with their current salary situation at the company which illustrate that financial motivation is important within a company. The finding equally shows that majority of the employees are motivated most to perform when they receive non-financial reward. Also, majority of the employees show a great intrinsic value for higher performance. Finally, the management at Ultimate companion limited should not stick to a single motivational strategy in order to achieve greater performance from the employees.

1.7 CONCLUSION

The primary goal of the study was to explore various issues of motivation for the workers at Bulawayo Polytechnic. Results of the study suggest that although compensation and benefits package is a key motivator for the workers but there are some other non monetary issues that affect workers' motivation at Bulawayo Polytechnic and these include: job design, work environment, career development, recognition & rewards, feedback, training, participation in decision making and empowerment. Findings of the survey show that the role of supervisor (HOD) is much important in retaining and motivating teachers in higher education unfortunately there is a communication gap between the HOD and workers in some departments, it must be eliminated. Therefore it is highly recommended on the basis of this survey to provide training to the HOD to make them good administrators. Workload of lecturers at Bulawayo Polytechnic is much high along with other administrative activities it must be reduced to get good results in research and teaching. Lecturers must be properly recognized for their achievements and feedback must be provided to them continuously and they must be given a sense of appreciation by involving them in departmental decision making.

1.8 RECOMMENDATIONS

Despite the fact that the majority of the respondents attend to the fact that employee motivation with the public service was effective, few challenges were identified and need to be tackled or addressed to achieve optimal efficiency and productivity in the service. In this regard the study recommends that;

- Employees of the institution should be given equal opportunities and recognition. Moreover, the whole motivational system should be made more transparent to all employees.
- There should be training and development programs open to workers. This should include both on the job and off the job training which will help workers to upgrade their knowledge and be able to meet their target.
- Since more respondents are motivated by incentives, management should look at the various incentives that will help motivate employees.

- There should be creation of opportunities for the department to meet and bond on frequent basis in order to enhance their working status.
- Managers should involve employees in their decision making process.
- There should be provision of informal recognition as it costs nothing. Formal recognition does not cost a lot, but it requires thought and preparation. Taking the time and putting the thought into preparing the element of recognition is sometimes even more appreciated than the element itself.

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Sickle Cell Anemia: Genetic Factors, Prevalence and Control

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Abstract- Sickle cell anemia is a genetic disorder resulting in irregularly regulating red blood cells also called as sickled cells leading to serious conditions like stroke, acute chest syndrome, pulmonary hypertension, organ damage, blindness and skin ulcers. Several mutations in HBB gene can cause sickle cell disease. Persons with sickle cell anemia can inherit infected genes from both parents. Despite a variable disease severity, individuals affected require regular health care from childhood all the way to adult age. This review, highlights the increased susceptibility to infections, the genetic factors and preventive measures to overcome various complications and challenges for sickle cell anemia.

Index Terms- stroke, sickled cells, mutations, hypertension

I. INTRODUCTION

Sickle cell anemia is a genetic disease associated with episodes of acute illness and progressive organ damage leading to erythrocyte rigidity. People with this disorder have atypical hemoglobin molecules called hemoglobin S, which can distort red blood cells into a sickle shape.

The sickle cell mutation reflects a single change in the amino acid building blocks of the oxygen-transport protein, hemoglobin. This protein has two subunits and gives red color to cells. The alpha subunit is normal in people with sickle cell disease. The beta subunit has the amino acid valine at position 6 instead of the glutamic acid that is normally present. Sickled cells cannot squeeze through the narrow blood vessels and stack up to block blood flow. This blockage prevents oxygen from being transferred to tissue and organs which is known as ischemia. The loss of oxygen can result in tissue damage. The lifespan of sickle RBCs 10-20 days as compared to the 120-day lifespan of normal RBCs which results in chronic anemia in SCD patients [1]. This chronic hemolysis leads to the generation of many other toxic molecules.

In 1949, Dr. Pauling and colleagues were the first to indicate that sickle cell disease occurs as a result of an abnormality in the hemoglobin molecule [2]. This was the first time a genetic disease was linked to a mutation of a specific protein. The sickle cell mutation occurs when a single base change in the DNA, is the fundamental genetic material that determines the arrangement of the amino acid building blocks in all proteins. It is now a known fact that SCD is an inherited disease which is passed down from parents to children. SCD is a serious disorder in which the body makes sickle-shaped red blood cells. They move easily through blood vessels. Red blood cells contain a protein

called hemoglobin. Hemoglobin binds oxygen in the lungs and transport to the rest of the body. Sickle cells are stiff and sticky and tend to block blood flow in the blood vessels, which can cause pain and organ damage.

II. GENETICS OF SICKLE CELL DISEASE

Mutations in the HBB gene cause sickle cell disease. Hemoglobin consists of four protein subunits, typically, two subunits called alpha-globin and two subunits called beta-globin. The HBB gene provides instructions for making beta-globin. Different mutations are caused due to various forms of beta globin in the HBB gene. One particular HBB gene mutation produces an abnormal version of beta-globin known as hemoglobin S (HbS). Other mutations in the HBB gene lead to additional abnormal versions of beta-globin such as hemoglobin C (HbC) and hemoglobin E (HbE). In people with sickle cell disease, at least one of the beta-globin subunits in hemoglobin is replaced with hemoglobin S. In sickle cell anemia, hemoglobin S replaces both beta-globin subunits in hemoglobin. In other types of sickle cell disease, just one beta-globin subunit in hemoglobin is replaced with hemoglobin S. Abnormal versions of beta-globin can distort red blood cells into a sickle shape. The sickle-shaped red blood cells die prematurely, which can lead to anemia.

III. SYMPTOMS

Symptoms of sickle cell disorder include Hand-foot syndrome, anemia symptoms such as fatigue and paleness, unpredictable episodes of pain, chronic inflammation, eye problems, jaundice, delayed growth in children, infections and sometimes stroke. Patients with SCD are also susceptible to diseases such as osteomyelitis and the spleen and kidneys of SCD patients are particularly susceptible to ischemic damage. The underlying abnormality is a single nucleotide substitution (GTG for GAG) in the gene for β -globin on chromosome 11, resulting in the replacement of a glutamic acid residue with valine on the surface of the protein (termed HbS)[3]. In normal adult HbA, two chains of α -globin and two of β -globin form a tetramer, stabilized by specific intra molecular points of contact, but without interactions between individual tetramers within the RBC [4]. When the molecule binds or releases oxygen, it undergoes a conformational change. In HbS, deoxygenation exposes the abnormal valine residue on the surface of the molecule, which then forms hydrophobic interactions with adjacent chains. The resulting polymers align into bundles, causing distortion of the RBC into a crescent or sickle shape and

reducing flexibility and deformability, which impairs passage of the cells through narrow blood vessels [5]. Sickling can be precipitated by environmental factors such as hypoxia, low pH, cold, and dehydration of the RBC, as well as adhesion molecules and cytokines associated with infections.

A number of other mechanisms for increased susceptibility to infection in SCD have been explored. Major infections occur in early infancy when the spleen is still partially functional and some increased risk persists despite modern prophylactic measures, suggesting additional immune deficits are present [6]. Patients also seem predisposed to other infections, including *Escherichia coli* urinary tract infection, *Mycoplasma pneumoniae* respiratory infections, and dental infections caused by anaerobes. The complement system involves a large number of plasma proteins that are cleaved sequentially by protease enzymes to generate active fragments. The cascade can be activated either via the classical pathway, following binding of IgM or IgG to surface antigens, or the alternative pathway, in which C3b interacts directly with the pathogen cell surface, then recruiting further downstream components [7].

IV. GENETIC FACTORS

Despite sharing the same underlying genetic mutation, the range of severity in the phenotype of SCD is striking, with some patients disabled by frequent crises and long-term complications while others live virtually normal lives. Individuals are also differently predisposed to particular pathological manifestations of the disease. This suggests that the phenotype is multigenic, variation in alleles at multiple loci may modify outcome [8]. Polymorphisms in a number of genes involved in the immune response have been suggested as contributing to increased susceptibility to infection in SCD. Particular HLAII subtypes have been shown to be predisposing or protecting factors for infectious complications, while certain polymorphisms of the FcR receptor (involved in clearing encapsulated bacteria), mannose-binding lectin, insulin-like growth factor 1 receptor (IGF1-R; involved in B and T cell recruitment and differentiation), and genes of the transforming growth factor β (TGF β)/bone morphogenetic protein (BMP) pathway have been associated with an increased risk of bacteremia [9-10]. These studies also highlight the need for caution in making generalizations about immune function in SCD, for example complement activation or neutrophil action, based on experiments using small numbers of subjects in localized geographical areas. Observed differences may increase individual risk, but may not be a universal feature [11]. Large samples across multiple racial groups would be needed to distinguish effects due to SCD per se from those caused by other unlinked and variable alleles.

V. PREVENTION

As illustrated, infection can lead to a range of complications in SCD, and these are not readily reversed simply by treating the infection. For this reason, prevention is the key strategy in management. Interventions in the last 20 years have dramatically reduced mortality, especially in children, and the

recommendations continue to evolve. Simple general measures are important in reducing the risk of infection, though the aim is to ensure as normal a lifestyle as possible. Meticulous attention to hygiene, particularly hand-washing, is vital, and to protect against *Salmonella*, patients are advised to cook food thoroughly, particularly chicken and eggs, keep items refrigerated, and avoid contamination [12]. Nutritional supplementation with zinc has been reported to reduce infection risk, improve growth rates in SCD children, and possibly improve skeletal and sexual maturation as well as having psychological benefits [13]. Early identification of infections is another key area, enabling prompt initiation of treatment to reduce complications. Parents are encouraged to monitor their children closely at home and seek advice if they have a fever or respiratory symptoms, while maintaining good hydration. There should be a low threshold for the use of antibiotics in ill children with SCD, particularly in the presence of chest signs or symptoms, which may herald ACS. A fever of more than 38.5 °C is an indication for the empirical use of broad-spectrum antibiotics such as a third-generation cephalosporin, with a macrolide added in potential ACS. Relevant specimens (blood, urine, sputum, etc.) should be taken for culture and antibiotics later modified or stopped depending on the results [14].

VI. GENETIC COUNSELING

Sickle cell disease is inherited in an [autosomal recessive](#) manner. If one parent is a [carrier](#) of the *HBB* Hb S pathogenic variant and the other is a carrier of any of the *HBB* pathogenic variants (e.g., Hb S, Hb C, β -thalassemia), each child has a 25% chance of being [affected](#), a 50% chance of being [unaffected](#) and a carrier, and a 25% chance of being unaffected and not a carrier. Carrier detection for common forms of sickle cell disease is most commonly accomplished by HPLC. Prenatal diagnosis for pregnancies at increased risk for sickle cell disease is possible by [molecular genetic testing](#) if the *HBB* pathogenic variants have been identified in the parents.

VII. INFECTION

Individuals with sickle cell disease develop splenic dysfunction as early as age three months; thus, young children with sickle cell disease are at high risk for septicemia and meningitis with pneumococci and other encapsulated bacteria including *Streptococcus pneumoniae*, *Neisseria meningitidis*, and *Haemophilus influenzae*. Historically, the single most common cause of death in children with sickle cell disease was *Streptococcus pneumoniae* sepsis, with the risk of death being highest in the first three years of life. Notably, the role of [newborn screening](#), education, and access to healthcare cannot be overstated. Despite not altering infection rates, these measures do lower morbidity and mortality [15]. With the further addition of vaccination programs and prophylactic penicillin the incidence of these infections has decreased significantly [16]. Individuals with sickle cell disease are also at increased risk for other infections such as osteomyelitis caused by *Staphylococcus aureus* or other organisms such as *Salmonella* species. Infectious agents implicated in acute chest syndrome include *Mycoplasma*

pneumoniae, *Chlamydia pneumoniae*, and *Streptococcus pneumoniae*, as well as viruses. Parvovirus remains an important cause of aplastic crisis. Indwelling central venous catheters confer a high risk of bacteremia in individuals with SCD.

VIII. PREVALENCE

The Hb S [allele](#) is common in persons of African, Mediterranean, Middle Eastern, and Indian ancestry and in persons from the Caribbean and parts of Central and South America but can be found in individuals of any ethnic background. Among African Americans, the prevalence of sickle cell trait (Hb AS) is about 10%, resulting in the birth of approximately 1100 infants with sickle cell disease (Hb SS) annually in the US. Approximately one in every 300-500 African Americans born in the US has sickle cell disease; more than 100,000 individuals are estimated to have homozygous sickle cell disease [17].

The prevalence of *HBB* alleles associated with sickle cell disease is even higher in other parts of the world. In many regions of Africa, the prevalence of the Hb S pathogenic variant (Glu6Val) is as high as 25%-35%, with an estimated 15 million Africans [affected](#) by sickle cell disease and 200-300,000 affected births per year worldwide [18-19]. Sickle cell disease accounts for as many as 16% of deaths of children younger than age five years in Western Africa [20-21].

IX. DISCUSSION

The sickle cell disease includes a group of genetic alterations characterized by the predominance of the S hemoglobin, which causes red blood cells to have the shape of a sickle. Sickle cells have a specific cascade of gene expression in response to the constant hemolysis. There is a dramatic upregulation of pro-inflammatory genes, but an anti inflammatory pathway that is induced upon sickle cell crises. Sickled red blood cells cannot pass through the capillaries.

Tissue that does not receive a normal blood flow eventually becomes damaged.

Normal red blood cells contain hemoglobin A. They are soft and round and can squeeze through tiny blood vessels. Normally, red blood cells live for about 120 days before new ones replace them. The lifespan of sickle cells is at least six times shorter than that of normal RBCs. The main clinical manifestations of sickle cell anemia are a chronic anemia caused by the destruction of red blood cells. Despite a variable disease severity, individuals affected require regular health care from childhood all the way to adult age.

X. CONCLUSION

Sickle cell anemia is a world-wide disease, especially present in countries with blacks and mixed populations, where the SS sickle cell form is very common. Most individuals can be expected to live well into adulthood, enjoying an improved quality of life including the ability to choose a variety of education, career, and family-planning options for themselves.

According to studies, it is the need of time to prevent, diagnose and systematically follow up children with sickle cell anemia. Hence, it is concluded that, SCD can be controlled with better implementation of preventive measures.

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Laboratory and Field Evaluation of *Bacillus thuringiensis israelensis* (WDG) against Dengue Vector *Aedes albopictus* Larvae in Lahore Pakistan

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Abstract- Dengue fever is making headlines all over the world. It is a mosquito-borne disease. The huge leap in dengue cases is causing many scientist and medical experts to worry. There is no cure for dengue fever. In fact, one of the biggest challenges the medical community faces is how to control dengue and how to stop the disease from spreading. Right now, one of the most effective way is the vector control. The current study is the laboratory and field evaluation of *Bacillus thuringiensis* var *israelensis* Vectobac® WDG (Water dispersible granules) 3000 ITU / mg was carried out against *Aedes albopictus* (early 4th instar) larvae from Lahore Pakistan. The primary objective was to control *Aedes* mosquitoes (Mainly vector of Dengue fever) by determining the minimum effective dosage of Bti WDG for larval mortality and pupae reduction of *Aedes albopictus* in laboratory as well as in the field assay.

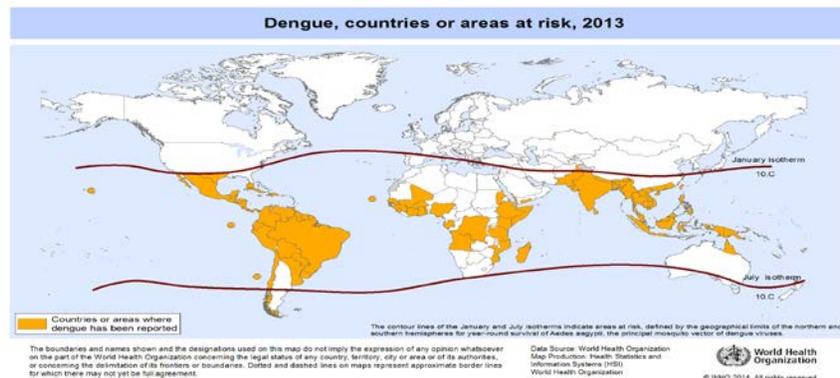
need to be studied. *Aedes aegypti*, commonly known as the yellow fever mosquito and is the most important vector for Yellow fever, Dengue fever and Chikungunya. While *Ae. albopictus* commonly known as Asian tiger mosquito is also a competent vector of many viruses including dengue and Eastern equine encephalitis.

Dengue is the growing public health disease. There is no vaccine for preventing dengue. Prevention and control of dengue and DHF currently depends on controlling the mosquito vector. The most effective way is the larval source reduction, i.e., elimination of water-holding containers that serve as the larval habitats for *Aedes* mosquitoes. The microbial larvicides used for mosquito control are *Bacillus thuringiensis* var *israelensis* (Bti) and *Bacillus sphaericus* (Bsph). *Bacillus thuringiensis israelensis* (Bti) was shown to be effective in reducing the number of immature *Aedes* in treated containers. However, further studies of Bti in combination with other insect viruses and other strategies to control dengue vectors are warranted. The sterile insect technique is an environmentally friendly, species-specific population control method. These two biological insecticides due to their environmental safety and specificity to mosquitoes have become mosquito control agents of choice almost throughout the world. Humans are the principle source of blood and utensils that can hold water are the primary sites for oviposition and larval development. *Aedes* breeds primarily in man-made containers like earthen jars, metal drums, used automobile tires and other items that collect rain water. In Southeast Asia, both of *Ae. aegypti* and *Ae. albopictus* are important vectors of Dengue fever (DF) and dengue hemorrhagic fever (DHF). Nearly about 87% population is at risk.

I. INTRODUCTION AND BACKGROUND

Dengue is an acute mosquito-borne viral infection that places a significant socioeconomic and disease burden on many tropical and subtropical regions of the world. It is currently regarded as the most important arboviral disease internationally as over 50% of the world's population live in areas where they are at risk of the disease, and approximately 50% live in dengue endemic countries. The main arthropod vector for transmission of the dengue viruses is *Aedes aegypti* (*A. aegypti*). The second, less effective vector, *Aedes albopictus* (*A. albopictus*), feeds on multiple species of vertebrates, but has still been shown to be responsible for some dengue transmission.

In Pakistan, the two most striking species are; *Aedes aegypti* and *Ae. albopictus*. Their distribution and relative abundance



In the Eastern Mediterranean region, dengue is classified as an ‘emerging disease’. Cases have only been officially reported to WHO for the last 2 decades, during which time three countries – Saudi Arabia, Pakistan, and Yemen – have had multiple outbreaks. For example, In Pakistan, first outbreak of Dengue hemorrhagic fever was reported in 1994 from Karachi with no confirmed deaths but in 2011, the city of Lahore in Pakistan experienced a major dengue outbreak associated with 21,685

confirmed cases and 350 deaths, mainly due to DENV-2. Observed climatic changes, including increased average global temperature and increased humidity, theoretically increase the epidemic potential of dengue. Based on long-term average vapor pressure prediction, climate change and population projections, approximately 50%–60% of the global population would be living in areas at risk of dengue transmission by 2085.



The current study was designed for laboratory and semi field evaluation of Bti WDG Vectobac 3000 ITU / mg as biological larvicides against field collected 4th instars of *Aedes albopictus* from Lahore. To date, this study is the first report of its kind against Asian dengue vector from Lahore Pakistan.

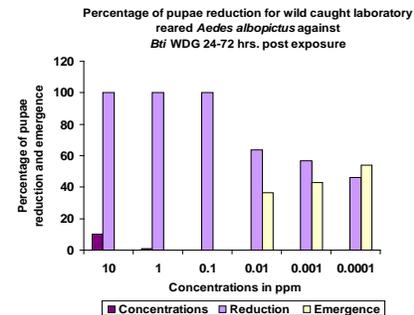
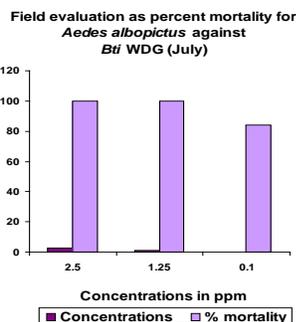
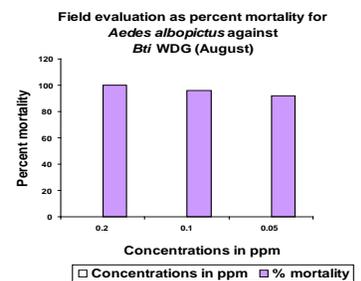
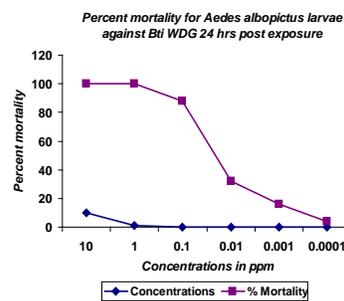
Symptoms and Treatment for dengue

The principal symptoms are high fever, severe headache, backache, joint pains, nausea and vomiting, eye pain, and rash. Generally, younger children have a milder illness than older children and adults. Dengue hemorrhagic fever is characterized by a fever that lasts from 2 to 7 days, with general signs and symptoms. This stage is followed by hemorrhagic manifestations tendency to bruise easily or other types of skin hemorrhages, bleeding nose or gums, and internal bleeding. There is no specific medication for treatment of a dengue infection. Persons who with dengue should use analgesics (pain relievers) with acetaminophen and avoid those containing aspirin. They should also rest, drink plenty of fluids, and consult a physician.

Mosquito Rearing and Maintenance:

Aedes larvae were reared in the laboratory under standardized conditions at 27°C±3°C and 80%±3% Relative Humidity (R H). Larvae for colony and experiments were maintained in batches of 200, each in 1200 ml of deionized water.

FEEDING: Each batch was mixed with 0.02% yeast solution then for larval growth finely coursed fish food was applied on the surface of water up to pupae formation (9-12 days of post hatching). Adults emerging within 24 hours were maintained in cages 30 cm³ and fed on 10% glucose solution and water. Females (4-6 days post emergence) were fed periodically on restricted albino mice to maintain the colony.



II. CONCLUSION AND FUTURE PRESPECTIVE

There has been no promising solution for sustainable control of Dengue vectors. The only effective way is: The trend for dengue vector control has shifted from insecticides to biological control such as use of biological agents (Bti) carried out in this study. In conclusion, *Aedes albopictus* (Asian dengue vector) found highly susceptible to Bti WDG microbial control agent, more effective for field studies. Furthermore, the minimum effective dosages to kill 100% of the larval population in a habitat have shown to be extremely low and product may have great potencies for inclusion in integrated vector management operations. Further studies for integrated control are recommended for *Aedes* mosquitoes to control dengue disease.

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Analysis of TFL1 mutants in Arabidopsis

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Abstract- In Arabidopsis (Flowering Plant) shoot apical meristem (SAM) is converted into inflorescence meristem. Study has been revealed that there are various genes which control this transition. Two types of inflorescence are found in flowering plants: Determinate and indeterminate. Terminal Flower 1 (TFL1) gene is one of those genes which play key role for the maintenance of inflorescence meristem. Tfl1 gene regulates flowering time and maintains the fate of inflorescence meristem. Arabidopsis genome contains six TFL1 like genes. TFL1 belongs to a small gene family. In this study a comparison between TFL1 wild type and Tfl1 mutant is conducted according to which TFL1 is able to convert the indeterminate inflorescence to determinate. TFL1 is believed to be a controller or more specifically a regulator of inflorescence architecture and flowering time. TFL1 is believed to be a negative regulator of flowering time so if mutations are introduced in it the flowering time will be accelerated.

I. INTRODUCTION

Post-embryonic life of flowering plants is divided into two distinct phases: an initial vegetative phase, during which leaves with associated lateral shoots or paraclades are produced, and a subsequent reproductive phase, during which flowers are produced. The transition between the two phases is caused by a complex process termed floral induction, which is controlled by both endogenous and environmental signals. In Arabidopsis, a facultative long-day plant, flowering is promoted by long photoperiods, vernalization (transient exposure to cold), and higher growth temperatures (Napp-Zinn, 1985; Martínez Zapater and Somerville, 1990; Koornneef et al., 1995). In angiosperms, the floral transition marks the progression from vegetative to reproductive growth, and thus represents a major change in plant development. This transition is regulated by both inhibitory and promotive graft-transmissible factors that are produced in the leaves and roots and transported to the shoot apical meristem (Evans, 1960; Lang et al., 1977); the arrival of these substances at the shoot apex is correlated with the establishment of the inflorescence meristem and its new developmental patterns. Single gene mutations that affect either the signaling process or the response of the apical meristem have been described in several plant species. For example, in pea the production of floral signals involves the sterile nodes (Sn) and day neutral (Dne) gene products, whereas the vegetative (veg) and late flowering (Lf) gene products influence the sensitivity, or responsiveness, of the apical meristem to these signals (see Murfet, 1990; Poethig, 1990). The signal/response mechanism that regulates the floral transition provides a situation well suited for a molecular analysis of shoot apical meristem function.

TERMINAL FLOWER1 (TFL1) controls flowering time and inflorescence architecture ([Shannon and Meeks-Wagner, 1991](#); [Alvarez et al., 1992](#)). As mutations in *TFL1* accelerate flowering time, *TFL1* is believed to be a negative regulator of flowering time ([Simon et al., 1996](#)). In addition, the inflorescences of *tfl1* mutants are converted from indeterminate into determinate; they produce reduced numbers of flower buds and possess terminal flowers at the shoot apices ([Shannon and Meeks-Wagner, 1991](#); [Alvarez et al., 1992](#); [Bradley et al., 1997](#)). In contrast with the loss-of-function phenotypes, overexpression of *TFL1* delayed flowering and prevented the IM-to-FM transition, resulting in the extension of the IM stage, the production of bract-like leaves, and the proliferation of secondary flowers ([Ratcliffe et al., 1998](#); [Hanzawa et al., 2005](#)). Thus, *TFL1* is a negative regulator of the phase changes of the SAM from vegetative to reproductive and from IM to FM.

Expression of *TFL1* is restricted to the inner cells of mature shoot meristems. *TFL1* mRNA is very low during the vegetative phase, but its levels are strongly upregulated at the switch to flowering ([Simon et al., 1996](#); [Bradley et al., 1997](#); [Ratcliffe et al., 1999](#)). *TFL1* expression does not extend into the outer cell layers, the epidermis of the shoot meristem, or into primordia, yet it controls the identity of all of these cells. First, *TFL1* determines the identity of primordia made. Second, in *tfl1* mutants, all cells, even the epidermis, ectopically express flowering genes ([Weigel et al., 1992](#); [Bowman et al., 1993](#); [Gustafson-Brown et al., 1994](#); [Bradley et al., 1997](#); [Liljegren et al., 1999](#)).

II. MUTANT TFL1

Mutation in *TFL1* gene of Arabidopsis results in conversion of indeterminate inflorescence to determinate inflorescence. Flowering time of Arabidopsis significantly reduce due to mutation in *TFL1* gene. During the vegetative growth phase of wild-type Arabidopsis, primordia give rise to leaves separated by short internodes and form a compact rosette. In wild type *TFL1* the induction of flowering by appropriate environmental signals, such as long days (LD), results in the apical meristem acquiring an inflorescence identity and generating floral meristem from its periphery. In addition, the shoot elongates (bolts) bearing two or three leaves with secondary inflorescences in axils, above which flowers occur. In mutant *TFL1* Arabidopsis shoot elongates after producing fewer rosette leaves and Limits the development of the normally indeterminate inflorescence by promoting formation of terminal floral meristem. Inflorescence development in mutant *TFL1* Arabidopsis terminates with a compound floral structure consisting of the terminal flower.

Experimental design and Data description

- Introducing mutations in the genome (SOT1)
- Expression analyses of mutant lines
- Comparison of gene expressions in different mutant lines
- Identifying the candidate genes under the effect of mutations through differential gene expression analysis

WT-152	To find the genes under the influence of high TFL1 expression.
WT- <i>tfl</i>	To find the genes, influenced by <i>tfl</i> 1
WT-35STFL	To find the genes under control of higher expression of TFL1.
35STFL-152	Genes under control of SOT1 mutation.
35STFL- <i>tfl</i>	Difference between higher and lower expression of TFL.

We have following data samples:

- Mutant TFL
- Wild type TFL1.
- Over expressed TFL (35STFL)
- 152 → locally developed line derived from 35STFL. It has higher expression of TFL along with another mutation that is yet to be characterized. (SOT1 Mutant X-Rays).

III. RESULTS

- ❑ Dimensions of data: 33602 14.
- ❑ Zero in data: 8416.
- ❑ Zero removed(Dim):25186 23
- ❑ The given data is raw date. We have performed RPKM normalization and after that We have checked the propensity and expression of gene by drawing barplot and log2boxplot.

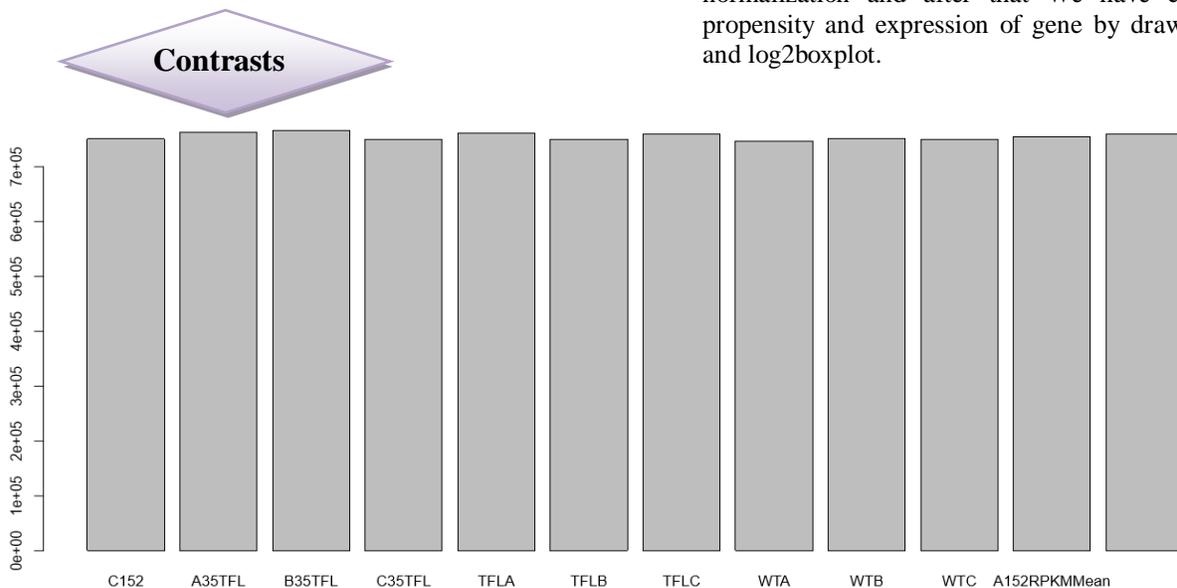


Figure 3. Barplot(rpkm normalized)

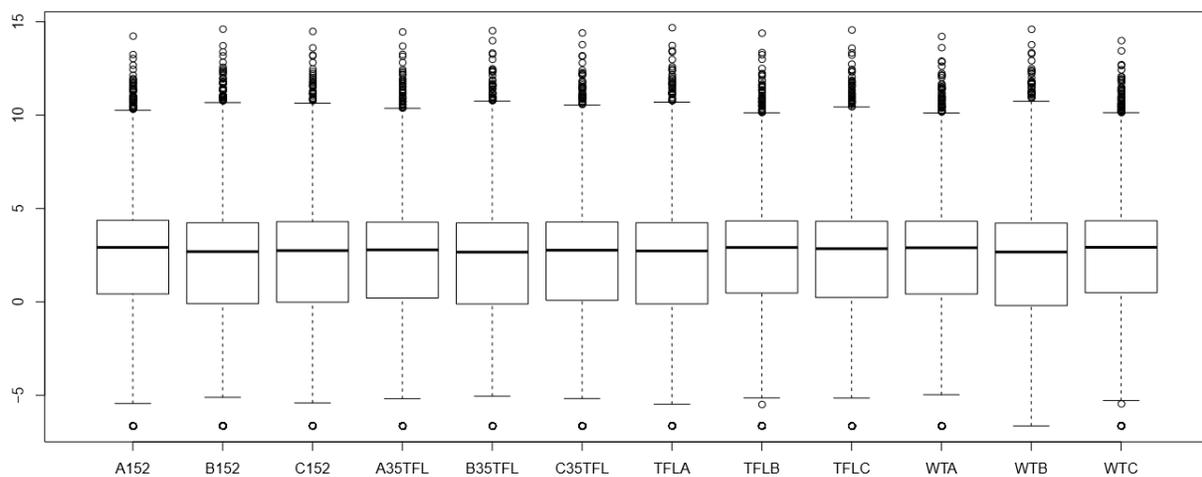


Figure 4. boxplot(rpkm Normalized)

	A152 - WT	A35TFL - WT	TFL - WT
-1	75	53	12
0	24837	24926	25060
1	274	207	114

- In our data there are 273 up regulated Genes divided into 46 clusters on the basis of function, Regulating different pathways e.g. response to steroid hormone stimulus, brassinosteroid mediated signalling , protein serine/threonine kinase activity
- 75 down regulated genes divided into 13 clusters on the basis of function, regulating different pathways e.g. DNA unwinding during replication, Nucleic acid-binding, flavonoid biosynthetic process, Glycoside hydrolase, subgroup, catalytic core.

IV. DISCUSSIONS:

Tfl 1 gene is an intriguing repressor which inhibits or slows down inflorescence. Growth of flowering stems or we can say the flowering in wild type Arabidopsis is indeterminate. So a terminal flower is not formed. To produce a terminal flower in Arabidopsis Tfl1 gene is used as an inhibitor of flowering which we can use to convert indeterminate flowering into determinate flowering which is our requirement. Tfl1 gene regulates the transcriptional repression and shows a down regulation effect in the Arabidopsis.

So by looking into these results we can conclude that tfl1 is a repressor gene that can be used in flowering plants to introduce determinate flowering. In future it can be used as a repressor in plants which are the main producers of food items to maximize the yield of the food products produced by them. We can also use it to inhibit the flowering at the base of the plant so that the flower may be able to get more sunlight in the case of those flowering plants which needs sunlight for inflorescence like sunflower. We can also prune the loss due to indeterminate flowering by regulating the expression of tfl1 gene and also we can control the setting of flowers on a plant. Below are some of the examples of determinate flowering which can be achieved by regulating the expression of Tfl 1 gene.



Determinate inflorescence with acropetal maturation



Determinate inflorescence with basipetal maturation



Determinate inflorescence with divergent maturation

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Assessment of Urban Conurbation along the Development Corridor of Abuja-Keffi, Nigeria

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Abstract- The aim of this research is to examine the physical (landuse) growth along Abuja-Keffi development corridor. Data for the study were Landsat Imagery (ETM) of 2001, Nigeria Sat-1 Imagery of 2007 and Nigeria Sat-X Imagery of 2013. Others included Google earth image of 2014 and Nigeria political shapefile. The study revealed that between 2001 and 2007, portion of Nigeria Federal Capital Territory (FCT), Abuja within the study area grew from 83.23 km² to 99.89 km² while that of Keffi increased from 3.77 km² to 9.13 km². This increase respectively accounted for 16.68% and 58.71% growth rate within 2001 and 2007. The study also revealed that between 2007 and 2013, in Abuja, landuse development along Abuja-Keffi Road increased from 99.89 km² to 158.07 km² while the portion in Keffi grew from 9.13 km² to 22.36 km². The minimum and maximum distance between settlements along the Abuja-Keffi development corridor was 0.21 km and 8.96 km in 2001, while, it was 0.08 km and 3.57 km in 2013. The study concluded that the rate of agglomeration of urban landuse along the Abuja-Keffi development corridor was high, hence the need to manage and control development.

Index Terms- Conurbation, GIS, Remote Sensing and Developmental Corridor

I. INTRODUCTION

Abuja is the present Federal Capital Territory (FCT) of Nigeria. The choice of Abuja as the new capital to replace Lagos the former capital was as a result of its centrality and availability of land for expansion [1,2]. Abuja is 525 km from Sokoto state (Northwest, Nigeria), 736 km from Maiduguri (North-East, Nigeria), 465 km to Calabar (South-South, Nigeria), and 806 km from Lagos (South-West, Nigeria), this shows the centrality of Abuja to the rest of the states in Nigeria. According to COHRE (2008), relocation of the FCT to Abuja became effective on 12th December, 1991. In this circumstance, over 200,000 public sector workers and that of foreign embassies, multilateral and bilateral agencies moved from Lagos to Abuja. Ever since, high spatio-temporal dynamic of landuse have been noticed in the Abuja and its surrounding settlements. The population was reported to have grown from 171,000 in 1981

to 378,671 in 1991, 445,699 in 1996, and 1,405,201 in 2006. Similarly, the land area covered by development was 78.75 km² in 1987, 147.22 km² in 1999 and 416.22 km² in 2007 [1].

Abuja has been reported as the fastest growing city in African [3]. The effect of this has extended to satellite and neighbouring towns bordering the FCT. Some of the satellite towns include: Gwagwalada, Kuje, Kwali along the Abuja-Lokoja Road; Bwari, Dutse, Kubwa along the Abuja-Kaduna Road and New Nyanya and New Karu along the Abuja-Keffi corridor. Rate of landuse development along these corridors were reported to be around 20% to 30 % annually [4]. Cursory observation of these three main development corridors revealed that the Abuja-Keffi development corridor is the fastest growing and accommodate larger Abuja population who reside outside the territorial areas. Hence, this study is an attempt at examining the continuous agglomeration of built-up urban landuse along this corridor.

1.1 AIM AND OBJECTIVES

The aim of the study is to examine the rate of agglomeration along Abuja-Keffi corridor Nigeria, using geospatial techniques. This includes the rate of growth and the possibility of settlements merging along the corridor.

II. STUDY AREA

The study area is a 10km buffer along the Abuja-Keffi 50.78 km road. The area is located within longitude 7° 25' 42.115'' and 7° 57' 9.346'' East and latitude 8° 46' 9.826'' and 9° 8' 17.569'' North of the equator. The study area covered a total of 1292.97 km² (129297.23 ha). This road links Abuja with the six North-eastern States of Borno, Yobe, Adamawa, Taraba, Bauchi and Gombe. It also links Plateau, Nassarawa and Benue States (North Central State) and some part of Kaduna State to the FCT. Major towns/settlements within the study area include: Karu and Nyanya in FCT and Maraba, New Nyanya, Uke in Nasarawa State. The administrative extent of the study area covers Abuja municipal council and part of Bwari area council in the FCT and Karu, Keffi and Kokona Local Government in Nasarawa State, Nigeria (See Fig. 2 and Fig. 3).

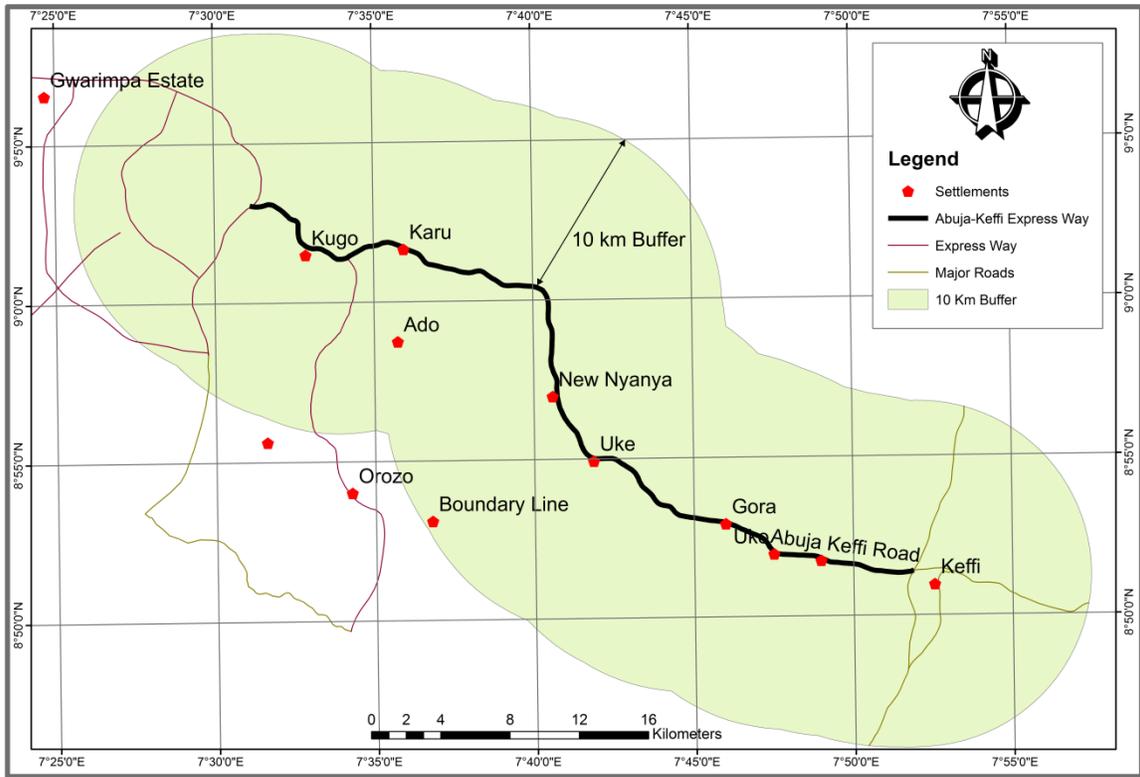


Fig. 1: Map showing 10 km buffer along the corridor under study

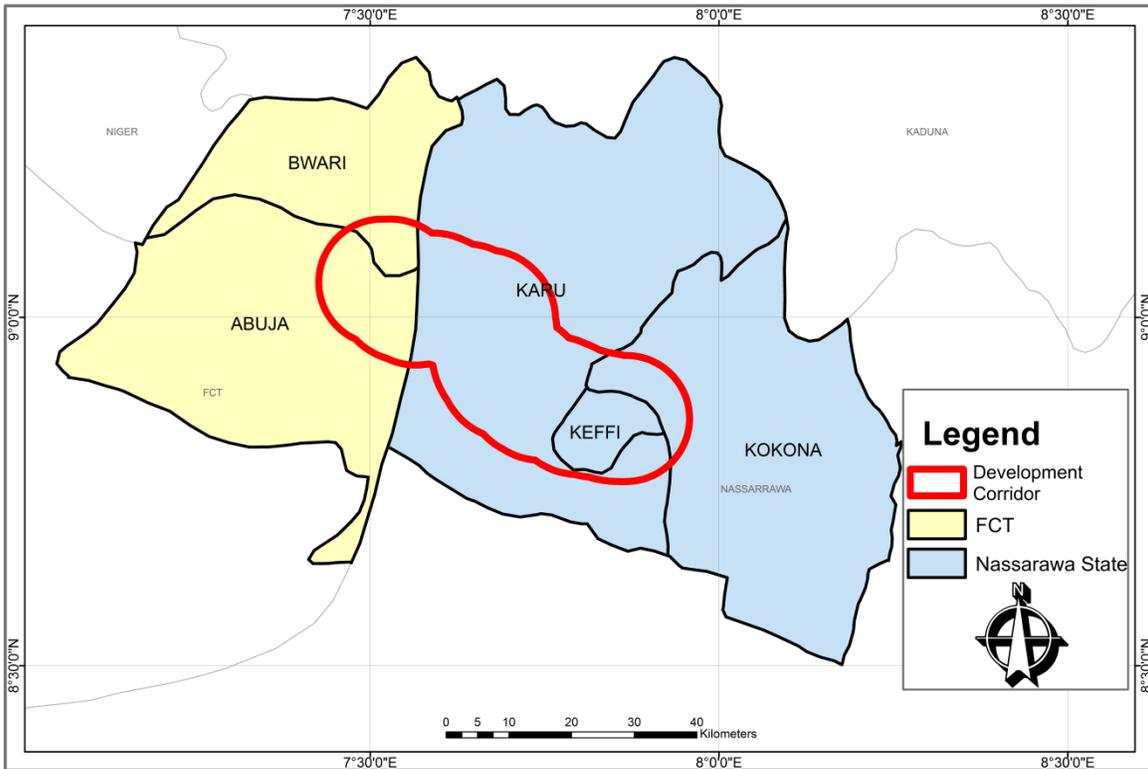


Fig. 2: Map showing the spatial coverage of the study area across the geographical boundary

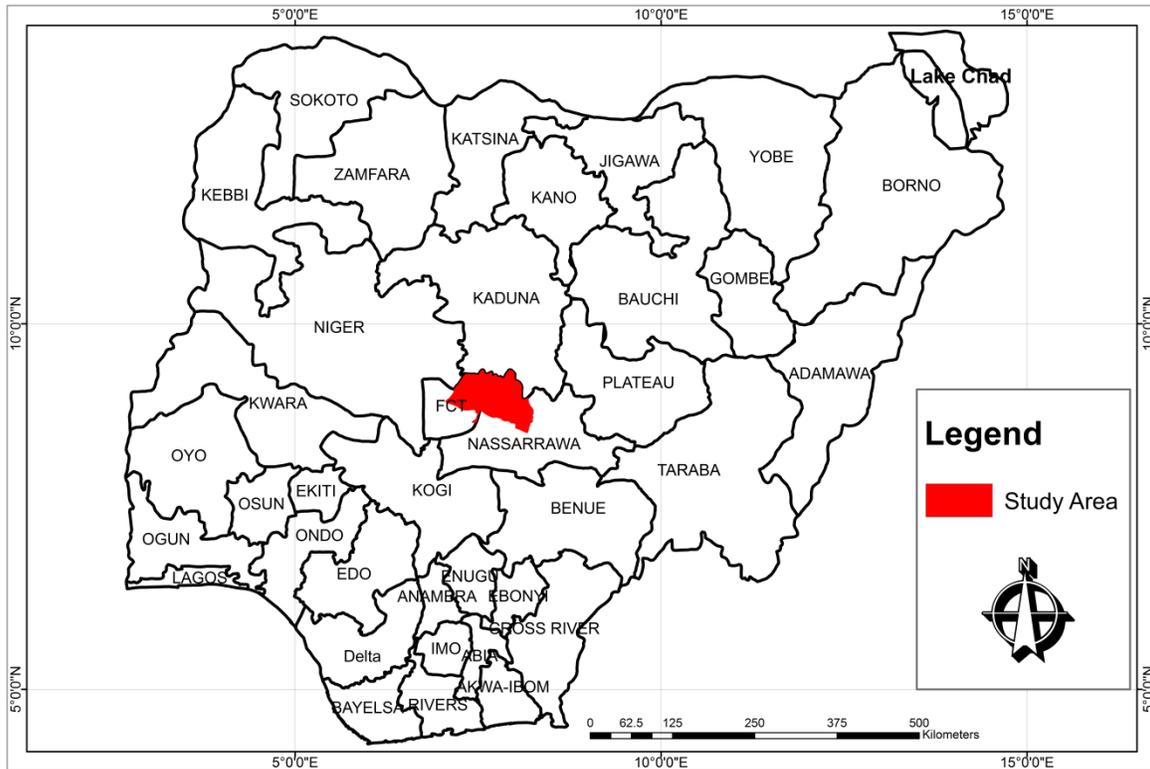


Fig 3: Map of Nigeria showing the study area.

III. MATERIALS AND METHODS

Multi-data Remotely sensed data (satellite images covering the study area) was used for the study. These satellite images include Landsat Enhanced Thematic Mapper (ETM) of 2001; with 30 metre resolution sourced from Global Land Cover Facility (GLCF) an earth observation interface (See Fig.4). Others were Nigeria Sat-1 Imagery of 2007, with 32 metre resolution (See Fig.5) and Nigeria Sat-X with 22 metres resolution (See Fig.6). Both were sourced from Advanced Space Application Technology Laboratory (COPINE). Google earth software was also used for the study.

The shapefile of the study extracted from the 10 kilometre buffer of the Abuja Keffi express road was also used to subset the Images. This shapefile was the determinant of the irregularity of the study area (See Table 1). Nigeria shape file, a populated data showing the 36 state of Nigeria and the FCT and that of all the local government areas in Nigeria was also used for the study. It is important to note that the Landsat 2001, Nigeria Sat-1 2007 and Nigeria Sat-X 2013 were used based on data availability. Some of the software's used for the study includes: Arch GIS 9.3, Microsoft Word 2010, and Microsoft Excel 2010.

Table 1: Showing the data used for the study.

s/n	Data Type	Date of Capture	Resolution	Source
1.	Landsat Imagery (ETM)	2001	30 m	COPINE, OAU
2.	Nigeria Shape file	2006		NCRS, Jos
3.	Nigeria Sat-1 Imagery	2007	32 m	COPINE, OAU
4.	Nigeria Sat-X Imagery	2013	22 m	COPINE, OAU
5.	Google Earth	2014	0.6 m	Google Earth.
6.	Shapefile of the study area	2015		Field Survey, 2015

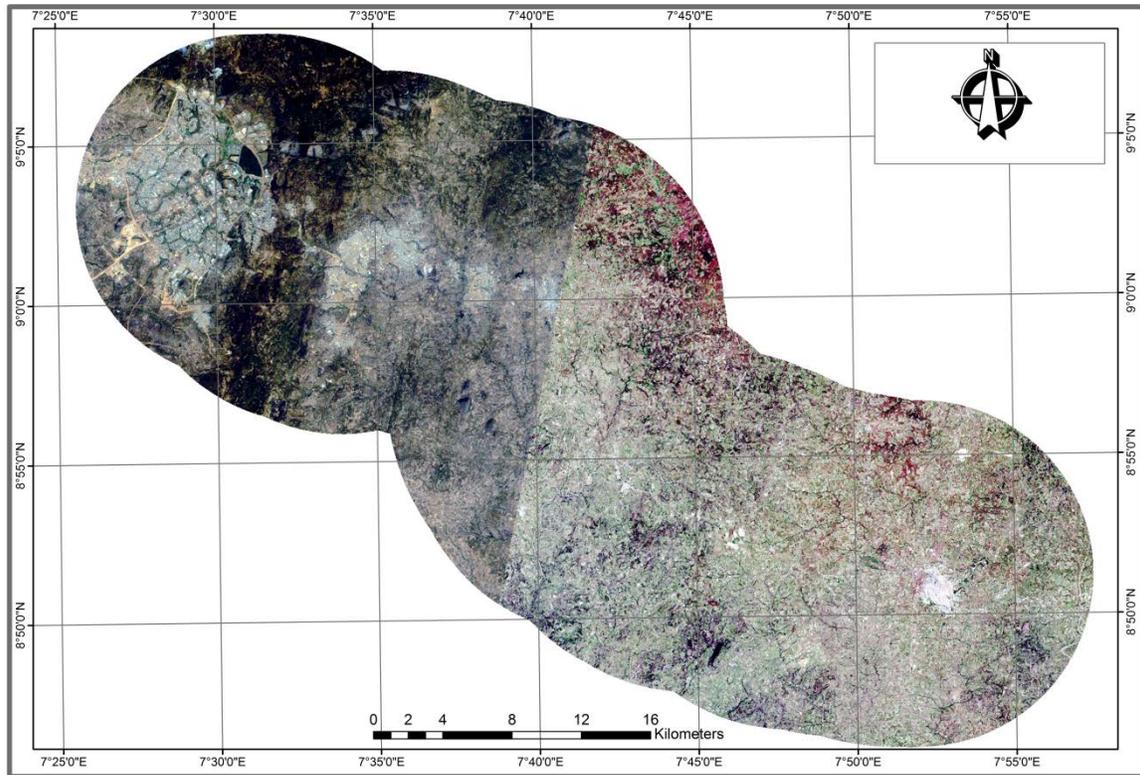


Fig. 4: Satellite image of the study area (Landsat ETM 2001).

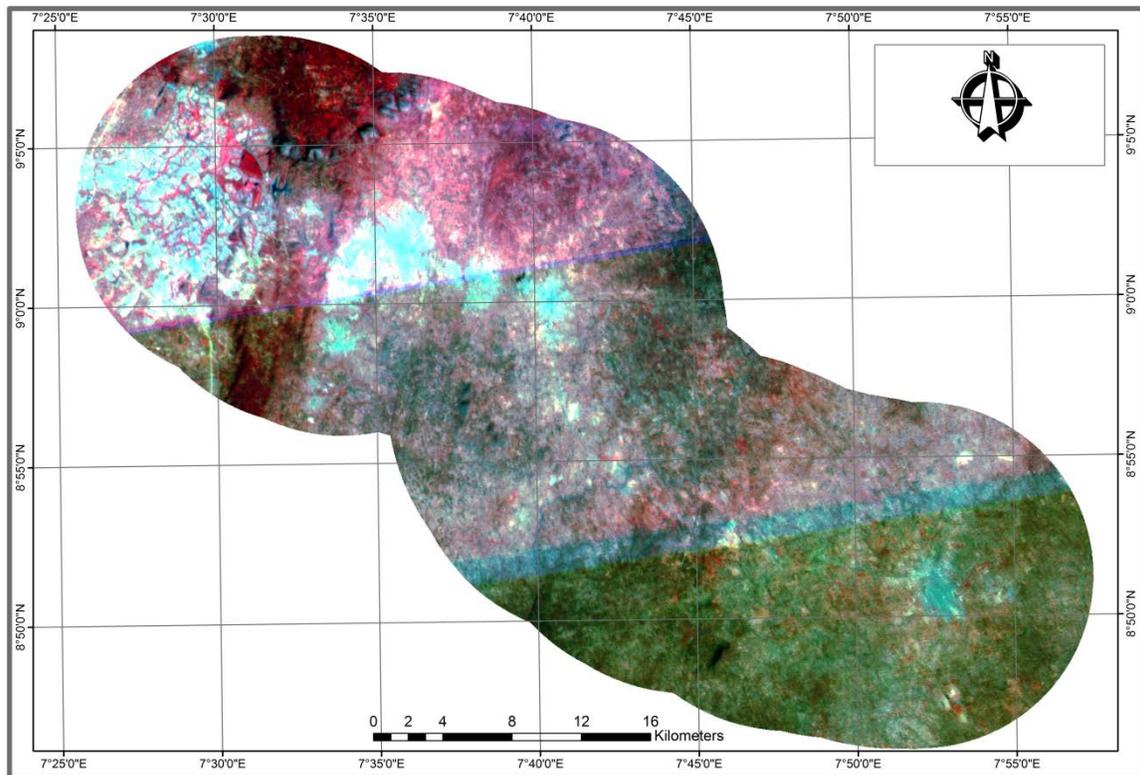


Fig. 5: Satellite image of the study area (Nigeria Sat-1, 2007).

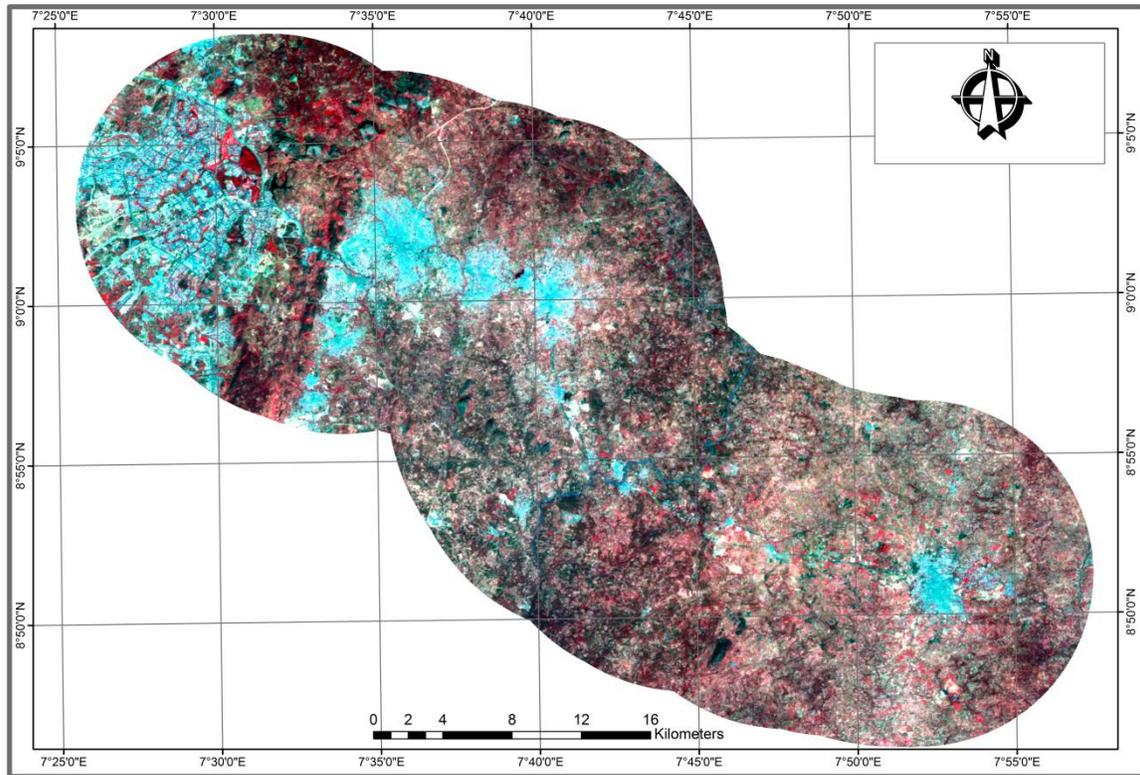


Fig. 6: Satellite image of the study area (Nigeria Sat-X 2013).

3.1 DATA PREPARATION AND ANALYSIS

The study used a multi-step method of data preparations and analysis. The first step utilised the Google earth interface to extract location of towns/settlement along the study areas. The extracted towns and settlements were plotted using Arc GIS 9.3. The second stage was the subsetting of satellite images of the study areas. This was done via the extraction of the boundary of the FCT and that of Nassarawa state. This was done to reduce the bulky nature of the data.

The third stage involves the importing of the Nigeria Sat-X image into the Arc GIS 9.3 where road network in the study area were extracted. The choice of the data was due to its clarity in terms of spatial resolution. The study also discovered that most of the settlements along the developmental corridor were within 10 km radius of the major road and this serves as the bases for delineation. The Abuja-Keffi road was extracted and 10 km buffer was created as shapefile. This forms the area under study (refer to Fig. 1). The created shapefile (Boundary of the study area) was used in the subsetting of the three medium resolution satellite images used for the study. Information extracted from those images (Landsat 2001, Nigeria Sat-1 2007 and Nigeria Sat-X 2013) are built up areas and distance between one town or settlement to another. The extraction were carried out through onscreen digitization where both the built-up areas and the road between one settlement to another were identified and extracted. The extracted data were overlay to display the graphical illustration of the changes over time. The Google earth data was used in for ground thruthing and populating of settlement names (See figure 7)

WORK FLOW

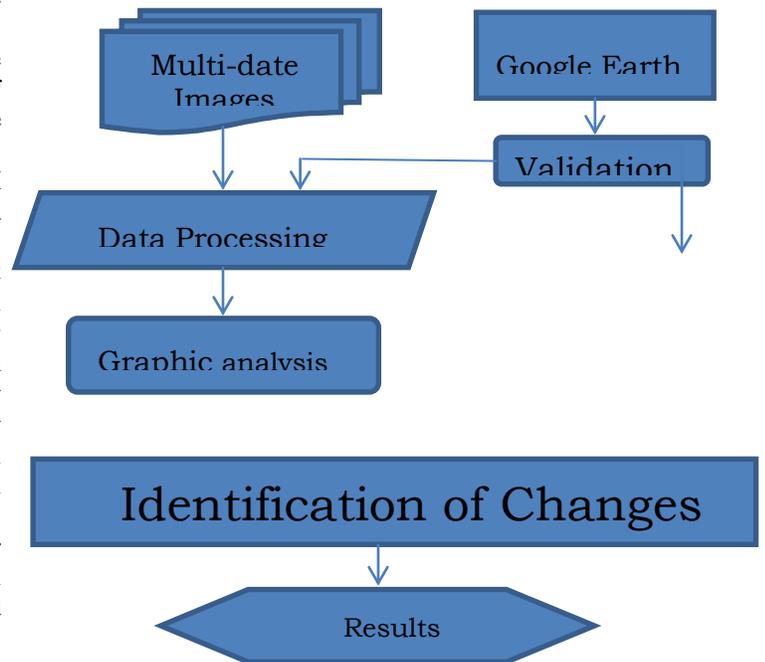


Fig. 7: Showing the flow diagram of the study.

IV. RESULT AND DISCUSSION

Growth of settlements along Abuja-Keffi Road

The study revealed that between 2001 and 2007, the portion of the FCT within the Abuja-Keffi Road grew from 83.23 km² to 99.89 km² while that of Keffi was 3.77 km² to 9.13 km². This established that about 16.68% and 58.71% growth within the years under study is witnessed in Abuja and Keffi respectively. The portion of Abuja that is within the study area grew from 99.89 km² in 2007 to about 158.07 km² in 2013, while Keffi

grew from 9.13 km² to 22.36 km² within the same range of 2007 to 2013. This implies that the portion of the study area in Abuja grew at an average of 9.70% per annum while that of Keffi was at 2.21%. This result revealed that rate of growth in Abuja between 2007 to 2013 has surpasses that of 2001 to 2007 while there was decline in the growth of Keffi between those years compared to Abuja. This corresponds to the finds most researcher that urban areas of developing countries are growing more than the smaller towns.

Table 2: Showing the attributed change within the developmental corridor under study.

Settlements	2001	2007	2013	Ch 2001-2007	% Ch 2001-2007	Ch 2007-2013	% Ch 2007-2013
1. Keffi	3.77	9.13	22.36	5.36	58.71	13.23	59.17
2. X1	0.10	0.14	0.42	0.04	28.57	0.28	66.67
3. X2	0.02	0.04	0.13	0.02	50.00	0.09	69.23
4. Uko	0.08	0.15	0.95	0.07	46.67	0.08	84.21
5. Gora	0.05	0.14	0.45	0.09	64.29	0.31	68.89
6. X3	0.00	0.04	0.45	0.04	100.00	0.41	91.11
7. X4	0.00	0.13	0.42	0.13	100.00	0.29	69.05
8. X5	0.21	0.27	0.66	0.06	22.22	0.39	59.09
9. X6	0.18	0.42	0.87	0.24	57.14	0.45	51.72
10. Uko	0.09	0.28	0.98	0.19	67.86	0.70	71.43
11. New Nyanya	0.33	0.82	3.33	0.49	59.76	2.51	75.38
12. X7	0.00	0.63	2.08	0.63	100.00	1.45	69.71
13. X8	0.00	0.00	1.25	0.00	0.00	1.25	100.00
14. Jikwai	0.65	1.18	5.16	0.53	44.92	3.98	77.13
15. Karu, Nyan y	33.89	43.68	76.46	9.79	22.41	32.78	42.87
16. Abuja	83.23	99.89	158.07	16.66	16.68	58.18	36.81

*Names of settlements represented by X1 to X8 could not be found on the Google map.

The study further revealed that the settlement with the minimum growth in the study area between 2001 and 2007 was 16.68% while 67.86% was the maximum growth within the year. Between 2007 to 2013, the settlement with the minimum growth grew at the rate of 36.81% while the maximum growth was 91.11%. The result of the findings also revealed that the average growth of settlement under study between 2001 and 2007 was 44.93% while 65.99% was recorded between 2007 to 2013. The study further revealed that about 58.33% of the settlements in the study area were growing above the average growth rate between 2001 and 2007 while 62.50% of the settlements were discovered to be growing above the average growth between 2007 and 2013. (See Table 3).

<i>Minimum Growth Rate</i>	16.68 %	36.81 %
<i>Maximum Growth Rate</i>	67.86 %	91.11 %
<i>Average Growth Rate</i>	44.93 %	65.99 %
<i>Above Average Growth Rate</i>	58.33 %	62.50 %
<i>Number of new settlement</i>	5	1

Table 3: Analysis of the growth along the development corridor.

2001-2007	2007-2013
-----------	-----------

The pattern of growth within the study area.

The study further revealed that the settlements within the study area were growing in a linear direction on the Abuja-Keffi road. This pattern was presented Fig. 8, Fig. 9, Fig. 10 and Fig. 11.

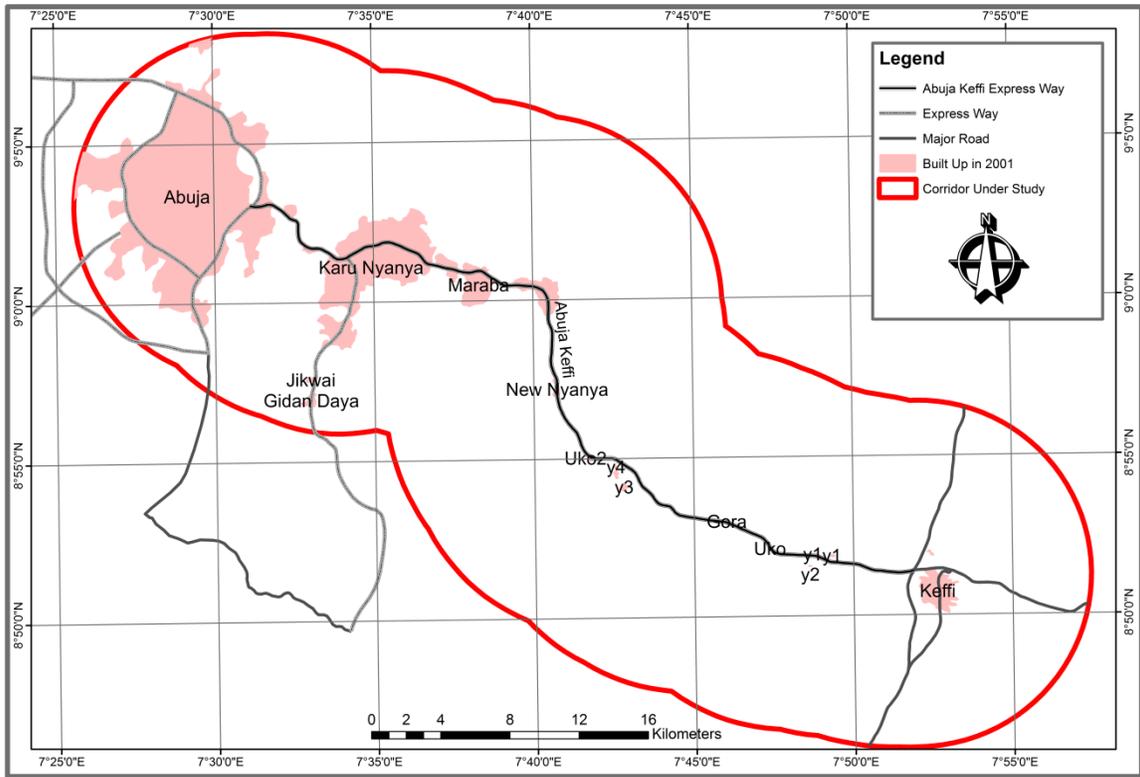


Fig. 8: Built Up area along the developmental corridor in 2001

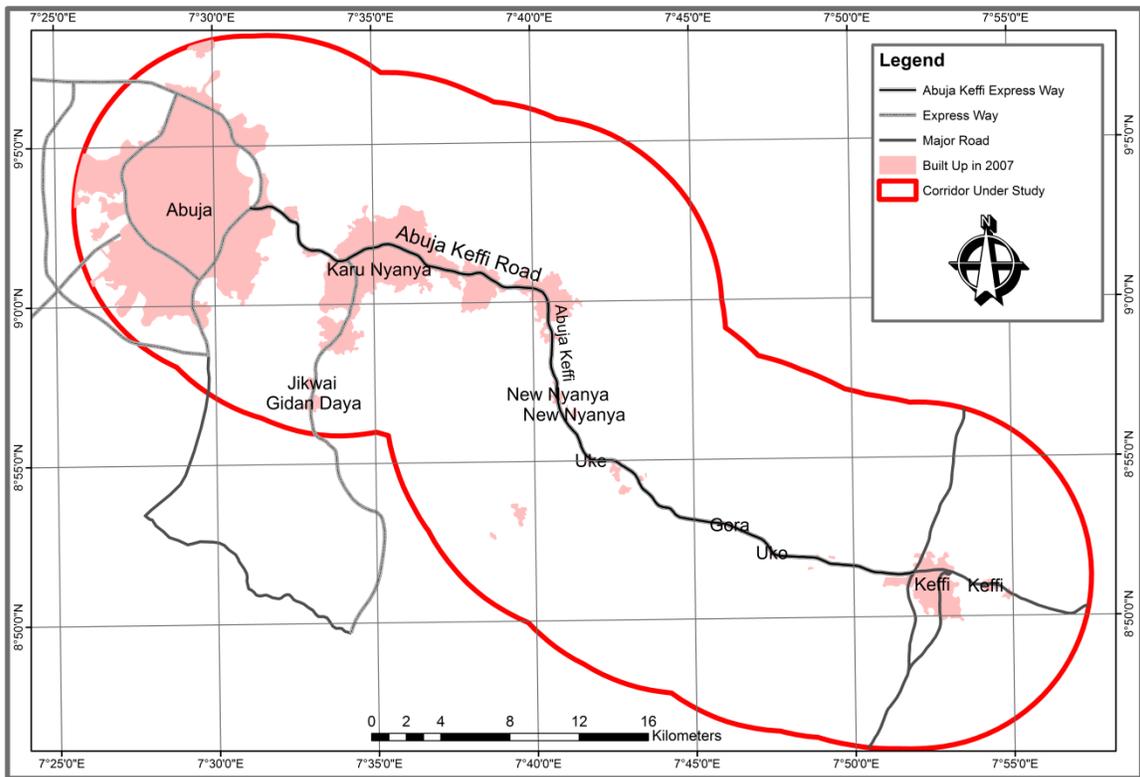


Fig. 9: Built Up area along the developmental corridor in 2007

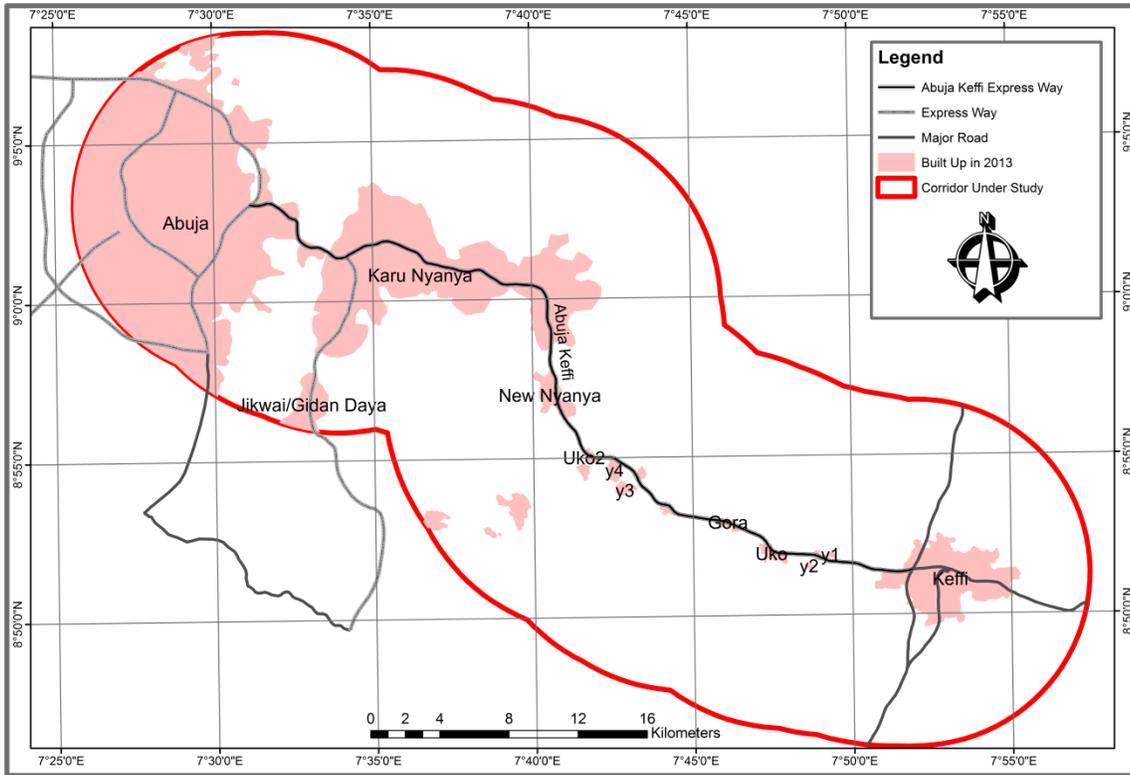


Fig. 10: Built Up

area along the developmental corridor in 2013.

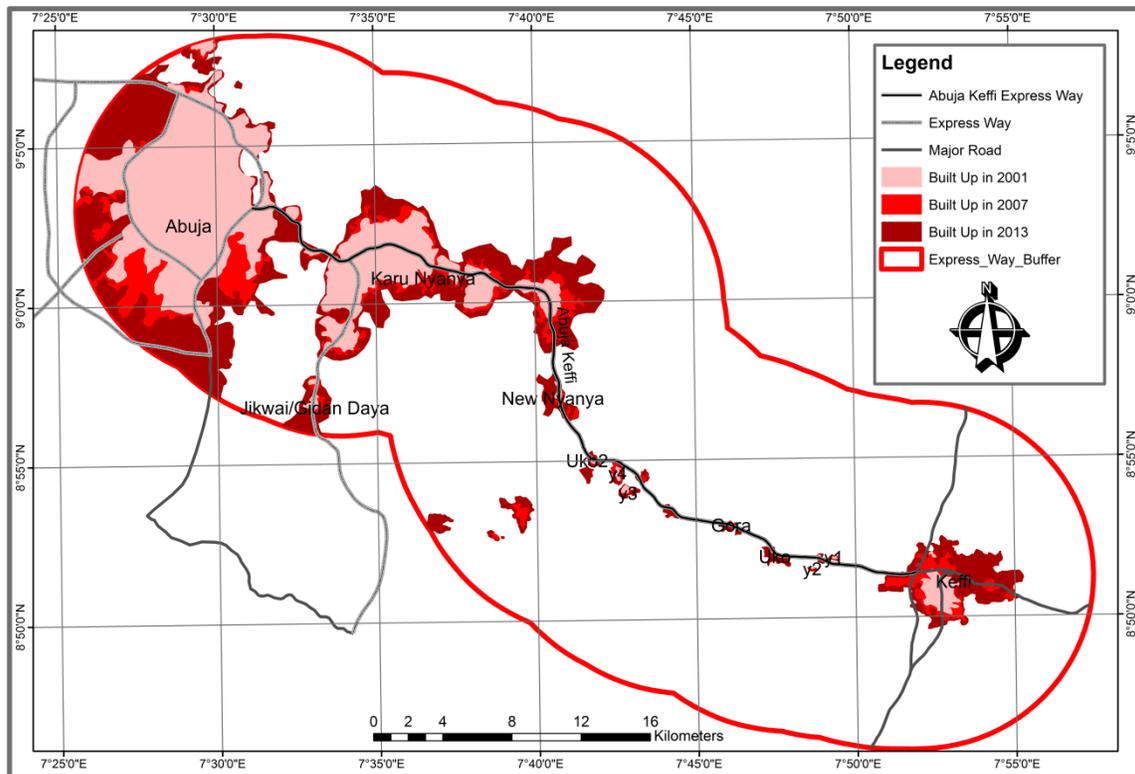


Fig. 11: Overlay of the built up areas along the developmental corridor for 2001, 2007 and 2013.

The study also revealed that the minimum and maximum distance between settlements along the corridor under study in 2001 is 0.21 km and 8.96 km. It was also revealed that in 2013, the minimum and maximum distanced reduced to 0.08 km and 3.57 km respectively. It was further discovered that the average distance between settlements along the developmental corridors also reduced from 2.72 in 2001 to 1.78 in 2013.

The study also discovered that in 2001, 32.68 km out of the 50.78 km corridor was not developed but as of 2007 and 2013, only 27.32 km and 17.76 km along the corridor remain un-built. The study also discovered that the standard deviation of the distance between settlements along the corridor was reducing. This signifies that the distance within settlement is more clustered around the mean in 2013 compared to the other years. The result of the study also shows that the number of nuclear settlements in 2001 was 12 in while 14 and 10 were recorded in 2007 and 2013. This revealed that between 2001 and 2007, 2 new settlements were added to the stock while in 2013, 8 settlements were merged together. (See table 4. and Fig 11)

Table 4: Distance between settlements along Abuja-Keffi Road

	2001	2007	2013
<i>Minimum Distance</i>	0.21 km	0.12 km	0.08 km
<i>Maximum Distance</i>	8.96 km	5.12 km	3.57 km
<i>Average Distance</i>	2.72 km	1.95 km	1.78 km
<i>Sum of Distance</i>	32.68 km	27.32 km	17.76 km
<i>Number of Settlement</i>	12	14	10
<i>Standard Deviation</i>	2561.42	1331.39	992.21

A view of the map on Fig. 11, revealed that most of the settlements between Abuja and New Nyanya have already merger. Indeed, a visible demarcation between these settlements is very difficult to identify. On the other land, the major land uses around the Keffi axis of the study area were dominated by agricultural land uses and undeveloped institutional land uses. This justifies while there were undeveloped areas in the Keffi axis of the study area. Another reason for the undeveloped areas along the Keffi axis could be attributed to land reservation either for future development or the activities of land speculators. One major implication of this conurbation is the traffic bottle neck witnessed along the corridor during the hours of 6 am to 9 am in the morning and 4 pm to around 9 pm in the evenings. The major reasons for this development were the result of the large FCT worker whom could not be accommodated within the FCT either due to high cost of rent or housing shortage.

V. SUMMARY OF FINDINGS

The study using the technique of Remote Sensing and Geographic Information System had revealed the spatial dynamic

of settlement along the Abuja-Keffi developmental corridors within the last 12 years understudy. The study was carried out using three multi-data satellite images of 2001, 2007 and 2013. The study revealed that the study year between 2007 to 2013 witnessed a high average growth rate of 65.99% compared to between 2001 and 2007. It was also revealed that about 8 settlements merged between 2001 to 2013. It was also discovered that the sum of undeveloped land between the Abuja and Keffi was around 32.68 km in 2001 but reduced to 17.76 km in 2013 with the average between settlements reducing from 2.72 km to 1.78 km respectively. This study concluded that the level of urban conurbation along the Abuja-Keffi developmental corridor moving at a faster rate than expected. However, the activities of land speculator and that of open space related uses prevented the corridor from merging to a single unit.

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Enhancement WPA2 protocol with WTLS to certify security in large scale organizations inner access layer Wi-Fi media associated devices

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Abstract- Now a days Wireless networks are very famous the reason is user friendliness of Wi-Fi, within 20 meters any one can connect any Wi-Fi device to network without any wire. Wi-Fi use 2.4gigahertz UHF and 5gighertz range. Mainly devices connect through wireless access points. This is the main entrance of network attackers to large scale organizations. Network security is very important in large scale organizations. Wireless security is help to prevent unauthorized access to the network via wireless access points. Increment of thousands of Wi-Fi users, need to improve wireless security. This Wi-Fi network attacks always focus on large organizations, now organizations consider about their wireless network security. The research explain how increase Wi-Fi security in large scale company networks using WPA2, WTLS, AES Encryption, IP-VPN and HTTP Proxy Servers. Research paper explain things that need to include in new protocol and discussion about the most efficient and fast way to transfer data through the wireless network in a large scale organization has been discussed.

Index Terms- wireless, network, security, organization

I. INTRODUCTION

Wireless technology is the best dynamic, high mobility GO-TO connectivity in the rapidly changing Technological world. Increasing bandwidth, freedom and flexibility of the communication method is making it the best communication infrastructure by choice. The wireless technology provides the capability to conduct commerce at any place and with any individual, where communication mechanism is established. As the popularity of the connectivity medium it has been adopted to small, medium and large sized organization. IN Network Engineers perspective regardless of the organization size, Figure 1 shows the diagrammatic view of pyramid architecture of the network. The network is falling under to a pyramid top to bottom (Core layer, Distribution layer and Access Layer), which is further illustrated in the **Appendix [A]**.

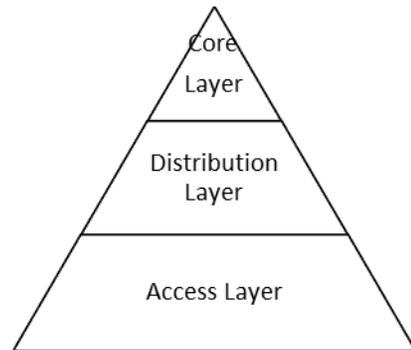


Figure 1: Pyramid architecture of a network

The client's connectivity to the network is done through the access layer and Wireless connectivity devices also falls under to this category. Large scale organizations secure that the pyramid architecture is properly established and always maintain the architecture because of the complexity will increase of the network. The core layers are tightly coupled with security countermeasures such as perimeter firewalls, intruder prevention systems which is further described in **Appendix [B]**. Even though the counter measures can avoid attackers who are trying to penetrate the large scale organization structure from other internet connectivity methods such as wired, in Wi-Fi connectivity clients can be a threat as the clients are dynamically changing with increasing number of established connections in the networks' inner access layer devices are not which is static. Which make this connectivity method more vulnerable that is a main drawback to this high scale organization and considering about networking whole as a theory. WPA/WPA2 are the most commonly used Wi-Fi Connection protocols and most of the industrial routers which supports Wi-Fi, follow these connection establishment protocols to establish a connection. Popularity of the connection protocols have made attackers to eavesdrop to these networks and now it has been proven that these protocols are not 100% bullet proof. How to secure a large scale organization from attackers? How to make a secured connection to a user with proper security counter measures by Through this research paper authors consider existing WPA or WPA2 connections are not further reliable connection protocols and will suffer exploitation. Therefore, authors suggest an updated WPA2 protocol a better replacement in encryption method and adding a Transport Layer security to the Protocol, and a networking concepts all together to make sure the security of the High scale

organization is protected in a user's and organization's perspectives.

II. NETWORK SECURITY ENCRYPTION MECHANISM.

What is encryption?

Encryption is a mechanism that encode message or information in a way that unauthorized parties can't intercept. Encryption does not of itself prevent interception. Its rejects the message content to the interceptor. In encryption process intended data packet to communicate is referred as plaintext. It use encrypting algorithm for encryption. That algorithm generates cypher text could read by decrypting the message. An encryption scheme usually uses a pseudo-random encryption key generated by an algorithm. Only the authorized receivers can decrypt the message with the key provided by the originator, but not to unauthorized interceptors.

Computer network encryption.

Computer network encryption could be known as the process of encrypting or encoding packed transmitted or communicated over a computer network. The primary purpose of network encryption is to protect the secrecy of digital data stored on computer systems or transmitted through the Internet or other computer networks.

It is a broad process that includes various tools and techniques to ensure that the messages are unreadable when in transition between two or more network nodes.

Network transfer layers are in OSI model layer 3 and 4. These two layers responsible for connectivity and routing between sender and receiver. Using the existing network services and security application soft wares, network encryption is invisible to the end user and operates without depending on any other encryption processes used. Data is encrypted only while in transmission as plaintext on the originating and receiving hosts. Plaintext in cryptography is ordinary readable text before being encrypted in to or cypher text or after being encrypted. Network encryption is implemented based on a set of open standards that given by IETF. Network encryption products and services are offered by companies such as Cisco, Motorola, and Oracle.

Following are the vital elements that provided by the modern encryption algorithms to security assurance of IT systems and communication.

- **Authentication:** the origin of a message can be verified.
- **Integrity:** proof of the message contents have not been changed since it was sent.
- **Non-repudiation:** the sender of a message cannot deny sending the message.

Plaintext is encrypted using an encryption algorithm and an encryption key. Today's encryption algorithms are divided into two categories.

1. Symmetric.
2. Asymmetric.

Symmetric-key ciphers use same key to encrypt and decrypt a message or file. The most widely used symmetric-key cipher is Advanced Encryption Standard (AES). This is mainly created for the government classified information. Symmetric-key is much faster than asymmetric encryption. In this algorithm sender must send back the key used to encrypt the data with the receiver before he or she can decrypt it. According to this requirement to securely distribute large number of data needs large number of keys. That means most cryptographic processes load happen in symmetric algorithm.

Asymmetric cryptography (public-key cryptography), This uses two different but mathematically linked keys. One is public and other is private. The public key can be shared with everyone. RSA is the most widely used asymmetric algorithm. The reason is in RSA both the both keys can encrypt a message. The opposite key that used to encrypt a message is used to decrypt it. Confidentiality, integrity, authenticity and non-reputability of electronic communications assures by this method.

WEP and WPA encryption.

WEP (Wireless Encryption Protocol) and WPA (Wireless Protected Access) are the encryption protocols that used for wireless networks. WEP is much older and much less secure than WPA. Therefore WPA is relatively easy to crack. But WEP is the most commonly used wireless security algorithm in the world. The keys used by WEP is implemented correspondingly are 64-bit, 128-bit, and 256-bit. The Wi-Fi Alliance officially retired WEP in 2004.

WPA is the direct replacement for the WEP. Same wireless network is possible to run only one protocol. These two protocols cannot run on same network same time. Same many protocol versions can run. There are wireless routers that supports the hybrid WPA with WPA2. The keys used by WPA and WPA2 change dynamically. In order to that it is impossible to intercept. WPA (IEEE 802.11i standard) consists with message integrity checks a technique that can determine if the intruder captured or altered the packets passed between the access point and client. TKIP (Temporal Key Integrity Protocol) employs key for per packet system that is more secure key system than WEP. In 2006 WPA outdated by WPA2. In WPA2 came up with compulsory use of AES (Advance Encryption Standards) algorithms and the introduction of CCMP. CCMP mechanism came as a replacement for TKIP. Security vulnerability in WPA2 is limited than WPA. WPA2 security vulnerabilities are limited among almost business level networks. Regarding the home networks it's more than secure to implement. But intrude through Wireless Protected Setup (WPS) is possible.

Background and Related Works

With the day by day expansion of technology and the economy strength of many countries, so many huge firms created in all over the world. As well as in past decade, number of users in internet had been increased rapidly. Big organizations communicate and exchange their information and personal detail with other related firms throughout the world by using internet. For this they create intranet among them. When doing this, the biggest problem those firms faced is securing their network from intruders and hackers. As an answer for that question plenty of intruder prevention systems and methods had been introduced.

Some of those are WPA, WPA2 as an encryption methods and key exchange methods. But these methods or system couldn't prevent each and every cyber-attacks on the internet.

This research paper explain WPA2 problems, versions and enhancements that have done solve the WPA major weakness. Also WEP, WPA as all wireless security protocols. Today most of hackers know how to go through those technology. Disadvantages in this paper it is only concern about WAP and WPA2. In New research, it concern about best way to protect Wi-Fi network using technologies like Digital Signature, Encryption, Key exchange, LAN Security as well as WEP, WAP, WPA2 [1].

This research is very close to new research, this is a military grade research this PKI system is invented to military, security of the systems and the networks that they connect to has very important. In this System use data encryption, and digital signature as well as the WPA and WPA2.this system is very satisfied system but disadvantage in here is it doesn't use WPE, LAN security methods and special case is this is not a home network product this is a large scale government product [2].

Security Improvement of WPA 2: Wi-Fi Protected Access 2, research group has discussed about WPA and WPA2 (Wi-Fi Protected Access) protocols that created to secure wireless networks. Wired Equivalent Privacy (WEP) and many sophisticated authentication and encryption techniques have been discussed in this paper. This paper present benefits of WPA2, its vulnerability & weakness and also present solutions that will improve Wi-Fi Protected Access 2 (WPA2) protocol. Also project group has talked about Hash function, DH algorithms and they have explained how those going to work on a Wi-Fi network [3].

Exploring the Weak Links of Internet Security: A Study of Wi-Fi Security in Hong Kong, research group investigates Wi-Fi usage, Wi-Fi security and the knowledge of it in Hong Kong. Research group has discussed about Internet security Internet access Wi-Fi security and so on. This study found that many home users of Wi-Fi in Hong Kong are oblivious of the importance of Wi-Fi security and there is a significant gender difference in Wi-Fi security perceptions and knowledge among Wi-Fi users in Hong Kong. They have further discussed about Wi-Fi encryption methods and Wi-Fi decryption methods [4].

Issues in Wi-Fi Networks research group has discussed about the mobile application security, Wi-Fi technology and Wi-Fi security protocols such as IEEE 802.11 and its WEP security algorithms. In this project they have focused on security architectures and algorithms such as Encryption and decryption methods. Wi-Fi Authentication Mechanisms, WEP Encryption/Decryption Issues, WEP Authentication are further discussed in this research paper [5].

Wi-Fi security research group has discussed about the security of Wi-Fi networks and Wi-Fi security protocols. As a major security standard IEEE 802.11 and its WEP protocol has deeply discussed through this research paper. Group also discussed about the Protocols such as WPA, WPA2 (Wi-Fi protected access) protocols. Also Encryption methods and decryption methods has been discussed in this research paper [6].

Solution

Wi-Fi Authentication mechanism for large scale organizations have been the main concern of this research paper and the problem have been divided to main areas which security and integrity is highly concerned. Existing WPA2 protocol which is further described in **Appendix [C]** have been updated in order to make a secure connection protocol.

Conceptualized WPA2 Methodology

WPA2 protocols encryption methods have been highly criticized because of the penetrable capability. And research authors have come up with a concept to increase the encryption capabilities and adding highly impenetrable Encryption method such as AES encryption and adopt WTLS Transport layer security to existing WPA2 protocol to make a secure connection protocol.

AES Encryption

AES encryption consist of three unique block ciphers. Which are AES-128, AES-192 and AES-256.which the key length to 128 to 256 is increasing and the bigger the key value the best the encryption will be. As it is a symmetric key cipher which both Sender and the receiver both the parties should know the same key to encrypt as well as to decrypt. As the conceptualized encryption method that will adopt to updated WPA2 protocol method will be using 256-bit key which is the maximum key length which AES supports, it's also proven that it is ideal for software applications and hardware that require either low-latency or higher throughput, it is also inherited in many protocols such as SSL/TLS. The research authors suggest an Encryption of AES-256-bit length key Encryption to WPA2 protocol. Which will secure highly in key exchange and in encryption module in secured connection protocol.

WTLS Protocol

WTLS protocol is developed to report problematic concerns in wireless mobile network devices.it is also similar to SSL (secure socket Layer). This protocol has been used in commerce applications in order to provide authentication, integrity and privacy protection which research authors try to adopt to large scale organizations. Wireless oriented Mobile networks which connects through Wi-Fi have a huge drawback that these connections don't provide client to server secured connection and through WTLS optimized dynamic key refreshing and WPA2 updated AES-256-bit key encryption it can be routinely updated during this connection. Which will make this combination impossible to penetrate.

HTTP Proxy Servers

Proxy servers to maintain data traffic between the clients and servers is the next security countermeasure research authors are suggesting to have. This proxy server configuration is done by the ISP (Internet service provider) it will be a dedicated software system which will be running on ISP server to manage large scale organizations data traffic. By using ISP Proxy Server, the users who connect to the network have to undergo another authentication in order to do data transmission using HTTP or HTTPS. Which this countermeasure falls under to HTTP Proxy to make attackers even harder to infiltrate the organizations network.

IP-VPN Protection to the generated traffic

After suggested safeguarded connection establishment the research group advocates to use an IP-VPN. IP-VPN (Internet protocol Virtual Private Network) provides secure communication, increased productivity and most important advantage Tailored to individuals. the research authors are providing the solution to large scale organizations and the authors are suggesting the traffic that organization generates will undergo with the IP-VPN tunnel that organization have to implement for their network. VPN separates organizations data from other traffic over internet which makes outer attackers to really hard to eavesdrop to these data because this data is separated from the outer traffic and which is unique to the organization. VPN tunneling uses three protocols.

1. Carrier protocol - (protocol used by network by the information is travelling over)
2. Encapsulating protocol- (SSL protocol/ IPsec protocol) Encrypting each IP packet of a communication session.
3. Passenger protocol- (IPX protocol) protocol used by the networks that are connected by the tunnel

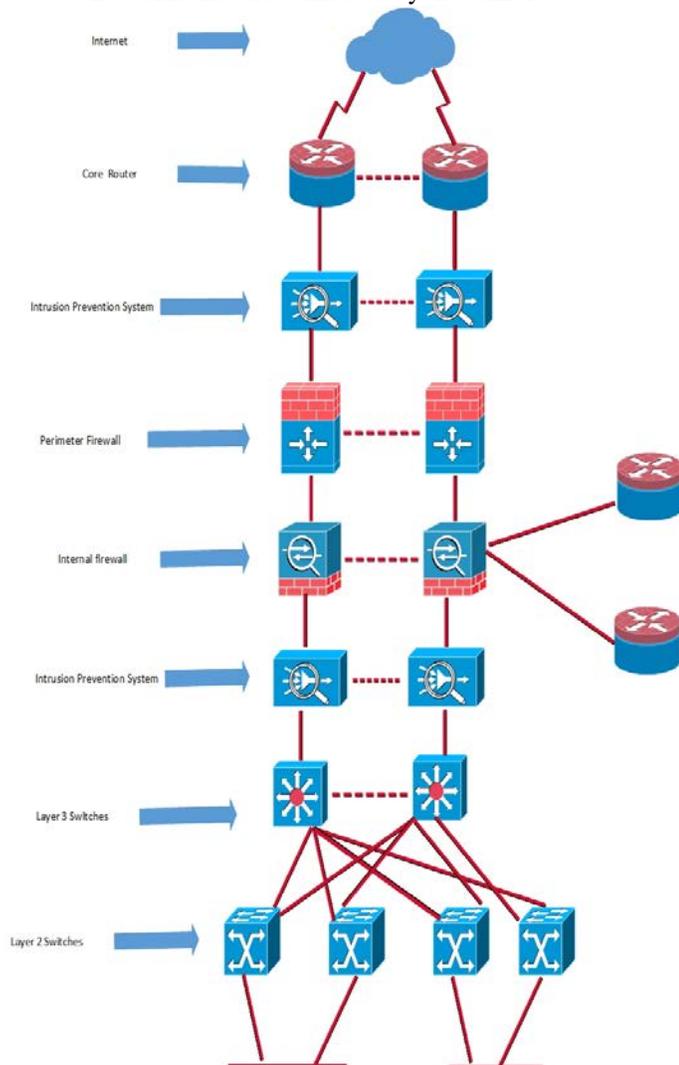


Figure 2: Inside Body of a properly secured High scale organization

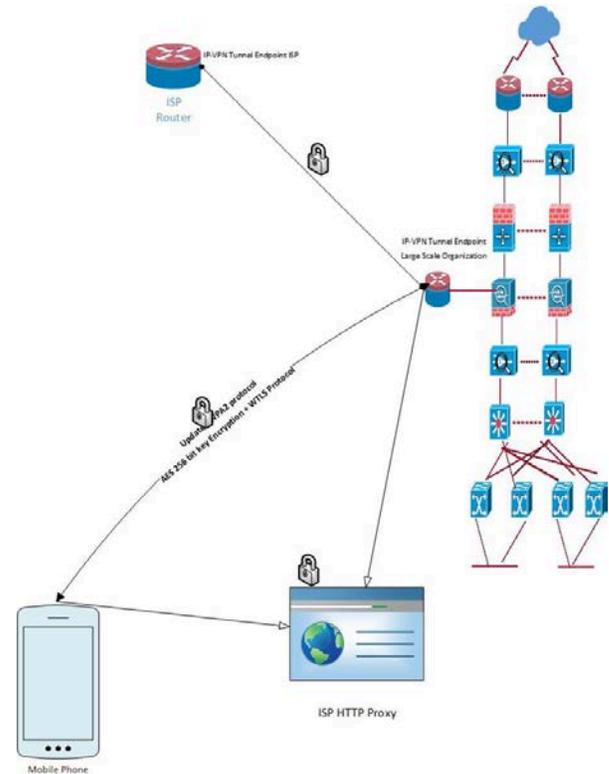


Figure 3: Conceptualized Solution adopted demonstration appearance

Figure 3 illustrates author's suggested solution for the large scale organizations access layer Wi-Fi connection medium security concept Conceptualized WPA2 protocol with AES-256 bit key length encryption and WTLS protocol HTTP Proxy server implementation connecting through high scale organization implemented IP-VPN for high secured connection to stop attackers in eavesdrop.

III. CONCLUSION

Fast growing of the Information technology field is effects human life style. This increment generate many issues in society specially cyber-crimes. Large scale Organizations are use Wi-Fi Technology. Using this wireless network intruders can access to this large scale organization. This research paper describe about the security in Wi-Fi technology and new technology developed using current technologies. Research paper provide one compact solution for wireless networks in large scale organizations. Solution consider about the all paths that need security in wireless networks and how can give service without any interruption or delay.

IV. FUTURE WORK

The projected solution to large scale organizations to secure access layer Wi-Fi connected devices are communicating through the organization IP-VPN and for the research future work the research authors are trying to address the solution in a

manner where the devices which is establishing the connection create a unique VPN to data transactions by client to server end points. HTTP authentication methods and adopting low performance required, high secured, flexible encryption protocols to HTTP authentication are the fields that research authors are trying to discover under future work to make a more secured connection.

ACKNOWLEDGEMENT

It is with excessive will that research team direct deep sense of appreciative and profound feeling of admiration to our Lecturer in charge of Computer Network Designing and Implementation Module and Research supervisor Mr. Dhishan Dhammearatchi for supervisory and instructing through the entire Research project. Without his guidance to the field would have not been potential to be successful in this research. We would like to thank to the members in Sri Lanka Institute of Information Technology for providing adequate resources.

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Appendix

Appendix [A]

Core layer

There are many distribution –layer devices in different areas of network, moving packets between those devices need high-redundant forwarding service core layer provide this service. Most powerful devices are core switches and routers manage to create highest speed connections.

Distribution layer

Purpose of the distribution layer is managing Routing, Filtering and QoS policies. Managing individual WAN branch-office connections also a responsibility of distribution layer. Some call this layer as work group layer.

Access Layer

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Connecting client nodes is the main purpose as well as switching platforms and providing or not providing layer 3 switching. In here servers and End-stations connect with enterprise. Connecting with user is the reason that layer got name Desktop layer.

Appendix [B]

Perimeter firewalls

Firewall installed in middle of private and public networks (internet) call perimeter firewalls .those firewalls are the traffic controller between these two networks.

Intrusion prevention systems

Intrusion prevention systems use for monitor system activities for identify malicious activities in networks. In the Intruder prevention systems are doing three task.

- Malicious activity identification

- Log activity information
Block or Stop and report.

WPA2

WPA2 is an upgraded version of WPA. WPA2 is a security protocol developed by the WIFI Alliance to make secure wireless connections and it also a security certification programme. This protocol implements with the IEEE 802.11i standard and also

Appendix [C]

Temporal Key Integrity Protocol (TKIP). WPA2 supports for CCMP, an AES-based encryption modes with very strong security. WPA2 certification is monetary for all new devices which is built after 2006 with the WIFI trademark

A Review on Particle Swarm Optimization for Distributed Generation Placement and Sizing

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Abstract- This paper surveys the research and development of Particle Swarm Optimization (PSO) algorithm for choosing the suitable position and size of Distributed Generation (DG) units within a distribution network. Our discussion first covers the algorithm development of PSO and its use in neural networks. After establishing the foundations of PSO, we then explore its use in sizing and sitting of DG units in distribution network. Future development in PSO algorithm such as combining PSO with other optimization techniques for attaining better results is also discussed in this paper.

Index Terms- Distributed Generation, Distribution Network, Optimal Placement and Size, Particle Swarm Optimization

I. INTRODUCTION

In the conventional power system, the generating units are kept far away from the consumers. While it has certain advantages, the biggest disadvantage is the occurrence of heaving line losses when power is transported to the consumers. There can be many ways of reducing power loss in the distribution network. For example, the use of superconductors in transmission lines can reduce line losses. However, the superconductor technology is still in its early days and still quite expensive. More recently, the concept of Distributed Generation (DG) has come up which is environmental friendly and economical. The sizing and placement of DG units can significantly affect the system losses. This has initiated considerable interest in finding an optimum position of the DG unit. To find a suitable place for a DG unit in Smart Grids, the authors in [1] use the Multi Criteria Decision Analysis. The optimization variables include Voltage Stability Index (VSI), Frequency Deviation in Substation (FDSS) and Frequency Deviation in DG (FDDG). The same authors in [2] have used circuit analysis to determine the voltage stability index (VSI) for distribution networks connected in loop configuration.

In this paper, we are more concerned with exploring PSO for optimizing the sizing and siting of DG units. Such an optimization problem can be solved by different optimization algorithm [3], for instance tuba search (TS). However, TS is a time consuming algorithm and has a tendency to get trapped into local optimal value. Search Annealing (SA) is another possible algorithm which also consumes considerable time to get the optimal solution. As compared to TS and SA, Genetic Algorithm (GA) has been widely used for finding the global (or near global) optimal solution of the problem. PSO has been proven to be better than GA in terms of computational time and convergence speed [3]. Hence, this paper surveys the use of PSO in placing DG units

II. ORIGINAL PSO ALGORITHM

The original PSO algorithm, which is a non-linear optimization algorithm, was discovered by James Kennedy and Russell Eberhart in 1995 [4, 5] while observing the social behavior of animals and birds. The authors proposed the velocity and position equations for each particle travelling in a group. The prevailing velocity can be calculated by using the previous velocity and the distance between P_{best} and G_{best} as expressed by following formula [4, 5]. All particles adjust their position according to the personal flying experience called P best (personal best) as well as the flying experience of the other particles in the group called G best (Global best).

$$v_i^{k+1} = v_i^k + c_1 r_1 (Pbest_i^k - x_i^k) + c_2 r_2 (gbest^k - x_i^k) \quad (1a)$$

The current position can be calculated by adding the current velocity in previous position.

$$x_i^{k+1} = x_i^k + v_i^{k+1} \quad (1b)$$

V_i^k : Velocity of particle i at iteration k

$C1$: Cognitive factor; $C2$: Social factor

$r1, r2$: Uniformly distributed random number between 0-1

x_i^k : Position of particle i at iteration k

$Pbest_i^k$: Personal best of agent i at iteration k

$Gbest^k$: Best among all in the group

Kennedy and Eberhart [4, 5] have proposed the value of $c_1=c_2= 2$. If c_1 is much greater than c_2 , each particle is remains attracted to its own personal best causing excessive wandering. Consequently, particles cannot find the optimal solution and remain trapped in the local value. On the other hand, if c_2 is much greater than c_1 , the particles are strongly attracted towards the global best position. This is also undesirable because the particles may move away from the optimal value. All the particles in the search space should obey these three rules [6].

1. Avoid collision with the neighbours
2. Match their velocity with that of the neighbours
3. Stay in close vicinity with the neighbours

The author in [7] modified the velocity equation by introducing the construction factor ‘K’ to insure the convergence of PSO. The modified expression is as follows:

$$v_i^{k+1} = K[v_i^k + c_1 r_1 (Pbest_i^k - x_i^k) + c_2 r_2 (gbest^k - x_i^k)] \quad (2a)$$

Where

$$K = \frac{2}{|2 - \varphi - \sqrt{\varphi^2 - 4\varphi}|} \text{ where } \varphi = C1 + C2, \varphi > 4 \quad (2b)$$

The authors in [8] introduced a new parameter called the inertia weight in the standard PSO form:

$$v_i^{k+1} = wv_i^k + c_1 r_1 (Pbest_i^k - x_i^k) + c_2 r_2 (gbest^k - x_i^k) \quad (3a)$$

$$x_i^{k+1} = x_i^k + v_i^{k+1} \quad (3b)$$

Refer to right side of equation (3a), which consists of three parts: the first part shows the previous velocity, the second and third parts are called the cognitive and social part. Without the second and third parts the particles keep on flying with the current velocity. Cognitive part increase the local search ability and social part increase the global search ability. The inertia weight w in Equation (3a) balances the local and global search abilities. The main advantage of introducing w is that it eliminates the requirement of careful setting of velocity. Also, increasing the inertia weight helps the search for a global solution and vice versa. The authors in [9] have used $w=0.7$ with the hit and trial method to balance the global and local search abilities.

The authors in [10] have used variable weight factor for the optimal design of small renewable energy systems. In a search space particles are flying to find the optimal solution. The process of reaching the particles towards a common point is called convergence. The proposed method keeps on increasing the weight until convergence is achieved. This modified PSO technique shows faster convergence speed and needs less computational time as compared to the standard PSO technique. Mathmatically, the variable inertia weight is represented as follows

$$W = \frac{(W_{max} - W_{min})}{\#iteration} * \text{current iteration no.} \quad (4)$$

The flow chart shown in fig. 1 depicts the PSO-based approach to find the optimal size and location of DG units to minimize the power losses. First of all we have to provide the input system data such as line data, bus data, and bus voltage limits, then calculate the base case power loss by using Newton Raphson Method. After that randomly generate the number of particles (number of DG units) with random position and velocities in the search space and set the maximum iteration, also set the iteration counter k equal to zero. Next check the voltage limits, if it is in the given range then calculate the power loss using the formula given in [30]. Otherwise, the particle is infeasible. The objective value for each particle is compared with its individual best, if the objective value is lower than $pbest$, set this value as the current $pbest$ and record the corresponding particle position. Update the velocity and position of the particle using equation (3a) and (3b). Before printing the solution check the maximum iteration limit, if the limit reaches at the maximum value, go to step 7 otherwise set the iteration index $K = K+1$ and go back to step 4. Finally print out the best solution for the target problem. The best solution includes the optimal location and size of the particle corresponding to the fitness value, representing the minimum power loss (active, reactive, or both active and reactive)

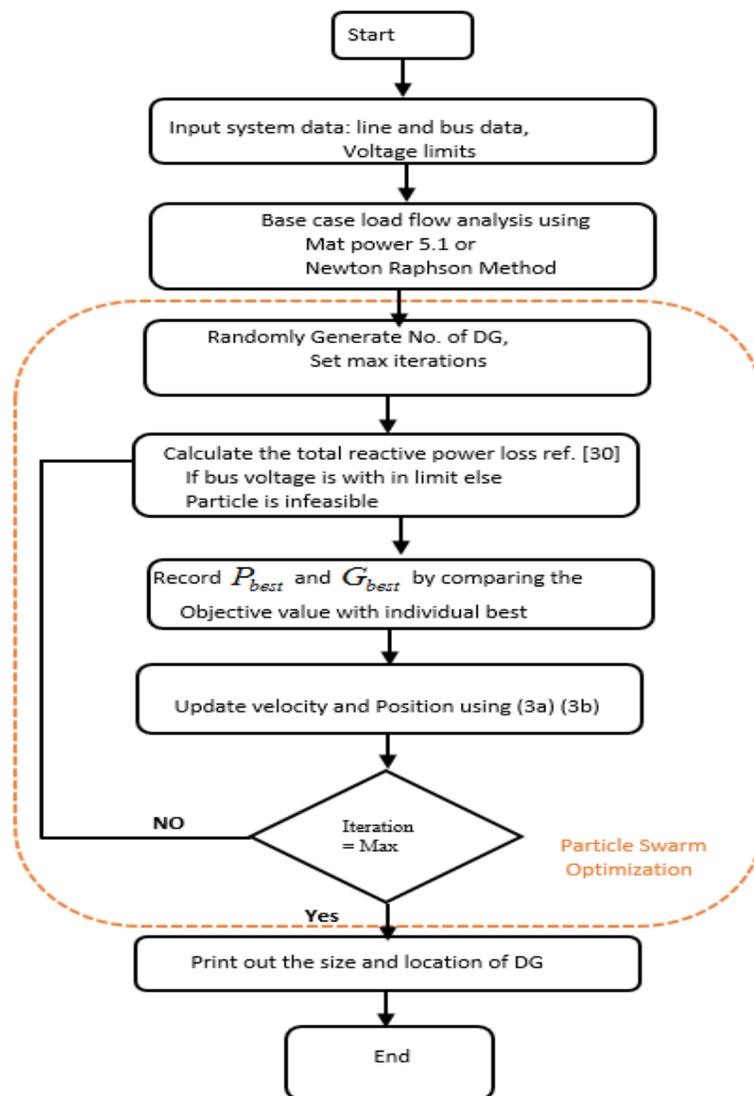


Figure 1. PSO Flow Chart

III. TRAINING A NEURAL NETWORK USING PSO

Data processing, classification and pattern recognition are widely used applications of Artificial Neural Network (ANN). ANN is a learning method motivated by the learning ability of human brain's neural systems which comprises of three layers structures: input, output and hidden layers. There are several learning algorithms, such as Back Propagation (BP) [11], Gradient Descendant [12], etc. One of the main disadvantages of these techniques is the slow convergence and tendency to get trapped in the local minima [13]. Since PSO is a population based search algorithm it can produce better results. One of the biggest issue with PSO is due to the strong competition between the flying particles in a search space the PSO get trap into local minima. To avoid getting trapped into the local minima and achieving fast convergence, the authors in [14] proposed Gaussian PSO with fuzzy reasoning based structural learning. Instead of uniformly distributed random variable, Gaussian random variable is proposed to escape from the local minima and the structural learning with fuzzy reasoning is proposed to improve the computational time by modifying the network structure. The authors in [15] propose optimization of type-2 fuzzy weights in back propagation learning for NN using PSO and GA. The type-2 fuzzy logic enhance the uncertainty in the learning while PSO and GA increases the convergence speed. It has been emphasized in [16, 17] that the weight affects the performance of the learning process. Another inspiring application of PSO in Neural Network is prostate cancer prediction system. The authors in [18] have proposed two-stage fuzzy neural network for prognosis system which provide more accurate prediction (due to fuzzy system) of prostate cancer results and translate it into information for doctor. [19] Shows the experimental study for pixel classification in satellite imaginary, the author did 1050 numbers of experiments and proposed the solution of two critical issues i.e. determination of hidden layers neurons and most discriminative spectral band. The multi-objective (MPSO) improve the classification accuracy and computation time.

IV. USING PSO FOR DISTRIBUTED GENERATION

Recent research shows that installing a DG unit in a distribution network leads to various technical, economical and environmental benefits. However, in order to reap these benefits, it is very important to find an optimal location and size of a DG unit. There are a number of constraints that need to be considered before placing a DG unit [20,37]

Equality constrains: Power flow equations represent the equality constrains (total power injected at any bus should be equal to total generation minus demand). For each bus the power flow equation should be satisfied, which can be handled by load flow such as Newton Raphson.

Inequality constrains: The thermal constrains and equipment rating are called inequality constrains. These constrains can be handled by proper sizing the DG unit which can be done by using PSO. Inequality constrains are as follow [32]

- 1) Each segment in the distribution network has a thermal limits which should not exceed than its maximum rating.
- 2) The output of DG should not exceed then the power supplied by the substation.
- 3) The total number of DG connected in distribution network should be bounded by a certain number. By definition, only one DG unit can place at a given bus.

Boundary conditions: While placing the DG at a given bus the voltage magnitude and angle should be kept at a certain acceptable level.

A. OPTIMAL SIZING

The authors in [21] have used PSO for optimal sizing of the stand-alone hybrid power system. This system includes wind unit, electrolysers, a reformer, anaerobic reactor, fuel cell and some hydro tanks. The objective is to minimize the total cost of the system and the components have optimal sizes, such that the power demand by the system meets. It has been argued in [22-24] that PSO provides excellent convergence and feasible optimal solution for sizing the micro-grid system consisting of wind/PV/battery banks/ fuel cells and reformers. The comparative analysis in [25] focuses on the size of the off-grid Renewable Hybrid Energy System (micro hydro plant, fuel cell, wind turbine and solar panel etc.) using GA and PSO. The analysis shows that PSO is much better than GA in terms of CPU utilization and the number of iterations to find the optimal value. The authors in [26] proposed improved PSO which utilize the benefits of both the GA and PSO that can enhance global searching capability and convergence of particles. To improve the convergence rate the convergence factor K is introduced and the global search ability is enhanced by introducing the idea of mutation of genetic algorithm this can escape the local trapping. In [27], the authors have proposed the structure of a micro grid consisting of Wind /PV hybrid system with battery, Hydro tank and fuel cell. The author used PSO algorithm to achieve the best sizing of the DG unit for the proposed micro grid. The authors in [28] have proposed an approach for sizing the hybrid systems (Wind/PV/Diesel Generator/Fuel Cell/Battery and Hydro Tank). The ϵ -constrain method [29] is used to minimize the overall system cost and CO_2 emission produced by the diesel generators. The author in [30] proposed an approach for siting and sizing of four types of DG units to enhance the loadability of primary distribution systems. The results show that there is a strong correlation between reactive power loss and loadability of the system.

B. OPTIMAL SITING

The author in [31] have proposed multi-objective based approach to find the best location and size of different DG units with different load model having non-unity power factor. A simple PSO algorithm is used to obtain the best solution for the multi objective problem. The authors in [32] have proposed improved PSO algorithm for the placement and sizing of multiple DG units. The problem is divided into two sub problems: DG unit's optimal location (discrete optimization) and its optimal size (continuous optimization). In the standard PSO, a factor is multiplied with inequality constrains and added into the objective function called penalty factor. The proper selection of penalty factor is very difficult which differ from problem to problem. The author eliminates the needs of proper selection of penalty factor by using a unique PSO feature. If the particle flies away from the search space then restore its violated position to P_{best} , this keeps the infeasible particles alive as a candidate. Author in [33] use the application of PSO for DG sizing and siting in the radial distribution network. The objective is to improve the voltage profile, and active power compensation by reducing the real power loss. By using the exact loss formula, the authors calculate the size of DG unit at every bus. The location of the DG unit is calculated by using the loss sensitivity factor. The bus having lowest power loss and lowest sensitivity factor will be the best location for DG placement. The authors in [34] use PSO for optimal placement of different types of DG units which can supply both real and reactive power in the distribution networks. The proposed PSO approach is tested on IEEE-69 bus distribution system and the result shows that as compared to other heuristic approaches, the proposed algorithm gives smaller DG size. The authors in [35] have used the dynamic sensitivity analysis method for the placement of capacitors which will reduce the search space problem. The results show that for more than one location, dynamic sensitivity is good because it helps in deciding other positions considering the previous locations and the value of capacitor. The comparison results show that the proposed PSO approach provides better global solution with greater saving. The authors in [36] have used PSO for optimal allocation of DG units for multi-phase unbalanced distribution network. The results show that optimal size and allocation of DG unit can reduce the total power loss and improve the voltage profile in the distribution network. The proposed method can place DG unit more effectively and in less computation time. The power loss reduction using PSO is better than power loss reduction using RPF (repeated power flow).

C. HYBRID PSO

Researchers are focusing on the hybridization of PSO with other techniques for getting better results. The authors in [37] have proposed hybrid PSO/GA algorithm to minimize the network power loss, better voltage regulation, and improve voltage stability index. The result shows that hybrid PSO/GA has better power minimization as compared to PSO and GA while GA has better voltage profile improvement as compared to PSO and Hybrid PSO/GA. The authors concluded that hybrid method offer a higher ability of finding the optimal solution. The authors in [38] have proposed hybrid PSO with analytical method (AM) to reduce the power loss and to improve the voltage profile. The sizing is done by AM and the placement is done by PSO. The result shows that loss reduction becomes more effective by increasing the number of DG units in the network. It also increases the voltage profile. In [39] the authors have proposed hybrid PSO which has a problem of being trapped into local optima and take a lot of time for getting the optimal solution. To balance the local and global searching ability, the same authors [40] have used fuzzy adaptive inference for tuning the inertia weight of PSO. The result shows that fuzzy Adaptive Particle Swarm Optimization (FAPSO) gives the optimal solution after 69 iterations while other PSO method need 190 cycles. The authors in [41] proposed a novel hybrid Rank Evolutionary PSO to improve the computation time (fastest) of multiple DG. The results shows that Rank Evolutionary PSO has stable performance and fast result in moving the particle to global optimal solution, less number of iteration, lowest standard deviation and fastest computing time as compared to other PSOs. The summary of the study is given in the below table 1.

TABLE 1: A Summary of Applications of PSO for Sizing and Citing of DGs

Categories	Objective Functions	Algorithm	Ref.	Study/Test
Optimal Sizing	Sizing of system components e.g. fuel cell, wind unit and compressor etc. to provide the demand of residential area	PSO	[22]	Simulation
	Sizing of system components to minimize the cost of total system in view of wind power uncertainty		[23]	Real Deployment (Kahnouj area in South-east Iran)
	Wind/PV unite sizing to improve the global convergence and efficiency of searching		[26]	Implemented in Practicle System
	Optimal sizing of Wind turbine /PV/FC and Hydrogen Tank is done to minimize the total cost of the system and CO2 emission		[28]	Simulation
Optimal Allocation	Voltage profile improvement		[30]	IEEE-33,69 Bus 173-Bus Lao Cai Radial Test System
	Improvement in P loss, Q loss , voltage profile and MVA intake by grid		[31]	IEEE-38 Bus Radial System IEEE-30 Bus Mesh System
	Real power loss minimization of the network		[32]	IEEE-69 Bus Practicle Test System
	Optimal allocation for reduction in real power loss		[33] [34]	IEEE-33 Bus Distribution System
	Capacitor allocation with better global optimal solution		[35]	IEEE-70 , 135 Bus System
	Optimal DG placement to reduce the total power loss and improve the voltage profile		[36]	IEEE-123 Bus Distribution System
Hybrid PSO	DG Placement and sizing to minimize the network power loss and to improve the voltage profile	GA+PSO	[37]	IEEE-33,69 Bus Radial System
		AM+PSO	[38]	
	Improvement in P loss, voltage profile and MVA intake by grid	GSA+PSO	[39]	IEEE-69 Bus Radial System
	Minimization of operation cost of transformer and capacitors	FAHPSO	[40]	IEEE-33 Bus Distribution System
	Quick Convergence while getting the global optimal solution	REPSO	[41]	
PSO: Particle Swarm Optimization GA: Genetic Algorithm AM : Analytical Method GAS: Gravitational Search Algorithm FA : Fuzzy Adaptive RE: Rank Evolutionary				

D. FUTURE DIRECTIONS

After reviving the existing research work on DG placement and sizing, following are the directions for future research.

1. DG placement and sizing on distribution network is done by analytical methods or heuristic methods, the heuristic methods provide better result as compared to analytical methods. The combination of these two methods can further improve the overall system performance such as convergence speed.
2. One of the biggest issue with the heuristic approach is the particles are trapped into local minima and fail to assure the global optimal solution due to the strong competition between particles, this issue can be solve by reducing the search area.
3. PSO is mostly applied in DG/Capacitor placement and sizing, some additional unexplored areas of power system where it can be further employed are protection and restoration.
4. The tuning parameters play a vital role in the convergence and processing time of PSO. However, very limited research have been carried out on selection of these parameters. Therefore, proper parameter selection is also one of the research areas.
5. Further research on mathematical background of PSO can enhance the overall performance characteristics.

CONCLUSION

This paper presents a summary of the research and development in Particle Swarm optimization algorithm especially for DG placement and sizing. It highlights the standard and modified algorithm and constraints needed to be handled when the DG unit is placed in the distribution network. Several applications of PSO in training a neural network, distribution network for DG sizing and siting, and hybrid PSO are also discussed in the literature. PSO is applied in different power system applications some additional unexplored area of power system where it can be further employed are protection and restoration. The PSO capabilities can be extend by hybridization with other evolutionary optimization algorithm to improve it accuracy and computation time. The major drawback of PSO is lack of strong mathematical background and failure to obtain the global optimal solution which is caused due to strong competition between particles and trap into local minima.

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Progressive Identification of Duplicity

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Abstract- Databases contains very large datasets, where various duplicate records are present. The duplicate records occur when data entries are stored in a uniform manner in the database, resolving the structural heterogeneity problem. Detection of duplicate records are difficult to find and it take more execution time. In this literature survey papers various techniques used to find duplicate records in database but there are some issues in this techniques. To address this Progressive algorithms has been proposed for that significantly increases the efficiency of finding duplicates if the execution time is limited and improve the quality of records.

Index Terms- Duplicate record detection, Progressive Sorted Neighborhood Method, Progressive Blocking, Entity resolution.

I. INTRODUCTION

Data's are among the most important assets of a company. But due to data changes and copied data entry, errors such as duplicate entries might occur, making data cleansing and particular duplicate detection indispensable. However, the size of today's datasets makes duplicate detection processes expensive. Online retailers, for example, offer huge catalogs comprising a constantly growing set of items from many different suppliers. As independent persons change the product portfolio, duplicates arise.

Databases play an important role in today's IT based economy. Many industries and systems depend on the accuracy of databases to carry out operations. Therefore, the quality of the information stored in the databases, can have significant cost implications to a system that relies on information to function and conduct business. With the ever increasing volume of data, data quality problems abound. Multiple, yet different of the same real-world objects in data, duplicates, are one of the most intriguing data quality problems.

Progressive identification of duplicity identifies most duplicate pairs early in the detection process. Instead of reducing the overall time needed to finish the entire process, progressive approaches try to reduce the average time after which a duplicate is found. Early termination, in particular, then yields more complete results on a progressive algorithm than on any traditional approach.

Several use cases are:

1) A user has only limited, maybe unknown time for data cleansing and wants to make best possible use of it. Then, simply start the algorithm and terminate it when needed. The result size will be maximized.

2) A user has little knowledge about the given data but still needs to configure the cleansing process. Then, let the progressive algorithm choose window/block sizes and keys automatically.

3) A user needs to do the cleaning interactively to, for instance, find good sorting keys by trial and error.

4) A user has to achieve a certain recall. Then, use the result curves of progressive algorithms to estimate how many more duplicates can be found further; in general, the curves asymptotically converge against the real number of duplicates in the dataset.

Two novel algorithms are proposed namely progressive sorted neighborhood method (PSNM), which performs best on small and almost clean datasets, and progressive blocking (PB), which performs best on large and very dirty datasets.

II. RELATED WORK

Much research on duplicate detection [2], [3], also known as entity resolution and by many other names, focuses on pair-selection algorithms that try to maximize recall on the one hand and efficiency on the other hand. The most prominent algorithms in this area are Blocking [4] and the sorted neighborhood method (SNM) [5].

Adaptive techniques. Previous publications on duplicate detection often focus on reducing the overall runtime. Thereby, some of the proposed algorithms are already capable of estimating the quality of comparison candidates [6], [7], [8].

The algorithms use this information to choose the comparison candidates more carefully. For the same reason, other approaches utilize adaptive windowing techniques, which dynamically adjust the window size depending on the amount of recently found duplicates [9], [10].

These adaptive techniques dynamically improve the efficiency of duplicate detection, but run for certain periods of time and cannot maximize the efficiency for any given time slot.

Progressive techniques. In the last few years, the economic need for progressive algorithms also initiated some concrete studies in this domain. For instance, pay-as-you-go algorithms for information integration on large scale datasets have been presented [11]. Other works introduced progressive data cleansing algorithms for the analysis of sensor data streams [12]. However, these approaches cannot be applied to duplicate detection. Xiao et al. proposed a top-k similarity join that uses a special index structure to estimate promising comparison candidates [13].

2.1 Disadvantages

1. These adaptive techniques dynamically improve the efficiency of duplicate detection, but in contrast to our progressive techniques, they need to run for certain periods of time and cannot maximize the efficiency for any given time slot.
2. Needs to process large dataset in short time
3. Quality of data set becomes increasingly difficult.

III. PROPOSED SYSTEM

In an error-free system with perfectly clean data, the construction of a comprehensive view of the data consists of linking in relational terms, joining two or more tables on their key fields. Unfortunately, data often lack a unique, global identifier that would permit such an operation. Furthermore, the data are neither carefully controlled for quality nor defined in a consistent way across different data sources.

1. Two algorithms are proposed, namely progressive sorted neighborhood method (PSNM), which performs best on small and almost clean datasets.
2. Progressive blocking (PB), which performs best on large and very dirty datasets. Both enhance the efficiency of duplicate detection even on very large datasets.
3. PSNM sorts the input data using a predefined sorting key and only compares records that are within a window of records in the sorted order. The PSNM algorithm differs by dynamically changing the execution order of the comparisons based on intermediate results.
4. Blocking algorithms assign each record to a fixed group of similar records (the blocks) and then compare all pairs of records within these groups. Progressive blocking is a novel approach that builds upon an equidistant blocking technique and the successive enlargement of blocks.

3.1 Advantages

1. To detect the duplicate data over short time in the real world.
2. High Accuracy
3. Time taken is minimized for detecting duplicate data (overall time).
4. Percentage (%) of duplicate data occurs in the uploaded content.
5. Total number of duplicate words.

3.2 PROGRESSIVE SORTED NEIGHBORHOOD METHOD(PSNM)

The progressive sorted neighborhood based on the traditional sorted neighborhood method [5]: PSNM sorts the input data using a predefined sorting key and only compares records that are within a window of records in the sorted order. The intuition is that records that are close in the sorted order are more likely to be duplicates than records that are far apart, because they are already similar with respect to their sorting key. More specifically, the distance of two records in their sort ranks (rank-distance) gives PSNM an estimate of their matching progressive iterations.

3.2.1 PSNM Algorithm

Algorithm 1 depicts implementation of PSNM. The algorithm takes five input parameters: D is a reference to the data, which has not been loaded from disk yet. The sorting key K defines the attribute or attribute combination that should be used in the sorting step. W specifies the maximum window size, which corresponds to the window size of the traditional sorted neighborhood method.

Algorithm 1. Progressive Sorted Neighborhood:

Require: dataset reference D, sorting key K, window size W, enlargement interval size I, number of records N

```
1: procedure PSNM(D, K, W, I, N)
2: pSize ← calcPartitionSize(D)
3: pNum ← ⌈N / pSize⌉
4: array order size N as Integer
5: array recs size pSize as Record
6: order ← sortProgressive(D, K, I, pSize, pNum)
7: for currentI ← 2 to ⌊N / W⌋ do
8: for currentP ← 1 to pNum do
9: recs ← loadPartition(D, currentP)
10: for dist ← 2 to range(currentI, I, W) do
11: for i ← 0 to jrecs do
12: pair ← recs[i] ; recs[i + dist]
13: if compare(pair) then
14: emit(pair)
15: lookAhead(pair)
```

The PSNM algorithm calculates an appropriate partition size pSize, i.e., the maximum number of records that fit in memory, using the pessimistic joining function calcPartitionSize(D) in Line 2: If the data is read from a database, the function can calculate the size of a record from the data types and match this to the available main memory. Otherwise, it takes a sample of records and estimates the size of a record with the largest values for each field. In Line 3, the algorithm calculates the number of necessary partitions pNum, while considering a partition overlap of W - 1 records to slide the window across their boundaries. Line 4 defines the order-array, which stores the order of records with regard to the given key K. By storing only record IDs in this array, we assume that it can be kept in memory. To hold the actual records of a current partition, PSNM declares the recs-array in Line 5.

In Line 6, PSNM sorts the dataset D by key K. The sorting is done by applying our progressive sorting algorithm Magpie, which we explain in Section 3.2. Afterwards, PSNM linearly increases the window size from 2 to the maximum window size W in steps of I (Line 7). In this way, promising close neighbors are selected first and less promising far-away neighbors later on. For each of these progressive iterations, PSNM reads the entire dataset once. Since the load process is done partition-wise, PSNM sequentially iterates (Line 8) and loads (Line 9) all partitions. To process a loaded partition, PSNM first iterates overall record rank-distances dist that are within the current window interval currentI. For I = 1 this is only one distance, namely the record rank-distance of the current main-iteration. In Line

11, PSNM then iterates all records in the current partition to compare them to their neighbor. The comparison is executed using the compare(pair) function in Line 13. If this function returns “true”, a duplicate has been found and can be emitted. Furthermore, PSNM evokes the lookAhead(pair) method, which we explain later, to progressively search for more duplicates in the current neighborhood. If not terminated early by the user, PSNM finishes when all intervals have been processed and the maximum window size W has been reached.

3.3 PROGRESSIVE BLOCKING

In contrast to windowing algorithms, blocking algorithms assign each record to a fixed group of similar records (the blocks) and then compare all pairs of records within these groups. Progressive blocking is a novel approach that builds upon an equidistant blocking technique and the successive enlargement of blocks. Like PSNM, it also pre-sorts the records to use their rank-distance in this sorting for similarity estimation. Based on the sorting, PB first creates and then progressively extends a fine-grained blocking. These block extensions are specifically executed on neighborhoods around already identified duplicates, which enables PB to expose clusters earlier than PSNM. Sections 8.3 and 8.4 directly compare the performance of key attribute, combination K defines the sorting. The parameter R limits the maximum block range, which is the maximum rank-distance of two blocks in a block pair, and S specifies the size of the blocks. We discuss appropriate values for R and S in the next section. Finally, N is the size of the input dataset.

Fig. 1. PB in a block comparison matrix

Algorithm 2. Progressive Blocking

Require: dataset reference D , key attribute K , maximum block range R , block size S and record number N

- 1: procedure PB(D, K, R, S, N)
- 2: $pSize \leftarrow calcPartitionSize(D)$
- 3: $bPerP$
- 4: $bNum$
- 5: $pNum \leftarrow \lfloor \frac{N}{pSize} \rfloor$; $c \leftarrow \lfloor \frac{dN}{S} \rfloor$; $dbNum \leftarrow bPerP \cdot c$
- 6: array order size N as Integer
- 7: array blocks size $bPerP$ as hInteger; Record $^{\frac{1}{2}}$ i
- 8: priority queue $bPairs$ as hInteger; Integer; Integer i
- 9: $bPairs \leftarrow fh1; 1; i; \dots; hbNum; bNum; ig$
- 10: order $\leftarrow sortProgressive(D, K, S, bPerP, bPairs)$
- 11: for $i \leftarrow 0$ to $pNum - 1$ do
- 12: $pBPs \leftarrow get(bPairs, i \cdot bPerP, (i + 1) \cdot bPerP)$
- 13: blocks $\leftarrow loadBlocks(pBPs, S, order)$
- 14: compare(blocks, pBPs, order)
- 15: while $bPairs$ is not empty do
- 16: $pBPs \leftarrow fg$
- 17: $bestBPs \leftarrow takeBest(bPerP = 4c, bPairs, R)$
- 18: for $bestBP \leftarrow 2$ bestBPs do
- 19: if $bestBP[1] \cdot bestBP[0] < R$ then
- 20: $pBPs \leftarrow pBPs [extend(bestBP)$
- 21: blocks $\leftarrow loadBlocks(pBPs, S, order)$
- 22: compare(blocks, pBPs, order)
- 23: $bPairs \leftarrow bPairs [pBPs$

- 24: procedure compare(blocks, pBPs, order)
- 25: for $pBP \leftarrow 2$ pBPs do
- 26: $hdPairs; cNum \leftarrow comp(pBP, blocks, order)$
- 27: emit($dPairs$)
- 28: $pBP[2] \leftarrow jdPairsj / cNum$

Two block pairs represent the areas with the currently highest duplicate density, the PB algorithm chooses $\delta 1; 2P$ and $\delta 2; 3P$ to progressively extend the first block pair and $\delta 4; 5P$ and $\delta 5; 6P$ to extend the second block pair. Having compared the four new block pairs, PB starts the second iteration. In this iteration, $\delta 4; 5P$ and $\delta 5; 6P$ are the best block pairs and, hence, extended. The results of this iteration then influences the third iteration and so on. In this way, PB dynamically processes those neighborhoods that are expected to contain most new duplicates. In case of ties, the algorithm prefers block pairs with a smaller rank-distance, because the distance in the sort rank still defines the expected similarity of the records. The extensions continue until all blocks have been compared or a distance threshold for all remaining block pairs has been reached.

IV. PROPERTIES CONCURRENCY

The best sorting or blocking key for a duplicate detection algorithm is generally unknown or hard to find. Most duplicate detection frameworks tackle this key selection problem by applying the multi-pass execution method. This method executes the duplicate detection algorithm multiple times using different keys in each pass. However, the execution order among the different keys is arbitrary. Therefore, favoring good keys over poorer keys already increases the progressiveness of the multi-pass method. In this section, we present two multi-pass algorithms that dynamically interleave the different passes based on intermediate results to execute promising iterations earlier. The first algorithm is the attribute concurrent PSNM (AC-PSNM), which is the progressive implementation of the multi-pass method for the PSNM algorithm, and the second algorithm is the attribute concurrent PB (AC-PB), which is the corresponding implementation for the PB algorithm.

The basic idea of AC-PSNM is to weight and re-weight all given keys at runtime and to dynamically switch between the keys based on intermediate results. Thereto, the algorithm pre-calculates the sorting for each key attribute. The pre-calculation also executes the first progressive iteration for every key to count the number of results. Afterwards, the algorithm ranks the different keys by their result counts. The best key is then selected to process its next iteration. The number of results of this iteration can change the ranking of the current key so that another key might be chosen to execute its next iteration. In this way, the algorithm prefers the most promising key in each iteration.

Algorithm 3. Concurrent PSNM

Require: dataset reference D , sorting keys Ks , window size W , enlargement interval size I and record number N

- 1: procedure AC-PSNM(D, Ks, W, I, N)
- 2: $pSize \leftarrow calcPartitionSize(D)$

```
3: pNum dN = dpSize W p lPe
4: array orders dimension jKsj N as Integer
5: array windows size jKsj as Integer
6: array dCounts size jKsj as Integer
7: for k 0 to jKsj 1 do
8: horders/2k ; dCounts/2k i sortProgressive(D, I, Ks/2k ,
pSize, pNum)
9: windows/2k 2
10: while 9 w 2 windows : w < W do
11: k findBestKey(dCounts, windows)
12: windows/2k windows/2k p l
13: dPairs process(D, I, N, orders/2k , windows/2k , pSize,
pNum)
14: dCounts/2k jdPairsj
```

V. CLOSURE

Due to careful pair-selection and the use of similarity thresholds, the result of a duplicate detection run is usually not transitively closed: the record pairs $\delta a; bP$ and $\delta b; cP$ might be recognized as duplicates but $\delta a; cP$ is (yet) missing in the result. Traditional duplicate detection algorithms, therefore, calculate the transitive closure of all results in the end [16]. As this calculation is blocking in nature, it hinders progressiveness. Therefore, we propose to calculate the transitive closure incrementally while the detection algorithm is running.

A suitable incremental transitive closure algorithm has already been introduced by Wallace and Kollias [17]. The proposed algorithm incrementally adds new duplicates, which are given as pairs of record identifiers, to an internal data structure that serves to calculate transitive relations from current results. The proposed data structure comprises two sorted lists of duplicates—one sorted by first records and one sorted by second records. If n is the number of records in the result, the proposed data structure exhibits an insert complexity of $O(n \log n)$ and a read complexity of $O(\log n)$. As these complexities would introduce a significant performance drawback to our progressive workflow, we instead store the duplicates in an index structure: We directly map each record identifier to a set of record identifiers representing a duplicate cluster. To add a new duplicate, we lookup the two contained records and point them to the same cluster, in which we add both records. Because of the map's overhead, this data structure requires approximately 75 percent more memory. However, inserts and reads can be easily done in constant time.

VI. LITERATURE SURVEY

Duplicate Record Detection: A Survey

Often, in the real world, entities have two or more representations in databases. Duplicate records do not share a common key and/or they contain errors that make duplicate matching a difficult task. Errors are introduced as the result of transcription errors, incomplete information, lack of standard formats, or any combination of these factors. In this paper, a thorough analysis of the literature on duplicate record detection. It cover similarity metrics that are commonly used to detect

similar field entries, and we present an extensive set of duplicate detection algorithms that can detect approximately duplicate records in a database. It also cover multiple techniques for improving the efficiency and scalability of approximate duplicate detection algorithms. It conclude with coverage of existing tools and with a brief discussion of the big open problems in the area.

Index Terms—Duplicate detection, data cleaning, data integration, record linkage, data reduplications, instance identification, database hardening, name matching, identity, uncertainty, entity resolution, fuzzy duplicate detection, entity matching.

Real-world Data is Dirty: Data Cleansing and The Merge/Purge Problem

The problem of merging multiple databases of information about common entities is frequently encountered in KDD and decision support applications in large commercial and government organizations. The problem study is often called the Merge/Purge problem and is difficult to solve both in scale and accuracy. Large repositories of data typically have numerous duplicate information entries about the same entities that are difficult to cull together without an intelligent—equation theory that identifies equivalent items by a complex, domain-dependent matching process. It has developed a system for accomplishing this Data Cleansing task and demonstrate its use for cleansing lists of names of potential customers in a direct marketing-type application. Results for statistically generated data are shown to be accurate and effective when processing the data multiple times using different keys for sorting on each successive pass. Combing results of individual passes using transitive closure over the independent results, produces far more accurate results at lower cost.

Supervised learning approach for distance based record linkage as disclosure risk evaluation

In data privacy, record linkage is a well-known technique to evaluate the disclosure risk of protected data. It is used to evaluate the number of linked records between a data set and its protected version. In this paper, an overview of the work that has been done during the last months. It describes the development of a supervised learning method for distance-based record linkage, which determines the optimum parameters for the linkage process. It also present an evaluation and a comparison between three different alternatives of such method.

Framework for Evaluating Clustering Algorithms in Duplicate Detection

The presence of duplicate records is a major data quality concern in large databases. To detect duplicates, entity resolution also known as duplication detection or record linkage is used as a part of the data cleaning process to identify records that potentially refer to the same real-world entity. It present the Stringer system that provides an evaluation framework for understanding what barriers remain towards the goal of truly scalable and general purpose duplication detection algorithms.

This paper uses Stringer to evaluate the quality of the clusters (groups of potential duplicates) obtained from several unconstrained clustering algorithms used in concert with approximate join techniques. The work is motivated by the recent significant advancements that have made approximate join algorithms highly scalable. Its extensive evaluation reveals that

some clustering algorithms that have never been considered for duplicate detection, perform extremely well in terms of both accuracy and scalability.

Pay-As-You-Go Entity Resolution

Entity resolution (ER) is the problem of identifying which records in a database refer to the same entity. In practice, many applications need to resolve large data sets efficiently, but do not require the ER result to be exact. For example, people data from the Web may simply be too large to completely resolve with a reasonable amount of work. As another example, real-time applications may not be able to tolerate any ER processing that takes longer than a certain amount of time. This paper investigates how we can maximize the progress of ER with a limited amount of work using —hints, which give information on records that are likely to refer to the same real-world entity. A hint can be represented in various formats (e.g., a grouping of records based on their likelihood of matching), and ER can use this information as a guideline for which records to compare first. It introduces a family of techniques for constructing hints efficiently and techniques for using the hints to maximize the number of matching records identified using a limited amount of work. Using real data sets, we illustrate the potential gains of our pay-as-you-go approach compared to running ER without using hints.

VII. CONCLUSION AND FUTURE WORK

The progressive sorted neighborhood method and progressive blocking algorithms increase the efficiency of duplicate detection for situations with limited execution time they dynamically change the ranking of comparison candidates based on intermediate results to execute promising comparisons first and less promising later. This paper surveys different research papers that proposed various algorithms for detection of duplicate records. The suggested functions properly combine the best evidence available in order to identify whether two or more

distinct record entries are replicas (i.e., represent the same real-world entity) or not. This is extremely useful for the non-specialized user, who does not have to worry about setting up the best set of evidence for the replica identification task.

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Relationship between e-government and e-tourism: case study of Sultanate of Oman

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Abstract- Earlier, countries used relationships with citizens in outbound and inbound manners and have used them for a better positioning of the nation. Nowadays, both relationships emerged and industrialized through the usage of ICTs to find solutions in attracting tourists and promote their own destinations. In addition, the complete structures of different sectors of goods and services have been partially revolutionized globally by an innovative modern interaction between agents involved. Therefore, the e-government construction requires technical development and implementation solutions from private sector in the country. Both sectors, tourism and government are facing obstacles and challenges generated by the advance and improvement in the use of ICTs by consumers and citizens. This report presents an overview of the relationship between e-government and e-tourism as an e-service under ICT technology. The relationship further explained using a case study of Sultanate of Oman with conclusion and recommendations to the nation.

Index Terms- ICT, e-tourism, e-government, ITA, TRA, G2B, B2C

I. INTRODUCTION

Since the World Wide Web (WWW) establishment and development, considerable attention has been given to the different adaptation of web-based technologies especially to the business environment like: business-to-business (B2B) and business-to-consumer (B2C) sectors. After that, new other sectors have been gaining more attention, including the involvement of government such as: government-to-business (G2B) and government-to-citizen (G2C). Since governments are traditional and considerably more conservative entities, slower to change or adopt new initiatives than other operators in the faster commercial field, it is reasonable and not surprising that governments in general have been slower to clamber onto the bandwagon of the web-enabled. Indeed, it is more reasonable to query about whether governments really require and want to make the service transition from government to e-government. Anthopoulos and Tougountzoglou (2012) said that most of nations give special focus on ubiquitous computing applications for the delivery of various e-services like e-tourism. Ku and Chen (2015) illustrated that it is important to governments to adopt a knowledge-sharing culture in their relationship strategy with tourists by developing a competence long-term relationships.

II. LITERATURE REVIEW

Desplas and Mao (2014) illustrated that the accelerated development of Information and Communication Technologies (ICTs) and Internet expansion have transformed business-consumers relationships (B2C) and government-citizens relationship. Gatautis and Vitkauskaitė (2015) argued that enterprises started to make significant use of e-government services in different modern approaches, stimulated by process and progress in the online public services greater availability and sophistication. It is interesting that marketing, tourism and customer support have overtaken different old approaches like production and logistics as primary application areas for ICT in large nation's scenarios. In tourism sector, online information and reservation services in general have become a commonplace (Gatautis and Vitkauskaitė, 2015). E-tourism is one of the most dynamic modern areas of e-business and specifically in G2B area under e-government category, with a major significant impact for nearly all stakeholders involved. The usage of ICT would enable service providers interacting directly with customers and citizens, which puts severe heavy pressure on traditional intermediaries such as old fashion travel agencies and tour operators (Gatautis and Vitkauskaitė, 2015). E-government should establish, promote and enhance the idea of e-tourism as a business to the private sector in order to conduct it in a wide manner to improve the tourism in the country and to improve its contribution to the nation's economy.

Ayo et al. (2015) mentioned that Technology Task Fit theory (TTF) has been used in prior research for predicting individual adoption of information system in e-tourism and it shows significant relations (Usoro, 2010). Hence, in every nation tourism should gain special treatment and special consideration while in planning stage in order to implement the most suitable tourism aspect for it. Natworadee (2014) indicated that every nation which consider tourism as a target approach should have a "Pull factor" which contains of the following:

- **Low Cost:** every tourist would like to get the best tourism ever with the best cheaper price possible
- **Country reputation and image:** the country 's image is important to the tourist since going to unstable country in terms of security, wars or bad behavior aspects may alienate them.
- **Culture, landscapes and nature:** every tourist would like from the tourism to change the life style to new one with new environment, culture and nature. Therefore, countries should make its culture and nature as part of the tourism not only copying others tourism aspects.

- **Great care:** tourists usually won't go to a country which do not give care and attention to its tourists and often they will keep the first image of the nation from the first visit
- **Low Political Regulations:** nations with heavy and hard political and regulation procedure usually will be neglected or alienated by tourists like: visa, airport long checking and procedures and forbidden list
- **Variety of Services:** more services with different varieties would attract more tourist and make their tour more pleasant in terms of hotels, food, activities to different ages and hobbies...etc.

Hence, every nation should implement tourism plan with coordination between government and private sector through modern technology because It is believed that tourism organizations in a country that can respond fast, efficiently and effectively to the constant innovation in ICT applications to support their business and private sector could outperform competitors and maintain long-term successful progress (Buhalis and Law, 2008). Thus, it is apparent that e-tourism is an evolution service sector due to the advancement of ICT. The search for different knowledge base and selection of the most suitable tools, technological solutions and supporting infrastructure in a nation is a remarkable challenge to e-tourism (Qin, Atkins. and Yu, 2013). Furthermore, nation should divide its tourism into two main aspects:

- **Common tourism:** it is a common tourism space that are usually found in many countries like having national parks, theme parks, cinemas, malls and many other entertainments to suit all ages, genders and hobbies
- **Special tourism:** this tourism aspect is important to have it in countries as special which is usually attached to culture and nature of the country. For instance: cities with deserts and mountains should illustrate activities attached and more focused with its nature rather than with snowing and nations with Islamic religion should have Islamic attached culture.

III. SULTANATE OF OMAN CASE

The Omani government has developed clear mission and vision for the e-government in Oman (e-Oman) achievement; the key e-Oman mission statements is begin with streamlining the government services to achieve Oman 2020 as a cycle (AlRahbi, 2011). Whereas, the strategic visions are also set from developing society for increasing and promoting awareness among local public citizens in all aspects required and targeted from e-government including e-tourism. Information Technology Authority (ITA) is the main responsible of the e-Government project in the Sultanate of Oman since it provides efficient services, integrates processes and enhance service efficiency. Additionally it is responsible to implement, supervise and maintain Digital Oman Strategy (Information and Communication Technology Surveys Results, 2012). E-Government and Information sector in the Telecommunications Regulatory Authority (TRA) is responsible for overseeing the process of e-transformation from old

traditional services towards modern services based on technology and modern platform via ICT, follow up the e-Government implementation plan, ensure the promotion possibilities common infrastructure for government and raise readiness transformation of e-services (including e-tourism) provided by the government for clients. In the recent years, Omani government has scored a remarkable progress in the area of e-Government transformation due to the effort targeted in developing ITA. ITA is an autonomous body seeking and taking care of the successful implementation improvising of Oman's e-Government. It emphasizes upon the e-Government played role in the process of sustainable development. This development would give a great boost and enhancement in other attached e-services in the country like e-tourism in order to rise its affect in the nation's economic. Ahmed et al. (2015), the number of tourists visited Sultanate of Oman increased from 2011 to 2012 by 48% to exceed 2 million tourists. However, this number is still low compared to its contribution to the country's total Gross Domestic Product (GDP) of only 3.9%. However, compared to 2.2% only in 2004 (Rami, 2007). Thus, it can be observed that tourism is exceedingly vital to the world's economy and Oman is willing to give special consideration to it as well. Many institutes have worked on developing various e-services through implementing e-products in order to serve tourists and facilitate their tour trips.

IV. CONCLUSION

The importance of local people's participation e-government will give an effect in tourism in general and e-tourism specifically if it is implemented correctly in tourism basis where all ministries in the country connected together for implementation of different e-services together. Rami (2007) argued that tourism sharing in each nation vary upon to the country's effort in the sector and upon to the implementation procedure to match different stakeholders requirements with good modern technology platform of ICT. In Oman, local individuals' entrepreneurial and private sector organizations incentives should evolve in more community-oriented approaches along with government in order to develop sustainable tourism and e-tourism in the country, whether through micro-scale enterprises, activities of larger domestic and international tour operators or through other future tourism projects through ICT platform still there will have to be more local communities involvement especially in planning and decision-making processes. There is also need for qualified training in e-government, e-tourism and other electronic aspects to be involved in local tourism, both in industry-related issues and in natural and social environment in order to serve local historiography and archaeology. Finally, cooperation between governmental and non-governmental organizations should have concerted action in order to reach the optimum approach goal in e-tourism through e-government and ICT.

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An Investigation of Destination Image: Tourist Guides as Self-Image Data Resources

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Abstract- Destination image perceived by market has been studied for a long time. The main objective of this study is to examine self- image perception of destinations with special references to Turkiye as a tourist destination and Turkish tourist guides. Under the light of developed conceptual framework, a field research was designed and applied. The study discovered that there may be differences between hosts' perceptions on overall image and destination image of a country. Considering the differences this article will explore two questions that authors pose: According to guides what kind of image problems does Turkiye have and how they affect each other? Authors of the paper have implied the importance of the tourist guides in the destination image formation and management processes.

Index Terms- Destination image, Tourist guide, Perception, Attitudes, Turkiye

I. INTRODUCTION

Because of the competitive nature of tourism industry and the competition is getting more intensive among tourism destinations, identification of different attributes of the image and destination image measurement are critical to tourism marketers and decision makers of a destination. Image measurement of a destination might provide significant information that is needed to direct future marketing and planning strategies and development of the destination (Baloğlu, 1996; Hsu et al, 2004; Kotler, et al. 1993; Eclipse 9, 2003). Based on the mentioned competition, country and regional destinations are exerting significant efforts and funds toward improving their image and attractiveness among travelers (Ritchie and Crouch, 2000).

Destination image issue has been the core point of many tourism related studies for a long time. While most of the studies were collecting primarily data from visitors, only few of them targeted the residents of destinations or staff of tourism sector as data resources (Pike, 2002). As it has been seen in the forums of tourism researchers on the internet like "tri-net" and e-journals like "Eclipse", many researchers advocates the necessity of measurement of self image perception besides the market image (Eclipse 10, 2003:10).

As one of the most responsible front line staff of tourism, tour guides are playing variety of roles which are vital for the tourism industry and image of destinations (Tosun and Temizkan 2004; Pond, 1993; Dahles, 2002; Zhang and Chow, 2004). Perception and thoughts of tour guides, as key role players, should be paid attention through the investigation of destination

image as self-image data resources. Therefore, this paper will focus on destination self image measurement including destination image perception of tourist guides as residents and staff of tourism destinations with special references to a specific group of tourist guides guiding in Turkiye.

II. COUNTRY DESTINATION IMAGE AND TOURISM

Country image, mostly defined the identification of a country, is the opinion including not only with specific features but also the characteristics of the country in tourism market (Dichter, 1985; Avcıkurt, 2003). Image of a country as a destination consists of belief, ideas or impressions about what exists at a country, so everything belongs to country is assessed based on what people know about a country (Demanche, 2003; Sönmez and Sırakaya, 2002; Etchner and Ritchie, 1991; Gartner, 2003). Issues in a country like people's origin, understanding of democracy and human rights, level of technological development, employment, traffic, environmental consciousness, cleanness, show of tolerance to different cultures, public health, safety and security are effecting the country image, destination selection process of travelers and competitiveness of a destination (DPT, 2000; WTTC, 2006). Although, tourism image of a country is the only one aspect of the overall country image, the tourism researches of past two decades illustrated that it has many relations with the overall image and all of the components of destination image are also effective on country image formation and destination selection process and behavior of travelers. It is widely believed that the more positive the perception of a vacation destination the greater the possibility of selection of that destination is (Gartner, 1993; Woodside and Lysonski, 1989; Um and Crompton, 1992; Sirgy and Su, 2000; Baloğlu and McCleary, 1999; Ahmed, 1991; Milman and Pizam, 1995; Sırakaya, Shepard and McCleary, 1998; Chon and Weaver, 1991). Moreover, Image differentiates tourist destinations from each other (Milman and Pizam 1995) and destinations usually obtain their superiority against the others by means of their images. (Baloğlu and Mangaloğlu 2001; Baloğlu 1996).

A potential tourist may eliminate a destination from the list if for one reason or another s/he dislikes. On the contrary, a tourist discovery may contribute to a realization of other aspects, of an economic, technological, environmental, political or cultural nature of that country (Sönmez and Sırakaya 2002, Demanche 2003, Lepp and Gibson, 2003). Negative perception of political, religious and cultural aspects of a destination strengthens the perception of risk and influences the likelihood of visiting it (Lepp and Gibson, 2003). Thus, destinations should

focus on constructing favorable image and increasing level of favorable perception of visitors.

As one of the main barriers in front of the constructing a favorable image in the world, political issues are getting more importance. Contrary to peace demands on personal, national and international level many of the people in the world continue to live by accentuating fear, hostility and suspicion (Kim and Prideaux, 2003). Efforts of various organizations and groups aiming racism and terror or lobbying for constructing negative image about some of the developing countries in the international arena may be concerned as the toughest obstacle to overcome on the way to improve destination image and the peaceful usage of tourism in the world (Tosun, 1999; Lickorish and Jenkins 1997). Tourism, as an image-correcting instrument, plays an active role in both preventing future conflicts and fostering better political relationships. It might be thought as an instrument able to reduce tension and suspicion by influencing national politics, international relations and world peace (Mathieson and Wall, 1982; Kim and Prideaux, 2003; Butler and Mao, 1996). Additionally Anastasopoulos, (1992: 641) reported that

“Tourism by itself, neither leads to automatic prejudice reduction nor facilities improvements in social relationships. Tourism simply provides the opportunity for the social contact to occur, while the outcome of such contact could invariably be determined by its planners and specific conditions... Therefore, careful considerations to the factors influencing social and cultural relationships between the host and guest populations can lead to a properly designed touristic experience, one which will promote cultural understanding and the process of peace”. For this to occur there should be careful planning. Images of destination countries might be more favorable with constructing a better understanding between others and us by means of the social and cultural relationship provided by careful planned tourism activities.

III. ROLE OF TOURIST GUIDES IN THE DESTINATION IMAGE FORMATION AND MANAGEMENT PROCESSES

In the literature review process of tourist guiding, it has been noticed that many researchers impressed that tourist guides play many different and important roles in tourism industry. Zhang and Chow (2004) have scrutinized many of past studies about guiding, summarized, and listed these mentioned roles in their study. According to the list in this study, tourist guides play roles of ambassador, buffer, actor, caretaker, catalyst, culture broker, information giver, intermediary, interpreter/translator, leader, mediator, middleman, organizer, salesperson, shaman and teacher.

Pond (1993) has compiled the roles of guides under 5 basic titles as follows;

- A Leader, controlling or convincing a group to browse where he or she does, creating right environment toward consensus, making decisions, having willingness to assume responsibility, exerting effort to satisfy the needs and wants of tourists.

- An Educator, instructing and teaching the visitors about everything peculiar to destinations in unobtrusive professional techniques.
- A Public Relation Representative (Ambassador) empowering the cross-cultural awareness and understanding and presenting the destination in a favorable way.
- A Host, creating a comfortable environment for the guest and,
- A Conduit fulfilling the previous four roles in a right place, time and way.

In addition to Ponds' list, Tosun and Temizkan (2004) classified these roles under educator, representative and subsidiary functions.

If the roles of guides are taken in to consideration it may be mentioned that tourist guides are in the essence of image formation and management of tourism destinations. In some circumstances, some of tourist guides present view of their world and home emphasizing or omitting what they choose. This occurs intentionally or because of the governmental authority over the guide in some countries. Most would agree that guides should inform as objective as possible (Pond, 1993; Dahles, 2002).

Dahles emphasized the effect of tour guides on the destination image formation and image management “They play a pivotal role in the social construction of a local identity. On a guided tour, tourists view and interpret local sights through the words of the tourist guides. Moreover, they are made to experience the environment according to the way in which the guide constructs and represents it. However, the type of information and explanations provided for certain situations may be quite different from both the information that the government requires to be disseminated about a place and the information which a local resident would provide, even where the guides are local residents.” (2002:788)

It is clearly acceptable that guiding is a very strategic factor in the representation of a destination and guides know the positive and negative aspects of the host country that should or not be displayed (Dahles, 2002). Unless we are sure about the quality of guide services, this may result in damaging the image of tourist destination (Ap and Wong, 2001). Even political science ignores strategic role of tourism and tourist guides, policy makers shouldn't and may not. Thus, Israeli Prime Minister Moshe Dayan stated in a moment of condor; “It is easier for Arabs to become Israeli air force pilots than to become tourist guides” (cited in Mathews and Richter, 1991:127).

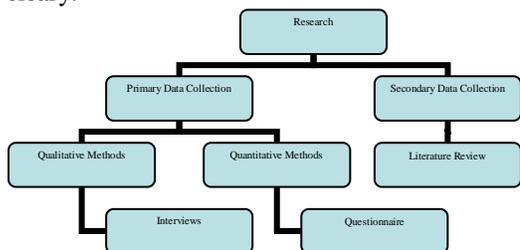
It seems there is a consensus in the literature that guides are not only key front line tourism staff of destinations but also ambassador and interface between host and visitor and a window on to a site, region or country (Pond, 1993; Ap and Wong, 2001; Dahles, 2002; Cohen, Ifergan and Cohen, 2002; Zhang and Chow, 2004; Tosun and Temizkan, 2004).

As mentioned before, knowing factors influencing image would help identify target markets and decide which image should be promoted to which segment of the market or eliminated to achieve success (Fakeye and Crompton, 1991; Demanche, 2003). At this point of view, image perception and

thoughts of “Professional Tourist Guides” (PTG) should be taken in to consideration through the investigation stages of what types of exposure affect process of country image formation in the minds of consumers.

IV. METHODOLOGY

The study was conducted in two steps. The first step of the research was the secondary data collection. In the first step, the literature about destination image and tourist guiding was reviewed and web sites of state run and public organizations as Turkish Ministry of Culture and Tourism, Association of Turkish Travel Agencies (TURSAB), Federation of Turkish Tourist Guides Associations (TUREB) etc. were visited and analyzed. Attributes of destination image related to tourist guides were listed and classified based on the data collected. Primarily important attributes were selected and put in to the draft questionnaire. Secondary data collection step was very important for the development of needed questionnaire. Following the development of questionnaire, focus group interviews, and designed questionnaire were conducted as the second step and field study of the research. As the researchers are also PTG and continuously in communication with other guides filling the questionnaires, they made unstructured interviews about the subject. Steps and research techniques of the study can be seen in following figure. We created this figure to be understood more clearly.



4.1. Survey Instrument

Both, scale items and unstructured techniques are needed for validation purposes as they complement each other to identify “true” images of tourist destination and to capture the richness and multi-components of the destination image construct (Etchner and Ritchie, 1993; Baloglu and Mangaloğlu, 2001). This study employed survey questionnaire as main data collection instrument besides focus group interviewing and participant observation. As a qualitative primary data collection instrument, “focus group interviewing technique is supposed to encourage not only an exchange of views and ideas, but also the production of new ideas as a consequence of the public sharing and assessing of the ideas. Access to information which is highly confidential, emotive or personal may be essential to the research project whether one gets it and then how it is used, depends very much on the trust built up between the interviewer and interviewee” (Clark et al. 1998; 137,138). The questionnaire draft was developed based on a comprehensive review of the relevant literature, opinions of the academicians on the scientific internet forums for researchers like tri-net and colleagues of the authors and experiences of the authors and conducted through personal interview. It involved open-ended, multiple choice and likert scale questions. The questionnaire consisted of four

sections. The first section included a study of tourism image of Turkiye; beaches, historical and natural attractions, cultural variety, nightlife, accommodation facilities, infrastructure, hygiene and cleanness in tourism facilities, prices of tourism services, attitudes of local to tourists, shopping opportunities and tourism staff. It was structured in 5 point Likert scale ranging from “(1) very bad” to “(5) very good”. The second section explored general issues of image of Turkiye by the statements about democracy level, human rights, relations with neighbors, risk of being victim of crime, risk of being a victim of terror, economy, job relations, cultural richness, standards of medical services, reliability of people, traffic, environment, hospitality of people, standard hygiene and cleanness, respect to private life and tolerance to different cultures. It was also designed in 5 point Likert scale ranging from “(1) strongly disagree” to “(5) strongly agree”. The third section included multiple selection and open ended questions that represent tourist guides’ perception of boundaries of Turkiye from the aspects of cultural and political structure. The fourth section involved variables of the profile of respondents.

4.2. Sampling

According to the 2014 reports of culture and tourism ministry of Turkiye, the number of licensed professional tourist guide is 15.802 in Turkiye. % 27.72 of them have the license and are not actively working as a tourist guide but they also don’t want to loose their licenses. Thus, sample population of study is decided 11.188 actively working professional guides. According to De Vaus (1996:71), the minimum sample size of 10.000 sample population should be 330. Riddick and Russel (1999: 163) stated that 367 is an appropriate number as a sample for 8.000 population. The calculated sample size is 400 by employing the formula barrowed from Ryan (1995:178).

4.3. Field Study

As one of the strongest problems, tour guides are mobile workers and to reach and make them to fill the questionnaire is not possible while they are working. The questionnaire were sent to the PTG via Internet and social media. Tourist Guide Associations from all over the country were also approached for distributing and collecting the questionnaires. PTG who are the members of these associations, according to where they reside, were asked to participate the survey by e-mail. 428 of the questionnaire were completed and returned. And this number is enough for the sampling in the study.

V. STUDY RESULTS

7.1. Demographic Profiles of the respondents

The gender distribution of the respondents was 132 (30.8 %) female and 267 (62.4 %) male. The three dominant age groups of respondents were 18-25 (34.8 %), 26-35 (28.5 %), 36-45 (16.1 %) and 46 and above 102 (25.8%) made up the smallest group. In terms of education 62.1 % of the respondents had faculty or 4 years school degree of university and 19.3 % had postgraduate while 15.3 % and 3.2 % had collage and high school education.

Table 1: Demographic Profile of Respondents

	Frequency N=428	This Survey %
<i>Gender</i>		
Male	267	62.4
Female	132	30.8
No Respond	29	6.8
<i>Age Group</i>		
18-25 yr	149	34.8
26-35 yr	122	28.5
36-45 yr	69	16.1
46 yr and above	39	9.1
<i>Education Level</i>		
High School (Lycee)	13	3.2
College (2 years Schools of Universities)	62	15.3
Faculty or 4 years Schools of Universities	251	62.1
Postgraduate	78	19.3
No Respond	24	5.6

7.2. Perceived General and Tourism Images of Turkiye by PTG

Perceived attributes about tourism image and general image of Turkiye by PTG and calculated standard deviations and means of attributes were listed in Table 2 and Table 3. For all of the 14 items about tourism image in Table 2 were framed positively higher than 3.00 ranging from 3.04 to 4.41 between “normal” and “very good”. According to the mean scores of 5 items ‘variety and richness of living culture’ (4.41), ‘climatic features’ (4.32), ‘natural attractions’ (4.30), ‘historical places’ (4.21) and ‘beaches and coastline’ (4.15), it is seen that PTG underlined the tourism resources and potential of Turkiye. Although there is no mean score under 3.04 of ‘Professional ability of tourism staff’, all of the mean scores of items between 4.00 and 3.00 may be acceptable economical development and general image related issues like quality, infrastructure, hygiene and cleanness and education. It should be considered to the extent of Turkiye

strengthen its economy these items will more satisfy PTG and tourists. Grand mean score of Table 2 (3.79) shows that the tourism image of Turkiye was perceived better than ‘normal’ and close to ‘good’.

Table 2: The Perception of Tourism Image of Turkiye by Professional Tourist Guides

	Frequency N=428	Std. D.	Means
1. Natural attractions		0.850	4.30
2. Climatic Features		0.765	4.32
3. Variety and richness of living culture		1.767	4.41
4. Historical Places (Museums, Ancient sites etc.)		0.910	4.21
5. Beaches and Coastal Line		0.885	4.15
6. Shopping opportunities and facilities		0.949	3.71
7. Variety of accommodation facilities		0.947	3.82
8. Attitude of public to tourists		0.988	3.54
9. Night life / entertainment opportunities		1.032	3.45
10. Quality of accommodation facilities		0.955	3.63
11. Affordability of products and service price		1.067	3.44
12. Hygiene and cleanness in tourism enterprises		1.012	3.41
13. Professional ability of tourism staff		1.188	3.04
14. Infrastructure of tourism areas (roads, communication, energy etc.)		0.991	3.43
Grand Mean		-	3.79
Mean Scale: 1- very bad, 2- bad, 3- normal, 4-good, 5- very good			

Table 3: The Perception of General Image of Turkiye by Professional Tourist Guides

	Frequency N=428	Std. D.	Means
<i>Proposed Items about General Image</i>			
1. EU membership will positively affect Turkiye’s tourism image.		1.180	3.83
2. Some tourist guides willingly give detrimental information.		1.335	2.70
3. PTG plays an important role in image generation.		0.883	4.39
4. Turkiye is a democratic country.		1.199	2.70
5. Turkiye shows respect to human rights.		1.177	2.50
6. Turkiye has good relations with neighbors .		1.151	2.38
7. Risk of being victim of crime (burglary, snatching etc.) is very high in Turkiye.		1.106	2.26

8. Terror risk is very high in Turkiye.	1.069	3.72
9. Turkiye is an economically strong country.	2.598	1.08
10. Business relationship is ethical in Turkiye.	1.057	2.41
11. Turkiye has variety and richness of living culture.	0.855	4.30
12. The standards of health service are high.	1.071	3.04
13. Turkish people is reliable.	0.972	3.35
14. Traffic is very safe.	0.775	2.10
15. Turkiye is environmentally friendly.	1.088	2.63
Grand Mean		2.93
Mean Scale: 1- strongly disagree, 2-disagree, 3- neutral, 4- agree, 5- strongly agree		

In general image evaluation as it's shown in Table 3, PTG were asked to indicate their agreement about 16 items on 5 point Likert scale from strongly disagree (1) to Strongly agree (5). The favorable perceptions about given general image items for Turkiye as mean scores in rank were 'PTG plays an important role in image generation.' (4.39), 'Turkiye has variety and richness of living culture.' (4.30), 'Turkish people is hospitable' (3.98), 'EU membership will positively affect Turkiye's tourism image' (3.83), 'Terror risk is very high in Turkiye' (3.72), 'Turkish people is reliable' (3.35), 'The standards of health service are high.' (3.04). The most unfavorable perceived image item about general image is 'Turkiye is an economically strong country' with mean score 1.08.

The grand mean score about general image of Turkiye is 2.93 and it could be stated that professional tour guides have more positive perception than the literature of past two decades about the overall image of Turkiye. The European Union accession process of Turkiye should be affective on the more positive perception of Turkiye.

7.3. Various Thoughts of PTG

PTG have been asked to position their opinion about the questions given in Table 4 between 1=strongly disagree and 2=strongly agree. PTG emphasized that they play affective role on the image formation of countries by mean score 4.39. They also stated that as a foreign and domestic political target of it expected EU membership will positively effect the image of Turkiye by mean score 3.83. It is indicated by PTG that besides PTG play important role on the image formation of a country, it sometimes may be negative contribution to the image of a destination by malevolent guides. As it is seen in Table 4 PTG gave the mean score 2.70 to the proposition of 'some of the guides intentionally gives wrong information about a destination'.

Table 4: Various Thoughts Of Professional Tourist Guides

	Frequency N=428	Mode	Std. D.	Means
1. Tour Guides play affective role on the image formation of countries.	5	0.883	4.39	
2. Expected EU membership	5	1.180	3.83	

will positively effect the image of Turkiye .

3. Some of the guides intentionally gives wrong information about a destination	4	1.335	2.70
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7.4. Classification of Turkiye on the Aspect of Political and Cultural Structure by PTG

As an unstructured image evaluation question, respondents were asked to position status of belonging of Turkiye by on the aspects of political and cultural structure filling in the blanks of given sentences. On the aspect of poitical structure, answers of 417 of the PTG were found evaluative. 39.3 % of answers positioned Turkiye in Asian, 35 % middle-eastern, 18.7 % European, 6.9 % Mediterranean and none of them Asian-European and Unique (Table 5).

Table 5: Classification of Turkiye on the Aspect of Political Structure by Professional Tourist Guides

	Frequency N=417	Valid %
<i>On the aspect of political structure Turkiye is a country.</i>		
European	78	18.7
Middle-eastern	146	35
Unique	0	0
Asian	164	39.3
Asian European	0	0
Mediterranean	29	6,9

Classification of Turkiye on the aspect of cultural ties can be seen in Table 6. While 48.5 % of 422 PTG stated that cultural ties of Turkiye are stronger with Middle Asia than other, 32.4 % of them stated Middle East and 10.6 % Europe. As one of the most intellectual social class in Turkiye, answers of PTG indicated that Turkiye can be seen as a cultural bridge or

crossroads of cultures but mostly being evaluated inside the Asian political border.

Table 6: Classification of Turkiye on the Cultural aspects by Professional Tourist Guides

	Frequency N=422	Valid %
<i>Cultural ties of Turkiye are stronger with than others.</i>		
Middle Asia	205	48.5
Middle East	137	32.4
Europe	45	10.6
North of The Black sea	19	4.5

7.5. Domestic and Foreign Political Issues Affecting Tourism Image of Turkiye

For determining the degree of foreign and domestic political issues affecting the tourism image of Turkiye, 2 multi selection question were asked. PTG were given 4 foreign and 4 domestic issues selected based on the literature review and asked to select the most important political issue of which has negative affect on the tourism image of Turkiye.

PTG added other issues such as ‘economy’, ‘governments and mafia relations’ and ‘radicals of rightists and leftists’ to the given ‘political events’, ‘separatist terror’, ‘Gezi Park protests’ and ‘security’ issues about domestic issues affecting tourism image of Turkiye in unfavorable way. About foreign political issues, they added ‘politicians’ and ‘Turks living abroad’ to the given selections.

In Table 7 it is seen that the most important negatively affective domestic political issue on the tourism image of Turkiye was selected ‘Political events’ (35.3 %) and the second was ‘separatist terror’ (22.4 %). The selection rate of ‘security’ (3.2 %) is very low.

Table 7: What is the most important domestic political issue affecting the tourism image of Turkiye?

	Frequency N=428	Valid %
<i>Issues</i>		
Political events	151	35.3
Separatist Terror	96	22.4
Gezi Park Protests	82	19.2
Security	12	3,2
Other	44	10.2

The most affective foreign political issue was selected as ‘Syria Crisis’ (38.3 %), the second was ‘Armenian allegations’ (22.4 %) and the third was ‘The EU process’ (18.2 %). ‘The wars in Iraq and in the middle east ’ (5.6 %) was not accepted in the

primary 3 issues to be solved (Table 8). In other, it is interesting that PTG added the issue ‘Turkish citizens living abroad’ as an negatively affective issue to the given issues. It means that intentionally or not, some of the Turkish citizens living abroad are not representing Turkiye in a positive way.

Table 8: What is the most important foreign political issue affecting the tourism image of Turkiye?

	Frequency N=428	Valid %
<i>Foreign Political Issues</i>		
Syria Crisis	164	38.3
Armenian issue	96	22.4
The EU Process	78	18.2
The wars in Iraq and in the middle east	24	5.6
Other	66	15.4

On the focus group discussions, some of the respondents emphasized that “Despite the fact that they are Turkish citizens if they do negative representation intentionally, they may be member or sympathizer of a group aiming racism and terror or a lobby constructing negative image in the international arena for Turkiye”. They may also be unintended and uneducated immigrant Turkish workers. It is easily realized that wars around tourist destination countries are affecting the visit desire of potential tourist to a destination. Most of the respondents were agree on that Turkiye has rich and various tourism resources. The governments could not have paid needed attention and realized the expectations of the tourism industry because of the political interests and pressures of interest lobbies on the politicians. Most of the negative perceived image items were seen related with the interests of politicians and their interest-oriented movements. They also stressed that even if Turkiye has lower standards of human rights, economy, infra and upper structure, education, traffic, hygiene and cleanness etc. comparing to the west (Europe and U.S.A), the perception of the tourists is getting more positive after the first experience in Turkiye. They indicated the most affective image eroding but self-manageable issues as Armenian allegations, Cyprus issue, human rights matter, and separatist terror.

One may expect that the demographic features influence the perceptions of PTG. To analyze these possible influences a two-way analysis of variance was used to not only the effects of demographic factors on image items but also the interactions between image items. The analysis could not provide a strong evaluative finding.

VI. CONCLUSION

It is arguable that if it necessitates or not to get tourist guides or other groups of tourism labor as the population for a study researching the image of their own habitat. But it is sure that PTG have deep, actual and multi dimensional knowledge and opinion about the issues related with their own country and tourism destination. As a frontline and more intellectual staff of

tourism industry, tour guides are playing a vital role in the each of the stages of tourist experience in a destination and image formation process of that destination. For a successful tourism planning, destination management and marketing strategy, opinions of tour guides should be considered. This study is contributing to the literature by establishing mirror effect (self perception) approach for the further destination image studies by positioning the tour guides as mirrors reflecting the current and coming up situation of the destination itself.

According to the research results, PTG perceive the tourism image as positive while general image of Turkiye is perceived negative. Generally, both of the images are affecting the other one and this situation is not just valid for Turkiye. It is valid for every country. However, there are some foreign and domestic political problems influencing the destination images it should be noted that positive tourism image may be a great chance for developing countries like Turkiye to build a positive general image in the international arena. Tourist guides, as representatives of the country, should be selected carefully and educated at least, as much as ambassadors on the political issues should. By using tourism, Turkiye may focus on eliminating the Armenian allegations, proving its charity on military intervention to Cyprus and telling the validity of its ideas. The hegemony of the international global scale tour operators and the trend of mass tourism based on sea, sun and sand may be recognized as the toughest step on the usage of tourism as a political image builder. Further researches may focus on how to improve the negative aspects of the image and what to do to achieve this. Besides, repeating and updating the research on a large scale will contribute to the generalization of research results. The works, in the future, will be more successfully carried out in the area. On the other hand, the matters may remain unresolved, destination may be infamised or it will lead to negative competition.

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Design and implementation of mobile laser data transceiver

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Abstract

The laser communications systems consist of three main parts are a transmitter, free space channel and receiver. In this work the circuit of mobile laser transceiver has been designed to use for data exchange between computers. The electronic parts that have been used to implement the mobile laser transceiver are laser diode of 650 nm used as transmitter, a phototransistor IS485 has been used as receiver, MAX232CPE is an IC used to as data controller, inverter DM74LS04 has been used to invert the received signal from a phototransistor IS485 and the program that has been designed and used to control the data exchange between computers is Visual Studio 2010. The programs have been used to exam receiving and transmitting file are free serial monitor and WinMerge. A laser beam transmits data form 1m to 20m of range with no errors in different free space conditions. The baud rates that have been achieved are from 9600bps to 256000bps.

Index Terms: FSO, laser communications, transceiver, OOK modulation.

I. Introduction:

The technology of communication has become very interesting recently. The continual development in this technology demands higher bandwidth to transfer higher bit rate data at fastest possible speed. This bitrate data can be modulated on a signal with frequency starting from a few kiloHertz at Marconi's time to many hundred teraHertz by using laser systems.

The line-of-sight conditions between the transmitter and receiver is a must. The benefits of laser communications systems are doesn't need for broadcast rights and buried cables. The laser diode is typically generating the carrier used for the transmission signal. Two parallel laser beams are required, one for transmission and the other for reception. The laser communication offers high bandwidth, which can be employed in neighborhood by putting and aligning the laser communication systems on the top of the existing buildings which offers a multi-gigabyte of communication speed. One of the other applications of Laser communications technology is temporary connectivity needs (e.g. disaster scenes, sporting events, or conventions), or space based communications. The following figure explains the main diagram of free space optics (FSO) systems:

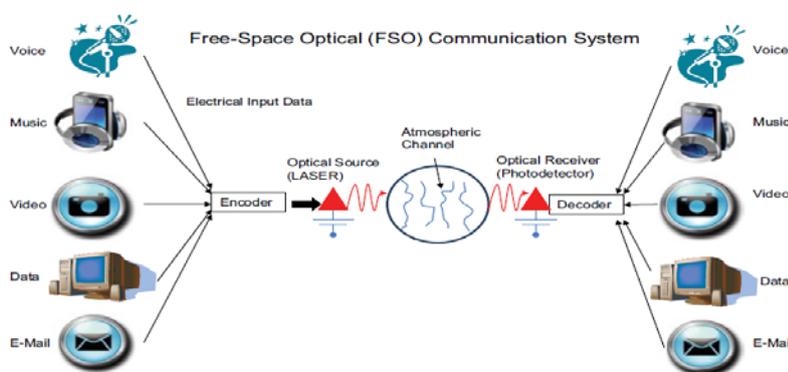


Figure 1.0 a scheme of FSO communication technology with optical wireless

David O. Caplan studied the designs of optical transmitter and receiver that are particularly well suited for average power limited photon famished links where channel bandwidth is readily available. He also studies a simple direct-detection systems used in short terrestrial or fiber optic links [1]. Yan Wang (et.al) studied the analysis for PPM modulation mode and the method of pulse (MOPA) type fiber laser based on

the PPM modulation system was designed. Where their simulation verified that it can reach 1 Mbps transmission rate [2], M. A. Minshed, studied signal modeling using bacterial foraging optimization algorithm in LADAR [3].

The most important advantages of FSO versus microwave communication are:

1. Beam width narrowness.
2. The large directivity of the laser versus RF.
3. The higher bandwidth of the laser by comparing with RF.

In this work the modulation that has been used is ON-OFF KEYING, the transmitter is a laser diode (wavelength 650nm) and the receiver (phototransistor). The maximum baud rate that has been achieved is 256000bps.

II. Theory of optical communication systems

The aim of communication systems is to transmit information which can be achieved in many ways. The FSO communications technology mainly depends on propagation of laser beam through atmosphere and other media. These media are interacting and affecting the quality of the propagating laser signal [4].

The most important parts of the communication systems are the transmitter and receiver, in the optical communication system the transmitter converts an electrical signal bit sequence to an optical data stream. Because the light output of a laser diode is defined as a function of the input current instead of voltage, laser diodes are driven by currents. The driver of laser can be considered a simple high speed current switch controlled by a modulated data stream at the input [5].

The receiver antenna of the optical communication systems is the optical detector which converts the optical signal to electrical signal. The receiver mainly determines the total performance because it handles the lowest signal level in the communication link [5].

Modulation is the process of facilitating the transfer of data or information over a carrier medium. There are two types of modulation (analog and digital). The moving to digital modulation provides more information capacity, compatibility with digital data services, higher data security, better quality communications, and quicker system availability.

1. Link calculations

The performance of the FSO overall systems is measure by applying equation of range of link budget driver, which is collect all affecting parameters on the system to get the received power at the receiver [4]. The affecting parameters are: transmitter, propagation losses, and receiver's sensitivity.

The transmitter consist of three stage they are laser power, transmitter antenna gain and transmitter transmission, while the propagation losses can be divided into two parts they are atmospheric transmission and space loss, and finally the receiver's sensitivity consist of receiver antenna gain and receiver's transmission as shown in figure 2.0 [4].

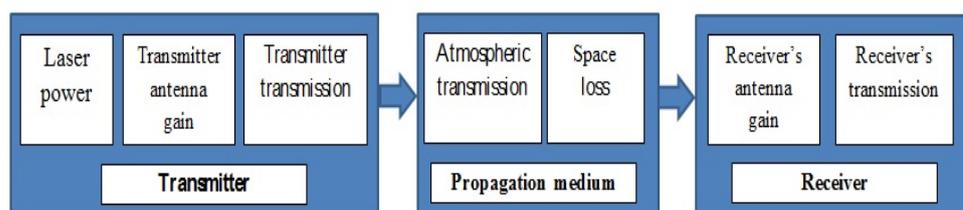


Figure 2.0 optical link affecting parameters.

2. Laser transmitter

The main properties of the laser diode transmitter are: Turn on delay, Frequency chirping and Temperature effects. The optical transmitter converts the electrical signal into an optical signal. The main sources of the optical signals in FSO communication systems are the Light Emitting Diode (LED) and the Laser Diode (LD), the LD has many advantages over LED they are: unique size, high efficiency, specific spectral region of operation (coherent light), high speed of operation, small divergence angle of propagation and appropriate for long distance of transmitting [6].

3. Modulation

The output of the laser diode is depending on the injected current to the diode instead of voltage. The current is driving the laser diode. Laser driver circuit regarded as a simple high speed current switch controlled by a modulated data stream at the input current, the used input current method of data offers many advantages such as reduced noise and a higher bandwidth [5].

Modulation that has been used is directly modulated transmitter consisting of a LD and a LD circuit. The data stream inputs directly modulated by the LDC. The emitting light output of the laser diode is response to the logic of “one” or “zero”. The simplest, most common and widely used modulation is direct modulation of the light intensity by data, called On-Off Keying (OOK) [6].

The Amplitude-Shift keying (ASK) modulation technique is the modulation technique that has been used in this FSO system. The On-Off Keying is a special case of the ASK, where in ASK the changing of the amplitude is depends on the information otherwise it's still fixed as shown in figure 3.0[5].

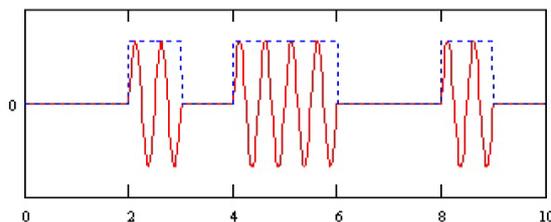


Figure 3.0 ASK modulation

4. Receivers (Photodetectors)

The optical power and the electromagnetic wave power converted into electrical power by the photodetectors. Because of the photodetectors can be regarded as a sensor for the light (in general electromagnetic wave) they are developing very fast with photonics applications (e.g. telecommunication, spectroscopy, military technology, photosensors, medicine, information processing, laser material processing and etc.) [7].

III. Design and construction of mobile laser transceiver

Optical transceiver is one of the FSO communication systems. The function of the electronic circuit that has been built is optical communication transceiver. The free space is the media of data exchange.

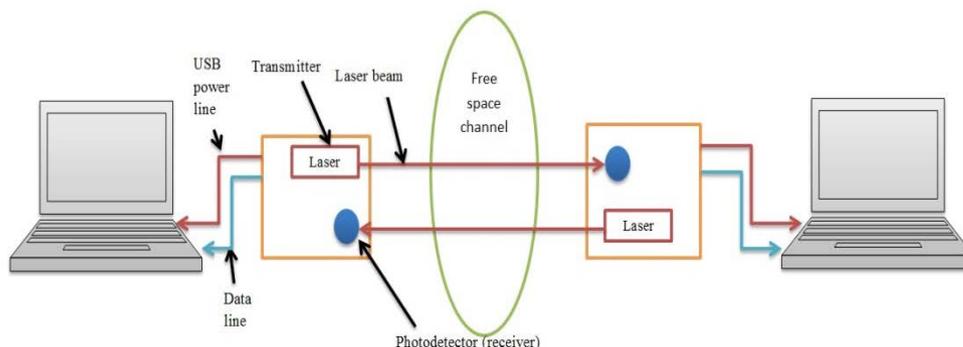


Figure 4.0 General schamatic diagram of the system

The proposed electronic circuit has been used to transmit data between the computers and networks. The parts of the optical communication transceiver are: transmitter (Laser Diode), receiver (Photodetector), other electronic circuit components, connection cable, power source and Software (visual studio program).

1. data transmission sequence

Transmitting: first step of the data process, the computer program decoding the selected file into zero –ones code and delivers this code through the data connection cable to the data process IC then the IC sends this code to the laser transmitter, the transmitter will modulate the data on the laser beam using ON-OFF keying modulation, the laser beam is then modulated with the code of data.

Receiving: on the other hand, the transmitted laser beam will be received from the photodetector (phototransistor), the phototransistor will invert the logic zero into logic one and vice versa this is because of the phototransistor design, the output of the phototransistor will be sent into inverter IC to make the code similar to the original one (the sent code), the next step is the data process IC, the data process IC will deliver the code to the computer program, which will encode the received code and convert it into file like the sent file with a deferent name.

2. transceiver circuit design

The design of transceiver circuit contains MAX232CP work as data traffic control, DM74LS04 inverter which invert the received signal from the phototransistor (IS485) and laser diode (650nm) as transmitter, figure 5 illustrates the transceiver design.

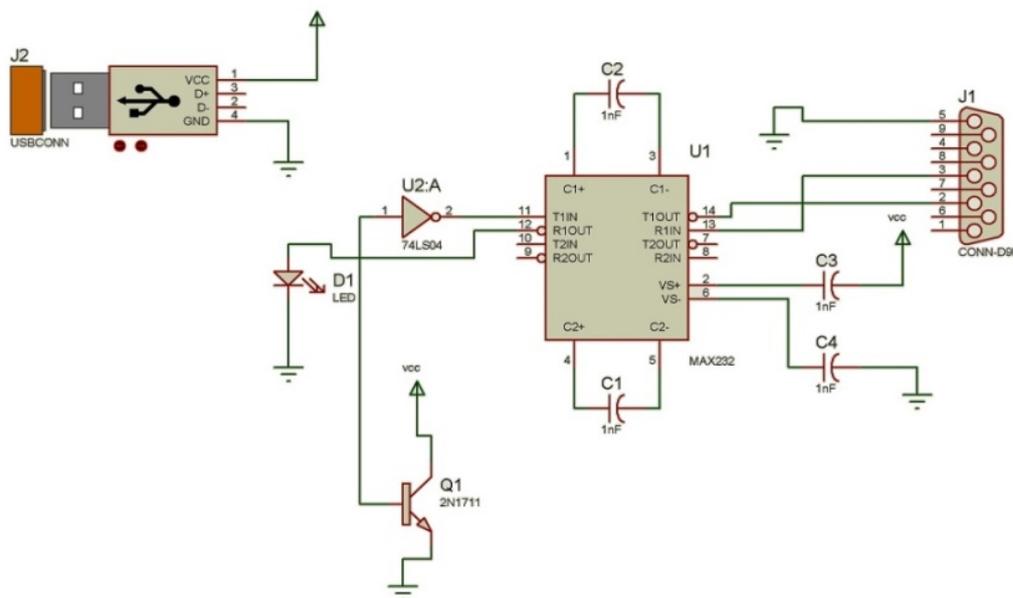


Figure 5.0 transceiver circuit designs.

IV. Results

Figure 6 illustrates the transmitted and the received signals as electrical signal that has been got from oscilloscope, where channel 1 is representing the received signal, while channel 2 is representing the transmitted signal.

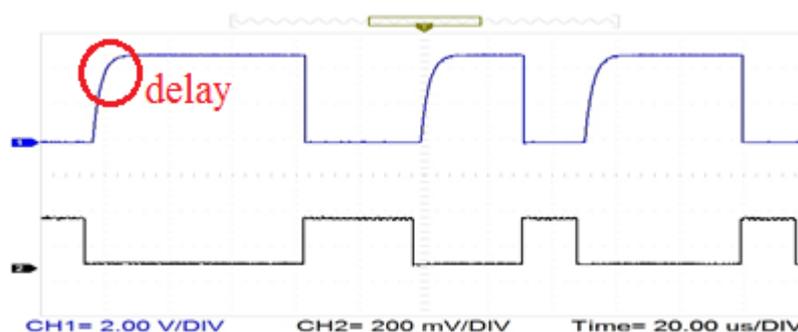


Figure 6.0 Sample of actual transmitted and received signals.

The amplitudes of the received signal as shown in figure 6 is bigger the transmitted because that the phototransistor (IS485) include internal amplifier and a Schmitt trigger circuit. A circle shown in figure 10 refers to the delay of the phototransistor (IS485) and this delay will be terminated when the signal takes out of the inverter (DM74LS04) because the inverter (DM74LS04) work in TTL (Transistor-Transistor Logic), this gives the circuit more reliability.

Using same transceiver device (by reflecting the transmitted laser beam into the receiver and baudrate 256000bps) and using free serial monitor program, the contents of a file will be observable as illustrates in figure 7 and the observer can observe that the contents of the sent and received files are the same. The alignment must be perfect because the time duration of transmitting data will decrease with increasing the baudrate.

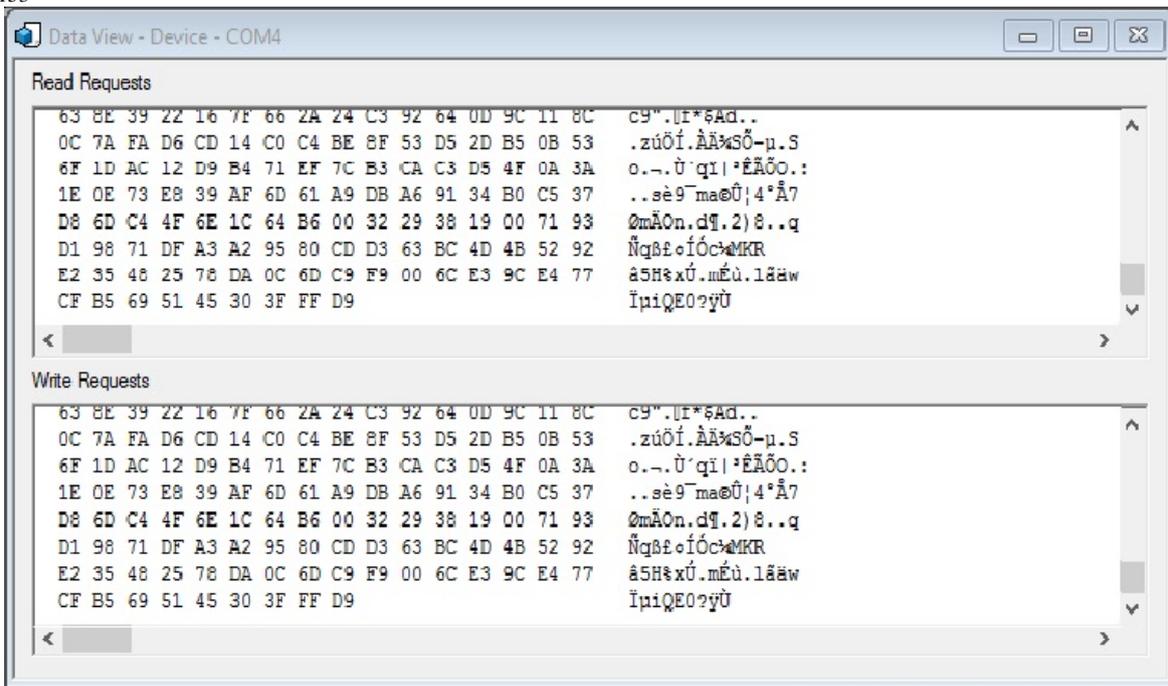


Figure 7.0 received image and sent image content

Now by using Win Merge program which is compare between two files and find the matching percentage, the result will be as shown in figure 8 which shows the different percentage between the two files and this difference is coming from the different files names because the program that has been designed (in Visual Studio) write the received file with different name.

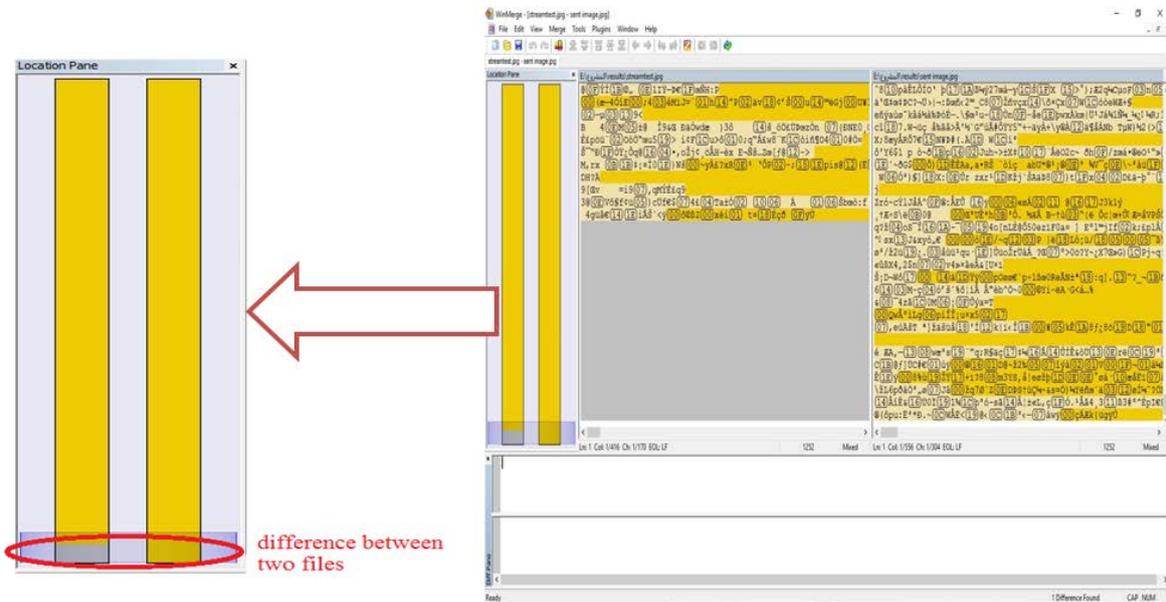


Figure 8.8 received image and sent image content difference.

Figure 9 shows the sent and received file with different names

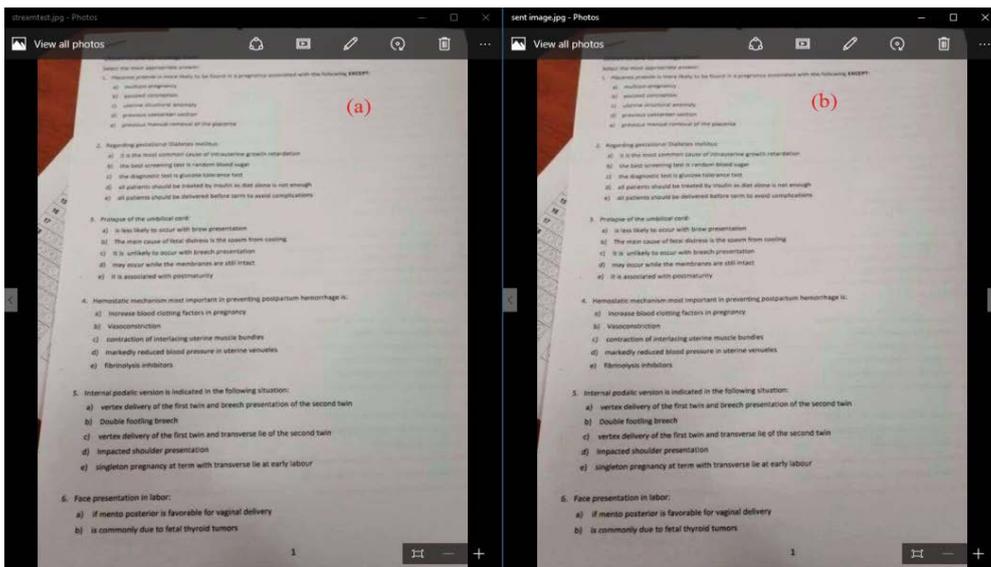


Figure 9 (a) received image (b) sent image

V. conclusion

As evident in the above, this paper seeks to explore the data exchange between two computers, we can conclude the following:

- In order to decrease the error percentage of data exchanges must get perfect alignment between a transmitter and receiver.
- Increasing in baud rate of data transmitting increase the speed of communication that may increases the percentage error of data exchange.
- The difference between two files can be canceled by designing new program.

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Gender Difference on Household Income and Asset Building: The case of Arbaminch Surrounding District, Gamo Gofa Zone, SNNPR, Ethiopia

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Abstract- Empowering the poor through household asset building and improving their economic status is now one of the top prioritized agenda by Ethiopian government. To address this, gauging gender differences in terms of determinants of income and asset accumulation by assessing the practical social and economic characteristics of FHH and MHH is critical in the area. This study was conducted in Arbaminch surrounding by selecting four rural kebeles. A stratified random sampling technique was employed to select 160 household heads for the study. Data were collected using semi-structured interview, key informant interviews and focus group discussion. Descriptive statistics and econometric techniques were employed for data analysis. OLS and Blinder Oaxaca decomposition model were used. The results of the study showed that MHHs own more productive resources such as savings, land, and livestock, labor and household equipment as compared to FHH. Moreover, OLS regression analysis in relation to household income showed that the numbers of livestock, cultivated land size, labor availability, credit, distance to nearest market, irrigated land size were statistically significant for both MHH and FHHs while social capital was only significant for MHHs. In the case of asset accumulation, OLS regression analysis showed the extension contact and irrigated land size were significant to MHHs, while the rest of other variables were significant for both households. Blinder-Oaxaca decomposition indicated that the observable characteristics (endowments) play a significant role for observed differences by contributing for the gap by the -1.58 and -1.491 respectively for household income and asset accumulation between two groups. But the differences due to coefficient and interaction were not statically significant for observed differences in both household income and asset accumulation. Over all; findings of the study suggested a bundle of gender sensitive interventions and policies to enhance the resource endowment.

Index Terms- Blinder- Oaxaca decomposition, household asset accumulation, household income, OLS, Male and female headed

I. INTRODUCTION

Economic security throughout the life course is basically linked to income and asset ownership. The majority of current social policies focus primarily on income supports and social services. However, building assets can also help individuals, families, and communities expand their economic horizons. Access to, control over, and ownership of assets are

critical components of well-being (Carter and Barrett, 2006). Productive assets can generate products or services that can be consumed or sold to generate income. Assets are also stores of wealth that can increase (or decrease) in value. Assets can act as collateral and facilitate access to credit and financial services as well as increase social status. Flexibility of assets to serve multiple functions provides both security through emergencies and opportunities in periods of growth (Deere and Doss, 2006). Access to, control over, and ownership of assets including land and livestock, homes and equipment, and other resources enable people to create stable and productive lives. Increasing the nexus of control over assets also potentially enables more permanent pathways out of poverty compared to measures that aim to increase incomes or consumption alone.

Asset building is a key strategy to promote economic and social development. Over the last decade, interest in asset-building policies has grown under the premise that compared to income; assets may have a more sustainable impact on well-being (Moser, 1998). This policy push has been driven by both theoretical and empirical motivations. Theoretical models suggest that asset ownership may lead to better economic, psychological, social, civic, political, and intergenerational outcomes (Sherraden, 1991). Empirical research, discussed below, has provided some evidence to support these theoretical models. Empirical research has found associations between asset ownership and several positive outcomes, including increased wealth (Schreiner et al., 2003), future orientation (Shobe and Page-Adams, 2001), political participation (McBride, Lombe et al., 2003), educational attainment (Filmer and Pritchett, 2001), and health (Thomas et al., 2002). For women, control and ownership of assets increases their bargaining power in the household (Beegle et al., 2001; Breza, 2005; Doss, 2006); provides better prospects for their education and employment (Fawe, 2000); and increases female autonomy and empowerment (Panda, 2002; Panda and Agrawal, 2005)

Female-headed households have been singled out in development policy research as one of the key groups to which poverty alleviation efforts should be aimed. Female-headed households are viewed as being at greater economic disadvantage than male-headed households because women generally have lower earning capacity than men due to lesser human capital, discrimination, and less physical or financial capital (Fitsum, 2002).

There are socio-economic indicators of gender inequality. These include measure of employment, education, health, ownership of property and income disparities. Gender gap results

from inequality in decision making power which leads to inequality in access to resources and by the differential treatment given to women and girls as compared to men and boys. Gender discrimination exists as part of the social system and runs through all aspects of life and at different levels such as at family level, community level and institutional level (Bogalech, 2000)

In the study area FHH were faced similar economic disadvantage than their male counter parts in terms of household income and asset accumulation. FHH are less equipped with skills of income generation, low educational status, discriminated against cultural norms and marginalized in terms of credit and extension services which are basic ingredients or determinants for income earning opportunity available to them. Therefore, it is essential to study the household income and asset accumulation of female and male headed households in the area, where gender disaggregated information in this aspect is missing.

II. RESEARCH METHODOLOGY

Description of the Study Area

Arbaminch surrounding district is found in GamoGofa zone of the SNNPR. It has common boundaries with Dita and Chencha in the North, Dirashe special woreda in the South, Amaro and Abaya in the East, Bonke in the West. The capital city of the district is Arbaminch town, which is located 505Km from Addis Ababa along South. The district has a total land area of 168172 hectares, of which 28414 is cultivable land. It has 29 rural kebeles and rural population of 189925, of which 94923 are female and 95002 are male (AZWARD, 2011)

The average land holding per household is estimated to be 0.8 ha (AZWARD, 2011). The area is subdivided into three major agro climatic zones known to be Dega (14%) and WeynaDega (53%) and kola (33%). The average annual rainfall is about 661mm per year. The altitude is about 1265m.a.s. There are two main cropping seasons in the areas that are belg and meher. The belg season begins from late February to late March/early April where maize, haricot bean and sweet potato are planted. The meher cropping season begins late June and continues up to end of September. Crops like tef, haricot bean, and sweet potato are planted in the meher season. The main livelihood activities being practiced in the woreda are farming, off farming and non -agricultural activities.

Land use pattern of the district indicates that about 2356, 4852, 5758 and 4535 hectares were used for annual crops, perennial crops, forest and grazing respectively. Mixed farming system is the main agricultural activity in the woreda. Cattle, goats, sheep, equine and chickens are important livestock species reared by farmers. Tef, banana, barley and maize are the major cereal crops in the area. The agricultural extension service in the woreda is mainly provided by the office of agriculture through development agents assigned in each development center.

Sampling Technique and Procedure

Arbaminch surrounding district was selected from fifteen districts of Gamo Gofa zone. Arbaminch surrounding district has 29 rural kebeles. From these, four kebeles were randomly selected for the study. The unit of analysis for this study was at household level. For the study stratified sampling technique was employed. A stratified random sampling was constructed by

classifying the population into two strata (MHHs and FHHs). To select a sufficient number of respondents from each stratum, simple random sampling technique was used. Then from the two strata proportionate male and female headed households were selected. Finally, to achieve the objective of the study a total of 160 respondents were selected that is proportionally 80 respondents from each stratum.

Data Sources and Data Types

The sources of the data for the study were both primary and secondary. Primary data related to the objectives and aspects of the study were gathered from the sampled households, key informants, focus group discussions and concerned bodies. The secondary data was collected from published and unpublished documents, rural development Office of the district. In addition to this, an in-depth literature search was conducted to gather information on the household income and asset building, determinants and related aspects.

Methods of Data Collection

The main data gathering methods for the study was semi-structured interview due to the educational back grounds of the target population mean that most of them are not able to write, and understand written materials without the assistance of researcher or enumerators. For this, interview schedule was designed in consultation with the respective advisors and additional amendments were incorporated in discussion with concerned offices of the district after being translated into local language (Gamoygna). To facilitate the data collection process together with the researcher, eight enumerators were recruited and trained before commencing the work based on their familiarity of culture ,language and the people as well as having good communication skill in consultation with the kebele administration officials. Besides, for the case of qualitative data in order to capture the socio economic context and to check the reliability of data, eight focus groups discussions (six person in each group) were held as well as the check lists for (men and women), key informant interview and observation at each PA were conducted.

Methods of Data Analysis

The data was processed and analyzed by using SPSS and Stata computer software. Both qualitative and quantitative data were analyzed. To analyze the quantitative data, simple descriptive statistics like percentage, mean, interpretation and inferential statistics (t-test and χ^2) were used. In order to examine gender differences in household income and asset accumulation, Blinder-Oaxaca decomposition analysis was used. It was used to shed light on the sources of the gender differences in household income and asset accumulation. And OLS regression analysis was also used to examine what predicts higher household income and asset accumulation for MHHs and FHHs. The determinants of outcome variables (i.e household income and asset building) were separately analyzed by using these models for MHH and FHHs.

III. RESULTS AND DISCUSSION

Sources of income and its share on household income differentiated by gender

Rural people derive income from multiple sources both from within and outside agriculture. They have commonly more than one source of income as they usually participate in both on farm and off farm activities. Crop and livestock income play an important role for the households in the study area. Besides farming, some of the households participated in off/non-farm activities and diversified the means of their income earning options. The households who couldn't meet their home consumption through farming and those who were pulled to get additional income were engaged in off/non-farm activities. Most of the households depend on their income earning options beside farming include agricultural or nonagricultural labor wage employment, hand crafting, fuel wood collection, charcoal selling, petty trading ,brewery, small business(shopping) and fishing. The survey results indicates that the majority of the households were earning income from both sale of crop and livestock production in addition to participating in off or non-farm activities. This indicates that agricultural activities (crop production and livestock rearing) were significantly pursued by either household. Among the sampled households 63.125% were

engaged in farm activities, 25.625% were involved in off-farm activities and 11.25% were in non-farm activities. Income from these sources at an average is lower for the FHHs.

With regard to gender of household head participation in different income earning options, FHHs have participated and dependent more on off-farm activities than MHHs. This is mainly because most of the MHs cultivate larger land size and earn income primarily from banana, maize, barley and fruits. As pointed out earlier, agriculture alone does not satisfy the basic needs of the people. Therefore, people have to acquire alternative sources of income .As a result, 32.5% of FHH participated only in off-farm activities compared to 18.75% of MHHs. Most of them were engaged in the low-return, unskilled wage employment and in business activities with low capital requirements. This indicates that some of MHH and FHH were engaged in different off-farm activities in addition to agricultural activities such as petty trade, working as daily laborer, spinning and etc. Discussion with FGD revealed there were a number of constraints that hinder people's participation in off and non-farm activities such as shortage of business knowledge, lack of motivation to look alternative income sources, low information and low educational status are some to mention.

Table 1.Participation of the respondents in income earning options by gender wise.

Income earning activity	MHHs	FHHs	Total
Farming	55(68.75%)	46(57.5%)	101(63.125%)
Crop	14(17.5%)	13(16.25%)	27(16.875%)
Livestock	7(8.75%)	3(3.75%)	10(6.25%)
Mixed farm	34(42.5%)	30(37.5%)	54(33.75%)
Off-farm	15(18.75%)	26(32.5%)	41(25.625%)
Petty trading	8 (10%)	15(18.75%)	23(14.375%)
Wage labor	6(7.5%)	7(8.75%)	13(8.125%)
Selling grass ,straw and charcoal	1(1.25%)	4(5%)	5(3.125%)
Non-farm	10(12.5%)	8(10%)	18(11.25%)
Shopping	3(6.25%)	1(1.25%)	4(2.5%)
Hand craft	4(5%)	5(6.25%)	9(5.625%)
Fishing	5(6.25%)	0(0%)	5(3.125%)
Weaving	2(2.5%)	0(0%)	2(1.25%)
Brewery	0(0%)	4(5%)	4(2.5%)

Source: Own survey, 2013

On average, households in the research area earned a total income of around 15000 Ethiopian birr (ETB) from a wide variety of activities with agriculture being the most important source. The comparison of mean total household income for the MHHs and FHHs shows that about 17000 birr and 13000 birr respectively. The t test for the mean difference in mean total household income between the FHH and MHH was statistically significant at less than 1% probability level hence differences in income sources between the FHH and MHHs.

The comparison on the share of income by their sources to the total sampled households; it shows agricultural income accounts for 53.34% of the mean total household income by indicating its important role on people's livelihoods. The share of off -farm activities accounts for almost 26.67% and the share of no-farm account about 20% of the total income of all the sampled households. Also a comparison of mean total household income share by its sources for MHHs and FHHs indicate the share of agriculture was about 58.82%, and 57.69 % for male and female respectively.

Table2.The means level of income share and their sources

Income category	MHH		FHH		Total	
	Mean (ETB)	Share (%)	Mean (ETB)	Share (%)	Mean (ETB)	Share (%)
Farm income	10,000	58.82	7500	57.692	8000	53.34
Off-farm income	4000	23.53	3000	23.07	4000	26.67
Non-farm income	3000	17.65	2500	19.23	3000	20
Total mean income	17,000	100	13,000	100	15000	100

Source: Own survey, 2013

Household Expenditure

In order to compare the economic status of households, the expenditure was computed instead of the income since expenditure is assumed to be more stable as households try to attain a certain level of welfare overtime. The expenditure data under consideration included money spent within a year on: food and non- food items such as cloths and foot wear, health/medical treatments, agricultural inputs ,livestock inputs, repair of house, energy/fuel , education, social activities such as wedding, *mahber*, etc . The aggregate of these all types expenses were worked for the total annual expenditure per capita in the sampled households.

In the study areas, households headed by men have the highest mean per capita expenditure than FHHs. The mean annual per capita expenditure for the total sampled households

was about 2000 Ethiopian birr. And a comparison of mean per capita expenditure by gender of the household head revealed FHHs are lower than MHHs, mainly due to lower non-food expenditure in real terms.

Regarding the per capita food and non-food expenditures are 12.5% and 18.18% higher for MHHs than FHHs respectively. As indicated by the corresponding t values, these differences are statistically significant. The Mean food expenditure per capita accounts for 40% of an average household’s expenditure per capita in the study area, in which it takes 40.9% and 42.1 % of an average expenditure per capita of FHHs and MHHs respectively. And also non-food expenditure per capita accounts for 60% an average household’s expenditure per capita in the study area, in which it takes 59.09% and 57.89% of an average expenditure per capita of MHHs and FHHs respectively

Table 3. Annual mean expenditure per capita for the household by gender (in birr)

Items	MHH	FHH	Total	Share(%)	t-value
Mean food expenditure per capita	900	800	800	40	2.713**
Mean non-food expenditure per capita	1300	1100	1200	60	3.581*
Mean total expenditure per capita	2200	1900	2000	100	5.17*

** Imply at 10% probability level, * at 1% probably level.

Source: Own survey, 2013

Housing characteristics of the household Head by gender

Another indicator of the asset building the members of the society is their status .The survey assesses a number of variables relating on the dwellings of households. The first important piece of information is about the ownership of the dwellings where households currently reside. As it can be seen from Table 19, a total of 92.5% of the households in the study area live in dwellings they themselves own. Remaining 7.5% have rented house. Accordingly, for both MHHs and FHHs the most dominant one is personal ownership of dwelling, followed by rented houses from Kebele and from others. Therefore, in terms of the ownership structure of households’ dwellings, there was no any gender difference.

However it was observed gender differences by the type or quality of the house. At the time of the survey period serious field observation was made and a number of variable relating to the dwelling of HHs such as roof material, floor material, wall material as well as lights were observed. Most of the houses in

the study area were made of wood logs and mud. With regard to light, 40% of total sampled households have lights. Among them 50% were MHH and 30% were FHHs. The house made from local material and no light could have low value, and the house made from roof of iron sheet and having light values more. The percentage difference for the type/quality of house between MHH and FHH has statistically significance difference at 1% probability level. A family having relatively better quality of house tends to have more asset accumulation in relative term than those who have poor quality houses.

Table4.Ownership of house and its quality by gender

Ownership status	MHH (%)	FHH (%)	Total (%)
Own	95	90	92.5
Rented	5	10	7.5
Total	100	100	100

Type of house			
Grass roofed and wood wall	28.75	36.25	32.5
Plastic roofed and mud walled	13.75	18.75	16.25
Plastic roofed and wood/ bamboo walled	17.5	20	18.75
Iron sheet roofed and wood wall	40	25	32.5
Lights in house	50	30	

Source: Own survey, 2013

The household asset accumulation by gender of household

Many households in our sample have tangible or real assets, such as livestock's and household durable goods. They serve not only as store of value but also are used as collateral in asset pawn market or are sold when cash is short. These assets also provide immediate use value whether for consumption or productive/business purposes to its owner.

Household asset building can be measured using market value of household asset and its agricultural asset. To measure total value of asset accumulated by the respondents, the researcher focused on fair market price of all household assets by considering the periods they served except for livestock and land. The household assets included in this study were household equipment's, farm tools, transport equipment and livestock's as well as rental value of land. In addition to this, financial assets were also considered. The monetary valuation of the different assets owned by households showed gender differences on asset accumulation. Accordingly the average total value of household assets in male-headed households was 25750 birr, whilst female-headed households had only 20500 birr. Male-headed households had more than the amount of productive assets in female-headed households including number of livestock and financial assets.

As we seen from the table below, gender difference was observed in specific types of assets. There was significant gender difference by possession of financial assets between male and female by indicating differential saving behavior between the two groups. Likewise great significant difference was also observed in possession of household equipment's. This was due to some household appliances (e.g. television, sewing machine, DVD player, refrigerator, etc.) were present mostly in MHHs compared to the FHHs. The comparison of livestock asset value also showed a significant difference between MHHs and FHHs. This indicates the types and the quality of livestock owned by

MHHs was highly better than those of FHHs. It is consistent with data from Northern Nigeria, Dillon and Quinones (2009) estimated the value of men's livestock holdings to be about two times that of women's in 2008. The mean value of total real assets is higher for MHHs than for FHHs. This was due to differential gender patterns on accumulation of specific types of assets and this in turn may be partly explained by the nature of employment or income earning activities that these respondents are engaged in. Farmers use income of agricultural activities to build asset in form of construction of house, purchase of agricultural equipment and household goods etc.

Table 5. Mean value of total household tangible assets by gender (in birr)

Mean real asset values	MHH	FHH	t-value
Farm equipment's	500	450	1.4
Rental value of land	3500	3400	0.67
Financial assets/deposits	1750	1250	3.76*
Livestock asset values	11000	9000	2.45*
Household equipment's	5500	3500	3.53*
Transport equipment's	3500	2300	3.15*
Mean total value of all assets	25750	20050	5.22*

* imply at 1% probably level

Source: Own survey, 2013

Econometric Analysis

Multicollinearity Test

Before running the analysis, it is necessary to check for the existence of multi-co linearity among the continuous and discrete variables. The reason for this is that the existence of multicollinearity will affect the parameter estimates seriously. Therefore, following Gujarati (2004), multicollinearity problem for continuous explanatory variables was assessed using a technique of Variance Inflation Factor (VIF) and Tolerance Level (TOL) where each continuous explanatory variable is regressed on all the other continuous explanatory variables and contingency coefficient is computed. The results of VIF analysis indicate that the VIF values for all continuous explanatory variables were less than 10. Therefore, all the explanatory variables were included in the model for further analysis.

Table6: Multicollinearity Test among Continuous Variables

Variables	VIF	Tolerance
AGE	1.11	0.898773
CULS	2.21	0.453248
LAVIA	1.79	0.559686
DISMRKT	1.67	0.598467
IRGLAS	1.61	0.619226
NULIVS	1.61	0.622602

Sources: Own survey, 2013

The values of VIF for continuous variables were found to be small (i.e. VIF values less than 10). To avoid serious problem of multicollinearity, it is quite essential to omit the variable with value 10 and more from the analysis. Based on the VIF result, the data have no serious problem of multicollinearity. Similarly, the contingency coefficients, which measure the association between various discrete variables, were computed in order to check the degree of association among the discrete variables. The values of

contingency coefficient range between 0 and 1, with zero indicating no association between the variables and values close to 1 indicating a high degree of association. Accordingly, the results of the computation reveal that there was no serious problem of association among discrete explanatory variables when the contingency coefficients did not exceed 0.75, which is often taken as a cut-off point.

Table7. Contingency coefficient for discrete/dummy explanatory variables

	HHSIZE	EDCAT	FECONT	PLAMT	MORG	CREDIT	RERECIV
HHSIZE	1.0000						
EDCAT	0.4608	1					
FECONT	0.3302	0.3116	1				
PLAMT	0.0615	0.0492	0.0052	1			
MORG	0.2167	0.1059	0.0440	0.2377	1		
CREDIT	0.248	0.117	0.158	0.088	0.0796	1	
RERECIV	0.0377	0.0819	0.0316	0.0772	0.0219	0.0144	1

Source: Own survey, 2013

Model results for determinants of household income and asset building

Table8.Determinants of Household Income for MHH and FHH as well as pooled (OLS Regressions)

Variable	Pooled (N=160)		MHH (N=80)		FHH (N=80)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
AGE	-.145	-1.94**	-.113	-1.06	-.134	-1.23
HHSIZE	.263	2.24**	.1879	1.34	.0799	-0.47
EDUCAT	.434	6.13*	.458	4.71*	.371	3.21*
NULIVEST	.250	3.86*	.3642	2.74*	.138	1.78***
CULS	.3156	5.27*	.456	3.69*	.1925	2.70*
PLAMT	.0645	1.48	.0063	0.03	.0054	0.056
DISMRKT	-.5695	-5.76*	-.8749	-5.93*	-.4160	-3.10*
CREDIT	.4035	3.587*	.4434	3.65**	.353	2.69**
LABAVAI	.4366	3.76*	.524	2.75*	.4077	2.62*
FECONT	.1550	3.13*	.1425	2.33**	.1727	2.13**
MORG	.2995	1.75***	.5120	2.03**	.1437	0.541
RERECIV	.1054	.567	.226	0.98	.1089	0.41
IRGLAS	.2093	3.26*	.2749	2.42*	.1695	2.30**

Source: Own survey, 2013

*, **, *** Significant at <1%, 5% and 10% probability level respectively

Table 9. Determinants of asset accumulation for MHH and FHH as well as pooled (OLS

Variable	Pooled(N=160)		MHH(N=80)		FHH(N=80)	
	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
AGE	-.215	-2.95*	-.2433	-2.51*	-.217	-1.85**
EDUCAT	.3575	4.88*	.4464	5.01*	.3647	2.94*
NULIVEST	.1738	2.56*	.4668	2.27**	.334	2.34**
CULS	.1347	2.06**	.4289	3.22*	.3693	2.79*
PLAMT	.121	0.77	.10298	0.42	.0723	1.02
DISMRKT	-.375	-3.81*	-.7556	-5.61*	-.3852	-2.68*
CREDIT	.238	1.46	.2900	1.35	.16583	0.6
LABAVAI	.443	4.11*	.71045	3.71*	.4635	3.43*
FECONT	.037	0.76	.0980	1.80*	.100	1.1
MORG	.192	1.20	.635	2.42*	.3567	1.6
RERECIV	.144	.54	.136	0.63	.2517	0.93
IRLAS	.116	1.89**	.1762	2.73*	.156	1.27

Regressions

*, **, *** Significant at <1%, 5% and 10% probability level respectively

Source: Own survey, 2013

Blinder- Oaxaca decomposition analysis

Table 10. Total income differential between MHH and FHH

Mean log income	Coeff.	Std. Err.	z	P> z
Overall				
Group_1	4.0625	.1849	21.97	0.000
Group_2	5.2875	.2456	21.53	0.000
Difference	-1.225	.3074	3.98	0.000
Endowments	-1.583	.2927	5.41	0.000
Coefficients	.3949	.25286	1.56	0.118
Interaction	-.0367	.24865	0.15	0.882

Note: Group_1 imply FHH and group_2 imply MHH

Source: Own survey, 2013

Table11. Total assets accumulation differential between MHH and FHH

Mean log AA	Coeff.	Std. Err.	z	P> z
Overall				
Group_1	4.5625	.1773	24.96	0.000
Group_2	6.125	.2404	25.47	0.000
Difference	-1.5625	.3047698	-5.13	0.000
Endowments	-1.491838	.2792398	-5.34	0.000
Coefficients	-.1069496	.2629	1.41	0.684
Interaction	.0362875	.26007	0.14	0.889

Note: Group_1 imply FHH and group_2 imply MHH

Source: Own survey, 2013

Interpretation of Econometric Results

Interpretation of Blinder-Oaxaca decomposition model results

Blinder-Oaxaca decomposition model help to measure the contribution of the different effects (endowments, coefficient and interaction) to income and asset accumulation differences between male and female headed households. This method distinguishes the income and asset accumulation difference that can be explained by differences in household endowments and differences in the coefficient (i.e. means differences in how the characteristics translate into accumulation of wealth or earn income) based on the asset function of these endowments. This model confirmed that the differences in both average household income and asset accumulation results highly from endowments between men and women.

The decomposition output of this study reports the mean predictions by groups and their difference. It showed the mean of log income was 4.0625 for FHHs and 5.275 for MHHs, yielding log income gap of -1.225 which is statically significant at less than 1% probability level. Similarly it also showed the mean of log asset accumulation was 4.5625 for FHHs and 6.125 for MHHs, yielding log asset accumulation gap of -1.5625 which is statically significant at less than 1% probability level

Table 10 and 11 indicates that differences in endowment account for about more than half the income and asset accumulation gap. The second term which is the coefficients quantifies the change in women’s income or asset accumulation when applying the men’s coefficients to the women’s characteristics. The third part is the interaction term that measures the simultaneous effect of differences in endowments and coefficients. Here it indicates that the observable characteristics (endowments) play a significant role by contributing for the gap by the -1.58 and -1.491 respectively for household income and asset accumulation between two groups. The negative sign in endowments in table 10 and 11 indicates FHH were disadvantaged in terms of endowments than their counterparts. But the differences due to coefficient and interaction were not statically significant for observed differences in both household income and asset accumulation. The explained difference in household income and asset accumulation was due to the higher endowments by MHHs. Hence, it is possible to argue that higher total household income as well as higher asset accumulation associated with MHHs was resulted from their higher endowments.

Interpretation of OLS results

The separate regression models were run for male and female-headed households. Brief discussions of the OLS regression results for significant variables for MHH and FHHs household income and asset accumulation are presented below.

Cultivated Land size: As mentioned in descriptive part, land is the most important household asset for households that depend on agriculture for their livelihoods. Access to land is a basic requirement for farming and control over land is synonymous with wealth, status and power in rural areas. It has a significant and positive impact on household income in both MHH and FHH, indicating that the larger the cultivated land size, the higher is the household income (HI). As seen in table 24 other factors being constant, a unit increase in cultivated land increases household income by 0.456 and 0.1925 unit for male and female headed households respectively. In other words, these figures indicate that farmland contributed about 45.6% and 19.25% to the household income for MHH and FHH respectively. This reflects that greater farmland holdings allow its holders for crop diversification and integration of crop production with cattle rearing. In the case of asset accumulation, cultivated land size was also significant for both MHH and FHHs households. Other factors being constant, a one unit increase in cultivated land would increase household asset accumulation (HAA) by .42895 and .3693 for MHHs and FHHs, respectively.

Age of household head: The variable is found to be not significant for both MHH as well as FHH and has negative association with the household income. That is, the households with older age tend to be less able to participate in different income earning options than medium aged household heads. Contrary to that the variable was significant and negative impact on household asset accumulation in both MHH and FHH. As table 24 shows increases in age at one unit would increase asset accumulation in certain limit and decrease the probability of asset accumulation by -.2433 and -.217 for MHH and FHH respectively. In other hand this implies that after 30 years old, households are in the way in accumulating wealth whereas after 61 years old, farmers have a chance to lose what they have accumulated during their medium age level and reaches to dependency syndrome.

Number of livestock owned (TLU): It serves as accumulation of wealth and social prestige as well as generate income through sale of animal and sale of its product. As expected, possession of livestock has a positive impact on households' income and asset accumulation for both MHH and FHHs. That is due to households with more number of livestock obtain more milk and milk products. Besides, a household with large livestock holding can obtain more cash income from the sale of live animals. The results for number livestock holding indicates that, other things being constant, the increase in a unit increase in a tlu would increase household income by .3642 and .138 for MHH and FHH respectively. Likewise the results for number livestock holding indicates that, other things being constant, the increase in a unit increase in a tlu would increase asset accumulation by .4668 and .334 for MHH and FHH respectively.

Education level: It has a positive influence on household income and asset accumulation because educated individual have better opportunities to participate in different income earning options whether agriculture or out of agriculture in better manner than illiterates. Other things being constant, an increase in household's education level by one unit results in an increase in the probability of increase in household income by .45865 and .371 for MHH and FHH respectively. Regard to asset accumulation, results for educational level indicates that, other things being constant, the increase in one level of education would increase asset accumulation by .4464 and .3647 for MHH and FHH respectively. The reason for this was educated individuals have better access to different information, business knowledge and have opportunity to engage in high return activities. This result indicates that, encouraging the rural people's education will enhance individual ability to accumulate asset.

Distance to nearest market (in kilometer): Proximity to market centers creates access to additional income by providing off-farm/non-farm employment opportunities, easy access to inputs and reduces transportation cost. It was, therefore, expected that households nearer to market center have better chance to improve household income options than those who do not have a proximity to market centers. Distance to local market has significant and negative impact on income and asset accumulation. The significant impact of distance to local market indicates the presence of regular local market facilities up to date transaction between suppliers and demanders and helps the expansion of micro enterprise to generate new employment opportunities. The negative impact of distance to market implies increase in distance to market by unit would decrease household income (HI) by -.8749 and -.4160 for MHH and FHH respectively. And also with regard to asset accumulation (HAA), increase in distance to market by unit would decrease asset accumulation by -.7556 and -.3852 for MHH and FHH respectively.

Household labor availability (in ME): Household labor availability is one of the determinants of farm activities and determines household's engagements in different off or non-farm income earning activities. As result shows labor availability was positive and significant for household income (HI) and asset accumulation (HAA) in both MHH and FHH. An increase in labor in one unit in ME resulted .524 and .4077 increase in household income and also .71045 and .46355 increase in asset accumulation in MHH and FHH keeping other factors constant. The numbers of adult male and female members of household (aged from 15 to 64 years) have positive and significant effects on the income diversity and this in turn increases probability of asset accumulation and income.

Irrigated land size. It is found to have significant for household income with 1% and 5% probability level for MHH and FHHs. The result for size of irrigation land displays that, other variables being constant, the probability of increase in household income by .2749 and .1695 as a size of irrigable land increases by one unit in MHH and FHHs respectively. This implies that the people tend to be increased income when there is an additional size of irrigable land. In relation to asset accumulation the variable was only significant for MHH. Other variables being constant, the probability of increase in household

asset accumulation (HAA) by .1762 as the size of irrigable land increases by one unit in MHH.

Frequency of extension contact: Frequent extension contacts can deliver services like advice, training and information on agricultural and other related issues. The frequency of contact between a farmer and development agents increase both crop and livestock production of farmers. Further observation of the result indicate that keeping all other things constant, the probability of household income(HI) increases by a coefficient of .1425 and .1727 as frequency of extension contact increases by one unit in MHH and FHHs respectively. Also in the case of household asset accumulation the variable was significant for MHHs at 10% probability level and not significant for FHHs. The result shows keeping all other things constant, the probability of household asset accumulation (HAA) increases by a factor of .0980 as frequency of extension contact increases by one unit in MHH. This is because the advice the MHHs got from DA's might help them increase agricultural productivity such as crop and livestock production and this in turn enhance s their ability to accumulate real assets than those who has low extension contact with extension agents.

Credit received: It has positive and significant influence on household income and significant at 5% probability level for MHH and FHHs. This is due to those farmers having access to credit are able to purchase agricultural inputs as well as able to engage in different income earning options such as off or non-farm activities and they expected to increase their income. Moreover the results indicate unit increase in household's credit would increase the probability of household income by .4434 and .353 respectively for MHH and FHHs.

Social capital (membership to organization): The result shows membership to organization has positive effect on total income and asset accumulation for MHHs. Keeping other things constant, membership to organization would increase the probability of household income and asset accumulation by .5120 and .63455 respectively for MHHs.

IV. CONCLUSION

The research study has mainly investigated gender differences in terms of household income and level of asset accumulation in Arbaminch Zuria Woreda of SNNPR. Considerable progress has been made in measuring the household income and asset accumulation by gender and in understanding the factors that account for the gender differences in household income and asset accumulation. To analyze the survey data both descriptive and econometric analysis were employed in this study.

The result of the OLS regression model revealed that out of 13 variables included in the model, 10 explanatory variables are found to be significant up to less than 10% probability level. Those are age, education level of household head, cultivated land size, livestock holding, labor availability, membership to organization, frequency of extension contact, credit, distance to nearest market and irrigated land size were found to have

significant association with household income and asset accumulation.

Statistically significant dissimilarity persists between MHH and FHHs in household income and asset accumulation. The result of Blinder-Oaxaca model confirmed that the differences in level of income and asset accumulation marked highly by the differential endowments between men and women. In line with this, the decomposition output reports the mean predictions by groups and their difference. It shows the mean of log income is 5.275 for men and 4.0625 for women, yielding income gap of - 1.225 which is statistically significant at 1% probability level.

Appendix

Appendix table 1. Conversion factor that used to estimate equivalent labor factor

Age category	Male	Female
<10	0.0	0.0
10-13	0.2	0.2
14-16	0.5	0.4
17-50	1	0.8
>50	0.7	0.5

Source: Storck et al., 1991

Appendix table 2 .Conversion factors that used to estimate tropical livestock unit

Livestock type	TLU	Livestock type	TLU
Calf	0.25	Donkey (young)	0.35
Weaned Calf	0.34	Donkey(adult)	0.70
Sheep & Goats (adult)	0.13	Heifer	0.75
Sheep & Goats (young)	0.06	Cow and ox	1.00
Chicken	0.013	Horse	1.10

Source: Storck et al., 1991

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Effect of Packaging Elements on Consumer Buying Behavior: Comparative Study of Cadbury Dairy Milk and Cadbury Perk

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Abstract- Consumer Buying Behavior is the area of interest for all the companies. Not for their upcoming offerings but for their current offerings too. Its continuous analysis is required in order to fulfill the requirement of customers as well as to compete effectively with the increased degree of competition from direct competitors and indirect competition. There are several factors which can affect the consumer buying behavior but when companies want to analyze it expensive and Fast Moving Consumer Goods (FMCG), the role of packaging found to have the significant role in affecting consumer buying behavior. That's why major purpose of this paper is to analyze the impact of elements of packaging on consumer buying behavior related with the purchase of chocolates which are treated as Fast Moving Consumer Goods as well as expensive products in Pakistan and for the analysis of packaging elements on consumer buying behavior a structured close ended questionnaire was developed through the help of important variables and methodologies used in the prior research work. Though questionnaire was distributed among five hundred respondents and among these we have got back four hundred and fifty six questionnaires. Moreover analysis of reliability of questionnaire and implementation of statistical tools has been done through SPSS. However it is difficult to measure the consumer buying behavior related with the purchase of two different brands of one company. But through circulating it to larger audience this became possible to evaluate the impact of different elements on different brands of Cadbury. The major advantage of this research is that this research helps most of the marketers in using packaging in the way it can produce the desired impact of the customers of expensive as well as FMCG.

Index Terms- Packaging, Packaging Elements & Consumer Buying Behavior

I. INTRODUCTION

We are living in the age of communication. Any one of us living anywhere in the world use different terms, symbols, signs, use different tools for advertising and prefer different packaging for products in order to satisfy miscellaneous needs more appropriately. (Gilaninia, Ganjinia and Moradi, 2013)

But the advancement in technology in the age of communication affects almost all types of human activities and it is also backed by the use of communication and mass communication (Gilaninia and Sharif, 2011) and when marketers want to see their offerings from the point of view of

their consumers they found that packaging of goods is also an important tool of visual communication. (Mohammadi, 2011)

The role of packaging is almost a change phenomenon because of the competition, change in consumer's life styles and increase in the rate of self service. On the other hands producers are also taking interest in packaging not only as tool of sales promotion but also because of its impact of impulsive buying and increase in the market share of the company. (Mutil, 2012)

II. STATEMENT OF PROBLEM

It has been observed that marketers are always trying to influence consumer buying behavior by use of different marketing mix elements; each and every marketing mix element has its own impact on consumer buying behavior. Similarly packaging has its own impact on consumer buying behavior, especially on the last stage of consumer buying behavior i.e. purchase decision there is a significant impact of packaging and this impact is more significant in the purchase of fast moving consumer goods, Research Conducted in 2004 indicated that packaging is based upon some elements and each and every element associated with it has some level of influence on consumer buying behavior.

Moreover research conducted in Iran in the year 2014 by Mousavi & Jahromi indicated Packaging has significant impact on the sales of those products which are treated as expensive, and in Countries like Pakistan chocolates are treated by most of us as the fast moving as well as expensive product. Furthermore, lot of research work has been done on the effect of packaging on consumer buying behavior associated with milk brands not only by Pakistani researcher like Adam and Ali, 2014, but also by researchers of other countries.

But no one emphasizes on the point mentioned by Mousavi & Jahromi that we cannot treat packaging as the major tool to influence consumer buying behavior for inexpensive goods. But the role of packaging is more dominant when the product is treated as expensive by the customers. That's why the need of research on the effect of packaging on consumer buying behavior associated with the purchase of chocolates is required to help companies, so packaging elements can create more emphatic impact on consumers of chocolates.

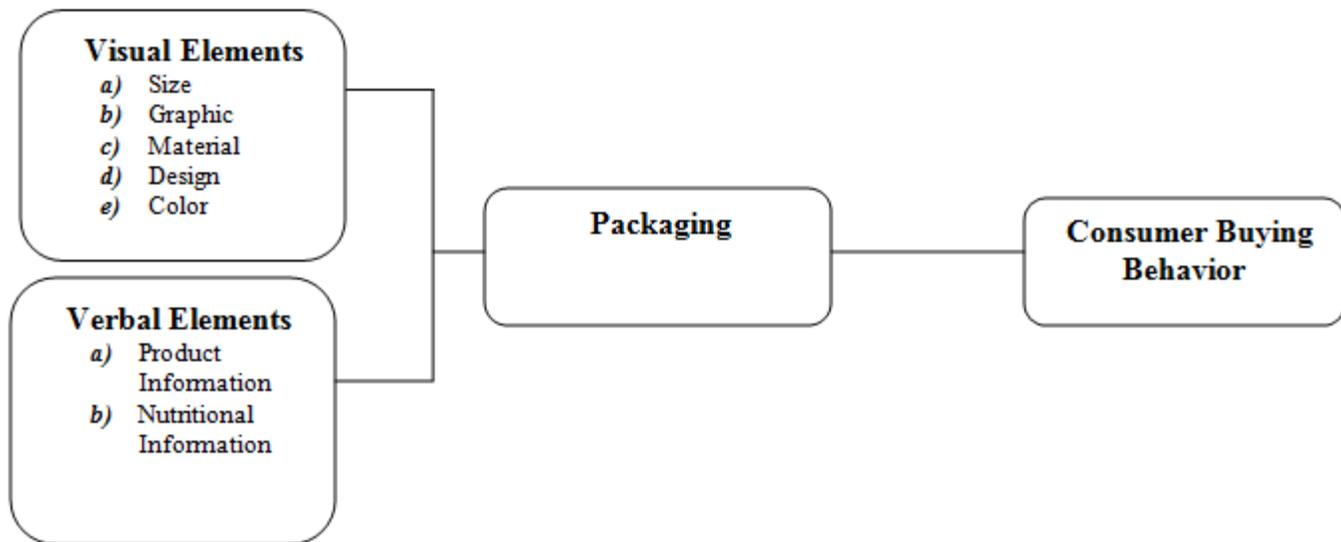
III. OBJECTIVES OF THE RESEARCH

Some objectives and major objectives of this research are listed below:

1. To check the impact of packaging of chocolates on consumer purchase decision

2. To determine the effect of visual elements of packaging on consumer buying behavior associated with chocolates.
3. To check the result of verbal elements of packaging on consumer buying behavior associated with chocolates.
4. To check the upshot of demographic variables on the selection of chocolate brand.
5. To compare the importance of verbal elements of packaging on consumer buying behavior associated with two most popular chocolate brands.
6. To compare the importance of visual elements of packaging on consumer buying behavior associated with two most popular chocolate brands

Research Model: Research Model is an important tool which elaborates the relationship between various variables and the research model for this research is as under



Packaging:

Development of wrappers and covers, for company's offerings is known as Packaging. (Keller, 2009) the importance of packaging can be estimated by its use as most of marketers believes that it is a part of part of marketing mix elements and must be considered as the important element in product strategy. (Kotler, 2008) it has significant importance in the product strategy that most of the times marketers try to take competitive advantage by using these marketing mix elements over the competing brands. (Keller, 2009)

Moreover packaging is also an important tool for Brand recognition and for the development of Brand associations. (Keller, 2009) and at last it is the toll through which marketers became able to achieve marketing objectives by fulfilling the desires of consumers through packaging aesthetics in the form of packaging size, packaging shape, packaging color, text used on packaging, graphics used on packaging and by other functional elements of packaging. (Rundh, 2013)

Moreover it is proved by the research that Packaging is evaluated positively by the consumers if it became able to communicate meaning of the product comprehensively and consistently. (Hannele, Kauppinen Raisanen, 2010) When it comes to communication then packaging is also an effective tool which helps marketers in gaining the attention of their target market. Through this marketers are not only able to communicate their value properly but also became able to grab consumer attention at the point of purchase. (Robert & Julie, 1998) not only this packaging is the only tool which is help organizations

as well as consumers in fulfilling their requirements regarding product storage & product transportation. (Calver, 2007)

Components of Packaging:

Initially research identified six elements of packaging which includes size of packaging, color of packaging, Text used on packaging, Material of packaging, Graphics used on packaging and Smell. (Smith and Taylor, 2004) But research work conducted after wards indicates that packaging elements are divided into two categories which are visual elements and verbal elements (Adam and Ali, 2014)

Visual Element of Packaging:

These elements are the useful tool to influence the emotions of the target market. Marketers can use lot of visual elements of packaging when the product is associated with the category which requires low customer involvement and customer do not want to waste their efforts in searching for products (Pinya, 2004)

Size:

The research conducted in the year 2008 proves that redesigning of packaging increases the rate of consumption, especially when the product is available in larger size (Kotler, 2008) furthermore increase in size of packaging also indicates better quality (Smith, 2004) and influence the desire to consumer. (Keller, 2009)

Moreover, access of new markets can easily be done by the change of packaging. (Arun; Ankuri; Hitesh; Udit; Deepali, 2012) furthermore it has been also proved by the research that consumers having small families does not focuses on large size packs and treat them as waste of product as the amount of product will be more than their requirements (Pinya, 2004) and if does not have longer reliability then consumers will not be inclined towards the larger sizes. (Golnesa, 2013)

Graphics:

It not only helps marketers in making their product unique but also helps them in highlighting their brand name more effectively by maintaining its individuality and identity in shelves. (Smith and Taylor 2004) Use of graphics is helpful in value addition in the physical appearance of the brand and also improves the exterior by enhancing the quality of aesthetics. Not only this graphics has the ability to produce positive impact on consumer mood and sometimes graphics matches with the unseen goals or unseen determination and hence will help marketers in enhancing the recall rate of their bands as compared to the competing ones. (Pinya, 2004)

A qualitative research conducted in the year 2013 identifies that textual elements associated with graphics are more worthwhile if they are placed on the left side of the packaging and pictorial elements will be considered worthwhile when they are placed on the right side of the packaging. (Pinya, 2004)

This is an important indication for marketers that graphics can be made more attractive through the proper placement of elements which are associated with graphics. Graphics are considered important whether consumer have the brand loyalty or not. When consumer are preferring any brand then graphics helps them in eliminating the clutter and when they are not loyal to any of the brand then graphics act as an important tool which can at least grasp their attention. (Pinya, 2004) as pictorials on packaging can increases the level of interest and level of curiosity of customers. (Lynsey ; Laura; Armstrong; Heather, 2013)

Material

As other visual elements, material also communicates, most importantly material affects the perceived quality associated with the product that means consumers thinking regarding material results in change of the perceived quality. Furthermore sometimes marketers use those packaging material which can prevent the freshness of product under extremely high or extremely low temperature. (Smith and Taylor, 2004)

In another study conducted in the year 2013 three types of packaging material including glass, plastic and cardboard were discussed, and finding of research revealed different perception of consumers regarding different types of packaging material, but most of the consumers were found to be in the favor of plastic for the purpose of packaging, as its not heavy and also can retain freshness of the products and chances of leakage are also minimal. (Lynsey; Laura; Armstrong; Heather, 2013)

Design

Research reveals that consumers feeling regarding the product packaging are actually transferred into how they are treating the product, that means innovative packaging shapes can

create an iconic brand image on consumers mind, by cutting the clutter at surrounded market place. (Arun; Ankuri; Hitesh; Udit; Deepali, 2012) Moreover research also concludes that beautiful and attractive packaging styles influences the purchase decision, and results in increase purchase of the product. (Golnesa, 2013) Moreover it is a belief of most of the consumers that design of products is directly associated with the ease of use, product storage and its carry from one place to another. (Pinya, 2004)

Color:

We are living in the modem era and consumers now-a-days also possess color vocabulary and therefore they will evaluate the color of the packaging used with its link with the product, that means according to the consumers there are some colors which can be used for each product category and all the remaining colors are misfit for that particular product category, that's why color is also treated as the useful element of packaging. Moreover color can make brand distinctive as compared to all the other competing brands, if the company became able to use color which other competing brands cannot opt easily. (Keller, 2009)

Consumer perception related with color varies, with respect to difference in cultures, but as we knows that this is an era of globalization and mass competition therefore because of change in demographics and other trends there is a visible change, in the color preferences (Singh, 2006) but the element which can help marketers in selecting the color for their brands is that there are some certain colors which are treated as best suited for particular types of products, therefore marketers must use color associations while selection the color or color combination for their band instead of general consumer thinking about the color. (Randi & Joseph, 1999)

Verbal Elements of Packaging:

Information conveyed by verbal elements is helpful in initiating or boosting of consumers thought process. (Silayoi and Speece, 2004) there are several components of verbal elements of packaging and each of these components have a significant role in influencing consumer buying behavior. (Adam and Ali, 2014)

Product Information:

Increase of concerns towards health also increases the importance of labeling and now it is the duty of manufacturing company and marketers to include product information in order to ease purchase decision. (Pinya, 2004)

It is also indicated by research that if company wants to increase the credibility of the product they must jot down accurate information about the product as it will help consumers in making decision, on the other hand if the information is confusing or does not seems to be appropriate then it can create confusion and produces negative impact on the brand. Research also revealed that product information has lesser or no importance to those having low involvement in product purchase, and for those having high involvement with the product, information related with it having significant importance, and for making appropriate decision the information related with the product will also take into the account, as it has the ability to

change or alter the attitude of consumers having high involvement with the product. (Pinya, 2004)

Nutritional Information:

Diet and Life style of consumers are the potent factors due to which nutritional information is also treated as important part of verbal elements of packaging, study conducted in the year 2009 indicated that nutritional information must be properly indicated on packaging especially in the category of food related product as this type of information affect the food choices of the customers. (Josephine, 2009)

Research provides the reference of research conducted Asian Food Centre in the year 2006 at jotted down three very important findings associated with the effect of nutritional information on packaging on consumer buying behavior a) Consumer want to have nutritional information on product packaging but the level of knowledge they have about the nutritional information is very low b) Consumer prefer the nutritional information which can describe the function of nutrition's on human body c) The decision which is made by the consumers related with their diet is only for short term. (Josephine, 2009)

and its impact on consumer purchase decision and as we have found sufficient material related with our requirements. That's why the research is descriptive in nature and the type of investigation we have performed was causal as the research was based upon cause and effect relationship. As in this research we only strive to check the impact of elements of packaging by asking our respondents to fill out questionnaires. Moreover we have compiled our results through snapshot analysis that's why the time horizon for the research was cross sectional and for obtaining the result we have considered the all the respondents separately, that's why the unit of analysis was individual. Research population includes all the customers of chocolates lives in Karachi, while frame of sampling includes all the customers of chocolates lives in Federal B Area, Gulshan e Iqbal. Defence, Sindhi Muslim Housing Society and Muhammad Ali Society

Type of sampling used in this research is Non Probability sampling and the method selected to gather data is Convenience Sampling. The sampling size for the research is of 456 respondents. After collecting data the reliability of the questionnaire and sample evaluated through SPSS, and for the research Alpha, is found to be 73.8% when the data found to be reliable then we implement Chi-Square & Multiple Regression analysis t find the result of our research objectives.

IV. RESEARCH METHODOLOGY

Research is done by considering variables used by other researchers in their prior research work on the topic of packaging

Statistical Testing and Evaluation:

Effect of Living Area on Purchase of Chocolate Brands:

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	185.834 ^a	4	.000
Likelihood Ratio	225.784	4	.000
Linear-by-Linear Association	92.997	1	.000
N of Valid Cases	491		

Effect of Education on Purchase of Chocolate Brands:

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.337 ^a	2	.000
Likelihood Ratio	26.734	2	.000
Linear-by-Linear Association	5.488	1	.019
N of Valid Cases	491		

**Effect of Income Level on Purchase of Chocolate Brands:
 Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.634 ^a	4	.000
Likelihood Ratio	38.974	4	.000
Linear-by-Linear Association	2.682	1	.101
N of Valid Cases	491		

Effect of Gender on Purchase of Chocolate Brands:

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.713 ^a	1	.100		
Continuity Correction ^b	2.413	1	.120		
Likelihood Ratio	2.721	1	.099		
Fisher's Exact Test				.111	.060
Linear-by-Linear Association	2.707	1	.100		
N of Valid Cases	491				

- Table 1** indicates that there is a association between living area and preference of chocolate brands
Table 2 indicates that there is a association between level of education and preference of chocolate brands
Table 3 indicates that there is no association between level of income and preference of chocolate brands
Table 4 indicates that there is no association between gender and preference of chocolate brands

**Effect of Elements of Packaging on Consumer Buying Behavior
 Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.814 ^a	.662	.658	.27344

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	95.717	7	13.674	182.877	.000 ^a
	Residual	48.900	654	.075		
	Total	144.617	661			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.351	.226		5.992	.000		
	Size	.592	.036	.682	16.221	.000	.293	3.418
	Graphics	.109	.040	.116	2.729	.007	.288	3.473
	Material	.107	.033	.083	3.229	.001	.780	1.283
	Design	.006	.029	.005	.214	.831	.820	1.220
	Color	-.139	.038	.097	3.618	.000	.725	1.379
	Product Info	-.070	.035	.054	2.009	.045	.717	1.394
	Nutrition Info	-.017	.043	-.010	.402	.688	.885	1.130

Table 7 indicates that among variables of visual element of packaging design of packaging of chocolate is the variable which does not have any impact on consumer buying behavior. While all the other variables like Size of packaging, Graphics on Packaging, Material of Packaging and Color of packaging are producing significant impact on consumer buying behavior. On the other hand table also indicates that between verbal element of packaging the variable which is affecting consumer buying behavior is product information while the other variable i.e. nutritional information has no impact on consumer buying behavior

Analysis for Cadbury Perk

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.706 ^a	.499	.477	.21835

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.554	7	1.079	22.634	.000 ^a
	Residual	7.581	159	.048		
	Total	15.135	166			

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.960	.690		2.841	.005		
	Size	.370	.059	.430	6.283	.000	.673	1.485
	Graphics	-.338	.089	.285	3.801	.000	.561	1.783
	Material	.450	.063	.446	7.093	.000	.797	1.254
	Design	-.053	.049	.069	1.092	.277	.792	1.263
	Color	.089	.106	.077	.841	.401	.373	2.680
	Product Info	.058	.070	.078	.840	.402	.367	2.726
	Nutrition Info	-.076	.078	.068	.975	.331	.639	1.564

Table 10 indicates that there is some difference in the findings for the Brand Perk and according to the table above it is clear that among all the variables associated with visual elements of packaging design and color are those variables which are not creating impact on consumer buying behavior. While on the other hand table also indicates that both the variables associated with verbal elements of packaging are not creating any impact on the consumer buying behavior

Analysis for Cadbury Dairy Milk

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.616 ^a	.379	.364	.24196

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.052	7	1.436	24.527	.000 ^a
	Residual	16.452	281	.059		
	Total	26.503	288			

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	7.850	.525		14.944	.000		
	Size	.366	.054	.372	6.814	.000	.743	1.346
	Graphics	-.890	.098	.587	9.048	.000	.524	1.907
	Material	-.135	.045	.159	3.023	.003	.796	1.256
	Design	.257	.045	.343	5.691	.000	.607	1.649
	Color	-.343	.047	.425	7.236	.000	.641	1.561
	Product Info	-.309	.056	.327	5.499	.000	.625	1.600
	Nutrition Info	-.019	.085	.015	.220	.826	.453	2.206

Table 13 indicates that for brand Dairy milk results are also different in comparison to the results we have calculated for overall effect of packaging of chocolates on consumer buying behavior and also with the results of packaging of Perk on consumer buying behavior and according to the table entire range of variables which are associated with the visual elements of consumer buying behavior are creating impact on consumer buying behavior but the similarity is this nutritional information is not creating any impact on consumer buying behavior and this result is similar as the result of packaging for Cadbury Perk

V. CONCLUSION AND DISCUSSION

After detailed statistical testing it has been observed that there is a significant impact of living area and level of education on the selection of any particular brand of chocolates, while gender and level of income does not have any impact on the section of any particular brand that means people lives in different areas irrespect of their gender and level of income have their own preference of chocolate brand. Similarly level of education is also influencing the purchase of particular chocolate brand. While it has been identified that the nutritional

information which is associated with verbal elements of packaging does not have any impact on the selection of chocolate brand, and this has been found true for both the brands. Furthermore design of packaging is the only element which does not have impact on consumer buying behavior associated with the purchase of chocolates, but this is not found true when we analyze the data separately for the Dairy Milk.

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Staffing: Practices and Challenges

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Abstract- The study investigated three public higher education institutions' academic staffing practices in which guidelines (institutional /national level) these institutions have, the criteria they use, the organ responsible and the challenges the institutions face in the process were dimensions of the study. To this end, embedded multiple case studies design was used and data were collected through semi-structured interview conducted to department heads. Besides, two national documents by the Ministry of Education and four universities in unison endorsed by the ministry respectively assessed and analyzed as supplement. Finally, thematic analysis was made. The findings implications show that while there are national documents meant for guiding the process of staffing by all institutions, they are not self-sufficient to show the procedures and the criteria used to recruit the right candidates except former national document indicates the responsible organ that doesn't seem to have been recognized and functioning by the institutions. As the result, the institutions do recruit using arbitrary procedures and criteria of their own that interest those involve in the process. Therefore, the situation calls for having proper binding guidelines, at national level, that clearly guide the process in such a way that procedures, job descriptions, criteria and tools of evaluation are clearly included in .

Index Terms- Practices of staffing at higher education institutions, criteria higher education institutions employ in staffing, challenges of higher education institutions in staffing, and the essence staffing guidelines at higher education institutions.

I. INTRODUCTION

Higher education institutions prime tasks are teaching, undertaking research and provision of community services. To this end, having academic staffs with the necessary expertise are inescapable. This requires a rigorous recruitment processes that is characterized by institutional/national policy in place. When there is a clear policy, the process could be much easier and more likely that better academics join the institutions. According to www.wikipedia (accessed at 28Nov.2015,at 02:04), staffing is the process of hiring, positioning and overseeing employees in an organization. According to Smriti Chand(2002), it is related to the recruitment, selection, development, training and compensation of the managerial personnel.

Teachers represent the most important personnel of the institutions and their role is matchless. The success or failure of the institutions is highly dependent on the quality, skill and effectiveness of these teachers (Milos Milutinovic and Raihan Mahmood Kadery,2013). The ways teachers carryout their tasks

determine the success or failure of the institutions. That is why organizations, in general, educational institutions in particular, encouraged to pay attention to selecting the right people and utilizing their capacities (Milos Milutinovic and Raihan Mahmood Kadery,2013:1).

Likewise, recruiting has become a significant issue because of the contemporary changes: globalization,massification, mobility in higher education,(Wilen-Daugenti and McKee, 2008). Globalization of higher education, in particular, is forcing the universities to increase technical and information literacy, make collaboration with other universities and create good branding (Wilen-Daugenti and McKee, 2008).

Toward this end, staffing guidelines are imperative to have. According to (Middlewood and Lumby,1999),effective human resource policy is the key to the high quality educational experiences as it can improve quality, commitment, and performance of academic and non-academic staff within the universities. They also argue that educational institutions need effective human resource policy because it provides a proactive and strategic background that can manage the rapid and complex change within education, (Middlewood and Lumby, 1999).

According to the University of Sydney (2014:1&2), it is committed to recruitment and selection practices that are open, competitive and based on merit. Recruitment and selection practices will reflect the University's strategic and operational objectives and its commitment to equity and diversity in employment practices.

The objectives of an educational system are realized through its teachers. These teachers teach, undertake research and give community services. These tasks are huge that they require not only knowledge and skills, they need intelligence, too. Teachers need to be knowledgeable in the subjects they teach, relate what they teach in the classroom with learners' real life situations so the students know the economic, social, cultural and political environments of the society they come from.

Teachers need to be intelligent, too. In their relation with their students and workmates, they have to show social and emotional abilities as students depend upon their guidance and teaching. Students' acquisition of knowledge, development of skills and attitudinal changes are greatly affected by their teachers. It is emotionally intelligent teachers that activate educational processes well and inculcate that quality in students,(Sreekala Edannur, 2010).Then, the great asset of the education system will be its teachers.

These days, the work environments are so complex that require different skills. The environment of teaching is no different. Teachers need to be equipped with skills to help them tackle these new and more complex problems. Nonetheless, all academics with degrees do not possess these attributes equally. That makes the staffing processes of higher education institutions

more important. According to the University of Oxford, et al (2016:1), higher education institutes and research entities are constantly competing for talent with other institutions in the world offering excellent conditions for researchers and lecturers. Those with the required potential need to be absorbed into the higher education institutions. To this end, the universities need to have staffing policy which is clear, well versed, fair, merit-based that provides equal employment opportunity regardless of one's race, age, ethnicity, impairment, sex, etc. Academics that undergo these processes and get hired may be the better ones who help achieve the needs of the strategic direction of the universities. So, the researchers were earnestly keen to see what public higher education institutions staffing practices look like: the guidelines they have, the criteria they use and the challenges they face.

General objective: Investigate the staffing practices of public higher education institutions.

Specific objectives:

- Assess guidelines institutions use in relation to academic staff recruitment.
- Study the criteria used by institutions to recruit academic staff.
- Look into the consistency of staff recruitment practices among universities.
- Identify the different challenges the institutions are facing in relation to staffing.

Research questions:

To achieve the set objectives, the following questions tried to be answered through the research.

- Are there staffing guidelines used by the universities?
- What are the specific criteria used to hire academic staff?
- Are the staffing criteria/ procedures used by universities consistent throughout?
- What are the challenges in the process?

Significance of the Study

The study focuses on investigating the academic staff recruitment processes of public higher education institutions. As a result, the research outcome may be important in the following ways:

- May create awareness among those who are concerned about the importance of clear guidelines to recruit staff.
- May showcase the deficiencies of higher education institutions legislation (2008) and the harmonized academic policy of Ethiopian public higher education institutions (2013) documents in place.
- May initiate the institutions to reconsider their criteria of staff recruitment.

Scope of the Study

The study investigated the practice of staffing of three public higher education institutions in 2014/15. While the institutions are Jimma University, Debre Markos University and Debre Tabor University, the dimensions of the research were guidelines the

institutions have, the criteria these institutions use and the challenges they face to recruit academic staff .

Limitation of the study: The limitation of the study was that the number of female participants, compared to males, was small as female academic staff in these institutions is very small.

Definition of important terms:

- Staffing: is the process that universities go through in order to recruit academic staff.

II. RESEARCH DESIGN AND METHOD

The research design used is embedded multiple case studies.

Case study

Is empirical inquiry that investigates a contemporary phenomenon in depth and within its real life context, (especially when) the boundaries between the phenomenon and the context are not clearly evident (Yin 2009: 18). Case study, by its very nature, copes with the technically distinctive situation where there will be many more variables of interest than data points, and as one result, relies on multiple sources of evidence, with data needing to converge in a triangulation fashion, and as another result, benefits from the prior development of theoretical propositions to guide (ibid).

Single case study and embedded multiple case studies

Single case study studies a case in its totality, studies units or processes or projects within a single case (embedded) while multiple case studies study and compare cases in their totality (holistic), studying various units within identifiable cases (embedded data collection and analysis), (Yin 2009: 21).

The research method used is qualitative.

Study participants:

Universities: The universities under study are of three generations: first, second and third. From these categories of universities, one from each was taken randomly using lot. So, the universities included in the study were three: Jimma (first generation), Debre Markos (second generation), and Debre Tabor (third generation).

Colleges, schools /institutions

To identify colleges involved in the study, first, the number of the colleges, schools or institutions of the sample universities was identified. Then, of the identified colleges, schools or institutions of the universities, one-third of them were taken from each university.

Departments: Again, to determine the departments of the sample colleges involved in the study, the number of the departments in the colleges was also identified beforehand. So that one-third of the departments were included.

Department heads: Of all the departments in sample colleges, one-third department heads from each college taken randomly. And the randomly selected departments' heads are interviewees by default. So, the number of the participants/interviewees that involved in the study are thirty six.

Sampling techniques

The sampling techniques employed are stratified, random, purposive and availability sampling. First, the universities are put in their generation/stratum and one from each generation taken randomly. Then, the number of colleges, schools, institutes, etc. of sample universities made known. Once this was done, the number of departments of these colleges was also made known. To maintain the proportionality between numbers of departments and heads involved in the study against the number of academic staff in the respective university, colleges with highest number of departments chosen purposively. Then, one-third of the departments selected randomly and the selected departments' heads were made interviewees.

Instruments of data collection:

Semi-structured interview:

The interview, which was conducted to department heads, was specifically on guidelines universities have, the criteria these universities use to recruit academic staff and the challenges faced in the staffing process.

Document analysis

The Higher Education Institutions' Legislation (2008) by the Ministry of Education and the Harmonized Academic Policy of Ethiopian Public Higher Education Institutions (2013), a document developed by four universities in unison and endorsed by the ministry of education were assessed and analyzed.

Method of data presentation and analysis

The data collected from the respondents were conscientiously read and classified. Comparison and contrast among the institutions on the dimensions of the research: the guidelines they have, the criteria they use and the challenges they faced and (the personnel involve in the staffing process implicitly) made. Besides, the Higher Education Institutions' Legislation of 2008 by the Ministry of Education and the Harmonized Academic Policy of Public Higher Education Institutions of 2013 were assessed and analyzed as supplement. Finally, thematic analysis was made.

Ethical consideration

Before commencing the research study, the researchers had a recommendation letter from the University (where researcher work) and communicated its objectives to the target universities. Afterwards, we went to respective sample colleges, schools and institutions and met respondents. Then, explaining the objective of the study once again, we convinced the respondents to participate in the study. With the promise of the confidentiality of the information we managed to collect, the researchers managed to collect the required data.

III. FINDINGS

Presentation and Discussion

As the objective of the study was to investigate the staffing practices and challenges of three public higher education institutions, and the design used is embedded multiple case studies, comparison and contrast of the institutions in different respects were made. The availability of guidelines, criteria used and personnel involve are points of comparison and contrast.

Note: Case study 1 represents Jimma University, while case study 2 and case e represent Debre Markos University and Debre Tabor University respectively.

Availability of guidelines for staffing

Case 1

When respondents asked if there are guidelines to staffing at their respective institutions, the responses were the following:

R1 replied, "I can't comment."

R2, R9 and R12 replied, "I am not sure."

R3, R4, R5, R7, R10, R11, R13 and R14 replied, "No, there are no guidelines."

R6 and R8 replied, "It's GPA."

The responses are: I can't comment, I am not sure, no there are no guidelines and GPA. From the responses, one can understand there are no clear guidelines at institution or national level to use. If there are guidelines to follow, there is no reason for the respondents to respond the way they did. Besides, when the two national documents, the higher education institutions legislation of 2008 and the harmonized academic policy of higher education institutions of 2013, are assessed there is little the documents offer the institution in this regard. The only area touched upon in the former document is the personnel involve in the recruiting process.

Case 2

R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25 and R26 replied, "Yes, there are guidelines for staffing."

The responses are, surprisingly, the same, which is different from case 1 responses where there were respondents who are neither sure there are nor interested to comment on the use. In this case all claim that there are guidelines to follow. However, as indicated earlier, the national legislation and academic policy documents have nothing to offer in this regard. This is meant the university has the mandate to develop its own. As a matter of fact, it doesn't have mandate to develop its own. The two national documents noted earlier are indicative of this. What the institution can do is modifying the national documents to its contexts. Therefore, the responses of the participants could be attributed to institutional culture. The university is one of the young universities. The staffs, most, are young with limited experience. At universities of this stature the academic freedom might be limited. With less academic freedom, it is unlikely that the academic staff speak their minds.

Case 3

R27, R29, R30, R32, R33, R34, R35 and R36 replied, "Yes, there are guidelines."

R28 & R31 replied, "No, there are no guidelines."

The responses are 'yes there are guidelines' and 'no there are no guidelines'. The difference from case 2 is that, here, there are participants who claim there are no guidelines. The closeness of responses of this university and that of case two university might be ascribed to the resemblance between them. Though case 2 university is older, by some years, than this university, they have commonalities: the staff are young and they are not so experienced as case 1. Staffs from these universities, from experience in our context, don't enjoy the academic freedom first generation universities do. So, the staffs might be afraid of the consequences of speaking their mind.

Discussion

Generally, despite the variability of respondents' responses and differing practices of the institutions in staffing academics, there are documents of legislation and academic policies of higher education institutions developed by the ministry of education and four universities in unison endorsed by the ministry respectively supposed to be used in this respect. However, these documents are not in a level that serves their purpose. For example, the harmonized guideline developed in 2013 at national level for the institutions to use is not a proper guideline. A proper guideline, as in the different literatures reviewed, explicitly shows the processes the institutions go through to recruit, indicate the personnel that involve in the process and clearly put the criteria that applicants need to meet to get chosen and occupy a certain teaching position. However, the harmonized academic policy of Ethiopian public higher education institutions of 2013 did say nothing in this regard. If at all and considered enough, it is the one on graduate assistants that states:

A candidate with the qualification of a Bachelor's Degree in three or four years program and with at least the level of a cumulative grade point average of 2.75. However, minimum cumulative grade point average of 2.5 and above may be considered under special circumstances justified by an academic unit and approved by academic vice-president (p.20)

Other than this, in the document, for higher teaching positions, it simply defines what lecturer, assistant professor, associate professor and professor is (pp.21-26). It doesn't show how each category of academics compared and the best picked. This is indefinite and open to different practices. As the document, for a position there might be hundred applicants who meet the minimum requirement.

On the other hand, when the higher education institutions legislation of the 2008 looked at, it suffers the same problems as the document noted earlier: the directives on academic staff recruitment are vague and indefinite. It simply indicates the need for applicants to attach their experience, credentials and additional certificates of trainings during registration (p.7). As how these applicants of same educational level with different experiences and additional trainings are compared and contrasted, how the additional trainings and experiences valued and those given priority, etc. are not clearly indicated. Besides, it indicates that either interview, written or practical exams could be set by the concerned department and the committee which consists of vice dean, department head, teachers' representative and personnel administration head selects (p.8). However, the minimum requirements expected of the applicants, the criteria

they are judged against, additional trainings and experiences that privilege should have been included in the documents.

From the data analyzed, one thing is certain. If there are guidelines at national level, there is no reason for institutions to use different criteria. Nor do the interviewees give different responses to the same question. As long as there are no complete guidelines, the institutions have no choice, but set their own criteria and undertake the staffing process. However, the institutions have failed in this regard too. Same universities of department heads gave different data on the issue. If there are guidelines at institution level, though minor differences are expected on criteria used between departments, they couldn't be totally different. Nor do respondents intentionally give fake data. Such a scenario might not be in the best interest of job seekers and the institutions either. With no complete guidelines in place, the processes of staffing might not be effective and efficient to achieve institutional objectives. According to the University of Sydney (2014:1), the recruitment and selection practices will reflect the university's strategic and operational objectives and its commitment to equity and diversity in employment. According to University of Queensland (2015:8), selection criteria are critical to the recruitment and selection process as they ensure that short listing, interview assessment and reference checks are made on the same basis for all applicants.

Organizational requirements of prospective staff members have a determining influence on the recruitment program. If the requirements are abnormally high, they may impede the program. Therefore, it is important that effective job analysis, job descriptions and job specifications be used to lay down the requirements for the job incumbent, and for the smooth running of a recruitment program (Gerber, Nel & van Dyk, 1995 in Jocelyn Molly Mokoditso, 2011:29).

From the different literatures reviewed above, higher education institutions need to have clear guidelines to follow thoroughly with little space for necessary amendments by those concerned as the situation warrants. Otherwise, the process might be swayed to individual interests that damage the interests of institutions and the education system in general. Employees, teachers of higher education institutions in this case, are the most important part of their organizations. The success and failure of their institutions highly depends on them. Effective staffing plans, policies and procedures promote the achievement of both an organization and employees 'personal goals, for instance, effective staffing can retain the human resource most likely to serve an organization's needs (Carrell, et al 2000 in Jocelyn Molly Mokoditso, 2011:29).

Besides,

Employees represent the most vital part of almost all organizations. Success or failure of organizations highly depends on the quality, skill and effectiveness of its employees. Organizations must, therefore, pay close attention to recruiting the right people and utilizing their capacities. Thus, the recruitment process is crucial for the organization's success. It is more vital for the universities because the major tasks of the universities, i.e. teaching and research, are mostly conducted by the teachers. Universities must have knowledgeable academics to provide quality teaching

Milos Milutinovic and Raihan Mahmood Kadery(2013:1)

All the discussions above show to what extent having staffing guidelines at institutions level is important. With guidelines, the practice of staffing might not be abused by discrimination, inequality and unfairness on the basis of competitors' ethnicity, religion, locality, etc which maximizes individuals' chance and right of employment on merit basis, which in turn helps organizations fill vacant teaching positions by best applicants available. This helps to maintain the quality of education institutions offer.

According to Anglia Ruskin University (2012:1), institutions policy must ensure that recruitment and selection decisions are based on the ability of the applicants to meet the requirements of the job description, person specification and any other relevant criteria. All applicants should be treated fairly and on equality basis that show the institutions are committed to valuing diversity and promoting equality. But, without clear guidelines, it is impossible to address. This conviction values the multicultural nature of higher education institutions at present worldwide. In Ethiopia, the situation of higher education institutions is no different. The classrooms are multicultural. So need to be the academic staff which is achievable with clear and practical guidelines. Clear guidelines promote justice, equality and equity which are features of a democratic institution and society at large.

Criteria institutions use to staffing

Case 1:

R3 replied, "Professional competence."
R8, R9, R10, R12, R13 and R14 replied, "I can't comment."
R1, R4 and R11 replied, "I haven't ever participated."
R2 and R7 replied, "Apart from GPA, anything the department induces is used."
R5, and R6 replied, "Sociability and professional competence are considered."

Apart from the interviewees who didn't comment on the issue, the criteria used to recruit academic staff, according the participants, are professional competence, GPA, anything a department induces and sociability.

The criteria indicated are not comprehensive that they give the complete picture of the applicants in competition. Besides, are vague and indefinite. How do those involve in the process of selecting measure sociality and professional competence? What are measurements of sociability and professional competence? What are the specific criteria that a department can induce? It is subjective and open to bias. Furthermore, there are respondents who are not interested to talk about the matter: either simply refusing to talk about the issue or mentioned that s/he hasn't participated in such process.

Case 2

R20 replied, "Interview is used to see different things which are indefinite."
R16 replied, "Interview and thesis presentation."
R15 replied "Practical skills like lab. experiment and interview are used."
R24 replied, "Publication (not compulsory), age, experience, etc."

R25 replied, "Interview conducted to observe applicants' background and academic performance."

R21 replied, "Subject area background and research expertise."

R17, R18, R19, R22, R23 and R26 replied, "Initiation, background and interest."

The criteria used, according to the respondents, are interview, presentation (thesis or subject matter), and practical skills like lab experiment, publication, age, experience, background, academic performance, research expertise, initiation and interest. They seem diverse. They could meaningfully show the candidates' knowledge, skill and attitude. The problem, however, here is that no one can guarantee the proper application of these criteria. One thing, there are no guidelines that show how these criteria are used in comparing and contrasting applicants. With the absence of binding guidelines, there could be subjectivity in evaluating and grading the applicants. Another problem is that the data show that, even within the university, the criteria vary from college/department to college/department. No doubt the criteria used within a university could, to some degree, vary among colleges/departments. But shouldn't entirely different. What we have witnessed from the study is, however, the latter.

Case 3:

R27 replied, "Research expertise, practical experiences, field experiences, GIS and software skills and attitude."

R30 replied, "Faculty head, department head, and academic vice president selects through interview."

R29 replied "Using interview faculty head selects in consideration of higher education institutions goals, university vision and mission, quality assurance strategies and subject matter mastery."

R36 replied "Through interview anything we want to see."

R31 replied, "Credentials, teaching skills and transfer."

R32, R33, R34, and R35 replied "No comment."

R28 replied, "Putting those with 2.75 and above in order, they are interviewed and made to present their thesis or subject area content followed by question and answer."

So, apart from those unwilling to comment on, the criteria used are research expertise, practical experiences, field experiences, GIS and software skills, attitude, credentials, teaching skills, interview (through which anything is assessed), putting those with 2.75 and above in order and interview and make them to present their thesis or subject area content followed by question and answer. The other means used are: transfer and application ;where a faculty head, department head, and academic vice-president selects through interview; a faculty head selects in consideration of higher education institutions' goals, university vision and mission, quality assurance strategies and subject matter mastery.

Again when we look in to the criteria used here, we believe they are good ones. They are varied, too. But how are they used?

To put the staffing criteria institutions use into perspective, transfer and application come first. For different reasons individuals might ask transfer from one institution to another or apply for a teaching position at universities without advertisement. However, the teachers getting hired this way are

not compared and contrasted with fellow academics. No one can say that they are the best candidates available. Notably, only few succeed this way. Apart from this, in special situations like when the applicants or those request transfer are very rare in the market and the institutions are in demand of them, hiring the individuals is sensible. Otherwise, staffing individuals with their request while their likes are available in hundreds in the market is a disadvantage for all those concerned except the applicants. According to the University of Sydney (2014:10), all candidates, including staff seeking redeployment, will be assessed in relation to clearly defined position-related selection criteria.

Selecting applicants by university officials taking into account the vision and mission of their university is another. Of course, the institutions can set their criteria envisioning their institutions' vision and mission as there are no clear and complete guidelines at national or institutional level so far. From the very beginning, however, the vision and mission of organizations always need to be benchmarks in planning, organizing and staffing processes of organizations. The problem here is that, in the pretext of vision and mission of the institution and using their executive role as shield, these officials may serve their individual interest. Second, except those officials of the universities who set, no one knows the criteria they are using. And what they set at a time might not be used the next time. As a process, it is not transparent and not institutionalized either. It doesn't involve all that should involve in the process. So much so that, the whole process couldn't be credible and trustworthy. According to European Commission for Education, Training, Culture and Youth (2008:10), in most European commission countries, the recruitment process as a whole is based mainly on a joint effort between the institutions and the authorities at central level. Only five countries enjoy particularly noteworthy institutional autonomy in terms of recruitment. In such recruitment scenario, it is probable that the right criteria be set and the right applicants be hired; the whole process could be transparent. This helps the institutions to maintain the principle of integrity and be trustworthy by the community.

Still, another way of recruiting is by a committee of vice-dean, department head, and experienced teachers in the department set the criteria. First and foremost, there has to be an organ responsible for this particular task at institution level with clear guidelines in hand. According to the higher education institutions legislation of 2008, these are not the organs given the mandate to recruit. The one doing the task of recruiting, at some of the institutions under discussion, is not a legitimate organ for the task. In this regard, the higher education institutions legislation of 2008, (p.7) clearly shows the members of the recruiting committee are vice-dean, teachers' representative, personnel administrative head and the head of the department in demand. However, what is happening is that the individuals mentioned above come together, when necessary, set their own criteria and select among applicants. Again the next time when there is need, the individuals come together and do the same. If committee members leave their post or the institutions, the committee members change, and the criteria for staffing might change, too. The whole process doesn't seem to have been institutionalized. Nevertheless, the whole process and staffing guidelines in particular are not ones set up at the time of staffing by an ad hoc committee and dropped the time after. It is an ever

present institutional document that could be developed by delegated organ at national level or institutional level and be revised and contextualized as the situation warrants. This is incompetence on the part of the institutions. Recruitments in such environments lack credibility. According to European commission for education ,training ,culture and youth (2008:10), in most European commission countries, most of the recruitment process is the responsibility of one of the existing institutional level bodies (senate or board of governors). Certain steps in the recruitment process, however, are defined largely either at central or institutional level. Categories of staff and their respective eligibility criteria are defined by official regulations in the vast majority of countries.

When we come to the clear criteria used by the institutions, as respondents, they may be important as they enable to see important attributes of would be teachers. The problems with them ,however, is that they differ from institution to institution with no substantive reason; the individuals involved in the recruitment process differ from institution to institutions; third, the criteria used by the institutions are open to subjectivity and there are no mechanisms to mitigate the influence of the subjectivity either. Most importantly, in some institutions, the criteria used are negatively discriminative and illegal. The fact that there might be times the procedures and criteria institutions use need to differ to some degree, doesn't necessarily mean as institutions of a country they can and should employ necessarily different staffing procedures and criteria. They are all to realize the educational policy of the country. Let alone in a county, countries of European commission are expected to use same criteria and standards and approximately half of the countries organize competitive examinations. Procedures for organizing these competitions are often subject to criteria defined at central level,(Eurydice.2008: 10).

Equally important is those who involve in the process of staffing. In the institutions those who are responsible to staffing differ from institution to institution and within institutions from time to time, too. This changing of personnel makes it difficult for those who are assigned to understand their roles and responsibilities and to be effective and efficient in what they do. Second, there has to be a specific organ tasked to do it. According to University of Regina (2008:1), successful recruitment depends on many factors including timeliness, efficiency and rigorous organization, clarity, and transparency of process. Above all, it depends on all those engaged in the search process understanding how their roles interact with and support the roles of others. It is crucial that search committee members have a detailed knowledge of procedures and regulations at the university and faculty levels. According to the University of Queensland (2015:13), the selection committee for all academic appointments should include the following: dean, head of school, academic board/nominee representative, senior academic staff member, student representative and academic staff from relevant school. Such clarity, apart from bringing efficiency and effectiveness to the whole process, it instills the culture of accountability and transparency in the institutions.

The subjective nature of the criteria used is the other problem. A case in point is interview. When interview is used as criterion, ad hoc committee at college level is set-up, applicants are short-listed and interviewed on any issues interviewers are

interested in turn and then all the committee members give scores. The scores add up and the results posted. To this end, interviewees are usually asked to talk about (in the pretext of knowing the applicants' language proficiency, reasoning and communication skills) is their background: the place where they come from and were educated, etc. So much so that most interviewers get the "most important" information they need: the ethnic background and the locality of the applicants. So, often many members of committees are believed to grade the applicants on the basis of this personal information of the applicants rather than their merit. This violates the rights of employment, the principle of non-discrimination on the basis of sex, race, age, sex, etc which is inconsistent to other institutions practices in the developed world. According to University of Queensland (2015:28), the candidates shortlisted are eligible to compete, there is no need to ask any candidate personal questions. Not only this, members of selection committees must take care not to ask questions or make comments to applicants or others that may discriminate, unless related to a genuine occupational requirement. They claim that it is illegal to discriminate in employment, including recruitment and selection processes, based on: sex, age, race, religion and impairment. According to Milos Milutinovic and Raihan Mahmood Kadery(2013: 4),University of Glasgow believes in equal employment opportunity where all individuals are treated based on their merits and abilities. Throughout the recruitment process, no academic or non-academic staff will be discriminated on any unfair or unlawful grounds i.e. sex, race, disability, marital status, religion and/or belief. By so doing, the university wants to ensure that in all cases the best candidate for the position is appointed.

Besides, in institutions of the developed world there are mechanisms to control subjectivity when they apply criteria which are prone to the problem. According to the University of Sydney (2014:9),the selection committee decides which applicants are recommended and their ranking based on the criteria: the application, referee reports, qualifications, the interview(s), seminar presentations and the opinions of the school members consulted (if applicable);and other assessment information.

However, when these criteria put into practice in the institutions under study, they fall short of credibility. A case in point is presentation. Applicants made to make presentations of their theses or on any contents of their specialty so that committee members evaluate and grade them. In the proceedings, there are no specific criteria which the competitors are judged against. They are simply judged. Given scores add up and determine their fate. These practices are far from being objective, and there is no accountability either. Individuals could value the same thing differently. There could a tendency of favoring one and disfavoring another intentionally or unintentionally unless there are specific criteria against which the individual applicant is judged. So, presentations with no specific criteria to judge against and discriminate among competitors look unreasonable.

Another is credentials and certificates of trainings. Certificates of participations and involvement of a certain nature might help teachers in what they do on daily-basis as they are forums that could develop one's professional practice. But, the required / expected ones from applicants are not specified beforehand. It is

when they are presented that they are labeled worthwhile or unnecessary. In such circumstances, it is difficult to trust the process. People knowingly or unknowingly may overlook those additional credentials which are relevant or vice-versa. Those who deserve the positions may not be selected. This is against the interest of citizens and the institutions in general. On top of that, the quality of education the universities offer is compromised.

The issue, other than the criteria discussed, which deserves some discussion, is respondents' refusal to talk about the criteria the institutions use. Many of them declined to talk about it. If they have trust in the whole process, they wouldn't have any reason not to talk. Refusal to talk, on the part of the respondents, is a sign of disapproval of the whole practice.

Successful recruitment depends on many factors as timeliness, efficiency and rigorous organization, clarity, and transparency of process. Above all, it depends on all those engaged in the search process understanding how their roles interact with and support the roles of others, University of Regina (2008). However, in the institutions under study the staffing process is not getting the necessary attention it deserves. This doesn't help the universities achieve their goals. Recruitment and selection practice will reflect the university's strategic and operational objectives and its commitment to equity and diversity in employment practices, the University of Sydney (2014:1)

In spite of the necessity and indispensability of staffing and its guidelines, the recently developed harmonized academic policy of Ethiopian public higher education institutions of 2013 document has failed to address the issue. This shows how the institutions are incompetent and the little attention they pay to the matter. However, in institutions of the developed world, staffing is one of the most important tasks of the institutions that due emphasis is paid to.

IV. CONCLUSION

Summary

The study was aimed to investigate the staffing practices of public higher education institutions in general, the guidelines that these institutions have in relation to staffing, the criteria the institutions use and the challenges these institutions face in this respect.

As to the prevalence of guidelines, according to the study, though there are documents like the higher education institutions legislation of 2008 by ministry of education and Harmonized Academic Policy of Ethiopian Public Higher Education Institutions (2013) developed and harmonized at national level for institution to use , they are not complete enough to guide the staffing process properly. They lack to indicate the procedures that the institutions go through to recruitment, fails to include the specific criteria of recruitment, devoid of the job description of each teaching position, with the exception of indicating the responsible organ for staffing (former.)

Another is the criteria the institutions employ to staffing .As there are no proper guidelines to follow, it is imperative for the institutions to set their own criteria and recruit. As a result, the procedures these institutions go through and the criteria they use differ from institutions to institutions. These criteria range from making applicants make presentation of their theses or on any

content from their specialty to interviewing, using informal informants about the discipline and personality of the applicants to comparing them in their grade point average, accepting through transfer, choosing the candidates taking into account the vision and mission of the respective institution by officials of the institutions, physical appearance, credentials, impairment, etc. Not only this, the personnel involving in the recruitment process, too, differs from institution to institutions and within institutions too from time- to –time.

V. CONCLUSIONS

From the findings of the research, the following conclusions are made.

- ✓ There are no clear and comprehensive guidelines that guide the staffing processes of the institutions.
- ✓ The staffing procedures and/or criteria used are not consistent among the institutions.
- ✓ The challenges the institutions face are:
 - Though in the legislation clearly put who the responsible body are, there are no specific organs responsible of staffing at institution level. In some universities the human resource department, for some the ministry of education, for others institutions' higher officials, still in others ad hoc committees of the dean, the department head, etc. do the business.
 - The criteria used by the institutions vary from institution to institution and change from time to time with in institutions depending on the interest of individuals involving in the process with in universities.

VI. RECOMMENDATIONS

Based on the conclusions made, the following recommendations are forwarded.

- A complete or self-sufficient guideline of staffing needs to be developed either by the ministry of education or the universities in unison.
- The specific organ delegated by the 2008 higher education institution legislation needs to be made the sole responsible organ to the task.

- There have to be binding staff recruitment criteria at national level with little amendments as the situation warrants.

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Green Networking: Strategies to save network for Next-Generation

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Abstract- The current Internet usage, which was designed over 40 years ago, is facing unprecedented challenges in many aspects in the future. Our future Internet, though there will be more than 600 million users, the world is about 10% of the way there, and there is a lot of growth to come. As a result global internet traffic and mobile traffic will rise steadily and explosively over the next five years. These issues are usually referred to as 'green networking'. Despite some proposals for energy-efficient topologies most of the studies are focused on warning the world about this problem. Mainly as the unnecessary energy consumption is being reduced day by day, the proposed paper provides strategies to save network for future covering through many components such as; wireless networks, wired networks, hybrid networks and the current chemical evolution happening in the world. Furthermore, the proposed project hopes to identify a few strategies that are the key enablers of energy-efficient networking research. Since the proposed project mainly highlights greening the networks, when these strategies come to play approximately 30-35% of energy will be saved through networking for future usage.

Index Terms- Green networking, wired networks, wireless networks, chemical evolution.

I. INTRODUCTION

Green networking is a component that is becoming very popular in this 21st century. Since the reduction of environment pollution and saving energy has become the key factors of this component. Green networking has a strong influence on both economically, environmentally and also mainly in networking field, in a time zone where the data storage and data processing is becoming more and more enormous. For a matter of fact, data-centers and networking infrastructure involve high-performance and high-availability machines which makes them rely on more powerful devices which require energy-consuming air conditioning to strengthen their operation. In recent years, many valuable efforts have been put in reducing unnecessary energy expenditure which is caused because of the massive data traffic growth. It is usually named as 'greening' of the networking technologies.

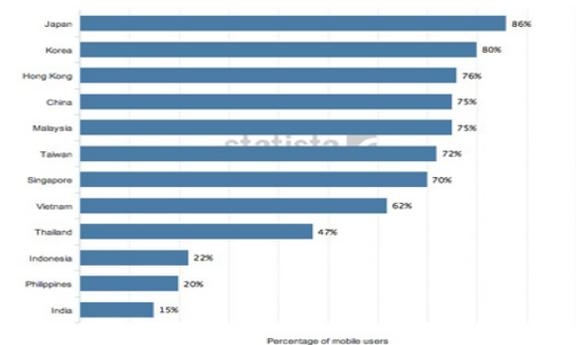
The topic of greening all the networks have been widely explored throughout these couple of years, because of the problem occurred due to the vast amount of data being collected every second of the day. Most of the greening work can be categorized into two groups in general. The most straightforward and successful way is designing energy-efficient topologies

which can provide similar connectivity while using low-powered network devices.

As energy related networks are concerned, wired networks, wireless networks and hybrid networks are specifically discussed in this paper. The key research component is to explore widely about algorithm-based and natural strategies that can be used in order to reduce energy-consuming network usage. Also the major impact on nature because of the chemical revolution happening, based on high energy usage is also discussed throughout the rest of the paper.

When considering about wireless networks almost all the smartphones, tablets and laptops are taking over the world with the term of 'wireless' using only mobile networks to local Wi-Fi networks. And rest of the communication is done by wired network connections which also a reason in high network usage. This rapidly increasing usage of wireless and wired networks has become two of the main reasons to develop energy-efficient strategies with the concept of 'greening'. Wired and wireless networks differs in power consuming. In wired networks more than 70% of power is consumed in user premises whereas only 10% of power due to mobile user. The following Figure 01 shows the mobile internet usage by country in 2012.

Mobile internet usage via smartphone in selected Asian countries in 2012 (in percent)



Asia Pacific: Smartphone users; Nielsen; 2012

Source: Nielsen

(Source: <http://www.asiabriefing.com/news/wp-content/uploads/2013/03/MobUsage.jpg>)

Figure 01: Mobile traffic growth by country.

Since hybrid network contains network hardware and equipment or network infrastructure from multiple vendors, it also has a contribution on heavy usage of network. As hybrid networks are becoming popular day by day in this era, it is also an important component when considering about 'greening' the networks.

When considering Green House Gases (GHG) reduction objectives, it mainly includes information and Communication Technology (ICT) sector. ICT sector alone has been produced approximately 2% of CO₂ from the total man-made emissions [2].

Since previous researches have mainly focus on only alerting the world about this rapidly increasing problem, this research paper propose to discuss about various mechanisms to save network for the coming future. Therefore a research in green networking strategies can be mentioned as a successful solution to this expanding issue in the current century.

The rest of the paper is organized as follows. Section 2 has provides the existing related work through the Literature Review. Section 3 describes the methodology of this paper by providing strategies regarding the main topic. Also the conclusion of the proposed project has described in Section 4.

II. BACKGROUND AND RELATED WORK

Wang et.al states that the major objective of this research is to incorporate rate adaption into green data center networks in order to achieve energy conservation. They approached network-wide energy proportionality by routing optimization based on simulations which confirms that more than 40% of the energy can be saved while introducing very slight stretch on network delay. Wang et.al formalized the problem of high network usage with an integer program and propose an efficient approximation algorithm – Two-Step Relaxation and Rounding (TSRR). They solved the problem quickly while guaranteeing a constant performance ratio. In this paper rate adaption is considered as advantageous because of the better stability when applied in networks. Also this network-global routing optimization, which is discussed in this paper can bring up to 40% energy savings, even without switching off any network devices. But the major weakness of this project is network unsteadiness brought by the frequent change of the network topology when traffic move in a wavelike pattern very fast [1].

This book covers different forms of modeling, analysis, design, management, deployment and optimization of algorithms. Protocols and architectures based on green communication and networking. Those areas may include lots of points which are very important when considering present and future energy usage. Such as energy efficiency, resource management, relay techniques, cross-layer design and optimization, rate adaption etc. Neely presents a methodology for optimizing time averages in systems with variable length frames. Zhang and Cheng developed another new model for green communication called, Demanding-Based Resources Trading (DBRT). Also Attar et.al introduced a novel solution named, "Broadband Wireless Access with Fiber-connected Massively Distributed Antennas" (BWA-FMDA). The advantages of BWA-FMDA architecture are its' flexibility of deployment, scalability of coverage from a few meters for indoor access and superior performance in terms of throughput as well as power efficiency [2].

In this survey article, the authors investigate the key research topics in the area of future Internet construction, challenges and usage. This aims to draw an overall picture of the current research development on the future Internet architecture.

Future Internet architectures are required to provide extensible and flexible explicit interfaces among many stakeholders such as users, Internet service providers, application service providers, data owners, and governments. However, many technical and non-technical challenges have emerged during this process, which call for potential Internet usage. Technically, the current Internet was designed over 40 years ago with certain design principles. Its continuing success has been blocked by more and more sophisticated network attacks due to the lack of security embedded in the Internet architecture [3].

This research focuses on exploring the insights that the principles of network engineering and what architectural changes will be required to meet these new challenges in the future. It says that one recurrent theme in the debates over Internet policy is the claim that the Internet's future success depends on preserving the architecture that has made it successful in the past. Identifying future trends is inherently speculative and in retrospect will turn out to be mistaken without any doubt in a number of important respects. According to this research wireless broadband market since 2008 and the emergence of wireless as the leading broadband platform in other countries both suggest that wireless broadband will become increasingly important in the years to come [4].

Bianzino et.al observed few techniques and categorized them as Adaptive Link Rate, Interface-Proxying, Energy Aware Infrastructure and Energy Aware Applications. Since a significant amount of CO₂ emissions are produced by the Information and Communication Technology (ICT) sector, they also mentioned that the massive Green House Gas emissions cause problems to the environment which are not limited. As solutions for CO₂ emission problem, researchers have stated four solutions; Recourse Consolidation, Virtualization, Selective Connectedness and Proportional Computing. They proposed to use the Benchmark methodology and metrics in handling this green networking research. In their Economical point of view, as a disadvantage there is a huge technological challenge lies in performing service migration without any service disruption, preserving fault-tolerance and data security. They concluded by mentioning as it is necessary to understand where the major energy expenditure occurs to pinpoint the place where the larger energy savings could be obtained [5].

This research is about three issues that are relevant and possible of research in the field of green networking. They specifically focused energy efficiency in wireless networking. They stated that development of more energy-efficient hardware, the introduction of energy-proportional equipment and the adoption of sleep modes for the network elements can be used to achieve energy efficient in any type of networks. Marshan and Meo have mentioned three solutions for their three questions named as Base stations and hot spot, Sleep modes, Centralized and distributed algorithms. They considered a cellular network setting with an algorithm to state the importance of sleep modes and low-power modes for base stations. They have used centralized algorithms and distributed algorithm to identify the optimal network configuration. As a disadvantage there are some problems in sleep modes for base stations like identifying an optimum subset of element for traffic, choosing base stations to off and on and management of transients due to base station switch-off [6].

A measurement study of the energy consumption characteristics of three widespread mobile networking technologies; 3G, GSM and Wi-Fi and they develop through TailEnder module.

3G and GSM is the largest fraction (60%) of the energy; referred to as the tail energy and is take high power state after the completing for transfer. Energy for uploads it's nearly 30% more than that for downloads for 100 KB transfer. Wi-Fi had overhead tail energy and its transferring data itself is significantly. Wi-Fi composed of scanning, association and transfer for 50 k download. They show that the TailEnder scheduling algorithm is probably within a factor of the energy consumed by an optimal offline algorithm that knows the complete arrival pattern of alteration a priori. Furthermore, they show that no deterministic online algorithm can be better than 1.62 competitive than an optimal offline adversary. First, is the transmission energy that is enough capacity to the length of a transmission and the transmit power level. Second, is the Radio Resource Control (RRC) protocol that is responsible for channel apportion and scaling the power consumed by the radio based on inactivity timers [7].

Interconnect the large number of data center servers and provide efficient and fault-tolerate routing service to upper layer application. Fat-tree and BCube topology are represented to data center network. They using energy aware routing to save energy consumption in high density. It suffering from the problem of the low scalability high cost as well as single point of failure and they solve the problem through they own pseudo code algorithm. When the number of outflows is less than 1000, more than 20% energy are saved; and the amount increases to 80% if the number of outflows is less than 100. As expected, the energy-saving effectiveness degrades as the network load increases [8].

III. OUR APPROACH

A. Wired Networks

Traditionally, networking systems are designed according to the principles that are naturally in opposition with green networking objectives. Basically networks are dimensioned to sustain peak-hour traffic, with extra capacity to allow for unexpected future events. As a result during low traffic periods and over-provisioned networks are also over-energy consuming. Since the networks are also designed in a redundant manner for more flexibleness and fault-tolerance, many devices are added to the infrastructure with the exclusive purpose of taking over the duty when another device fails. These conditions revolutionary opposed to the environmental ones, make green networking an interesting and technically challenging, research field.

As one approach of this research, there are mainly three strategies to reach the green networking objectives named as resource integration, virtualization and selective connectedness. As the first category, resource integration regroups all the dimensioning strategies to reduce the global consumption at a given time since the traffic level in a given network nearly follows a well-known daily and weekly behavior. Since this strategy is already a popular approach in some other related fields such as data centers and CPUs, this can be simply achieved in networking by shutting down some lightly loaded routers and

re-routing the traffic on a smaller number of active network equipment.

Virtualization comes to the play when considering about the improvement of hardware utilization. It regroups a set of mechanisms allowing more than one service to operate on the same piece of hardware which results in lowered energy consumption. This concept is also a well-known strategy in sharing servers in data centers in order to reduce hardware costs, improve energy management and reduce data center carbon footprint. Regarding green networks Virtualization can be applied to many kinds of resources including network links, storage devices, software resources, etc. The following Figure 02 shows the basic sketch of how the network virtualization happens currently.

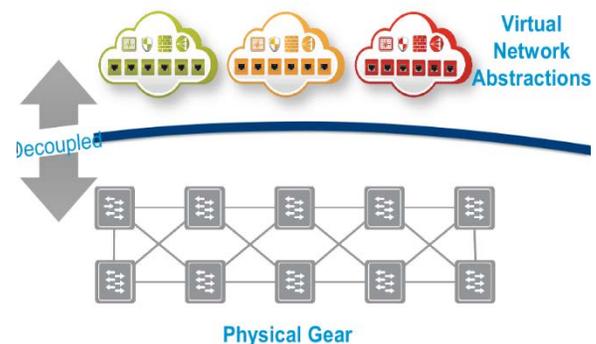


Figure 02: Network Virtualization
(Source:<http://www.techopsguys.com/wp-content/uploads/2013/08/network-virtualization.png>)

In networking, selective connectedness can be concerned as a most trustworthy connection base, which will provide direct access to people's own career interests. Rather than connecting all the devices which may be or may be not useful at the time, connecting only the devices which are most important at the time will help in reducing unwanted energy waste. Also when considering about 'greening' the networks, this strategy can be simply used where routers can turn-off or turn-on depending on their usage and the group of multiple processes and services using above mentioned virtualization in the same hardware. This strategy is specially proposed because a single device working at a full capacity, wastes less power than running several devices simultaneously.

B. Chemical Damages

The Climate Group, GeSI Report says, the emission of Carbon dioxide from PCs, peripherals and printer is 57% (820m tons CO₂), Telecoms infrastructure and devices is 25% (360m tons CO₂), Data centers is 18% (260m tons CO₂) in 2007. And it is expected to grow by 4% by 2020. The traffic growth in the internet is doubling every two years. The traffic of internet videos is higher than the traffic of wireless data and wireless voice. As the following Figure 03 shows current usage of energy, for cooling down the data centers.

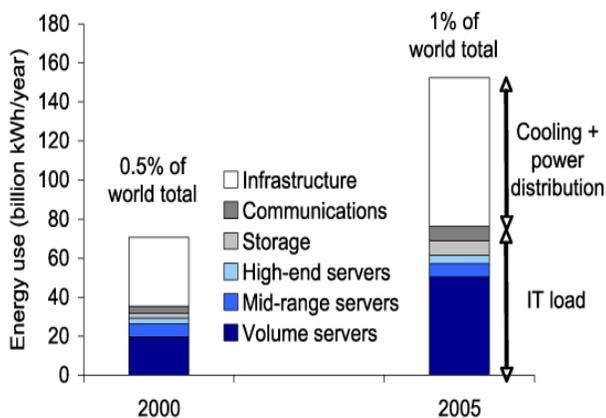


Figure 03: Energy consumption in data centers
 (Source: lukenotricks.blogspot.com/2010_05_01_archive.html)

Server farms and cellular networks together consume much electricity. The energy consumes by the internet, the wireless and wired communication is comparatively less than the quantity if electricity consumption by ICT systems in houses and offices especially laptops. This causes a huge amount of CO₂ emission every year. The major effect of CO₂ emission is climate change. The use of high temperature electronics, avoid air conditioning in server farms and cellular networks are some reasons for energy consumption. Round half of the electricity usage in ICT goes to centers to cool systems inside. It mixes the hot and cold air. Servers utilize nearly ¾ of power usage for no useful works. These servers are inefficient.

Therefore energy improvements can be done in several areas. By using Ultra-efficient power amplifiers for transmit signals with large point to average power ratio, Active antennas and self-organizing networks in Mobile and passive cooling everywhere, dynamic energy usage and Network Virtualization and Programmable, application specific, highly parallel, power productive digital baseband processors which consume less power per function can be used to improve the energy efficient.

Air cooling represents an important share of the energy expenditure in data centers and cold climates may loosen this dependency. Liquid cooling or fresh air cooling will be a better solution which uses air from outside to cool for data centers. For example, Google does locate the server farms near the river to get energy hydroelectric power plants. The water flow provided by the river may in addition be used within the cooling systems. Microsoft leaves their servers in the open air to cool. Amazon does geographical delocalization to save energy consumption. Virtualization is a technology which allows the applications to run on many servers which reduces the wastage of energy by servers and redundant servers will be removed.

As the usages of mobile phones have increased the need of energy efficient is high. The energy consumption can be reduced by having IP-Based Base Transceiver Stations and Radio-over-Fiber technologies.

C. Wireless Networks

Mobile phones are any ware today with an estimated cellular subscription of more than 4 billion worldwide. Most phones presently used more than one of 3G, GSM, and Wi-Fi for data transformation. For example, the insertion of 3G is estimated more than 15% of cellular contribution worldwide and more than 70% in some countries. How do the energy utilization attribute of network activity up 3G, GSM, and Wi-Fi on mobile phones analyze with each other? How can we cut down the energy consumed by frequent applications using each of these three technologies? To consider these questions, we first conduct a detailed assessment study to quantify the energy consumed by data transmission across 3G, GSM and Wi-Fi. We find that the energy utilization is informally related to the characteristics of the workload and not just the total transmission size, e.g., a few hundred bytes transferred intermittently on 3G can obsess more energy than transferring a megabyte in isolated. Below is a summary of the key findings of our analysis study, which remain dependable across three variance cities, diurnal variation, mobility patterns, and devices. The following chart presented in Figure 04 shows the evolution of wireless networks with mobile data and wired networks.

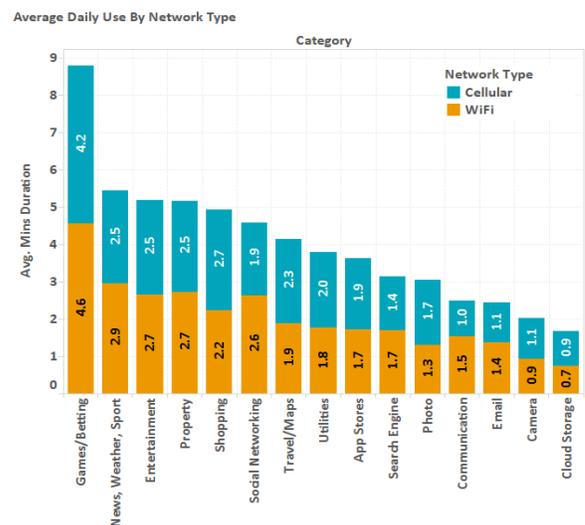


Figure 04: Usage of wireless networks.
 (Source: <http://www.realitymine.com/wp-content/uploads/2013/08/Average-Daily-Use-By-Network-Type.png?f29246>)

As a way of closing the hole among the special-purpose and general-purpose devices, the proposed project suggest accommodate the notion of requirement-specific energy scales down at all levels of the system. Namely providing for the design and use adaptively in hardware and software to exploit mismatches between system functionality and workload/user requirements. Specifically, the proposed paper suggest considering each component in the general-purpose device and comparing it to the requirements of the applications using that device. Ideally, each general-purpose component should be capable of scaling down its energy use to connect the design view used by the application with the lowest requirements. There are two substitute for achieving this: gradation-based scaling, where the component has a wide range of adaptability, or

plurality-based scaling, where the device chooses bitwise multiple components with different properties. Below, the scale-down expansion in the context of the display, wireless, and processor components of the system that attempt to use adaptively improve the efficiency of energy use in the device.

D. Data Centers

Present data centers, containing thousands of switches and servers, run data-intensive applications from cloud services such as search, web email, to infrastructural calculation. (GFS, CloudStore, and MapReduce) The goal of Data Centre Network (DCN) is to combine the huge number of data center servers, provide productive and fault-tolerant routing service to over layer applications. It is well known that the current practice of tree architecture in data centers suffers from the problems of low scalability, high cost as well as single point of failure. Hence, recently a lots of advanced network architectures are proposed to restore the tree topology, represented by Fat-Tree, BCube and etc.

As a solution for that, BCube (BN, BL) topology, where BN indicates the number of ports in a switch and BL denotes the number of levels, where there are different values of BN and BL to vary the topology scales. Similarly, it varies the couple of ports in switch in Fat-Tree, denoted as FP. It can be assumed that the network capacity of all links in these topologies are 1Gbps. The number of flows in a topology can be changed to simulate different network load, and the traffic matrix is one of normal way generated upon servers.

E. Milimeter wave radion access

(1) Wireless and mobile internet access

Green networking is a expeditiously expanding area of research. It is the practice of selecting energy-efficient networking technologies and products, and decreasing resource usage whenever possible [9].

Wireless and mobile internet access recently became an integral part of human lives. Consumers now access the Internet more on mobile devices than on PCs such as smart phones, tablets and etc. A wireless internet infrastructure with the capacity for fast data transfer is used in all areas from education to e-state and e-commerce. According to a recent Cisco report, the most recent data show that the overall internet usage is 60% via mobile devices. Last year's wireless data traffic was nearly 30 times the size of the entire global Internet in 2000. The following Figure 05 shows the approximate mobile data traffic growth that will be happening within next 3 years.

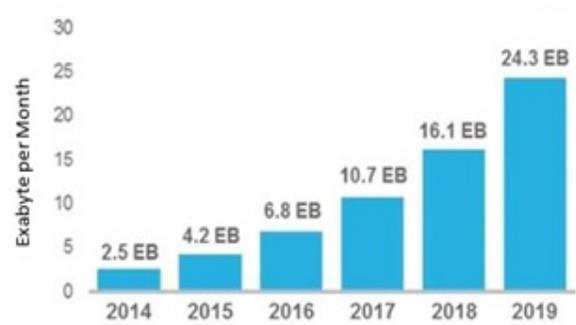


Figure 05: Global Mobile Data Traffic Growth
(Source: <https://www.mvndynamics.com/wp-content/uploads/2015/02/screen01-ash.png>)

(2) Video Streaming

Video streaming is becoming much more widely used by end users for both work and leisure. With the increasing number of personal and home devices, increased data created, and the resulting content-rich applications, video streaming in particular, has become the application that requires the highest amount of bandwidth [10].

Because of above incident future of wireless internet is in a danger. If this continues like this future internet usage will be limited. A solution for above problem is Milimeter wave radion access (mm-Wave) [11]. One major factor that is driving Internet bandwidth utilization is the move to from wired networks to wireless (WiFi and mobile services). So mm-wave radio access will increase wireless bandwidth.

The uncrowded, license-free mm-wave frequencies can provide 50 to 100 times more user capacity than that is readily available. When combined with other optimizations, mm-wave is expected to increase wireless bandwidth by a factor of up to 1000 than current 4G within the next few years [12]. According to recent measurement, current mm-wave already supports a bandwidth of at least 1 Gbps, the bandwidth that can sustain the most demanding applications such as high-definition video streaming.

IV. CONCLUSION

Currently since the world has faced a critical problem in terms of power consumption it is indeed important to start saving energy in the networking perspective. High use of internet can be effected in internet loss in the near future. As the internet is an essential part of lifestyles, using it efficiently is a solution than limiting the usage. This research paper introduces some strategies towards greening the networks based on wired networks, wireless networks, chemical environment and data centers. Furthermore, in this paper, some strategies are applied to save network which are currently being used in different sections other than networking. As the main objective, this paper has presented many strategies to save network for future generations by greening the networks efficiently.

V. FUTURE WORK

The main limitation of the proposed project is, that this research does not provide any specialized algorithms on reducing the network power consumption regarding green networking. (E.g. Distributed Algorithms) Many strategies that are currently using in related fields (E.g. data centers) are discussed within the research. This research can be elaborated furthermore by providing new algorithms regarding the discussed strategies. Since this research project mentions about saving network for future generations, it can also be more elaborated by providing strategies through hybrid networks. Not introducing new strategies regarding the topic of reducing unnecessary energy consumption through hybrid networks can be pointed as a drawback of this project.

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Combating Cyber Crime Using Artificial Agent Systems

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Abstract- As this is the 21st century, the term “globalization” has become popular. Simply put, globalization is the process of international integration. Under this, as nations, people have lots of factors that must be definitely considered. Among those important areas, information technology (IT) is something that is being evolved day by day. As a negative aspect of IT, with the help of technological advancements, criminals are using cyberspace to commit numerous cyber-crimes. Since people are connected to the cyber space with their own devices, they are all vulnerable to intrusions and other various kinds of threats. Basic protection methods, such as internet security suits, are not just enough to protect the data and devices. Introducing effective and highly advanced cyber defense systems has become essential. As of today, with the technology, the globe is moving towards the artificial intelligence (AI). AI plays a major role in technology and has been involved with many technological aspects as well. Creating cyber defense systems, using intelligent agents has become a trend by today. Basically, an intelligent agent is a software component which can be emerged in an environment, take decisions, and has the ability of noticing and representing. The purpose of this study is to introduce a sophisticated cyber-crime defense system which involves intelligent agents that are based on artificial intelligence.

Index Terms- Cyber-crimes, Intrusion detection and prevention system, artificial agents, artificial intelligence.

I. INTRODUCTION

This research paper mainly focuses on how to combat cybercrimes, and also it demonstrates how intelligent and effective the tool “agent” that can be used in detection and prevention of cyber-attacks. Cyber-attacks tend to have a huge impact on the IT industry when it comes to data theft, many societies across the world have components or systems which depend on web applications. As web applications are used increasingly on basic and critical activities they have become a very vulnerable and a popular target for security attacks. It can be noticed that the increase of cyber-attacks are very high in today’s cyberspace. Any action that bypasses the security mechanisms of the targeted system using a computer and a network can be defined as a cybercrime. In a cybercrime the computer might be used as an intruder or it can be the target.

In cyberspace maintaining confidentiality, integrity and availability are essential. Most network-centric cyber-attacks are carried out by intelligent agents such as computer worms and viruses; hence, combating them with intelligent semi-autonomous agents that can detect, evaluate, and respond to cyber-attacks has become a requirement. Physical devices and human intervention are not sufficient for monitoring and protection of these infrastructures from attacks. Therefore, the study of cyber-attack detection strategies and systems are becoming a popular and interesting topic among the specialists in the network security field. Expansions of the intrusion systems are rapid in modern technological environment.

Intrusion detection systems (IDS) are one of the very popular systems which are deployed to detect cyber-attacks. It can be classified as host based systems or network based systems. Host-based systems are based on information’s of a single host while network-based systems are based on monitoring traffic of the information. It is critical that these cyber defense systems being flexible, adaptable and powerful, and being able to detect a wide variety of threats and making intelligent real-time decisions. Apart from IDS’s, Intrusion Prevention Systems (IPS) is also being used in this invention. These will not only detect and warn about cyber-attacks but will prevent them from entering into the system. IPS’s are placed in-line and are able to actively prevent/block intrusions that are detected, more specifically IPS can take such actions as sending an alarm, dropping the malicious packets, resetting the connection and/or blocking the traffic from the offending IP address which could be very troublesome for the cyber-attackers and perky for the users.

An Agent is a small program module that functions continuously and autonomously. Characteristics of an agent system should be reactivity, proactive in action and small in size. There are many advantages of building cybercrime detection systems using the agent technology. They can run independently. The agent can be reconfigured to newer version without interrupting to the rest of the system and also they can exchange information by deriving more complex results than on its own. This particular program module plays a major role in the system as all the algorithmic data is allocated into the Agent making this invention work as a whole. Agent is built in a way that it’s easy for the user to cooperate with the system without any issue; the agent basically makes stuff simple for the user. The in-depth analysis of an agent might seem pretty complicated but its main aim is to be user friendly for the user. In order to make things simpler for the users and for communication purposes a language called the Agent Communication language (ACL) is being used by the agent to interact with the users. Agent has administrative control over the system as the agent is used to formulate inner judgment when it comes to the system.

The content of the paper has been divided into four main chapters, according their topics. First chapter is the introduction chapter where it gives a basic idea about the research. Second chapter explains the characters or components which are being used in other related research papers. Solution for the identified problem is given in the third chapter. Fourth chapter includes the conclusion and in the last chapter possible future tasks to get better results are being mentioned.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

Cyber attacking, it is a common word used in the present world. Daily thousands of computer networks or computer systems get attacked by an unknown systems or hackers in order to damage or destroy the system. In order to prevent and detect such attacks many systems are being developed. A background study was done in order to identify the available technologies, mechanisms etc.

A. Intrusion Detection System

An Intrusion Detection System or IDS is a network security technology originally built for spotting vulnerabilities that exploit against a targeted application or a computer system. It is the process of monitoring the events occurring in a computer system or in a network and analyzing them for possible incidents indications, which are violations or impending threats of destruction of computer security strategies, suitably used policies, or common security practices. An ID system gathers and analyzes information from various sources within a computer or a network to identify possible security breakings, which include both intrusions and attacks from the outsiders the organization and does not use them properly or attacks within the organization. Particular intruders can be pin pointed and shown through an algorithm [2] [9] [10]. Intrusion detection system only can identify intrusions, and it cannot prevent the system from attacks [5] [7]. It should be fast enough to identify the intruders (external or internal intruders) as soon as the attack is going on. In IDSs efficiency is a more important feature. Intrusion Detection System (IDS) technologies are not very effective as there are several limitations, such as performance, scalability and flexibility. Intrusion Prevention System (IPS) is a new approach to defense networking systems. Figure 01 indicates how an IDS is placed in a system.

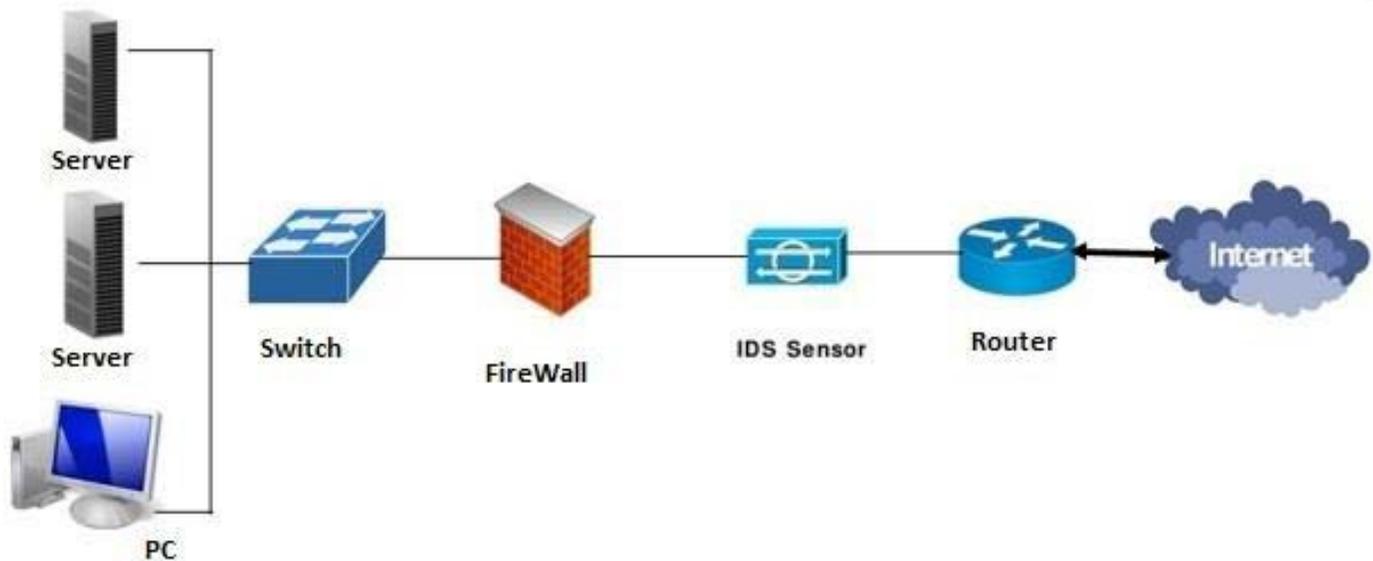


Figure 1: Intrusion detection system

(Source:

https://www.google.lk/search?q=Intrusion+detection+system&source=lnms&tbm=isch&sa=X&ved=0ahUKEwjxhKjK357LahWKco4KHb5pBQ0Q_AUIBygB&biw=1366&bih=667#imgrc=bgoc5oyiXo2hwM%3A)

B. Intrusion Prevention System

Intrusion prevention systems or IPS, also known as intrusion detection and prevention systems or IDPS, are network security appliances that monitor networks and system activities for malicious activities. The IPS often lies directly behind the firewall and provides a complementary or integral layer of analysis that selects for dangerous contents. Intrusion prevention is a preemptive approach in network security which is used to identify potential threats and respond to them swiftly. Like an intrusion detection system (IDS), an intrusion prevention system (IPS) checks and controls network traffic. However, because an exploit may be carried out quickly after the attacker gains access, intrusion prevention systems also have the ability to take immediate actions, it's about a bunch of rules created by the network administrator. As an example, IPS might drop a packet that it determines to be malicious and block all further traffic from that IP address or port [9]. Legitimate traffic, meanwhile, it should be sent forward to the recipient with

no sudden interruption or delay of service. Unlike its predecessor the Intrusion Detection System (IDS) is known to be a passive system that scans traffic and alerts back the threats the IPS is placed intact with (in the direct communication path between source and destination), automated actions will be taken on entire traffic flows that enter the network by actively analyzing them. Specifically, these actions include:

- Dropping the malicious packets;
- Sending an alarm to the administrator;
- Blocking traffic from the source address;
- Resetting the connection.

The IPS should work properly, as it one of the main frontline components used to avoid the degrading of network performance. It must also work fast because exploits could be caused in real-time. The IPS must also spot and react precisely, so it can eliminate threats and false positives. Figure 02 indicates how an IPS is placed in a networking environment.

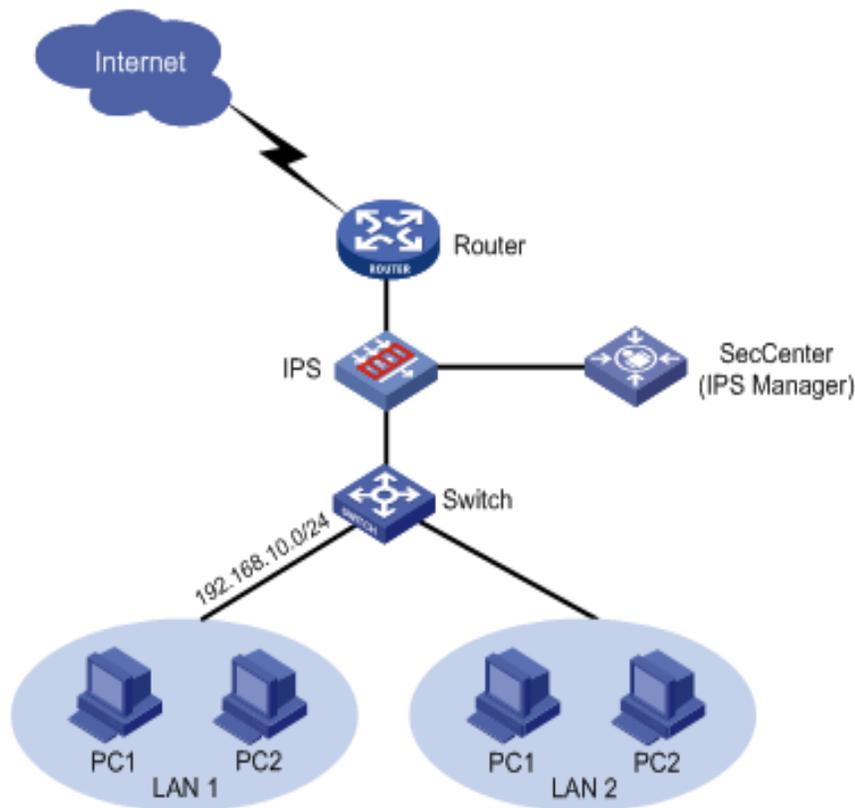


Figure 2: Intrusion prevention system

(Source: http://www.h3c.com.cn/res/201005/26/20100526_985682_image001_676465_30005_0.png)

C. Cyber Security System / Cyber Attack Detection Systems (CADS)

Cyber Attack Detection Systems (CADS) and its generic framework perform well for all the classes. This is based on Generalized Discriminant Analysis algorithm (GDA) for feature decrement of the cyber-attack datasets and a collective approach of classifiers for classification of cyber-attacks [1] [10]. Cyber Attack Detection System is having improved detection accuracy for all the classes of attacks.

Cyber Attack Detection Systems are of two types [2]. Host Intrusion Detection Systems (HIDS) and Network Intrusion Detection Systems (NIDS). Host intrusion detection refers to the class of intrusion detection systems that reside on and monitor an individual's host machine. There are several characteristics which is used by a host intrusion detection system that can be used in collecting data

including File systems, Network Events, and System Calls. Network Intrusion Detection System is a network cyber-attack detection system (NCADS) which monitors the packets that traverse to a given network link. A NCADS is obviously of little use in spotting attacks that are launched through an interface on a host except for the network.

D. Detects denial-of-service (DOS) attacks

A DoS attack is an attack type which is used to make a computer or a network resource unavailable to the users, such as to temporarily or permanently interrupt or suspend services of a host connected to a network. By targeting user's computer and its network connection, or the computers and network of the sites the user is trying to use, an attacker may be able to prevent the user from accessing email, websites, online accounts (banking, etc.), or other products and services that reside on the affected computer. The most common type of DoS attack is a situation where an attacker floods a network with information. When the user types a URL for a particular website into web browser, he is sending a request to that site's server to view the page. Only a certain amount of requests will be processed by the server at a time, therefore requests will not be processed if an attacker swamps the desired server with. This is known as a "Denial of Service" because the user will not be able to access that site. There are many other types of cyber-attacks such as brute force attacks, browser attacks, shellshock attacks, SSL attacks, backdoor attacks and botnet attacks[3] [6] [7]. Figure 03 illustrates the mechanism of a Typical DoS attack.

TYPICAL DOS ATTACK

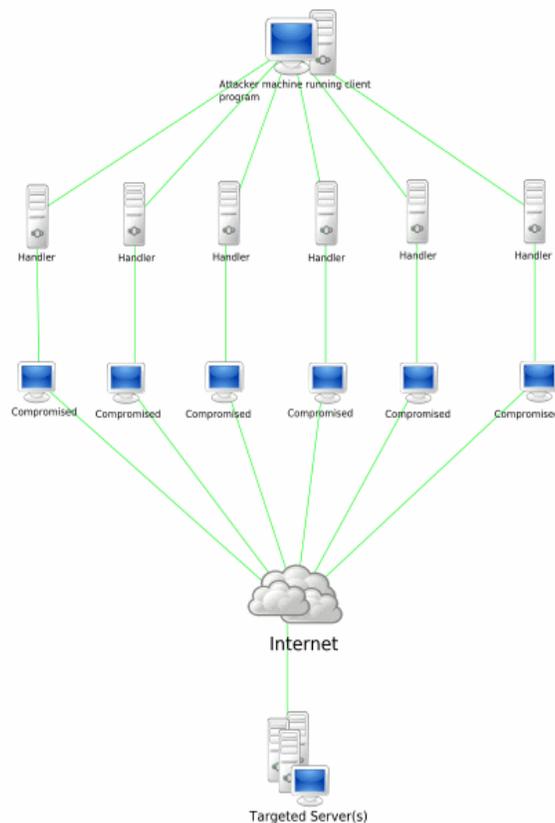


Figure 3: Typical DOS Attack

(Source:

<https://www.concise-courses.com/security/wp-content/uploads/2013/08/dos-attack.png>)

E. Agent Based / Artificial Agent

An entity that can be activated, autonomous and has the capability of formulating inner judgment can identify as an agent. An agent is a software program that gives assistance to user to complete some tasks or activities. Agents in a multi-agent system (MAS) must be able to cooperate and work together with every user of the system [4] [8]. Therefore, a common language is requisite for the purpose of communication, an Agent Communication Language, or ACL can be used for this. Intelligent agents are software components which have special features of intelligent behavior such as pro-activeness, understanding of an agent communication language [2] [3]. They may also possess features such as mobility, adaptability and collaboration. Multi-agent system is a system which consists of multiple agents interacting with each other to learn or exchange experience [4] [8]. Consequently more complete operational picture of the cyber space can be provided by these multi-agent tools.

F. Algorithms

An algorithm can be identified as a procedure or a formula which helps in solving a problem. A computer program can be viewed as an implementation of an algorithm. In mathematics and computer science, an algorithm usually means a procedure that helps to solve a recurrent problem. New approaches can be made by combining set of algorithms in order to detect and defeat cyber-attacks [5] [9]. Combining Fuzzy logic and Genetic Algorithm (GA) for identify intrusions has being developed since there is an essentiality of a high security approach to safe and confident communication of information between different organizations [7]. In creating new approaches FUZZY LOGIC algorithm and GENETIC algorithm are being used. Genetic Algorithm is an optimization algorithm that helps in finding appropriate fuzzy rules. Fuzzy rule is a machine learning algorithm. Fuzzy logic along with genetic based approach gives more powerful performance.

G. Data sharing between agents

Agents share its data with other agents in the system. In sharing data, the system has used wide varieties of sharing schemes such as, centralized data reporting on one side and decentralized sharing on the other. This article present a theoretical concept and framework based on peer-to-peer computing in order to integrate a multi-agent system. But this is sharing results in a scalability bottleneck due to the high volumes of incoming data; these systems often have slow performance or slow reaction [8].

H. Data mining

Data mining /data or knowledge discovery is the process of analyzing data from different perspectives and transforming it to useful information. It allows users to analyze data from many different dimensions, categorize it, and summarize the identified relationships. Typically, data mining is the process of identifying correlations or patterns among fields in large relational databases. Data mining concept can be used to analyze a multi-agent based approach in intrusion detection. Analyzing previous cyber attacking details using data mining techniques predictions regarding the future attacks can be done [10].

III. WRITE DOWN YOUR STUDIES AND FINDINGS

As been mentioned in the introduction the agent plays a key role in providing solutions to this system. The multi-agent system contains multiple agents which consist of the Agent Communication Language (ACL). This will tend to make things easier for the user. Cyber-attack detection systems (CADS's) are based on assumptions that intrusive activities are noticeably different from normal system activities and detectable. Cyber defense proposes a unique algorithm to identify cyber-attacks on web based applications. Cyber security systems in the other hand consist of a Broadway defense system, this will help the user to use the system and track many areas of cyber-crime occurrences.

CADS will make sure that external and internal cyber threats will be taken care of, through the web based algorithm used cyber defense will be able to track down the culprits within a short period of time. The IDS and IPS will also be used in tracking cyber-attacks. The IDS will identify and notify the users about cyber-crimes with the help of the agent system, whereas the IPS will identify, notify and prevent the attacks being caused. If a specific piece of valuable data is being compromised the IPS will be taking action against it and makes sure that malicious data does not harm the system or whatsoever. Using an IPS is more advantageous compared to using an IDS, as an IDS just identifies and notifies the system, whereas the IPS will prevent it from occurring.

If the agent based approach is taken into consideration, the multi-agent system consists of multiple agents with unique tasks to be done. The **IDS agent** is clear with the data collection and is curious with unwanted data, if any unwanted data is found the system notifies it through the IDS. According to a detection strategy suspicious occasions will indicate through the **classification agent**. **Decisions/Actions Agent** looks complicated in settling on decisions and performing particular assignments as the basic security strategies. **Alarm generation agent** handles all the interruption caution messages. The **configuration agent** makes sure that

arrangement of data is done in a way so the decisions/actions agent will be able to retrieve data about cyber-attacks without any hassle.

When it comes to Intrusion Detection (ID), generally, ID can be defined as the problem of identifying or clarifying individuals who attempt to use a computer or a computer system without authorization and those who have legal access to the system but are abusing their privileges. It is also important to define an attempt as any action that try to compromise the integrity/confidentiality/availability of a particular resource. An Intrusion Detection System (IDS) watches over all network activity and identifies suspicious actions that may indicate a network attack from someone who is attempting to break into. Generally, and IDS can be divided into two categories. The first category is host-based, which includes analysis of the system's configuration files to detect suspicious settings, and inspection of other system areas to detect policy violations. The second category is network-based. In network-based, the mechanisms are set in place to act out known methods of attack and to record system responses.

While agents do not directly support the techniques for detection, they can change the way of applying theories. This means improving efficiency and effectiveness. Because agents can reproduce themselves and reside on multiple platforms, they potentially can eliminate attackers from trying to mislead IDS. Agents can maximize the strength of general IDS into robust, attack-resistant IDS. The agents are mainly focused on responding to an intrusion rather than its detection, because responses can be generated from anywhere in the network. Moreover, the following items can be described as advantages of using agents to respond to an intrusion.

- Tracing the attacker

Attackers often log into a network of many hosts before attacking a target and sometimes hide their source address. In order to catch the attacker, the IDS must trace back through the network and locate the actual host who is sending the packets. To fulfill this requirement, the infrastructure required would be expensive, but not with a widely installed agent platform.

- Responding to the attacker

When an attack is detected, it would be better if automatically respond at the target host. Such a response can prevent the attacker from establishing a better foundation and using the selected host to further compromise the network. It also helps to minimize the effort needed to recover the damage that was done by the attacker.

- Responding to the source

Responding to the attacker's host, gives an IDS much capabilities to break the attacker's mitigate plans. Without using agents, it will be hard for IDS to gain sufficient access to attacker's host in order to take necessary actions.

- Evidence gathering

Currently, it is impossible to gather evidence automatically of an attack from many different sources. Agents offer the ability to run anything, anywhere, at any time, including different hardware platforms, operating systems, and different applications such as web servers.

- Isolating the source and target

In case of action failed that was taken for source and the target, a network level response is needed to limit the attacker's actions such as block communication with the target host. The ability of agents to travel through network, it is possible to perform such an action. Users will find it easy and user friendly to use the system along with the help of the multi-based agent systems. With the help of multiple agents Cyber Attack Detection Systems will also seem fair from the user's point of view. As it is the main component in this research area. IPS and IDS will also be beneficial as the agent based system will quickly determine threats and prevent those using prevention and detection systems.

IV. CONCLUSION

Fast development of information technology considerably impacts to human life styles. However it also generates issues such as emergence of cyber-crimes. Application of artificial agent is a new trend to combating cyber-crimes as they provide features such as mobility, rationality, adaptability and collaboration. This paper has briefly presented about the cyber-crimes and advances made so far in the field of applying artificial agent techniques in collaboration with Intrusion Prevention Systems, Intrusion Detection Systems, Cyber Attack Detection Systems and algorithms in order to combat cyber-crimes.

V. FUTURE WORK

In future works there are things which can be improved to have better results. Agents can help to improve IDSs in many areas, but they have no ability of identifying upcoming attacking strategies. In order to mitigate this issue, agents must be programmed with the ability of forecasting the future of attack types. When it comes to performance, IDSs might be running slowly when they are embedded with such agent based software. Since it is necessary to identify and respond to an attack quickly, combination of agents and IDS would delay the above mentioned identifying and responding processes. The client-server architecture is well known and has been stabilized as a technology. But the area of agent system technology is still evolving and is under construction. There should be new designs and implementations, to bring the mentioned technologies to a same level. The new methodologies must be introduced in order to overcome the issues mentioned above.

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$M^X/G/1$ Queue with Disasters and Working Breakdowns

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Abstract- In this paper, $M^X/G/1$ queue with disasters and working breakdowns services is analyzed. The system consists of a main server and a substitute server. It is assumed that disasters occur only when, the main server is in operation. The occurrence of disasters forces all customers to leave the system and causes the main server to fail. At a failure instant, the main server is sent to the repair facility and the repair period begins immediately. During the repair period, the system is equipped with the substitute server which provides the working breakdown services to arriving customers. The concept of working breakdown services is included and the steady state system size distribution is derived. Various performance measures are derived and the effects of system parameters on queue length are studied.

Index Terms- Disasters, $M^X/G/1$, Supplementary variable technique, Working breakdowns.

I. INTRODUCTION

Over the last two decades, queueing systems with disasters have been studied extensively and applied to computer networks, communication systems and manufacturing systems. The queueing systems with disasters are characterized by the phenomenon in which the occurrence of disasters not only destroys all unfinished jobs but also breaks down the machine processor. Such disasters have no effect if the system is empty. The occurrence of disasters forces all customers to leave the system and causes the main server to fail. At a failure instant, the main server is sent to the repair shop and the repair period immediately begins. Finally, disasters can be viewed as a machine breakdown that leads to destruction of all work in process in manufacturing systems. For example in computer networks and telecommunication systems, if a file is infected by a virus, the infected file may transmit the virus to other process such as CPU, I/O devices diskettes etc. Therefore, a virus infection can be considered as a disaster that destroys all stored files.

Queueing models with disasters were introduced by Towsley and Tripathi (1991)[1] for the purpose of analyzing distributed database systems that undergo site failure. Since the first investigation of the queueing system with disaster by Towsley and Tripathi (1991)[1], there has been considerable attention paid to its applications to local area network, communication system and manufacturing systems. Jain and Sigman (1996)[2] extended this idea to the $M/G/1$ queue with disasters and Yang and Chae (2001)[3] analysed $GI/M/1/DST$ queueing model. There has been considerable research on queueing models with disasters, which are also referred to as “mass exodus” by Chen and Renshaw (1997)[4], “catastrophes” by Chao (1995)[5] and Kyriakidis and Abakuks (1989)[6], and “stochastic clearing” by Artalejo and Gomez Corral (1998)[7] and Yang et al. (2002)[8]. This topic was recently extended to a discrete-time queue with negative customers and disasters. Atencia and Moreno (2004,2005)[9,10] presented a stationary queue length distribution of the Geo/Geo/1 queue; that model has either negative customers or disasters under a particular assumption in which an arriving customer is classified as a positive customer or a negative customer (disaster) with certain probability. Artalejo and Gomez-Corral (1998)[7] analysed computation of the limiting distribution in queueing systems with repeated attempts and disasters. Recently, Yi et al.(2007)[11] analyzed the queue length of the Geo/G/1 queue with only disasters. Li and Lin (2006)[12] analyzed the $M/G/1$ processor-sharing queue with disasters. Since processor-sharing queues are very useful and disasters are extensively found in practical stochastic systems, it is both theoretically necessary and engineering important to analyze performance measures of processor-sharing queues with disasters. Yechiali (2007)[13] studied a queueing model combining both disasters and impatience. In 2007, the author studied single, multiple and infinite queueing models assuming all the underlying random variables to be exponentially distributed. In succession, Sudhesh (2010)[14] obtained the exact transient solution for the state probabilities of the same model. Chakravarthy (2009)[15] analyzed a disaster queue with Markovian arrivals and impatient customers consider a single server queueing system in which arrivals occur according to a Markovian arrival process. Kim and Lee (2014)[16] analyzed $M/G/1$ queueing system with disasters and working breakdown services. In the present work the author analyses the work of Kim and Lee (2014)[16] for a batch arrival queueing system with disasters and working breakdowns. The system consists of a main server and a substitute server and disasters only occur while the main server is in operation. The occurrence of disasters forces all customers to leave the system and causes the main server to fail. At a failure instant, the main server is sent to the repair facility and the repair period immediately begins. During the repair period, the system is equipped with the substitute server which (who) provides the services to arriving customers with lower service rate than that of main server. At the end of the repair period, if there are customers in the system then the substitute server stops service and the main server restarts and operates the system at its normal service rate. It is assumed that the service interrupted at the end of the repair is lost and the substitute server is replaced by the main server instantaneously. i.e., The service is restarted with the normal service distribution of the main server.

II. RESEARCH ELABORATIONS

1. Mathematical analysis of the system

1.1 Model Description:

The customers arrive in batches in accordance with a time-homogeneous Poisson process with parameter λ . Let X denote the number of customers arrive in a batch with probability distribution $\Pr(X = k) = g_k, k=1, 2, 3, \dots$. This shows that the probability that a batch of k arrivals occur in an infinitesimal interval $(t, t+h)$ is $\lambda g_k + O(h)$. Let $X(z) = \sum_{k=1}^{\infty} g_k z^k$ be the PGF of X and $E(X) = X'(1)$ be the mean of X . This arrival process is said to follow a compound Poisson process with mean arrival rate $\lambda E(X)$.

The customers are assumed to serve in the order of their arrivals. (i.e.), First come First served (FCFS) discipline is followed. Initially the customer is served by the main server whose service is termed as normal service. The normal service time S_1 is assumed to be independent and identically distributed (i.i.d) random variables. The density and its LST are respectively denoted by

$$s_1^*(\theta) = \int_0^{\infty} e^{-\theta x} s_1(x) dx$$

$s_1(x) dx = \Pr\{x < S_1 < x + dx\}$ and

It is assumed that disasters occur during the main service and the inter arrival times D of disasters follow exponential distribution with parameter δ . Whenever a disaster occurs, the main server fails and all the customers present in the system are forced to leave the system and the system becomes empty. As soon as the main server fails, it undergoes a repair procedure. The repair times, denoted by R follow an exponential distribution with a rate of γ . The repaired server is assumed to be as good as a new server.

The concept of the working breakdown is as follows: As soon as a disaster occurs at the system, the main server fails and a repair process immediately begins. During a repair period, the stream of new customer arrivals continues. The service rendered by the substitute server is considered as the working breakdown service S_0 and the service times are i.i.d random variables. The density and

its LST are respectively denoted by $s_0(x) dx = \Pr\{x < S_0 < x + dx\}$ and $s_0^*(\theta) = \int_0^{\infty} e^{-\theta x} s_0(x) dx$. The service rate $E(S_0)$ of the substitute server is assumed to be lower than that of the main server. The working breakdown service continues until the main server returns from the repair facility or the system becomes empty whichever occurs earlier.

If there are customers in the system, at the end of repair, the substitute server stops service and the main server restarts and operates at its normal service rate. The service interrupted at the end of repair is assumed to be lost and it is restarted with normal service distribution $S_1(x)$. Meanwhile, if there are no customers in the system at the end of repair, the main server stays idle in the system and waits for arriving customers. Further it is assumed that X, S_0, S_1, D and R are mutually independent. The system is denoted by $M^X/G/1/Disaster$ with Working Breakdown.

Notation: The following notations are used to discuss the model

$N(t)$ = The system size at time t, λ = Group arrival rate, X = Group size random variable, $\Pr(X = k) = g_k, k=1, 2, 3, \dots$

$X(z)$ = Probability generating function of X .

Let $Y(t)$ be an indicator random variable given by $Y(t) = \begin{cases} 0, & \text{the main server is under repair at time } t \\ 1, & \text{the main server is available for service at time } t \end{cases}$

Let $S_i^0(t)$ denote the remaining service time when $Y(t) = i, i \in \{0, 1\}$ at t . Then the process $\{N(t), Y(t), S_i^0(t), t \geq 0\}$ becomes a Markov Process in which $S_i^0(t), i = 1, 2$ are considered as supplementary variable.

The steady state equations satisfied by the system size probabilities are obtained using the supplementary variable technique by introducing the remaining service times as supplementary variables.

To derive the Kolmogorov equations for the system size distribution the following limiting probabilities are introduced $i \in \{0, 1\}$.
 $P_{0,i} = \lim_{t \rightarrow \infty} \{N(t) = 0, Y(t) = i\}; P_{n,i}(x) dx = \lim_{t \rightarrow \infty} \{N(t) = n, Y(t) = i, x < S_i^0(t) \leq x + dt\} n \geq 1$

Then at steady state,

$P_{0,i}$ = The probability that the system is empty while the main server is available or under repair according as $i=1, 0$.

$P_{n,0}(x)$ = The probability that there are n customers in the system, the main server is under repair and the remaining working breakdown service time is x .

$P_{n,1}(x)$ = The probability that there are n customers in the system, the main server is busy and the remaining normal service time is x .

1.2 The System Size Distribution

The following steady state equations are obtained for queueing system, using supplementary variable technique, and following the argument of Cox (1955)[17],

$$(\lambda + \gamma)P_{0,0} = P_{1,0}(0) + \delta \sum_{n=1}^{\infty} \int_0^{\infty} P_{n,1}(w) dw$$

Idle state:

$$-\frac{d}{dx} P_{1,0}(x) = -(\lambda + \gamma)P_{1,0}(x) + P_{2,0}(0)S_0(x) + \lambda P_{0,0}g_1 S_0(x)$$

Busy state:

$$-\frac{d}{dx} P_{n,0}(x) = -(\lambda + \gamma)P_{n,0}(x) + P_{n+1,0}(0)S_0(x) + \lambda \sum_{k=1}^{n-1} P_{n-k,0}(x)g_k + \lambda P_{0,0}g_n S_0(x), n \geq 2$$

$$\lambda P_{0,1} = P_{1,1}(0) + \gamma P_{0,0}$$

$$-\frac{d}{dx} P_{1,1}(x) = -(\lambda + \delta)P_{1,1}(x) + \gamma \int_0^{\infty} P_{0,1}(w) dw S_1(x) + \lambda P_{0,1}g_1 S_1(x) + P_{2,1}(0)S_1(x)$$

$$-\frac{d}{dx} P_{n,1}(x) = -(\lambda + \delta)P_{n,1}(x) + \gamma \int_0^{\infty} P_{n,1}(w) dw S_1(x) + P_{n+1,1}(0)S_1(x) + \lambda \sum_{k=1}^{n-1} P_{n-k,1}(x)g_k + \lambda P_{0,1}g_n S_1(x), n \geq 2$$

The L.S.T of the steady state equations are obtained by using the definition of Laplace- Stieltjes Transformation and its properties. The L.S.T of the density functions are defined earlier and the L.S.T $P_{n,i}^*(\theta)$ of the Probability Distribution $P_{n,i}(x)$ is

$$P_{n,i}^*(\theta) = \int_0^{\infty} e^{-\theta x} P_{n,i}(x) dx, i = 0,1.$$

given by

Thus the L.S.T of the equations with respect to x are given by,

$$\theta P_{1,0}^*(\theta) - P_{1,0}(0) = (\lambda + \gamma)P_{1,0}^*(\theta) - P_{2,0}(0)S_0^*(\theta) - \lambda P_{0,0}g_1 S_0^*(\theta) \tag{1}$$

$$\theta P_{n,0}^*(\theta) - P_{n,0}(0) = (\lambda + \gamma)P_{n,0}^*(\theta) - P_{n+1,0}(0)S_0^*(\theta) - \lambda P_{0,0}g_n S_0^*(\theta) - \lambda \sum_{k=1}^{n-1} P_{n-k,0}^*(\theta)g_k, n \geq 2 \tag{2}$$

$$\theta P_{1,1}^*(\theta) - P_{1,1}(0) = (\lambda + \delta)P_{1,1}^*(\theta) - P_{2,1}(0)S_1^*(\theta) - \gamma P_{1,0}^*(\theta)S_1^*(\theta) - \lambda P_{0,1}g_1 S_1^*(\theta) \tag{3}$$

$$\theta P_{n,1}^*(\theta) - P_{n,1}(0) = (\lambda + \delta)P_{n,1}^*(\theta) - P_{n+1,1}(0)S_1^*(\theta) - \gamma P_{n,0}^*(\theta)S_1^*(\theta) - \lambda P_{0,1}g_n S_1^*(\theta) - \lambda \sum_{k=1}^{n-1} P_{n-k,1}^*(\theta)g_k, n \geq 2 \tag{4}$$

1.3 Probability Generating Functions

Now to obtain the partial PGFs of the number of customers in the system, the following partial PGFs are defined

$$P_0^*(z, \theta) = \sum_{n=1}^{\infty} P_{n,0}^*(\theta) z^n, P_0(z, 0) = \sum_{n=1}^{\infty} P_{n,0}(0) z^n, P_1^*(z, \theta) = \sum_{n=1}^{\infty} P_{n,1}^*(\theta) z^n, P_1(z, 0) = \sum_{n=1}^{\infty} P_{n,1}(0) z^n$$

The partial PGFs are obtained, multiplying the corresponding equations by suitable powers of z and following some algebraic manipulations.

The identity $\sum_{n=2}^{\infty} z^n \sum_{k=1}^{n-1} a_{n-k} b_k = \left(\sum_{n=1}^{\infty} a_n z^n \right) \left(\sum_{n=1}^{\infty} b_n z^n \right)$ is used to derive the PGFs.

$$\theta P_0^*(z, \theta) - P_0(z, 0) = (\lambda + \gamma)P_0^*(z, \theta) - \frac{S_0^*(\theta)}{z} [P_0(z, 0) - P_{1,0}(0)z] - \lambda P_{0,0}X(z)S_0^*(\theta) - \lambda X(z)P_0^*(z, \theta)$$

Equations(1) and (2) imply,

$$P_0^*(z, \theta)[\theta - g_\gamma(w_X(z))] = \frac{P_0(z, 0)}{z} [z - S_0^*(\theta)] + S_0^*(\theta)[P_{1,0}(0) - \lambda P_{0,0}X(z)] \tag{5}$$

Where $g_\gamma(w_X(z)) = w_X(z) + \gamma$

$$P_0(z, 0) = \frac{z S_0^*(g_\gamma(w_X(z))) [\lambda P_{0,0}X(z) - P_{1,0}(0)]}{z - S_0^*(g_\gamma(w_X(z)))}$$

At $\theta = g_\gamma(w_X(z))$ equation (5) implies,

(6)

$$P_0^*(z, \theta) = \frac{z[S_0^*(\theta) - S_0^*(g_\gamma(w_X(z)))] [\lambda P_{0,0} X(z) - P_{1,0}(0)]}{[z - S_0^*(g_\gamma(w_X(z)))] [\theta - g_\gamma(w_X(z))]} \tag{7}$$

Substituting the value of $P_0^*(z,0)$ in equation (5),

$$P_0^*(z,0) = \frac{z[S_0^*(g_\gamma(w_X(z))) - 1] [\lambda P_{0,0} X(z) - P_{1,0}(0)]}{g_\gamma(w_X(z)) [z - S_0^*(g_\gamma(w_X(z)))]}$$

At $\theta = 0, S_0^*(0) = 1$ we get,

Since $h(z) = S_0^*(g_\gamma(w_X(z))) - z$ satisfies the condition $h(0) = S_0^*(\gamma + \lambda) > 0$ and $h(1) = S_0^*(\gamma) - 1 < 0$, it is shown in theorem 1.1 that there exist a unique root z_0 inside the open unit disk $|z| = 1$ for the equation $S_0^*(g_\gamma(w_X(z))) - z = 0$

Theorem 1.1: The equation $S_0^*(g_\gamma(w_X(z))) = z$ with $h(0) > 0$ and $h(1) < 1$ has unique root z_0 inside the open disk $|z| = 1$.

Proof: Let us define $h(z) = S_0^*(g_\gamma(w_X(z))) - z$ which is analytic function in the unit disc is $|z| < 1$. Suppose $f(z) = -z$ and $g(z) = S_0^*(g_\gamma(w_X(z)))$ (which are all analytic). It can be shown that $|g(z)| < |f(z)|$ on the contour of the circle.

For, $|f(z)| = |z| = 1, |g(z)| \leq g(|z|) = S_0^*(\gamma + \lambda - \lambda|z|) = S_0^*(\gamma)$.

Hence, from Rouché's theorem, it follows that $f(z)$ and $f(z) + g(z)$ will have the same number of zeros inside of $|z| < 1$. Since $f(z)$ has only one zero inside the circle $|z| = 1$, $f(z) + g(z) \equiv h(z)$ will also have only one zero inside $|z| = 1$.

This implies the denominator $P_0^*(z,0)$ and hence the numerator of equation (8) is always zero.

$$\text{Thus, } S_0^*(g_\gamma(w_X(z_0))) = z_0, P_{1,0}(0) = \lambda P_{0,0} X(z_0) \tag{9}$$

$$P_0^*(z,0) = \frac{\lambda z [X(z_0) - X(z)] [S_0^*(g_\gamma(w_X(z))) - 1] P_{0,0}}{g_\gamma(w_X(z)) [z - S_0^*(g_\gamma(w_X(z)))]}$$

Substituting (9) in (8) we get,

Similarly multiplying the equations (3) and (4) by suitable powers of z and adding the corresponding equations we get,

$$\theta P_1^*(z, \theta) - P_1(z,0) = (\lambda + \delta) P_1^*(z, \theta) - \gamma P_0^*(z,0) S_1^*(\theta) - \frac{S_0^*(\theta)}{z} [P_1(z,0) - P_{1,1}(0)z] - \lambda P_{0,1} X(z) S_1^*(\theta) - \lambda X(z) P_1^*(z, \theta)$$

$$P_1^*(z, \theta) [\theta - g_\delta(w_X(z))] = \frac{P_1(z,0)}{z} [z - S_1^*(\theta)] - S_1^*(\theta) [\gamma P_0^*(z,0) + \lambda P_{0,1} X(z) - P_{1,1}(0)] \tag{11}$$

$$P_1(z,0) = \frac{z S_1^*(g_\delta(w_X(z))) [\gamma P_0^*(z,0) + \lambda P_{0,1} X(z) - P_{1,1}(0)]}{z - S_1^*(g_\delta(w_X(z)))}$$

At $\theta = g_\delta(w_X(z)), S_1^*(0) = 1$ and the equation (11) implies,

$$P_1^*(z, \theta) = \frac{z [\gamma P_0^*(z,0) + \lambda P_{0,1} X(z) - P_{1,1}(0)] [S_1^*(g_\delta(w_X(z))) - S_1^*(\theta)]}{[z - S_1^*(g_\delta(w_X(z)))] [\theta - g_\delta(w_X(z))]} \tag{13}$$

Substituting the value of $P_1(z,0)$ in (11) we get,

$$P_1^*(z,0) = \frac{z [\gamma P_0^*(z,0) + \lambda P_{0,1} X(z) - P_{1,1}(0)] [1 - S_1^*(g_\delta(w_X(z)))]}{[z - S_1^*(g_\delta(w_X(z)))] g_\delta(w_X(z))}$$

At $\theta = 0$, (13) leads to,

Since $h(z) = S_1^*(g_\delta(w_X(z))) - z$ satisfies the condition $h(0) = S_1^*(\delta + \lambda) > 0$ and $h(1) = S_1^*(\delta) - 1 < 0$, there exist a unique root z_1 inside the open unit disk $|z|=1$ for the equation $S_1^*(g_\delta(w_X(z))) - z = 0$ by Rouché's theorem. (The proof is similar to as theorem 1.1).

Thus $S_1^*(g_\delta(w_X(z_1))) = z_1, P_{1,1}(0) = \gamma P_{0,1}^*(z_1, 0) + \lambda P_{0,1} X(z_1)$ (15)

From the equation we have, $P_{1,1}(0) = \lambda P_{0,1} - \gamma P_{0,0}$ (16)

Equating (15) and (16) we get, $P_{0,1} = \frac{\gamma}{\lambda(1 - X(z_1))} (P_{0,0} + P_0^*(z_1, 0))$ (17)

Substituting (17) in (15) we get, $\gamma P_0^*(z, 0) + \lambda P_{0,1} X(z) = \lambda P_{0,1} - \gamma P_{0,0} \Rightarrow P_{1,1}(0) = \frac{\gamma}{1 - X(z_1)} (P_{0,0} X(z_1) + P_0^*(z_1, 0))$

Using this, $P_{1,1}(0) - \gamma P_0^*(z, 0) - \lambda P_{0,1} X(z) = \gamma \left(\frac{X(z_1) - X(z)}{1 - X(z_1)} (P_{0,0} + P_0^*(z_1, 0)) + P_0^*(z_1, 0) - P_0^*(z, 0) \right)$ (18)

Substituting (18) in (14) $P_1^*(z, 0)$ is simplified as,

$P_1^*(z, 0) = \frac{z\gamma[1 - S_1^*(g_\delta(w_X(z)))]}{[z - S_1^*(g_\delta(w_X(z)))]g_\delta(w_X(z))} \left(\frac{X(z) - X(z_1)}{1 - X(z_1)} P_{0,0} + P_0^*(z_1, 0) \frac{X(z) - 1}{1 - X(z_1)} + P_0^*(z, 0) \right)$ (19)

Thus the partial PGFs of the system size of the model are listed by:

$P_0^*(z, 0) = \frac{\lambda z[X(z_0) - X(z)][S_0^*(g_\gamma(w_X(z))) - 1]}{g_\gamma(w_X(z))[z - S_0^*(g_\gamma(w_X(z)))]} P_{0,0}$

$P_1^*(z, 0) = \frac{z\gamma[1 - S_1^*(g_\delta(w_X(z)))]}{[z - S_1^*(g_\delta(w_X(z)))]g_\delta(w_X(z))} \left(\frac{X(z) - X(z_1)}{1 - X(z_1)} P_{0,0} + P_0^*(z_1, 0) \frac{X(z) - 1}{1 - X(z_1)} + P_0^*(z, 0) \right)$ (20)

The total Probability Generating Function (PGF) of system size distribution at steady-state can be obtained using the equation

$P(z) = P_{0,0} + P_{0,1} + P_0^*(1, 0) + P_1^*(1, 0)$

Thus the total PGF $P(z)$ is expressed in terms of unknown $P_{0,0}$ which can be evaluated using the normalizing condition,

$P(1) = P_{0,0} + P_{0,1} + P_0^*(1, 0) + P_1^*(1, 0) = 1$

Substituting for $P_{0,1}$ from the equation (17), $P_{0,0} + P_{0,1} = \frac{P_{0,0}g_\gamma(w_X(z_1)) + \gamma P_0^*(z_1, 0)}{w_X(z_1)}$ (22)

Equations (20) and (21) respectively imply, $P_0^*(1, 0) = P_{0,0} \left[\frac{w_X(z_0)}{\gamma} \right]$ (23)

$P_1^*(1, 0) = P_{0,0} \left[\frac{g_\gamma(w_X(z_0))}{\delta} \right]$ (24)

Equation (20) at $z = z_1$ gives,

$$P_0^*(z_1, 0) = \frac{\lambda z_1 [X(z_0) - X(z_1)] [S_0^*(g_\gamma(w_X(z_1))) - 1]}{g_\gamma(w_X(z_1)) [z - S_0^*(g_\gamma(w_X(z_1)))]} P_{0,0} \tag{25}$$

Using the equations (22) to (25), in the normalizing condition $P(1) = 1$, $P_{0,0}$ can be calculated.

Then $P(1) = 1$ implies,

$$P_{0,0}^{-1} = g_\gamma(w_X(z_0)) \left(\frac{\gamma + \delta}{\gamma \delta} \right) + \frac{\gamma}{w_X(z_1)} \left(1 + \frac{\lambda z_1 [X(z_0) - X(z_1)] [S_0^*(g_\gamma(w_X(z_1))) - 1]}{g_\gamma(w_X(z_1)) [z_1 - S_0^*(g_\gamma(w_X(z_1)))]} \right) \tag{26}$$

1.4 Steady state condition:

The necessary and sufficient condition for the system to be stable is that $\delta > 0$. As long as $\delta > 0$, then the system under consideration is stable. For proof one can refer Kim and Lee (2014) M/G/1 queue with disasters and working breakdowns.

III. RESULTS

2. Performance measures

The steady-state system size probabilities and the expected number of customers in the system, when the system is in different states are calculated.

2.1 The Server in Idle State:

The probabilities that the server is idle P_i ,

$$P_i = P_{0,0} + P_{0,1} = \frac{P_{0,0} g_\gamma(w_X(z_1)) + \gamma P_0^*(z_1, 0)}{w_X(z_1)} \tag{27}$$

follows from the equation (22)

2.2 The Server in Working Breakdown State: Let P_{Busy}^D denote the steady-state system size probability and L_{Busy}^D denote the average number of customers, present in the system when the system is in working breakdown state (disaster state). Then the measures can be calculated from the partial PGFs of the system size given in equation (20).

$$P_{Busy}^D = \lim_{z \rightarrow 1} P_0^*(z, 0) = P_{0,0} \left[\frac{w_X(z_0)}{\gamma} \right] \tag{28}$$

follows from the equation (23)

$$L_{Busy}^D = \left[\frac{d}{dz} P_0^*(z, 0) \right]_{z=1} = P_{Busy}^D + P_{0,0} \left[\frac{\lambda E(X)}{\gamma} + \lambda (X(z_0) - 1) \frac{d}{dz} \left[\frac{[1 - S_0^*(g_\gamma(w_X(z)))]}{g_\gamma(w_X(z)) [z - S_0^*(g_\gamma(w_X(z)))]} \right]_{z=1} \right] \tag{28.1}$$

$$\frac{d}{dz} \left[\frac{1 - S_0^*(g_\gamma(w_X(z)))}{z - S_0^*(g_\gamma(w_X(z)))} \right] = \frac{1}{S_0^*(\gamma) - 1}$$

For the further simplifications the following results are used:

$$\frac{d}{dz} \left[\frac{1}{g_\gamma(w_X(z))} \right] = \frac{\lambda E(X)}{\gamma^2} \tag{28.2}$$

Thus,

$$L_{Busy}^D = P_{Busy}^D + \frac{\lambda}{\gamma} P_{0,0} \left[\frac{E(X)}{\gamma} g_\gamma(w_X(z_0)) - (1 - X(z_0)) \frac{1}{S_0^*(\gamma) - 1} \right] \tag{29}$$

2.3 The Server in Normal Busy State: Let P_{Busy}^N and L_{Busy}^N denote the probability that the server is busy and the average number of customers waiting in the system when the server is busy, with regular service rate, then

$$P_{Busy}^N = \lim_{z \rightarrow 1} P_1^*(z, 0) = P_{0,0} \left[\frac{g_\gamma(w_X(z_0))}{\delta} \right] \text{ follows from the equation (24)} \tag{30}$$

$$L_{Busy}^N = \left[\frac{d}{dz} P_1^*(z, 0) \right]_{z=1} = P_{Busy}^N + \frac{\gamma}{\delta} \left[L_{Busy}^D + \frac{E(X)}{1-X(z_1)} (P_{0,0} + P_0^*(z_1, 0)) \right] + \gamma P_{0,0} \left(1 + \frac{w_X(z_0)}{\gamma} \right) \left(\frac{\lambda E(X)}{\delta^2} + \frac{1}{\delta} \frac{d}{dz} \left(\frac{S_1^*(g_\delta(w_X(z))) - 1}{z - S_1^*(g_\delta(w_X(z)))} \right) \right)_{z=1}$$

$$L_{Busy}^N = P_{Busy}^N + \frac{\gamma}{\delta} \left[L_{Busy}^D + \frac{E(X)}{1-X(z_1)} (P_{0,0} + P_0^*(z_1, 0)) \right] + P_{0,0} \frac{g_\gamma(w_X(z_0))}{\delta} \left[\frac{\lambda E(X)}{\delta} + \frac{1}{S_1^*(\delta) - 1} \right] \tag{31}$$

2.4 Mean System Size

The expected number of customers in the system is given by $L = L_{Busy}^D + L_{Busy}^N$ which is obtained by adding equations (29) and (31).

IV. PARTICULAR CASES

3.1 $M^X/M/1$ Model:

The model developed in the present chapter is general in nature as service time, repair time, batch size follow arbitrary distributions. This section discusses some special cases of the proposed model by considering specific distributions for service time and repair time.

i) $M^X(M/M)/1/$ disasters working breakdown: If the normal service time (S_1) and the service time during breakdown period (S_0) follow exponential distributions of parameter μ_1 and μ_0 with ($\mu_1 > \mu_0$) then the partial PGFs for the Markovian model are obtained by taking

$$S_0^*(g_\gamma(w_X(z))) = \frac{\mu_0}{\mu_0 + \gamma + \lambda(1-X(z))}, S_1^*(g_\delta(w_X(z))) = \frac{\mu_1}{\mu_1 + \delta + \lambda(1-X(z))} \text{ in equations (20) and (21)}$$

i.e., The PGF of the system size when the system is in breakdown period $P_0(z)$ and in Normal service time $P_1(z)$ are given by

$$P_0(z) = \frac{\lambda z (X(z) - X(z_0))}{z g_\gamma(w_X(z)) + \mu_0(z-1)} P_{0,0}, P_1(z) = \frac{z \gamma}{z g_\delta(w_X(z)) + \mu_1(z-1)} \left\{ \frac{X(z) - X(z_1)}{1-X(z_1)} P_{0,0} + P_0(z_1) \frac{X(z) - 1}{1-X(z_1)} + P_0(z) \right\}$$

ii) $M/(G/G)/1/$ disaster working breakdown: When the arrival follows Poisson distribution then the generating function of the batch size $X(z)$ is reduced to z . Thus by substituting $X(z) = z$ in the corresponding equations we get

$$P_0^*(z, 0) = \frac{z[S_0^*(g_\gamma(w(z))) - 1][\lambda P_{0,0} z - P_{1,0}(0)]}{g_\gamma(w(z))[z - S_0^*(g_\gamma(w(z)))]}, P_1^*(z, 0) = \frac{z[\gamma P_0^*(z, 0) + \lambda P_{0,1} z - P_{1,1}(0)][1 - S_1^*(g_\delta(w(z)))]}{g_\delta(w(z))[z - S_1^*(g_\delta(w(z)))]}$$

$$P_0^*(1, 0) = P_{0,0} \left[\frac{w(z_0)}{\gamma} \right], P_1^*(1, 0) = P_{0,0} \left[\frac{g_\gamma(w(z_0))}{\delta} \right], P_{0,0}^{-1} = g_\gamma(w(z_0)) \left(\frac{\gamma + \delta}{\gamma \delta} \right) + \frac{\gamma}{w(z_1)} \left(1 + \frac{\lambda z_1 [z_1 - z_0]}{(z_1 - 1)\mu_0 + z_1 g_\gamma(w(z_1))} \right)$$

It is verified that these equations exactly coincide with corresponding results of Kim and Lee(2014), $M/G/1$ queue with disasters and working breakdowns.

4. Numerical analysis:

In this section, numerical results related to the model of the present chapter are provided. The relation between the mean arrival time of the disaster (δ^{-1}), mean repair time ($E(R) = \gamma^{-1}$) with mean system size (L) and expected waiting time $E(W) = \frac{L}{\lambda E(X)}$ are examined for the model in tables 1 and 2 respectively. The graphical representations of these relations are presented in Figures 1 to 4 for each model. The table values and hence the graphical representations show that the mean queue length and expected waiting time decrease, as δ or γ increases. The system size probabilities when the server is in different states are also listed. The batch size X is

assumed to follow Decapitated Geometric distribution of parameters (1-p). The PGF of X then, is $\frac{(1-p)z}{1-pz}$. It is also assumed that normal service time S_1 follows two-stage hyper exponential distribution $a\mu_{11}(e^{-\mu_{11}t}) + (1-a)\mu_{12}(e^{-\mu_{12}t})$ and slower service time S_0 during breakdown period follows Deterministic distribution of parameter μ_0 . In all the tables, z_0 and z_1 respectively denote the roots of $S_0^*(g_\gamma(w_x(z))) = e^{-\frac{g_\gamma(w_x(z))}{\mu_0}} = z$ where S_0 is Deterministic distribution and $S_1^*(g_\delta(w_x(z))) = \frac{a\mu_{11}}{\mu_{11} + g_\delta(w_x(z))} + \frac{(1-a)\mu_{12}}{\mu_{12} + g_\delta(w_x(z))}$ where S_1 follows 2-stage hyper exponential distribution. The system size probabilities $(P_l, P_{Busy}^N, P_{Busy}^D)$, Mean queue length (L) and Expected waiting time (E(W)) are given in corresponding tables.

Table 1 ($\lambda = 2, \gamma = 2, p = 0.4, a = 0.32, E(S_0) = 1, E(S_1) = 0.441778$)

δ	z_0	z_1	P_l	P_{Busy}^N	P_{Busy}^D	L_{Busy}^N	L_{Busy}^D	L	E(W)
2	0.462685	0.485610	0.524909	0.339994	0.135097	1.442757	0.836851	2.279608	0.683882
3	0.462685	0.421364	0.580296	0.262968	0.156736	1.051812	0.970892	2.022704	0.606811
4	0.462685	0.374114	0.613563	0.215321	0.171116	0.834044	1.059969	1.894013	0.568204
5	0.462685	0.337314	0.635897	0.182656	0.181447	0.693399	1.123961	1.817360	0.545208
6	0.462685	0.307589	0.651970	0.158769	0.189261	0.594419	1.172366	1.766785	0.530035

Table 2 ($\delta = 2$)

γ	z_0	z_1	P_l	P_{Busy}^N	P_{Busy}^D	L_{Busy}^N	L_{Busy}^D	L	E(W)
2	0.462685	0.485610	0.524909	0.339994	0.135097	1.442757	0.836851	2.279608	0.683882
3	0.610440	0.485610	0.596638	0.344609	0.058752	1.342113	0.372771	1.714884	0.514465
4	0.502273	0.485610	0.597035	0.360196	0.042769	1.314280	0.235620	1.549899	0.464970
5	0.408079	0.485610	0.598052	0.369362	0.032585	1.292809	0.163667	1.456475	0.436943
6	0.328424	0.485610	0.599243	0.375135	0.025623	1.275230	0.120714	1.395944	0.418783

Figure 1

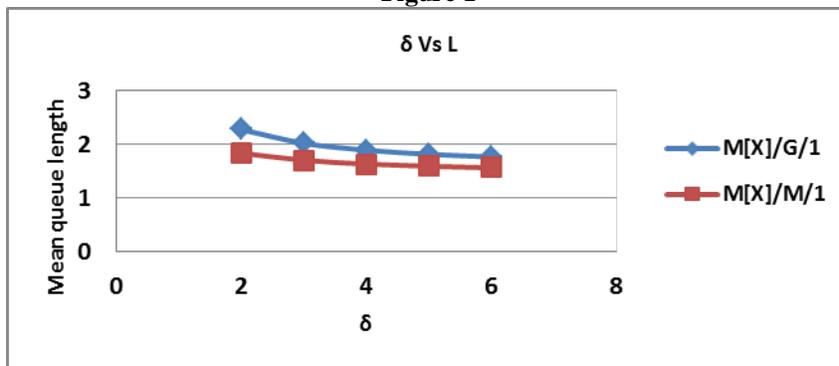


Figure2

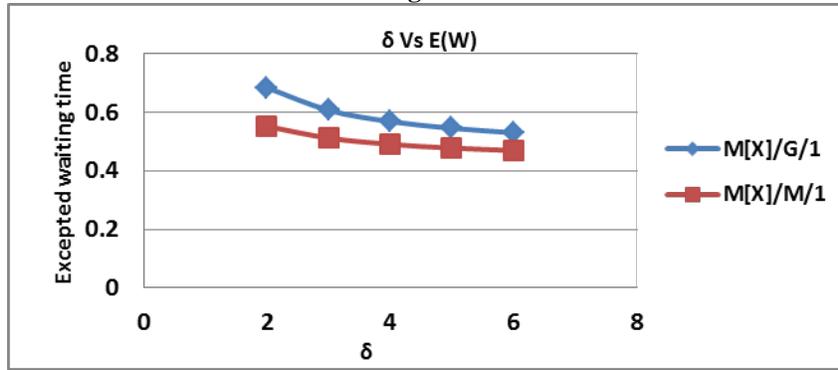


Figure3

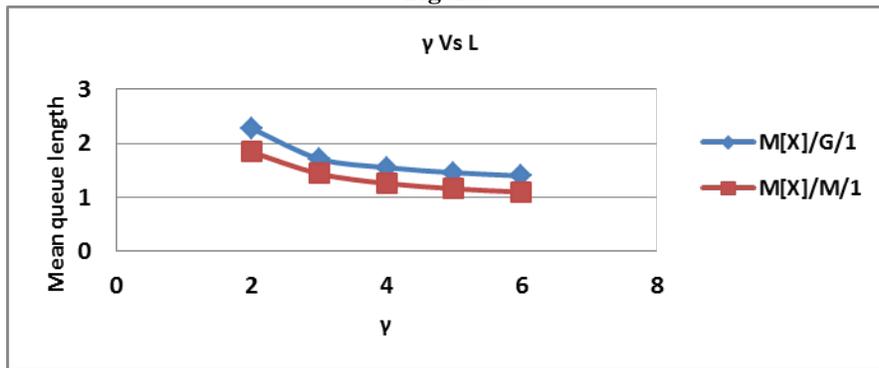
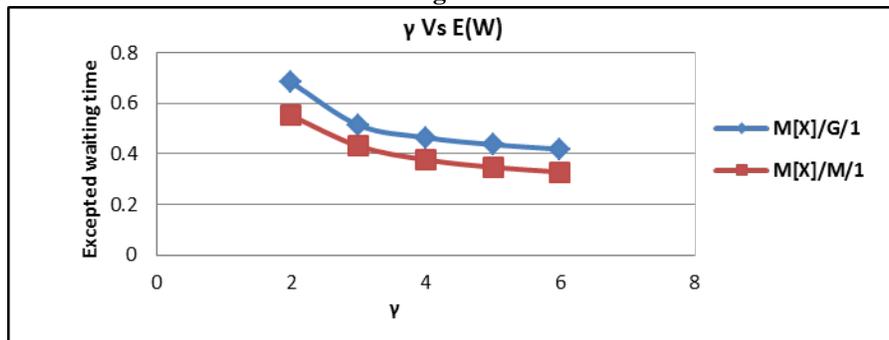


Figure4



V. CONCLUSION

Kim and Lee (2014)[16] analysed an M/G/1 queueing system with disasters and working breakdowns. In this model it is assumed that the breakdown server is sent to repair facility and is replaced by a slow server till the server is fixed. The author analysed a batch arrival queueing system MX/G/1 with disasters and working breakdowns and derived the steady state system size distributions and some important performance measures for the model. It is verified that when the mean batch size $E(X)=1$, the results obtained is exactly coincide with the results of Kim and Lee (2014).

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Evaluation of physical and mechanical properties for various wax blend patterns

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Abstract- Excessive application of investment casted precise and complex components in aerospace and automobile industries pushes developments in near net shape investment casting process. As investment casting is lost wax process, the wax pattern manufacturing is the significant part of process chain of ceramic mould development .Improvement in properties of wax pattern is needed for successful production of mould as well as casting. In present research work, approach will be made to develop pattern with the mixtures of various commercial wax and novel additives to enhance better physical and mechanical properties of wax blend as well as final pattern. In present work focus will be made on the properties tensile strength, volumetric shrinkage and surface finish as these properties directly affects the accuracy achieved for mould cavity as well as the final casting. Comparison of these properties for various wax blend combination will help for development of effective wax pattern.

Index Terms- methods of improving properties, properties of wax blend patterns, progress in investment casting

I. INTRODUCTION

As investment casting process is a “lost wax” method , in which wax is lost and given shape is made by doing design and manufacturing of that shape mould and the mould broken by two shapes and getting our required shape .The investment casting process is used now in every where in the recent times .The application like aerospace ,power generation ,gold and diamond industries ,gear manufacturing where the accuracy is very much important.

If we increase the properties of physical and mechanical for the wax blended patterns ,it will helpful for the applications where greatest accuracy is needed and because of accuracy the investment casting components are rejected .Now in the recent years the further additives and machining processes are available sothat rejection rate for components is reduced .But it will definitely improve the cost of the manufacturer.

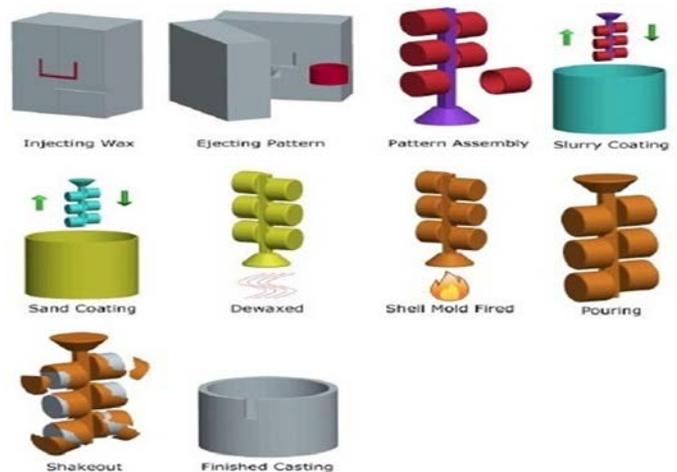


Fig. 1 process chain for the investment casting

As shown in the figure , how the process is occurred in the investment casting is explained. Injecting wax ,ejecting pattern ,pattern assembly ,slurry coating ,sand casting ,dewaxed ,shell mold fired ,pouring ,shackout ,finished casting. As the process chain is so much long and it is suitable for complex components .If the properties we want to improve the above process is very much important.

Generally waxes are used for blended pattern is paraffin wax,microcrystalline wax,carnuba wax,bees wax etc.for the we taken the paraffin wax,irani wax,rosin wax,mointain wax,microchip wax.addtives used for the process is generally upto 0to20 percent.

II. LITERATURE REVIEW

1 From progress in investment casting the topics Process parameters , wax used in investment casting , additives used in investment casting are useful for the experiment

2 From Research of optimize wax pattern in investment casting by using different form of waxes the topics Bee wax , carnuba wax , montan wax , paraffin wax , china wax , additives are used in investment casting by different percentages.

3 From **Recycling of pattern wax in the investment casting dewaxing the topics PARAFFIN WAX,CARNUBA WAX,MICROCRYSTALLINE WAX,EXPEIMENTAL INVESTIGATION,MESUREMENT OF DIFFERENT PARAMETERS LIKE TENSILE STRENGTH,VOLUMETRIC SHRINKAGE,SURFACE ROUGHNESS**

4 from Physical properties of blend oxidized paraffin wax the topics Thermogravimetric analysis , mechanical properties , surface tension measurement , flow rate measurement.

5 from Analysis the properties of lost wax processes and its use ability the topics Composition of investment casting wax , categories of investment casting wax , recycling , quality maintained in the investment casting

6 from **Simulation of wax pattern dimensions for accuracy improvement** the topics Numerical simulation of wax solidification was found useful to calculate and control the shrinkage of wax pattern to improve the accuracy.

7 from Investment casting wax influencing which eliminate wax pattern defects the topics Pattern wax composition , wax preparation , injection characteristics , influences . corrosion defects.

8 from Wax defects in investment casting the topics Wax deformation of pattern , trapped air , powder and silicon spray

Wax Preparation Experimental methodology :-

As shown in the table 1 the waxes used for this experiments are Paraffin wax, Rosin wax, Irani wax, Microchips wax, Mointain waxetc. For the blend 1 Paraffin Wax, Irani wax and additive as a charcoal powder and the %preposition of each constituent is 62,48 and remaining additives are there. For the blend 2 Irani wax , Rosin wax and additive as a charcoal powder and the %preposition of each constituent is 40, 51 and remaining % is additives. For the blend 3 Rosin wax, Mointain wax and additive as a charcoal powder and the %preposition of each constituent is 42, 56 and remaining is additive. For the blend 4 Mointain wax, Microchip wax and additive as a charcoal powder and the %preposition of each is 54,40 and remainig is additive. For the blend 5 Paraffin Wax, Microchip wax and additive as a charcoal powder and the %preposition of each is 30,65 and remaining is charcoal powder. There is a shape of die. Die is a complex shape sothat the properties improve will directly affect for the complex shape product. In the figure no.3 it is acomplex shape pattern is shown. There is a Tga analysis for the wax blend pattern which shows it is remains same upto temperature 250 and then drops and then remins constant.

Sr no.	Name of wax used
1	Paraffin wax
2	Rosin wax
3	Irani wax
4	Microchips wax
5	Mointain wax

Table 1:- Types of waxes used

Blend no.	Paraffin Wax	Irani wax	Rosin wax	Mointain wax	Microchip wax
1	62	28	0	0	0
2	0	40	51	0	0
3	0	0	42	56	0
4	0	0	0	54	40
5	30	0	0	0	65

Table 2 : Wax blend mixture constituents.



Fig.2 shape of the die.



Fig. 3 wax blend pattern.

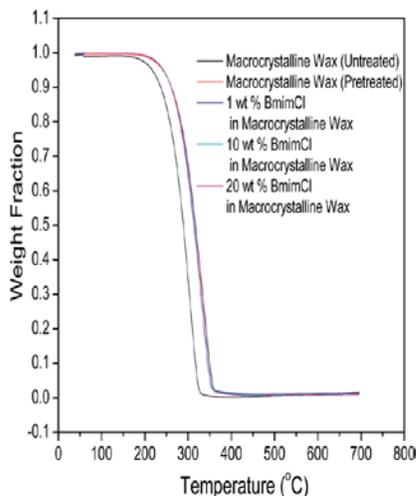


Fig.4 Tga analysis for the wax

**Observation Table :-
SHRINKAGE TEST :**

TYPES OF WAX BLEND PATTERNS	LENGTH	WIDTH
Die	276 mm	45 mm
Paraffin wax + rosin wax + montan wax	273.5 mm	43 mm
Irani wax + steric acid	273 mm	42 mm
Irani wax	274 mm	43 mm
Paraffin wax + microchips wax + steric acid	275 mm	44 mm

Table 3

SURFACE ROUGHNESS TEST :

WAX BLEND PATTERN	SURFACE ROUGHNESS (Ra)
Paraffin wax + rosin wax + montan wax	I. 0.86
	II. 0.84
	III. 0.84
Irani wax + steric acid	I. 0.83
	II. 0.83
	III. 0.84
Irani wax	I. 0.85
	II. 0.87
	III. 0.85
Paraffin wax + microchips wax + steric acid	I. 0.89
	II. 0.88
	III. 0.90

Table 4

Methodology Applied :-

Volumetric Shrinkage :-

The volumetric shrinkage is calculated as follows:

- i) Apply a coating of grease on two halves of die to make it leak-proof from water and align the two halves of die together.
- ii) Fill the die cavity with water and measure its volume with the help of a measuring flask. (*vd*)
- iii) Fill water in a measuring flask and note the initial reading (*vi*).
- iv) Place the wax patterns made inside the measuring flask, volume rises and take the final reading. (*vf*)
- v) The difference between the two readings (*vf - vi*) gives the volume of pattern.
- vi) The percentage of volumetric contraction of the pattern is given by the following expression

Volumetric coefficient of thermal expansion is calculated by the relationship as shown.

$$\Delta v = \beta v_i (T_i - T_f)$$

Where, ΔV = change in volume

β = volumetric coefficient of thermal expansion

$$\{ (\) \} \times 100 \frac{D f i D V V V V \square \square}{\square \square}$$

v_i = initial volume,

T_i = initial temperature.

T_f = final temperature

Surface Roughness :-

Surface roughness is measured by optical profilometer instrument.

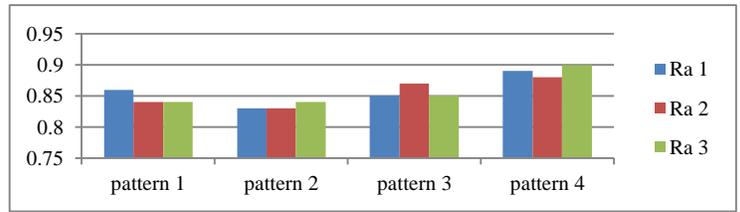
Tensile Strength :-

Tensile strength is measured by UTM machine.

Tensile strength :-

	Mpa 1	Mpa 2	Mpa 3
Pattern 1	56	58	54
Pattern 2	50	52	51
Pattern 3	55	54	55
Pattern 4	49	52	50

Table 5



**.Fig.6
Tensile strength**

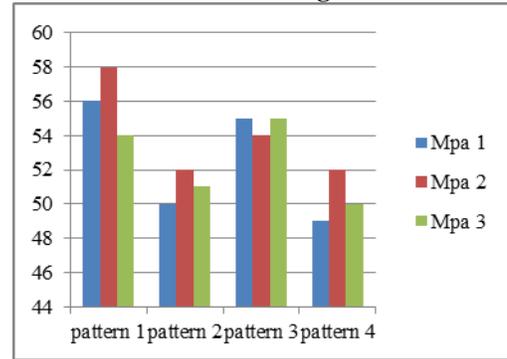
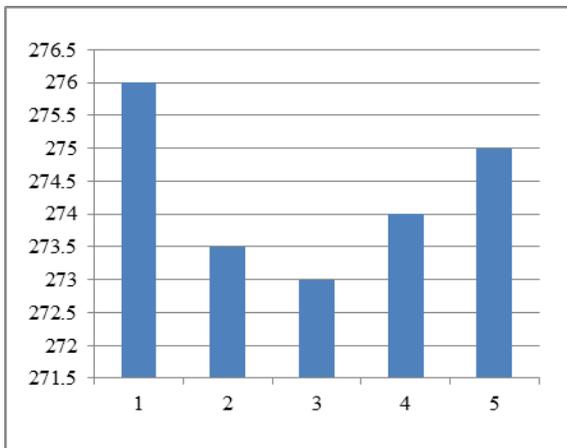


Fig.7

SHRINKAGE-LENGTH GRAPH :



**Fig. 5
Surface roughness :-**

III. CONCLUSION

The following conclusions are drawn out of the experiments conducted on wax blend selection and selection of optimum process parameters :The wax blend 2 with proportion of paraffin wax, microchips wax, montan wax and steric acid gives the better results of linear shrinkage, volumetric shrinkage and surface roughness. The influence of temperature on the surface roughness of pattern mixtures was observed. Differences in shrinkage deformation of patterns according to the type of pattern mixture was observed.

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Back flashover Analysis for Egyptian 500kV and 220kV Transmission towers

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Abstract- Lightning is still the main cause of transmission and distribution lines outages and represents an important problem for insulation design of power systems through the back-flashover phenomenon. This paper discusses the back flashover phenomenon on the Egyptian 500kV single circuit tower and 220 kV double circuit tower lines. The induced voltages across the insulator strings of the two lines are calculated. The effects of the lightning stroke magnitude and shape, the striking distances and the tower footing resistance on the induced voltage across the insulator strings are discussed.

Index Terms- Lightning stroke, Back Flashover, Induced Voltage, tower footing resistance, ATP Simulation

I. INTRODUCTION

Lightning is one of the major causes of sudden line outages [1]. Lightning generates traveling waves on overhead lines, which travel to different devices connected to both sides of line and represent a danger for line insulators and equipment insulation connected to that line [2]. Lightning return-stroke current and the charge delivered by the stroke are the most important parameters to assess the severity of lightning strokes on power lines and apparatus [3]. The lightning damages a power apparatus in two ways: the first, it raises the voltage across the apparatus such that the terminals across the struck apparatus spark over causing a short circuit of the system or the voltage punctures through the apparatus electrical insulation, causing permanent damage. The second is the energy of the lightning stroke may exceed the energy handling capability of the apparatus, causing meltdown or fracture [4]. Back Flashover (BFO) is one of the several phenomenon which decreases transmission lines reliability. It occurs as a result of direct lightning stroke to the tower structure or guard wires and injects wave currents with high amplitude and very high steepness to the phase conductors. Injection of these wave currents produce voltages with high amplitude and very high steepness, which in turn cause phase to ground faults in transmission lines[5, 6]. Even if lightning strikes a shield wire, the generated traveling voltage wave will travel to the nearest tower, produce multiple reflections along the tower, causing back flash across an insulator [7]. Back flashover will occur when these voltages exceed the line critical flashover (CFO).

II. TRANSMISSION SYSTEM MODELING

Egyptian High-Dam 500kV Single-Circuit tower with two overhead ground wires and Egyptian 220kV tower double circuit transmission lines with one overhead ground wire are modeled to discuss the back flashover phenomena. The High-Dam500 kV transmission line tower has a flat configuration, as shown in Figure (1). The line has three sub-conductors per phase and two ground wires. The span length is equal to 400 m. The distance between the adjacent phases is equal to 12 m. Modeling of transmission line tower is an essential part for travelling-wave analysis of lightning surges in overhead transmission lines. The equivalent circuit of the tower is simulated by ATP program. The model consists of main legs and cross-arms, as shown in Figure (3). The Egyptian 220kV tower double circuit line modeled with one overhead ground wire transmission towers. The J. Marti overhead line model was used for modeling in ATP-EMTP software. Height of the transmission-line tower was 41m and the span length is equal to 400 m. The tower is of vertical configuration as shown in Figure (2).

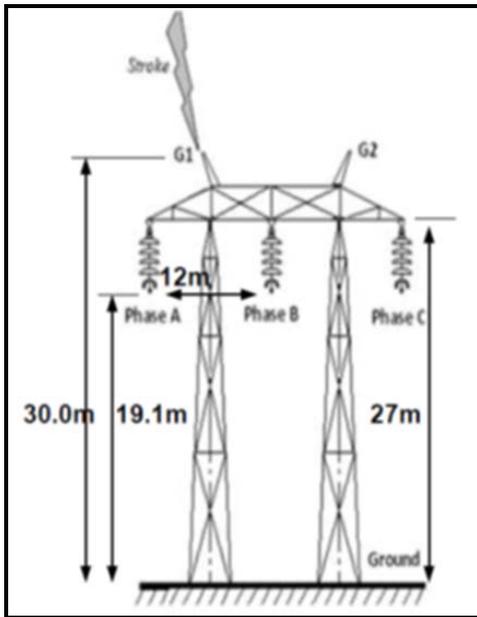


Figure (1) Egyptian high dam 500kV tower

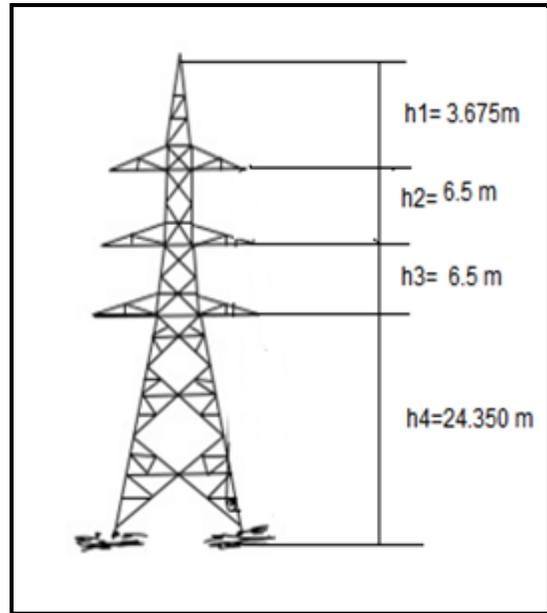


Figure (2) Egyptian 220kV tower

1. Transmission tower model

For single circuit Egyptian High-Dam 500kV tower, the model consists of main legs and cross-arms. The surge impedance of each part is expressed by the functions of their dimensions and geometry. The surge impedance in ohm, propagation velocity in meter per second and length in meter of each tower's part are indicated in Figure (3), for double circuit Egyptian 220kV tower. In recent years, there are various models of transmission tower proposed by the researchers. One of the more well-known models is the multistory model. It is composed of four sections that represent the tower sections between cross-arms. Each section consists of Constant-Parameter Distributed Line (CPDL) model in series with a parallel RL circuit, included for attenuation of the traveling waves. The propagation velocity of a traveling wave along a tower is taken to be equal to the light velocity. The tower is represented by four lossless Constant Parameter Distributed Line (CPDL) models as illustrated in Figure (4), where Z_{t1} is the impedance of tower top to the upper phase conductor, which is equal to the impedance of upper phase to middle phase conductors and to the impedance of middle phase to lower phase conductor. Z_{t4} is the impedance of lower phase to tower bottom.

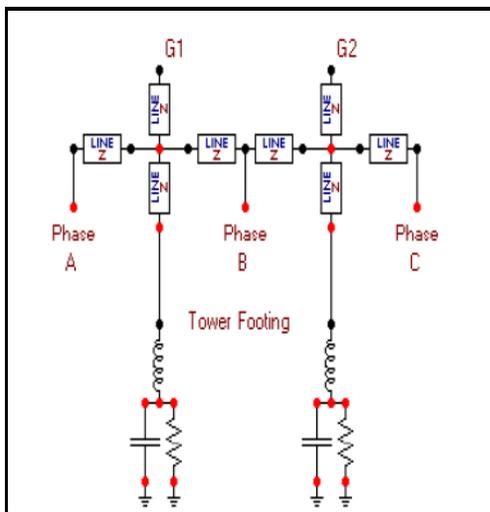


Figure (3) ATP Model of Egyptian High-Dam 500kV tower

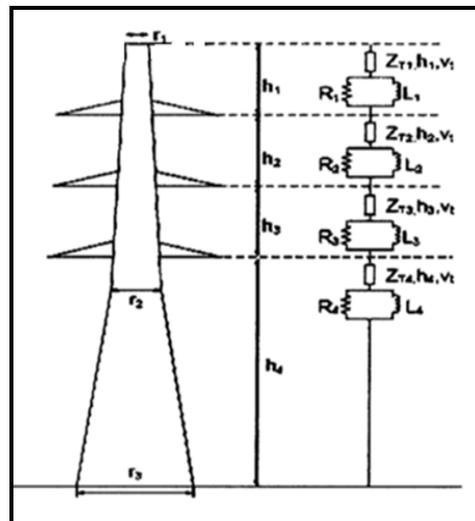


Figure (4) Egyptian 220kV double circuit multistory tower

2. *Lightning source model*

In ATP- EMTP software, lightning-strike model is represented by a current source with parallel resistance. The parallel resistance is actually lightning-path impedance. Lightning-path impedance is selected as 400 Ω. The model used in this study is the Heidler current model, where four characteristics of lightning current quantities at striking point must be considered: lightning-current peak, maximum of current-steepness, rise time, and decay time .Figure 5 shows the Heidler model in ATP-EMTP.

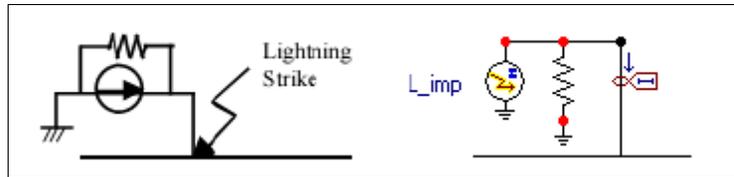


Figure (5) Lightning Stroke Heidler Model

3. *Tower surge impedance*

The surge impedance of the tower was determined from surge-impedance formula recommended by IEEE and CIGRE [8].

$$Z_t = 60 * \ln[\cot \{0.5 * \tan^{-1}(\frac{R}{h})\}] \tag{1}$$

Where R is the equivalent radius of the tower represented by a truncated cone, h= is the tower height

$$R = [r_1 * (h_1+h_2+h_3) + r_2 * h + r_3 * h_4] / h \tag{2}$$

$$h = h_1+h_2+h_3+h_4 \tag{3}$$

The tower traveling time is: $\tau = 2h/v$ (4)

Where, V = speed of light (3 x 10⁸ m/s) and the value of a parallel RL circuit can be calculated as [9]:

$$R_1 = r_1 x h_1, \tag{5} \quad R_2 = r_1 x h_2, \tag{6} \quad R_3 = r_1 x h_3, \tag{7} \quad R_4 = r_2 x h_4 \tag{8}$$

$$L_1 = R_1 x \tau \tag{9}, \quad L_2 = R_2 x \tau \tag{10}, \quad L_3 = R_3 x \tau \tag{11}, \quad L_4 = R_4 x \tau \tag{12}$$

4. *Tower footing resistance*

An accurate footing-impedance model is important for decreased resistance value when discharge current value increases. Resistance value is agreed to be greater when lightning currents are small. Its variation to low current and low frequency values is only significant for large soil resistivity. A footing-impedance model incorporating soil ionization effect can be approximated a

$$RT = \frac{R_o}{(\sqrt{1+(\frac{I}{I_g})})} \tag{13}$$

Where, R_o is footing resistance at low current and low frequency, I_g the limiting current to initiate sufficient soil ionization, and I the strike current through resistance. The limiting current is given by:

$$I_g = \frac{E_o * \rho}{2\pi R_o^2} \tag{14}$$

Where ρ is soil resistivity (ohm-m) and E_o is soil ionization gradient (400kV/m).

III. SIMULATION RESULTS OF EGYPTIAN HIGH-DAM 500kV SINGLE-CIRCUIT TOWER

The 500 kV High-Dam overhead transmission line tower of a flat configuration has been modeled using ATP program, as shown in Figure (6). The system consists of three towers with span length of 400 m. The lightning stroke hit the ground wire (GR1) of tower 1 with a peak value of 20 kA.

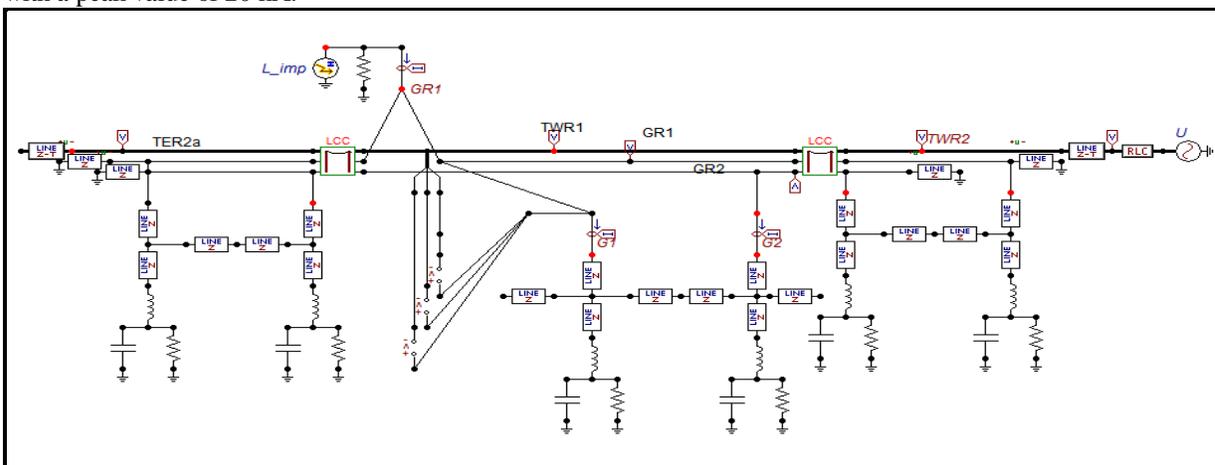


Figure (6) ATP simulation of the system

1-Voltage induced on the struck tower

A $1.2/50\mu\text{s}$ lightning stroke of 20kA peak current hits one of the two ground wires (G1). The induced voltages across insulator string wave forms of phases A, B and C of the struck tower are shown in Figure (7). It is noticed that, due to asymmetry, the induced voltages across insulators are not the same in the three phases.

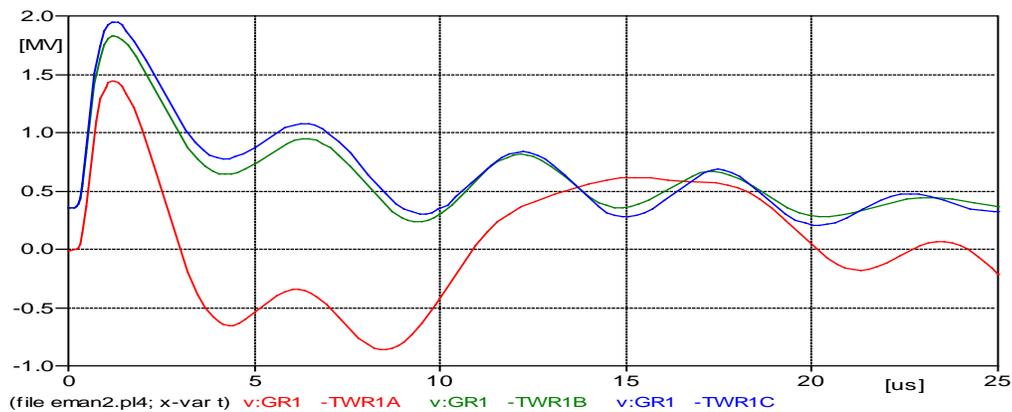


Figure (7) Voltage across insulator strings of phases A, B and C of tower 1

2-Effect of Lightning Stroke Parameters on Voltage across insulator strings

The parameters of the Lightning Strokes are the impulse current amplitude (peak value), wave front time and wave tail time. The Voltage across insulator strings with various peaks of $1.2/50\mu\text{s}$ lightning current stroke are shown in Figure (8). The amplitude of the lightning stroke current used in the analysis are 10, 20, 30 and 40 kA. It is noticed that the magnitude of the back flash over voltage across insulator increases with increasing the peak of the lightning current.

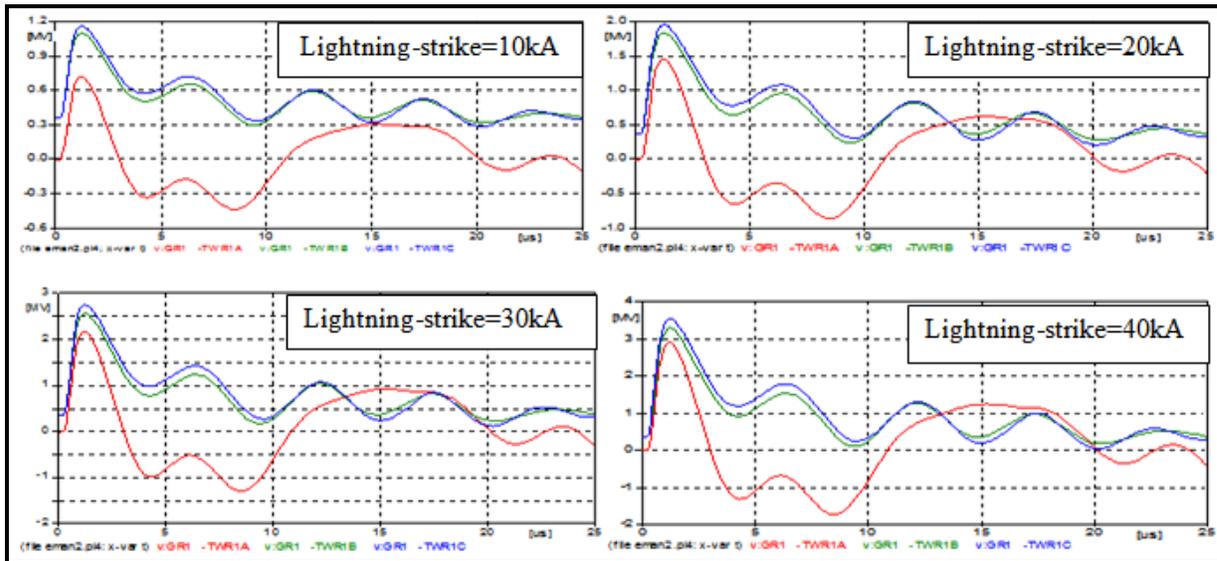


Figure (8) Voltage across insulator strings with various peak value of lightning Current

The effect of lightning wave front time on voltage across insulator strings is shown in Figure (9). The peak value of the lightning stroke current hit the ground wire of tower 1 is 40kA with a wave tail time of $40\mu\text{s}$. It is noticed that the shorter front time of lightning current, increases the back-flashover voltage across the insulators.

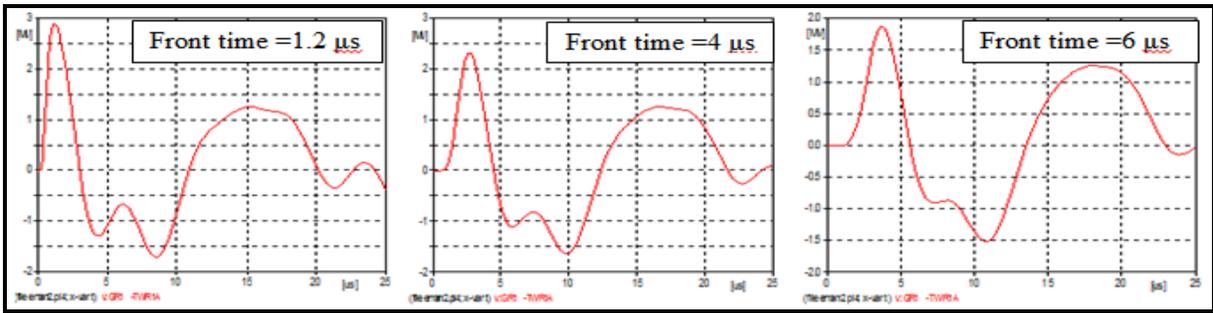


Figure (9) Voltage across insulator strings with various front time of lightning Current

The effect of lightning wave tail time on voltage across insulator strings are shown in Figure (10). The peak value of the lightning stroke current hit the ground wire of tower1 is 40kA with a wave front time of 1.2μs. It's clear that, the longer the tail time of lightning current, the larger the back-flashover voltage.

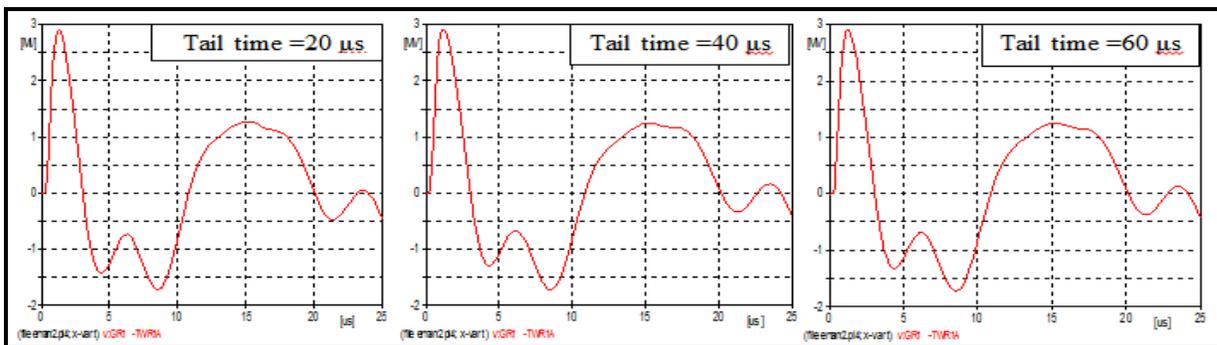


Figure (10) Voltage across insulator strings with various tail time of lightning Current

It observed that as the lightning wave tail time increased, the maximum value of back-flashover voltage is increased. It is clear that, as the tail time increased from 20μs to 60μs, the maximum value of back-flashover voltage is increased by about 6%.

IV. SIMULATION RESULTS OF EGYPTIAN 220kV DOUBLE CIRCUIT TRANSMISSION LINE TOWER

The consider system of 220 kV double circuit overhead transmission line consists of five towers each tower has length of 41m with span length of 400 m from each other

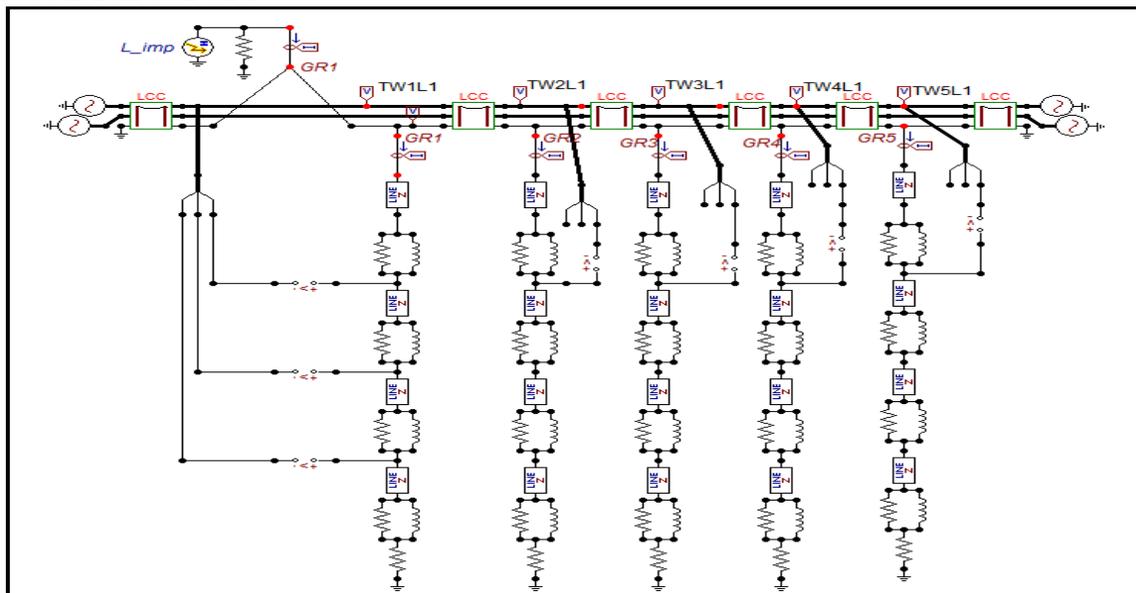


Figure (11) ATP simulation of the system under study

1-Effect of Striking Distance on Voltage across insulator strings

A lightning current stroke with peak value of 40 kA, hits the ground wire at the first tower. Figure (12) shows the voltage across insulator strings wave forms of phase A, which is the nearest phase to stroke point, at the five towers. It is noticed that the voltage across insulator strings magnitude decreases with increasing striking distance. The peak value of back flash over versus the distance from the struck tower is shown in Figure (13). It is noticed that the value of the back flash over voltage decreased as the distance increased. The peak value decreased to about 67% from its value at 400m from the struck tower, to about 52% at 800m, to about 43% at 1200m, and to about 39% at 1600m from the struck tower.

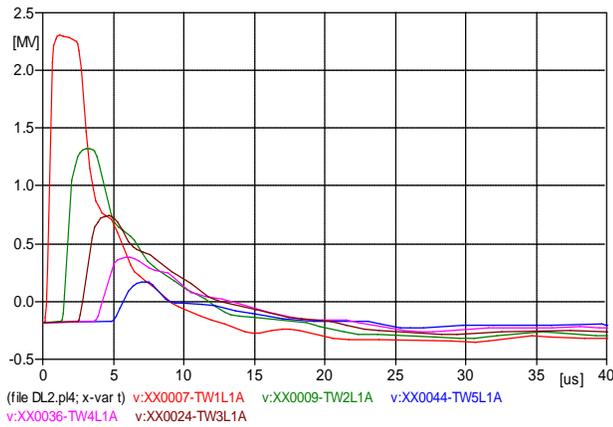


Figure (12) Voltage across insulator strings for various striking distances

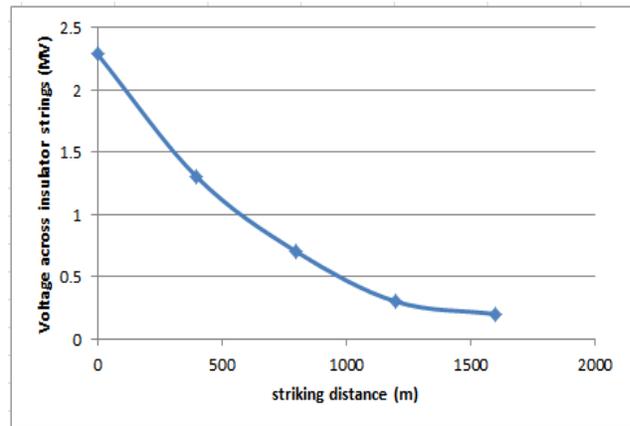


Figure (13) the effect of Striking Distance on voltage across insulator strings

2-The effect of Lightning Stroke on Voltage across insulator strings

The effect of peak value of 1.2/50μs lightning current surge on the Voltage across insulator strings .the peak value of Voltage across insulator strings (Back-Flashover Voltage) versus the peak value of the lightning current is shown in Figure (14). It is noticed that the back-flashover voltage increased as the peak value of the lightning current increased. The back-flashover voltage is increased by about 263% from its value as the peak value of the lightning current increases from 20 to 50kA

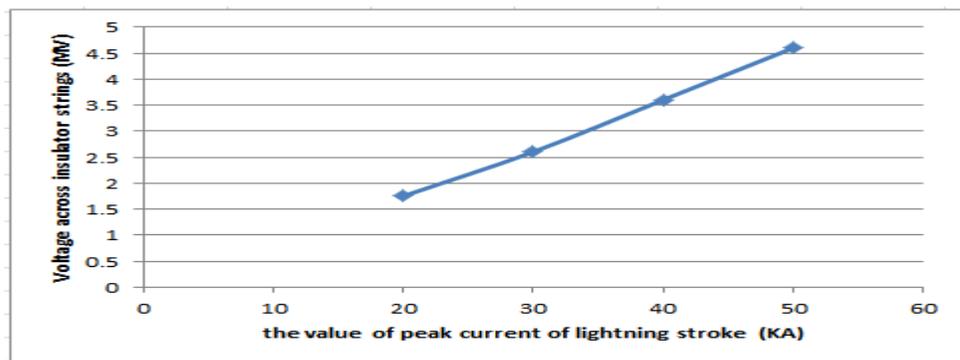


Figure (14) Effect of peak of lightning stroke wave on voltage across insulator string

The effect of the lightning front time of the lightning impulse on the peak value of the induced voltage across insulator string is shown in Figure (15). The peak value of the impulse wave is taken as 40 kA, with a tail time of 50μs. It is noticed that the shorter front wave time, the larger is the back flashover voltage. The maximum value of the back-flashover voltage is decreased by about 13.5%, as the front time increased from 1.2μs to 6μs,

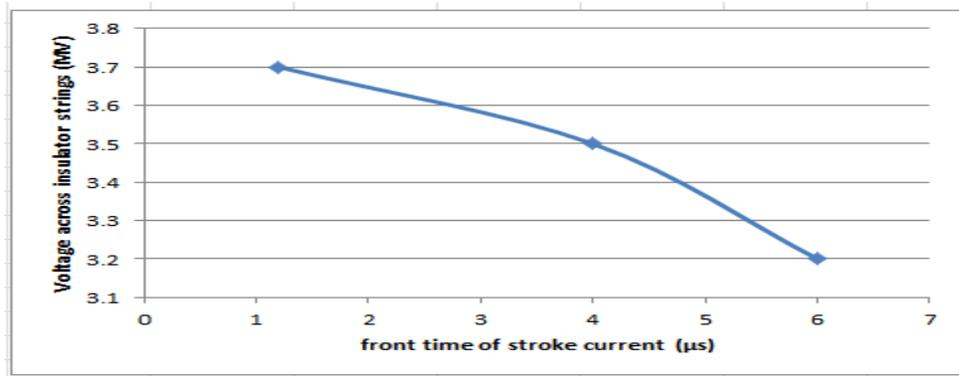


Figure (15) the effect of front time of lightning Stroke wave on voltage across insulator strings

The effect of the tail time of the lightning impulse wave on voltage across insulator strings is shown in Figure (16). The peak value of the impulse wave is taken as 40 kA, with a front time of 1.2μs. It is clear that as the tail time increased from 20μs to 60 μs, the maximum value of the back-flashover voltage is increased by about 6%.

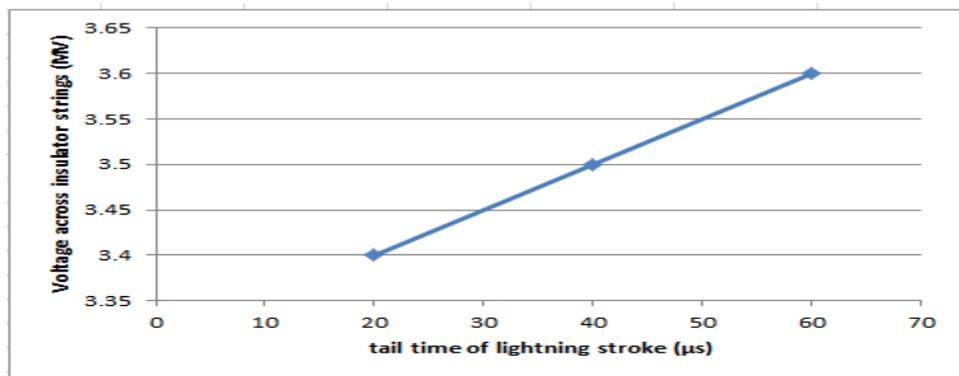


Figure (16) Effect of tail time of lightning Stroke wave on voltage across insulator strings

3- Effect of insulator string on Back-Flashover Voltage

For the simulation, lightning-surge current was injected into the top tower of the first tower. Back-flashover voltage across insulator string was measured at each phase, for single-circuit line, by using probe branch voltage. As has been explained, back flashover occurs when voltage across line insulation is equal to or greater than Critical Flashover Voltage (CFO), which is determined from Basic Insulation Level (BIL) calculated via the equation below [10].

$$BIL = CFO \left(1 - 1.28 * \frac{\sigma_f}{CFO} \right) \quad (15)$$

Where, σ_f is the coefficient of the variation, for lightning impulse, the sigma is 2% to 3 % [10]. According to ANSI C92 IEEE1313.1 [11], the suggested BIL for 220kV is (900-1050) kV. With this BIL value and σ_f of 2%, the CFO is approximately 1050kV. The lightning stroke is assumed to hit the ground wire of first tower with value of 15kA, the induced voltage across insulators of phases A, B and C is shown in Figure (17). If the voltage across insulator string equal or larger than the Critical Flashover Voltage (CFO), this mean that back-flashover will be occurred on this phase. It is clear that the voltage at the upper and middle phases exceeds the CFO, i.e. the back-flashover is occurred at the two phase A and B.

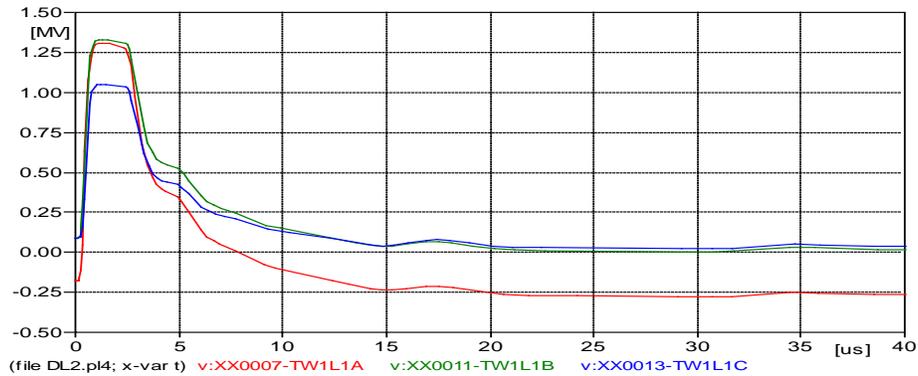


Figure (17) Voltage across insulator strings, for 15kA lightning-strike current

4-Effect of Tower-Footing Resistance on Voltage across insulator strings

The effect of the tower-footing resistance on the induced voltage across string insulator is shown in Figure (18). The figure indicates that the higher the tower footing resistance, the higher the possibility for damage to transmission-line equipment through induced higher back-flashover voltage across insulator strings

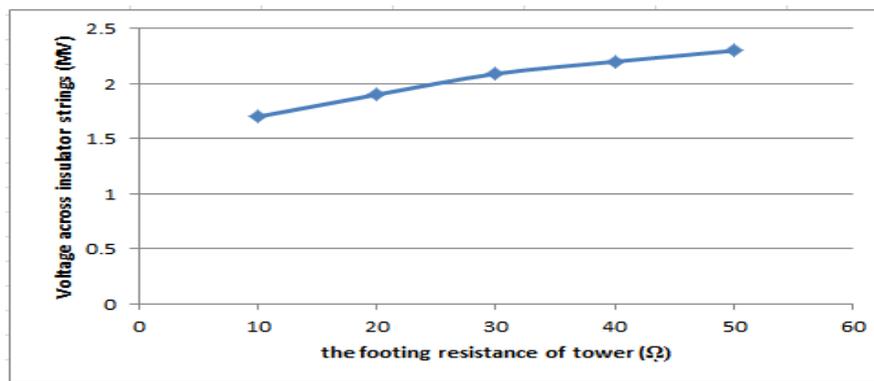


Figure (18) Effect of Tower-Footing Resistance on Voltage across insulator strings

V. CONCLUSION

The main conclusions derived from this study can be summarized in the following main points:

For 500 kV transmission tower.

1. The maximum value of the voltage across insulator string is increased by about 6%, when the tail time is increased from 20μs to 60μs.
2. The magnitude of the voltage across insulator increases with increasing the lightning current.
3. As the front time of lightning current decreases, the voltage across the insulators string of phase conductor is increased, and as the tail time of lightning current increases, the voltage across insulator string of phase conductor is increased.

For 220 kV transmission tower

1. The peak value of the voltage across the insulator string is decreased to about 57% from its value at 400m from the struck tower, to about 31% at 800m, to about 13% at 1200m, and to about 9% at 1600m from the struck tower.
2. The voltage across the insulator string is increased by about 263% from its value as the peak value of the lightning current increases from 20 to 50kA.
3. The voltage across the insulator string decreases to about 86.5%, as the front time of lightning current increases from 1.2μs to 6μs and increased by 35%, as the footing resistance increases from 10Ω to 50Ω.

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Efficient Home Automation and Security

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Abstract- To design and implement a flexible and powerful home yet cost effective security system using the GSM technology is the main aim of this research. This novel idea came to our mind while participating in schneider go green challenge .In this growing world nothing is left untouched by technology, so for occupant's convenience and safety a mobile based home security system is needed. The system is can detect burglary, leakage of cooking gas; smoke caused due to accidents effectively and after detecting such activity it sends a message to the owner number. Android cell phone application is used to control the whole process. The user can control all the features and systems remotely (outside) thorough the app. With the additional control for home appliance switching activating and deactivating the alarm system is also provided. Within the GSM covered region a person can be assured of complete safety of his/her house anywhere in this world.

Index Terms- Remote appliance control, GSM, Home automation, Home security system.

I. INTRODUCTION

Process of improving the quality of a person life by facilitating flexible, comfortable and a secure control over house-holds is called Home automation. With advancement of technology and internet connectivity Internet based home automation systems are one of the most popular system. Controlling and monitoring of a house using internet from a remote place requires a laptop /computer which is bulky. So as efficient and consumer friendly alternate can, mobile phone with Operating system on it can be used for remote monitoring and controlling of a house. A mobile phone can be easily handled and carried all day long so it is feasible to use a mobile phone rather than a laptop or a computer. Prior to this systems were dependent on telephone line, using a communication line based remote controller. In general four significant challenges the home automation faces are:

The WSN (Wireless Sensor Network) technology has an advantage that it ensures remote monitoring with fast and secure network establishment with budget of a common man. The key difference between WSN and GSM is it's the covering area which facilitates very long distance communication.

Being battery powered wide area coverage even in remote rural area are the main advantage of GSM network. The user can get a theft/ intrusion alarm without any lag instantly. User needs to activate the alarm system through the application by pressing the button to get the alarm message each time before leaving the house from the security system installed in the user's premises. To prevent any misuse of the alarm activation system the user has to log on to the system with a specific credentials to activate and deactivate the alarm system. Users can turn that off the

application unexpectedly left in running condition. This saves a lots of energy waste and further reduces bill payable. User need not to be an expert to run the application in his/her mobile it is completely user friendly. As per requirement of the user and safety needs the designed system has choices for further addition of more sensors. To get more control over appliances the user also can add more relays if he/she feels so. So in short the system is a modern intelligent home security system which give us all features with trust about safety of the house.

II. SYSTEM ARCHITECTURE AND WORKING PRINCIPLE

A. System overview:

The available GSM communication options are:

(1)Using voice call feature- It intimates the polices/ fire station on triggering of the alarm..

(2)By sending a SMS- Appliances can be turned on/off the by simply sending a SMS. This will also generates a alarm if there is an intrusion or fire hazard by sending a SMS to the owner.

(3)By use of Internet- By using this feature we can control the device from anywhere in the world where there is a internet connection.

In this paper we are using a SMS based communication. The whole system is controlled using an android mobile application. The application takes care of all the short messages to be sent to monitor the device status remotely and control the appliances.

Features of the system:

1) Low cost: 8-bit low cost microcontroller are used to build the system are. The sensors too are pretty inexpensive. The sensors are connected to the board via low resistance wires.

2) User friendly interface: Anyone with a little knowledge in android usage can manage the system as it very user friendly and can use it to ensure the safety of his/her house and control the home appliances and can. The application starts with just one touch and wants the username and password to ensure that it's in the hand of the proper user.

3) Small size: total package is very lightweight and small in size. It can be easily put into a 8 to 10 inch square box for commercial purpose.

4) Alarm in case of emergency: Whenever the system detects an certain hazardous event, system sounds a noisy alarm instantaneously alongside sending a message to the user it

5) Short response time: To ensure proper safety the users need to get notified about any sort

incidents like fire hazards or unexpected intruder within a very short time. It takes the system less than a second to send a message to the user describing the incident.

6) **Wide area coverage:** Every area in connection with GSM can help the user to connect and control the system.

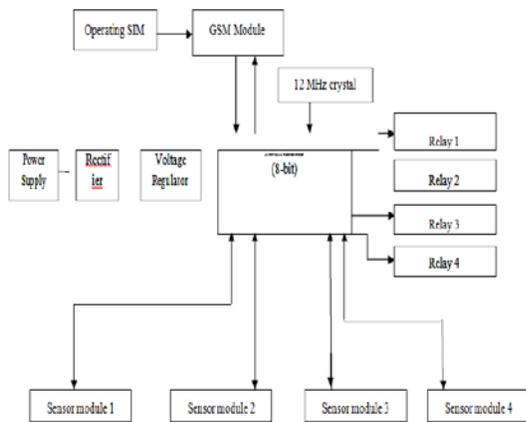


Fig. 1: Block diagram of the system

C. Reason for choosing such a system:

As stated 4 main challenges faced by home automation are: high cost of ownership, difficult to manage, poor flexibility, and difficulty in achieving security. Android mobiles are now available low cost everywhere. For the flexibility of use the Android operating system are becoming more and more popular which is one of the prime reason of using this operating system to control the whole device.

D. Security in GSM communication:

The security mechanisms of GSM are implemented in three different system elements namely SIM card, handset and the GSM network. The SIM contains the IMSI, authentication key for each individual subscriber, the ciphering key generating algorithm, the authentication algorithm, as well as a PIN. The ciphering algorithm is also contained in GSM handset. The encryption algorithms are present in the GSM network as well. A database is used identification and authentication information for subscribers which is maintained by Authentication Center (AUC) which a part of the Operation and Maintenance Subsystem. For each user an information folder is maintained this information consists of the IMSI, the TMSI, the Location Area Identity (LAI), and the individual subscriber authentication key (Ki). In order for the authentication and security mechanisms to function, all three elements (SIM, handset, and GSM network) are required.

E. The system:

The block diagram of the system is shown in Fig.1. The system that resides in the home is actually shown here. In 8 bit ATmega328 microcontroller readings of the sensor are taken as an input. The microcontroller according to the data transferred by the sensors and threshold value then computes and decides between sounding of an alarm and sending the alert message to the user.

The GSM module operates with the help of the operating SIM. Any instructions transfer between user and the system are

made using the operating SIM number. The module then decodes the incoming signal from the user and acts accordingly by directing the microcontroller. The module also gets the signal from the microcontroller and sends message to the user. So the GSM module is the bridge between the home system and the user. A pictorial view of the system is given in Fig. 2.

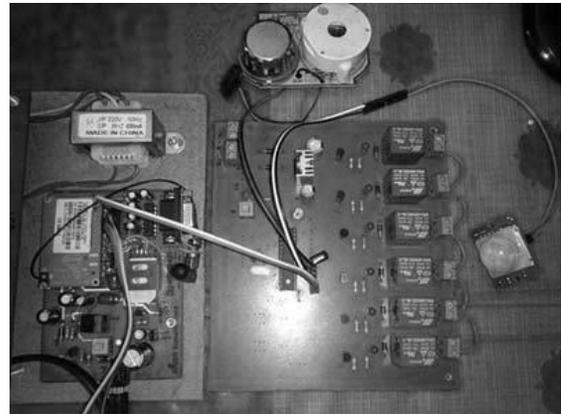


Fig. 2: the system which reside inside the house

F. How is this system different from others:

GSM based home security system already available in the market, but they are neither easy to use nor economical. The main advantage of our system is that it is based on android OS and therefore provides user friendly user interface. In other similar models user has to input a specific keyword for performing each operation of the system, but in this system the developed android application will perform that work and user will have to just change it using the applications user interface and press the button "Send Config". There is another option in this application which command the system to "Check Status", return a Message that will contain all device current status into a readable graphical form.

G. Operation of the system:

The user should use a mobile phone operating on android operating system. For remote monitoring the application should be installed in the phone. The home screen with buttons in application is shown in Fig. 3.

Through this application the user can get the status of the home appliances. If he/she has accidentally left something on in the house then it can be turned off using this application by simply touching the on/off. For instance the want to turn on the Air condition before going home so that the bedroom has a comfortable temperature enough then they can perform through this application.

The notification sensor buttons increases the feasibility of the application and simply allows the user to activate or deactivate the sensors. These sensors have only to be activated by the user before leaving the house.

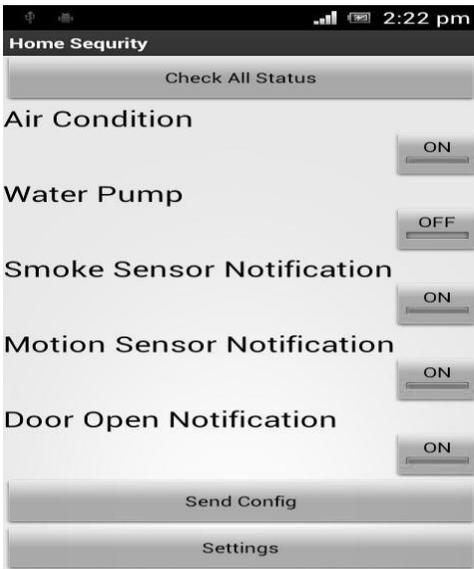


Fig.3: the application interface

When the user comes to the house then they have to deactivate the sensors so that they won't send any notification to the user while he/she is inside the house.

Application has password protection to prevent the misuse of the system. By entering a specific password the user has to log on to the system. The user need to give the number he wants to get connected that means the number of the SIM that the home system use. Then they will be asked to give the password which was set previously.

If the user can also change the password by clicking "Setting" tab of the application. But however to change an password and set a new one the user has to log on with the old password to open the application. These steps ensure total security of the system. Fig. 4 shows the window which will appear when the user presses the application icon.



Fig.4: The application opening window here the user has to provide the password to get access to the application.

H. program flow chart:

If the value of the sensors exceeds the maximum value then the alarm system will be triggered by the microcontroller. The microcontroller will also convey the GSM module to deliver the corresponding message to the user's cell phone.

As stated earlier user can turn on/off a specific sensors or appliance only by pressing a button in the mobile application. The chart below shows the control of the system and its algorithm.

III. RESULT

A prototype of the system was made and tested as shown in Fig.2. The system works quite well. The motion sensor was accurate, were free from errors and false dections. The smoke sensor was also tested. The appliance control process was tested through the application by using some light bulb as a load. Everything works well and is ready to use. With an outer layer the system can be made safe. Additional relays are connected to ensure the feasibility of the product when connected to additional load.

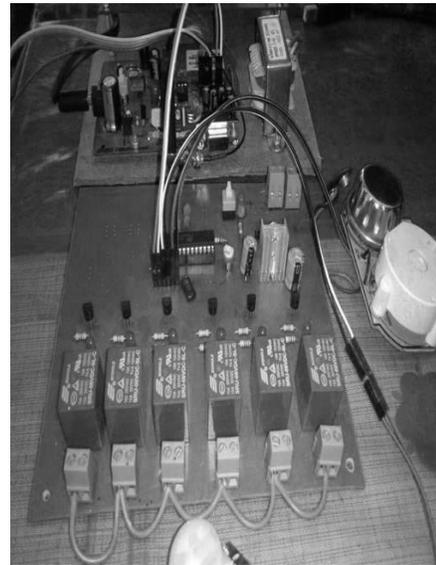
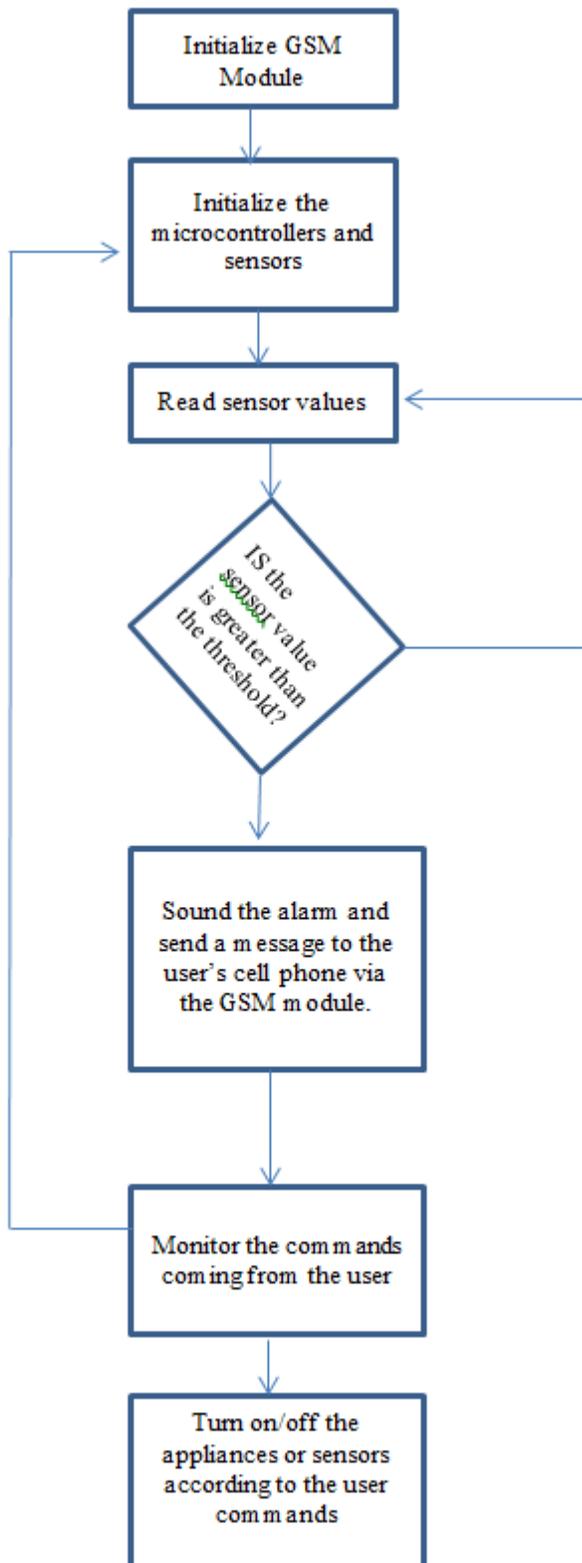


Fig.6 : Additional relays to connect more appliances for controlling

In the application the users also have the option to include more appliances as per the need. For this he/she need to go to the setting and just click on “add more appliances”. After naming the appliance it will be appeared on the application main window. The user has to deactivate all the sensor notification button manually after reaching home.

IV. FUTURE INITIATIVE

Mobile application will be made more intuitive and user friendly with more options for controlling the devices. Additional feature to control devices through internet will also be added so that the user can log in through internet to control the appliances and get real time notification of the status of the sensors by using internet. GPS tracking will be enabled can also be used to track the position of the user. It will certainly improve the overall functioning of the system and will save the user from manually controlling the sensors each time he/she leaves home. The sensors are connected through wires but it can be connected through a Wireless Sensor Network to remove the complexity of passing the wires from one room to other.

V. CONCLUSION

This paper presents the design and use of a economical and secure home security system for general users. The most prominent feature of the system is that the user can control the system through an android application. Android mobile phones being popular in the market and most preferred for use make this more apt for sake of simplicity and versatility. Many previous works require the user to type and send and Short message to send command to the system. But this paper present an unique and easy way to manage appliances and as well as to get notified about the condition of the house. Certainly anyone would agree that pressing a single button is more comfortable than to typing a SMS. The whole system was implemented by fabricating it on a

PCB board which will be very small in size. Reduced size makes it more applicable for commercial manufacturing and distribution.

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Secure in Telecommunication data Preservation: Wavelength Division Multiplexing and Quantum Cryptography

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Abstract- Quantum cryptography is a modern technique in networking which is used as a component in making networks secure. Network security is a major problem in Telecommunication data Preservation. The storage of call detail records (CDRs) of telephony and internet traffic and transaction data (IPDRs) which are from governments and commercial organizations. It is often argued that data retention is necessary to combat terrorism, and other crimes. Data retention may assist the police and security services to identify potential terrorists and their accomplices before or after an attack has taken place.

With the use of quantum cryptography and Wavelength division multiplexing provide security by enabling the unconditionally secure transmission of a random binary key, which enable bi-directional communication as well as multiplication of signal capacity. This may useful to compress several request to a single wave via fiber optics. And capable of protecting bandwidth capacity. Proposed research is about how to ensure the security of telecommunication call detail record transactions with quantum key distribution, wavelength division multiplexing and ultrafast frequency combs.

Index Terms- Wavelength division multiplexing, Quantum cryptography, Quantum Networks, Quantum computers, Fiber optics, ultrafast frequency combs.

I. INTRODUCTION

Fundamental component of the economic and social infrastructures are telecommunications networks. Security for Telecommunications Networks is thus an important aspect which cannot be ignored. Protecting these networks from malicious attacks that could lead to loss or unavailability of confidentiality and integrity of network services, an effective and long lasting security program should be accomplished to protect telecommunication networks from such attacks.

In the field of telecommunications, data preservation generally refers to the storage of governments and commercial organizations call detail records (CDRs) of internet traffic and telephony i and transaction data (IPDRs). In the case of government data preservation, usually of telephone calls made and received, emails sent and received and websites visited usually store data. Location data is also collected. They must also store traffic data for a period which may be determined and it

was argued that data retention is required to combat terrorism, and other crimes. And the hardware and software required to store all the retained data would be extremely costly. And Because of the economic frugality of the telecommunication industry, sharing of telecom infrastructure among competitive telecom service providers is becoming the requirement and process of business in the telecom industry to lower their increasing investments. Providing standard telecom services such as PSTN, ISDN and GSM services on phones. Telecom infrastructure contained both electronic and non- electronic devices. Base tower station, antennas, microwave radio equipment, switches, transceivers for signal processing and transmission includes in electronic infrastructure.

In brief, objectives of this research are provide security handling big data which generated by telecommunication with the Quantum key distribution. And compress several request to a single wave by using wavelength division multiplexing.

This research consists of six major sections. These are:

- 1) Abstract
- 2) Introduction
- 3) Background of related work
- 4) Our Approach
- 5) Conclusions
- 6) Future Work

II. BACKGROUND AND RELATED WORKS

Currently, several researches which based on conventional data transmission over installed fiber are used wavelength-division multiplexing (WDM) technology because this technology enables bidirectional communications over one strand of fiber, as well as multiplication of capacity. According to the Townsend et.al using quantum cryptographic key distribution can be help to reduce the network traffic which generated by multiple user requests. But this approach for constructing optical quantum networks does one node at a time, which lacks scalability. [1]

According to Roslund et.al with the concept of wavelength division multiplexing and the quantum domain demonstrate entanglement of frequency which occurs Quantum information processing. A single step to enhance the capacity by using ultrafast frequency combs. It is easily addressable and robust with De-coherence and scalability. [2]

Falahati & Meshgi research focuses on analyze the interests of using quantum technique for the distribution of encryption keys in 802.11 wireless networks and also propose a scheme for the combination of quantum cryptography and 802.11i establishment of the PTK (Pairwise Transient Key) is for security mechanisms for the . Quantum cryptography, simultaneously generate shared, two parties may,secret cryptographic key material using the transmission of quantum states of light. Key distribution is the problem of classical cryptography algorithm, and tends to provide safe channel to transport key. Quantum cryptography may distribute key in quantum channel. An intruder attacks on quantum channel QBER rate increases and it'll detected. Proposed system will use cryptography in telecommunication. [3]

Thayanathan & Albeshri research focuses on Enhancement of security and privacy in mobile data centers is challengeable with efficient security key management. Data centers need efficient quantum cryptography using Grover's algorithm and authentication techniques to solve this problem. Which are appropriate approaches to enhance the security and privacy with less complexity. Best approach is light which has same quantum properties, because people can see only the light not the data. Light based on quantum cryptography and PairHand protocols used in this research. [4]

The foundation research for this research is the BB84 research which is about a method to minimize the effect of interference of a third party via a communication channel. The researchers C. Bennett and G. Brassard who conducted the foundation research explains the concept of cubit, which is a two-state quantum-mechanical system, such as the polarization of a single photon. Then the researchers describe the method of forming polarized photons and about quantum public key distribution. Also the researchers describes about the possible situations the quantum public key distribution can bring to the stage. According to the researchers when the third party interaction gets minimum, quantum public key distribution method can be started. The describing research has simulated BB84 operation with several security attacks scenario and noise immune quantum key distribution in order to increase the security and reduce the noise interference. While most QKD simulation researches focused on protocol mechanics, this study focuses on hardware setup based on OptiSystem. But this simulation setup still needs vigorous testing and analysis. [5]

Tanaka et. al research is about ultra-fast, 84 quantum key distribution transmission at 625 MHz clock rate through a 97 km field-installed fibber using practical clock synchronization based on wavelength-division multiplexing. According to researchers QKD has recently been put to practical demonstration through field-installed fibbers. Step by step the researchers has designed methods with the intention of overcoming the problems like backscattered light noise, Trojan-horse attacks, thermo-optic effect and polarization sensitivity by designing, a bidirectional transmission (plug and play) scheme and applied it into the natural environment and a One-way transmission scheme with time-bin encoding. The nonlinear crosstalk could be suppressed by using the WDM scheme. The optical power of the clock signal through

the fibber has been set as low as possible to suppress those unwanted noise generations. However this system's detection efficiency is low and clock frequency is below 3GHz. [6]

Rarity et. al research is about using the quantum cryptography for secure key exchange between a ground station and a satellite .a key Exchange system using Quantum cryptography could provide the highest security method for exchanging keys between any two points on the globe. The method of Quantum cryptography has its security based on the laws of nature and is, absolutely secure against any computational improvements, in principle. The research resulted that there are no technical obstacles to building a system that could exchange keys at kilo baud rates between a meter diameter telescope on the ground and a 10 cm diameter lightweight telescope with a satellite. [7]

Bennett et. al research describe about apparatus and protocol designed to implement quantum key distribution. Exchange a random quantum transmission, very faint flashes of polarized light of consisting ,discussion of the sent and received versions of this transmission if this estimate is small enough, distil from the sent and received versions a smaller body of shared random information the system depends on the uncertainty principle of quantum physics, instead of the usual mathematical assumptions such as the difficulty of factoring, it remains secure against an adversary with unlimited computing power. [8]

Tanaka et.al research paper is about the system called high-speed quantum key distribution (QKD) system. The system developed to generate secure key in a rate of 1-Mbps 10-dB transmission loss. For the purpose of speeding-up all processes in high-speed quantum key distribution system the research team apply a wavelength-division-multiplexing technique using the colorless interferometry technique and a key distillation hardware engine. The research team provides a novel WDM scheme, sharing interferometers and temperature regulators over multiple channels, which enables us to increase the number of channels with a small impact on system cost and size. User to execute key distillation with 1-Mbit code length in real time in order to generate a secure key while satisfying both high speed and high security, the team develop a key distillation Hardware engine. The research team experimentally evaluated the performance of the developed system. System achieved key generation rate of over a 14.5-dB transmission loss greater than 200 kbps. [9]

Zhang et al. research on High-dimensional quantum key distribution which offer the possibility of high secure key rate with high information of photon efficiency. Consider High dimensional quantum key distribution (HDQKD) based on the time energy entanglement produced by natural parametric down conversion and show that secure against collective attacks. Its security rests upon visibility data obtained from Franson and compound interferometers that probe photon-pair frequency correlations and arrival-time correlations. From these measurements, an upper bound can be established on the eavesdropper's Holevo information [10].

III. OUR APPROACH

In this research focused on quantum network for the telecommunication area with the quantum computing and quantum cryptography systems.

In the field of telecommunications, data retention (or data preservation) generally refers to the storage of call detail records (CDRs) which is a data record produced by a telephone exchange or other telecommunications equipment which documents the details such as a telephone call or other communications transaction (e.g., text message) that passes through that facility or device. The record contains various attributes of the call, such as time, duration, source number, destination number, and completion status. It is the automated equivalent of the paper toll tickets that were written and timed by operators for calls which take long distance in a manual telephone exchange of telephony and internet transaction data (IPDRs) and traffic by governments and commercial organizations. It is often argued that data retention is necessary to combat terrorism, cyber and other crimes. Data retention may assist the police and security services to identify potential terrorists and their associate before or after an attack has taken place.

One of the most used technology is Unispeed Blue Shield Management System Figure 4. Unispeed Data retention devices consistent more than 10 million concurrent sessions in memory and delivers more than 500.000 records per second. In Unispeed proprietary log storing the CDR records format significantly reduces the storage requirement. No central data repository is required and no data transfers to mediation system, as both can be handled by each retention device remotely.

The advantage of quantum cryptography lies in the fact that it allows the completion of various cryptographic tasks that are proven or guess to be impossible using only classical. Difference between classical cryptography and Quantum cryptography is Quantum cryptography use separate channel to distribute keys. Quantum networks allow physically separate quantum systems for the transportation of quantum information. In addition using quantum key distribution algorithms can have a secure communication. It enables to produce a shared random secret key known only to them, which can then be used to encrypt and decrypt messages, as it is the most well-known example of the group of quantum cryptographic tasks. Quantum cryptography elegantly provide security by enabling the unconditionally secure transmission of a random binary key between Data discovery and pattern analysis from call detail records data warehouses and other data analytic devices. The big data which are from call detail records from any telecommunication users' needs some

privacy controls because staff dealing with this specific big data should be honest and trustable person. Quantum cryptography provides maximum protection and increases the storage capacity and security strength of the big data with less complexity. As a consequence referenced as Quantum Key Distribution is the security of the transmission is ensured by the no-cloning theorem that prohibit the perfect reproduction, or cloning, of a quantum system without disturbing.

Quantum key distribution Figure 2 which the security of encryption that uses relies on the foundations of quantum mechanics, in opposite to traditional public key cryptography, which depend on the computational difficulty of certain mathematical functions, and cannot provide any sign of intruder at any point in the communication process, or any mathematical evidence as to the actual complexity of turn other way round the one way functions used. Within the network information processing can be done using quantum logic gates. A quantum gate or quantum logic gate is an imperfect quantum circuit operating on a small number of cubits. They are the analogues for quantum computers to classical logic gates for conventional digital computers.

Uses of frequency comb which is a spectrum consisting of a series of discrete, equally spaced elements Frequency combs can be created by a number of mechanisms, including amplitude modulation (AM) of a continuous wave laser or counter balancing of the pulse train generated by a mode locked laser. And Wavelength division multiplexing (WDM) the technique modulating numerous data streams, optical carrier signals of varying wavelengths of laser light, onto a single optical fiber. It enables bi-directional communication as well as multiplication of signal capacity. This may useful to compress several request to a single wave. Figure 1. A WDM system uses a multiplexer at the transmitter to join the number of signals together, and a demultiplexer at the receiver to split them apart. With the right type of fiber it is possible to have a device that does both simultaneously, and can function as an optical add-drop multiplexer.

In telecommunications companies wavelength division multiplexing systems are more popular, because they allow them to expand the capacity of the network without prefer more fiber. By using WDM and optical amplifiers, they can accommodate several generations of technology enlargement in their optical infrastructure without having to repair the backbone network. Capacity of a given link can be developed simply by upgrading the multiplexers and demultiplexers at each end.

IV. CONCLUSION

Security is a major problem in telecommunication field. It produces a lot of negative effects and those effects can cost millions of dollars, or even billions and it can effect even for life security. We have studied about securing telecommunication field using Quantum Cryptography, Quantum Networks and Fibre optics to reduce Eve attack and secure important data in the warehouses Figure 3. Quantum Cryptography use separate channel to transport keys. Eves can't easily get the keys. Best way to secure data is use Quantum Cryptography.

V. FUTURE WORK

Quantum systems need to be isolated from the rest of world in order to work. Quantum cryptography is absolutely secure in theory. However, practical implementations often different from the theory description, there can have paths to break the security for eavesdropping. By openly publishing all this research results, we ensure hardening of quantum communication technology against all possible attacks. And have practical implementation on quantum cryptography in telecommunication.

APPENDIX

wavelength-division multiplexing (WDM)

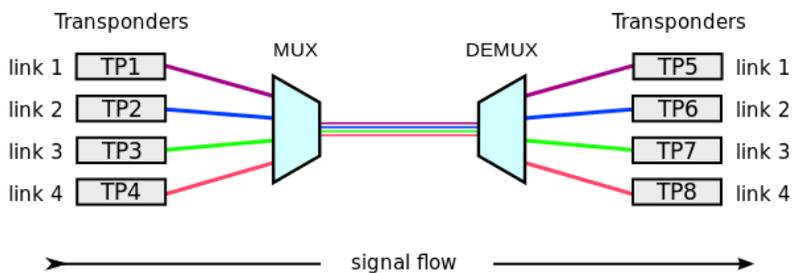


Figure 1 Wavelength Division Multiplexing

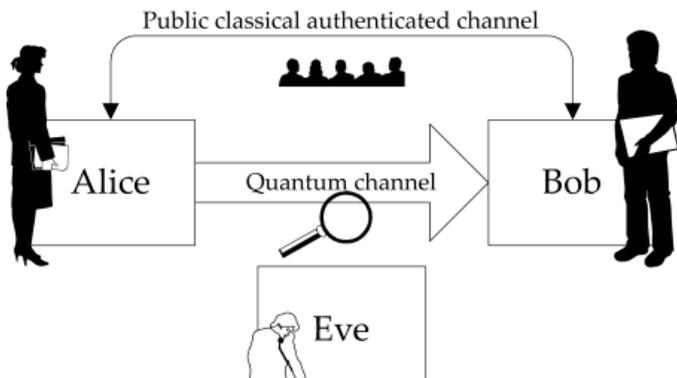


Figure 2 Quantum key distribution comprises a quantum channel and a public classical authenticated channel.

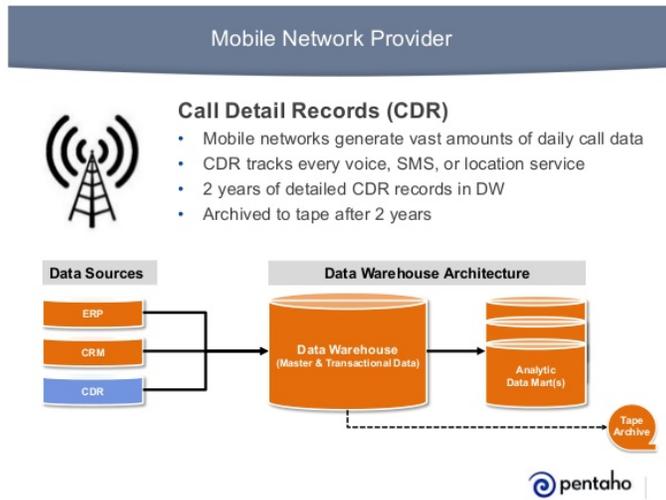


Figure 3: Call Detail Records (CDR)

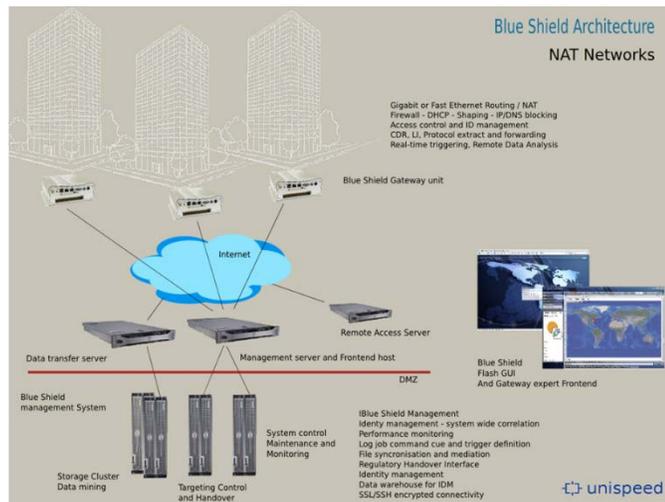


Figure 4: Unispeed Blue Shield Management System

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Figure 1

Available: https://upload.wikimedia.org/wikipedia/commons/thumb/9/9b/WDM_operating_principle.svg/400px-WDM_operating_principle.svg.png

Figure 2

Available: <http://gva.noekeon.org/QCandSKD/Figures/AliceBobEye.png>

Figure 3

Available: <http://image.slidesharecdn.com/verizonfinaldeck-130625193946-phpapp01/95/exclusive-verizon-employee-webina>

Figure 4

Available: http://www.unispeed.com/en/images/architecture_accessp_lan.png

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International Tourism Price Competitive Index and A Comparative Application With Turkey

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Abstract- If countries want to develop and boost their tourism industry, it should be paid attention to comparative price competition especially among rival destinations. Because there is a broad consensus that touristic demand is responsive to prices. In this regard, this study aims to analyze by comparing the price competition of 10 countries where we can consider as rival destinations in the international tourism market to Turkey. Data on goods and service price of countries where World Bank had prepared within the scope of International Comparison Program (ICP) programme (2011) were used in price analysis. Based on these data, total weighted costs of goods and services in the tourism product basket were calculated for 10 different destinations. In the study, purchasing power parity and exchange rates were determined based upon Turkey. Results of analysis suggest that Jordan and Tunisia among 10 destinations have the strongest price competitiveness, however indicating that France and Italy have the weakest price competitiveness.

Index Terms- Purchasing Power Parity, Tourism Competitiveness, Tourism Price Competitiveness Index.

I. INTRODUCTION

Tourism is a sector that is being considered in economic development policies of many countries and has a strategic importance. Because it contributes to economic development in a country by providing foreign exchange inflow, and positively affects employment. Companies operating within the tourism sector and various business lines working in these companies have regarded international tourism as an opportunity to increase their income.

Countries and business should take into account tourist goods and services prices in rival destinations in the international tourism so that they get and maintain the above mentioned benefits expected from the tourism in an effective manner. Which countries are tourism price competitive capacity higher than the others and what are the reasons for this advantage? Answers to these questions must be known. To find answer(s) to these questions is required that a comparison make between prices of a wide variety of products in different destinations (Oyewole, 2004).

The reason for this requirement is that touristic demand is widely accepted to be heavily influenced by price competitive capacity of destinations. It can be said that this acceptance is based on view about price elasticity of demand (Assaf and Josiassen, 2011, 3). However, there are many studies that international visitors are aware of tourist goods and services prices, and take into account the cost of tourism basket consisting

of tourist goods and services in the decision on the destination selection (Crouch, 1994; Edwards,1995; Dwyer, et al, 2000; Oyewole, 2004).

Associating the costs of basket of tourist goods and services with the destination selection and touristic demand has brought forward price competition in international tourism. Tourism price competitiveness of countries with comparative price advantage among alternative destinations is regarded as high (Dwyer, et al, 2001). It is the main objective of our study to make the price comparison.

Crouch (1994) states there are considerable difficulties in comparing the price of international tourism. These difficulties result largely from touristic products denominated in foreign currency and impact of exchange rate changes on purchasing power. One might need approaches to price measurement which have normalized or neutralized these challenges in order to fully understand the impact of price on international tourism demand (Oyewole, 2004).

Dwyer et al (2000) have developed a method for measuring price with these characteristics. It has thus been dealt with the challenges associated with comparability between prices of goods and services consumed by tourists in different countries. This study aims to construct comparative price competitiveness indexes and ranking for international tourism basket in selected rival destinations by following this approach developed for tourism price competitiveness index.

II. TOURISM PRICE COMPETITIVENESS INDEX

Tourism competitiveness can be defined as an ability to represent a place where appeals concerning the destination for those who are and are not residing in a country (destination) are optimized, to offer quality, innovative and attractive services for tourists, and to have a significant market share in domestic and international tourism market (Dupeyras and MacCallum, 2013, 7). Tourism competitive capacity is a general concept that includes price differences in association with exchange rate movements, the productivity levels of the various components of the tourism industry and other factors affecting the attractiveness of a destination (Dwyer et al., 2002, 328). Tourism competitiveness can be affected by many social, demographic, qualitative and economic factors (Dwyer et al, 2001, 3).

This study has tried to assess tourist product price competition, which is one of competitive capacity components. Touristic product price is a key component of the country or destination's general tourism competitiveness. Prices are one of the most essential criteria for making decisions as to whether journeys will make or where to travel (Forsyth and Dwyer,

2009). At the same time, price experience the tourists had experienced in their previous tours become effective in making decisions as to whether they revisit destinations where they traveled before (Barros and Machado, 2010). As a result, tourists are being considered the prices of the destinations where they will visit while making choice between touristic destinations. They have compared costs of living in their own countries and alternative destinations (Dwyer et al., 2001). Therefore, if any country wants to develop and boost its tourism industry, it should be paid attention to comparative price competition especially among alternative destinations.

Price competitiveness indexes are developed to perform comparative price analysis of destinations depending on the importance of price competitiveness in tourism. Many alternative models and indicators are used in these developed indexes (Forsyth and Dwyer, 2009,77). One of indexes developed to do the price competitiveness analysis in the tourism is a price index that was developed by World Economic Forum (WEF). Four price indicators were used to create this index, indicating that they are composed of Purchasing Power Parity (PPP), Fuel Price, Ticket Price and Collected-Taxes and Hotel Price (WEF,2015).

Another one of the comprehensive approaches to measuring tourism price competitiveness is Purchasing Power Parity (PPP) approach developed by Dwyer et al (2000). Price competitiveness index developed by these authors uses values-in-local-currency of the same goods and services in different countries mentioned in the report by World Bank International Comparison Programme. Cost of tourism product basket for each destination can be calculated based on these price data. Depending on calculated costs of tourism basket, travel/tourism expenditures may be formed purchasing power parity (PPP), which shows the levels of expenditure required to purchase goods and services in the same tourism basket in different destinations. The calculation of PPP for each touristic spending categories enable us to establish a relationship between tourist purchasing patterns and price. Then, price competitiveness index can be derived from PPPs harmonised with exchange rate. Calculation relating to index is performed according to the following formula (Dwyer, et al., 2000; Dwyer, et al. 2001, Forsyth and Dwyer, 2009).

Price Competitiveness Index = PPP / Exchange Rate *100

It was previously extremely difficult to acquire price data which would make comparisons between transnational price competition. However, in recent years, it has been possible to achieve comprehensive sources of data that can be made transnational price comparisons. In particular reports drafted within the scope of ICP are an important source to achieve price data. Prices of many developed and developing goods and services were gathered together in ICP reports in an extensive manner (World Bank ICP, 2015). It is an important source which benefits to create price competition indexes since this report contains a lot of information that utilizes to build price competitiveness indices such as purchasing power parity (PPP), product prices denominated in local currency and product prices denominated in dollars (Forsyth and Dwyer, 2009).

III. METHODS

Method mentioned below is followed to build a price competitiveness index of basic components of tourism price:

- 1) Selection of destinations to be made price comparison: Countries selected for the study pay regard to being destinations competing with each other. Because destination price competitiveness become important when compared to alternative destinations exactly where tourists can choose (Forsyth and Dwyer, 2009). In this context, Spain, France, Greece, Italy, Egypt, Morocco, Tunisia, Jordan, Algeria and Turkey have been selected as destinations where cost of tourism product basket will bear. Some criteria are taken into consideration, such as tourism demand, touristic product features and proximity, in selecting these destinations.
- 2) Harmonization of list of goods and services in the ICP report with goods and services in the touristic product basket and preparation of tourism product basket have been made based on research results of tourism revenues by types of expenditure of Turkey Statistical Institute (TUIK, 2011-2015). Accordingly, tourism product basket consists of (i) Food - Beverage and Tobacco Expenditures, (ii) Transportation Expenses, (iii) Accommodation Costs, (iv) Recreation Services and Equipment Expenditures and (v) Touristic Goods and Services such as other goods and services. Food and Beverage and Tobacco category contains food groups like bread and cereals, meat, fish, milk, cheese and egg, oils and fats, vegetables and fruits, coffee, tea, cocoa, sugar, sweet and spice, also including liquids not containing alcohol and those containing alcohol, e.g. liquor, wine and beer, along with cigarettes. Transportation expenses category includes local transportation expenses of short distance journeys such as taxi, buse, tramway, and expenditures on road, railway and airway transportation used for long distance journeys across the country. Recreation services and equipments category covers consumer goods such as radio and televisions, camera and video, and goods and services such as their accessories and repair. In addition to this, this category contains public entertainments such as cinema, theater, sportive events, radio and television programmes, and religious and cultural performances. Accommodation category contains accommodation services such as hotel, motel and pension. Other goods and services category covers other goods and services such as communication, clothes, shoes, carpet, rug, souvenir, education and health.

ICP report lists price of about 255 different goods and services fell into 26 categories. Yet goods and services addressed in the study consist of five categories including food-beverage and tobacco, accommodation, transportation recreation and other goods and services. A relationship must therefore establish between goods and services that make up tourism revenue items according to the types of expenditure of TSI and goods and services put into ICP. In this regard, those to be included in the tourism product basket prepared above on the basis of price data of goods and services in the ICP report were selected and harmonized.

A total of transport costs when a tourist arrives at and departs from a relevant destination have been excluded from

touristic goods and services basket. There have been many differences between travel transportation costs due to various reasons such as the presence of different travel classification because among the countries, the choice of different means of transport, the presence of different carriers, special and different pricing for future reservations/bookings, carter services and using different junctions/routes for entering into and going out from the country (Qiu and Zhang, 1995; Oyewole, 2004)

3) Weighting the different products and services that are consumed by tourists and reflect their buying habits should include any price competitiveness index or indicator, and two key elements, which are basic price data and weighted ratio of the product classes. In general, there has not been much difficulty in achieving price data. However, the subject of weighting can pose a problem in both conceptually and achieving the data. The weighting regarding an indicator of the price competitive capacity should be based upon the spending patterns of tourists. Spending patterns may vary from country to country and

even tourist classifications. For example, patterns an American tourist spends in any destination will be different from that of a Japanese tourist. Some countries (e.g. Australia) have determined regularly how much their incoming tourists spend on which goods and services. However, this does not appear to hold true for many countries. In this case, the weighting of indicators of the price competitive capacity may be obtained from the countries like Australia that regularly follow their tourist spending patterns or goods or services constituting tourism expenditure basket can be formed on a hypothetical base (e.g. food and beverage: 30%, transportation: 15%) (Forsyth and Dwyer, 2009, 81).

In this regard, tourism expenditures were weighted by calculating five-years average based on research results of tourism revenues according to the expenditure types of Turkey Statistical Institute (TUİK, 2011-2015) (Table 1).

Table 1. Tourism Revenue And Weights According To The Expenditure Types Of TUİK

Tourism Revenue according to The Types Of Expenditure Of TUİK (USA \$)					
Year	Food - Beverage and Tobacco	Accommodation	Transportation (in Turkey)	Recreation	Other Goods and Services
2011	6 476 576	3 082 350	2 076 185	169 456	13 300 798
2012	6 138 781	3 053 647	1 706 185	188 648	14 173 837
2013	6 583 641	3 544 120	1 779 404	176 695	15 877 319
2014	6 523 852	4 202 131	1 962 824	171 526	15 720 153
2015	6 178 908	4 084 873	2 202 484	482 621	13 284 099
Year	Weights	Weights	Weights	Weights	Weights
2011	0,26	0,12	0,08	0,01	0,53
2012	0,24	0,12	0,07	0,01	0,56
2013	0,24	0,13	0,06	0,01	0,57
2014	0,23	0,15	0,07	0,01	0,55
2015	0,24	0,16	0,08	0,02	0,51
Weighted Average	0,24	0,13	0,07	0,01	0,54

4) Collection of price data: World Bank International Comparison Program (ICP) is the most important source that can be used for price data paid to goods and services by visitors in the different destinations. ICP data, which have

most recently been updated by World Bank, were used in this study. Price data denominated in local currency of five touristic spending classes from each of destinations examined were tabulated by obtaining from ICP (Table 2).

Table 2. Cost Denominated In Local Currency Of Products In The Tourism Basket

Countries	Food - Beverage and Tobacco	Accommodation	Transportation	Recreation	Other Goods and Services
Spain	107,3	108,5	72,9	61,4	876,6
France	186,7	79,1	160,1	117,9	1635,1
Greece	33	18,8	18,9	9,2	203,1
Italy	165,9	97,8	123	78,3	1378
Turkey	255,5	60	159,9	42,9	1209,8
Egypt	492,4	34,3	64,4	32,4	1360
Morocco	200	31	47,8	23,6	660,1
Tunisia	12,1	4,6	6,9	1,6	58,1
Jordan	5,1	0,3	1,7	0,3	20
Algeria	2067	153,6	787,3	165,7	6617

- 5) The combination of price and expenditure weights were obtained by multiplying tourism revenue weighting according to TÜİK expenditure types in Table 1 by costs of tourism product basket in Table 2 (Table 3).

Table 3. Combination of Price and Expenditure Weights

Countries	Food - Beverage and Tobacco	Accommodation	Transportation	Recreation	Other Goods and Services	Costs Of Tourism Product Basket
Spain	25,8	14,4	5,3	0,6	476,0	522,1
France	44,8	25,1	11,7	1,1	887,9	970,7
Greece	7,9	4,4	1,4	0,1	110,3	124,1
Italy	39,8	22,3	9,0	0,7	748,3	820,2
Turkey	61,3	34,4	11,7	0,4	657,0	764,8
Egypt	118,2	66,3	4,7	0,3	738,5	928,0
Morocco	48,0	26,9	3,5	0,2	358,5	437,1
Tunisia	2,9	1,6	0,5	0,0	31,6	36,6
Jordan	1,2	0,7	0,1	0,0	10,9	12,9
Algeria	496,2	278,3	57,7	1,5	3593,2	4426,9

- 6) Calculation of purchasing power parity for tourism expenditures; PPP represents levels of expenditure required to purchase goods and services in the same tourism basket in different destinations. For example, if the cost of touristic goods and service in Spain is 522,1 Euros and 764,8 YTL (New Turkish Liras) in Turkey, PPP can be calculated as:
- 7) Formation of price competitiveness index from PPPs harmonized with the exchange rate. For this purpose, the following formula was used (Dwyer, et al.,2001).

$$\text{Price Comp. Index} = \frac{\text{Purchasing P. Parity}}{\text{Exchange Rate}} \times 100$$

$$\text{PPP} = 522,1 / 764,8 = 0,68 \text{ Euro/YTL}$$

This value means that each YTL to be paid for tourism product basket in Turkey will equal to 0.68 Euros to be paid in Spain. The calculation of PPP for each touristic spending category allows us to establish a relationship between purchasing patterns of tourists and price.

It is the main purpose of this study to compare price levels of goods and services in a selected destination (Turkey) with those in rival destinations by fixing exchange rate. Exchange rates used in the calculations are figured out based on the exchange rates in March 1, 2016.

IV. INTERPRETATION OF PRICE COMPETITIVENESS INDEX AND FINDINGS

Tourism price competitiveness index can be interpreted in the manner of the ratio of purchasing power parity to exchange rate. Price competitiveness index is easy to calculate, interpret and understand. Index values allow destinations to sort by price competitiveness they have had (Dwyer, et al., 2001). For example, if we think Spain compare with Turkey,

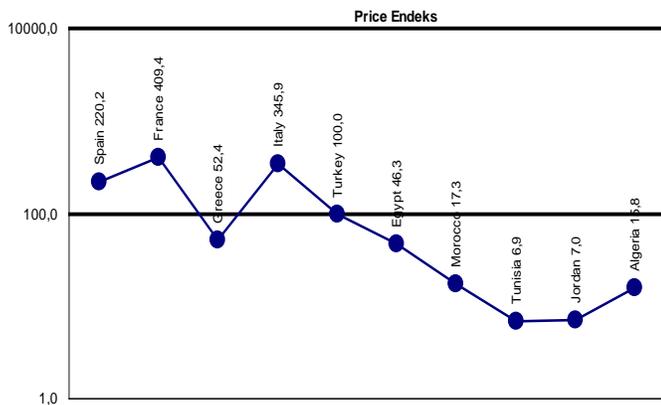
As calculated above, if PPP is assumed as 0.68 and Exchange Rate as TL/Euro;

$$\text{Price Comp.Index} = 0,68/0,31 * 100 = 219$$

When 219 for Spain is compared with 100 for Turkey (100 versus 219), it becomes evident that Spain have more disadvantageous than Turkey.

In other words, index value for a particular destination is regarded as 100. If price competitiveness index of any destination is below 100, this suggests that relevant destination has a more competitive position in terms of prices according to reference destination. Similarly, if price competitiveness index of any destination is above 100, indicating that relevant destination has a less competitive position in terms of prices according to selected destination. As can be seen in Figure 1, Greece, Egypt, Morocco, Algeria, Tunisia and Jordan from selected destinations in this study have the costs of tourism product basket that is below Turkey's price, which is regarded as 100. However, Spain, Italy and France have the costs of tourism product basket that is above Turkey's price, which is regarded as 100.

Figure 1. Tourism Price Index of International Destinations



Price competitiveness of the countries is fairly simple to compare through this method. Price competitiveness index and sorting have constructed by comparing each country with Turkey (100). In order to compare the cost of products in tourism basket, cost of tourism product basket of all countries was standardized by being regarded as 100, which is true for Turkey. The main reason for selecting Turkey is to ensure comparability and assess tourism price competitiveness when compared Turkey with rival destinations. Selecting another country rather than Turkey has not changed the results.

Table 4. Price Index and Sorting Concerning Destinations

Countries	PPP	Exchange Rate	Price Index	Sorting
Tunisia	0,05	0,69	6,9	1
Jordan	0,02	0,24	7,0	2
Algeria	5,79	36,56	15,8	3
Morocco	0,57	3,3	17,3	4
Egypt	1,21	2,62	46,3	5
Greece	0,16	0,31	52,4	6
Turkey	1,00	1	100,0	7
Spain	0,68	0,31	220,2	8
Italy	1,07	0,31	345,9	9
France	1,27	0,31	409,4	10

Exchange Rate= Domestic Monetary Unit / Turkish Lira

Table 4 shows price index and therefore sorting of countries. We can say from Table 4 that Tunisia and Jordan have a much more advantageous position than other destinations but France and Italy have a more disadvantageous position than the others.

V. RESULT

Price competitiveness is an important component of overall tourism competitiveness any country or destination have. There is a general consensus that prices are one of the most essential criteria for making decisions as to whether journeys will make or where to travel. Countries should be taken account of comparative price competitiveness with rival destinations since prices are highly important to make decisions about the travels. Various price competitiveness indices have been developed to make price comparisons. One of these is an index that was developed by Dwyer et al (2000). Price comparison of 10 destinations where we can be accepted as rival for one another in the Mediterranean basin was made based on prices in Turkey. Accordingly, Tunisia ranks first in terms of tourism price competitiveness. France ranks last in terms of price competitiveness of tourism. Turkey where comparisons were performed ranks seventh.

However, tourism price competitiveness of destination should be considered a part of extensive work in assessment of the overall competitiveness of the destination. much as the prices are taken into consideration in the decision as to which destination tourists select, it is not the only criteria. It should be noted that together with price differences, exchange rate movements and qualitative factors that affect level of productivity and attractiveness of stakeholders that are involved in the tourism industry are important in the decision process by which tourists make.

This study is important to introduce Tourism Price Competitiveness Index and to show how secondary data (ICP, TSI, etc.) will analyze for an efficient comparative analysis.

Future researchers can be carried out the evaluation of different destinations by following methods and assessments used in this study and by developing them.

This study does have its limitations. Spending habits of citizens of different country of origin visiting a particular destination and total weight of expenditure on goods and services in the tourism product basket may vary. In this study, spending habits of visitors from different countries of origin and total weights of expenditure on goods and services are considered to be equal.

Another limitation is that goods and services in the touristic basket are classified according to classification of TSI. Goods and services in World Bank ICP report have been tried to harmonize with the classification of TSI. A full harmonization may not have achieved for ICP report lists 255 different goods and services fell into 26 categories.

In addition, values in local currency of goods and services in the study were derived from World Bank ICP report. Data presented in the report might be outdated because preparation and publication of a report need some time.

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Design of Accumulator Based 3-Weight Pattern Generation Using Kogge Stone Adder

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Abstract- Weighted sets consist of three weights ,namely 0,1,and 0.5 have been successfully use so far for test pattern generation, since they gives both low testing time and low consumed power. Since accumulators are generally found in current VLSI chips, this scheme can be effectively made to use drive down the hardware of BIST pattern generation, as well. From the execution results, it is proved that the testing power for the proposed method is reduced by a considerable percentage. In accumulators used the adder, if we RCA adder or CLA adder its consume the more power and required more gates . If we kogges stone adder its required less power and less gates. Comparisons with previously presented schemes indicate that the recommended scheme compares favorably regarding required hardware.

Index Terms- Built-In-Self Test, Weighted Test Pattern Generation, Kogge Stone Adder, and Test per clock

I. INTRODUCTION

Advances in VLSI technology have led to the fabrication of chips that contain a very large number of transistors. The chore of testing such a chip to verify correct functionality is extremely complex and often long delayed. Furthermore to the problem of testing the chips themselves, the incorporation of the chips into systems has caused test generations cost to grow exponentially. A widely accepted approach to deal with the testing problem at the chip level is to include in Built-In-Self-Test (BIST) capacity inside a chip. BIST is a design technique in which units of a circuit are used to test the circuit itself. BIST represents a combination of the concepts of built-in test (BIT) and self-test. Ideally, a BIST scheme should be easy to implement and must provide high fault coverage.

Pseudo-random BIST generators have been tremendously used to test integrated circuits and systems. For circuits whose faults are not detected easily, a large number of random patterns have to be generated before high fault coverage is attained. Therefore, weighted pseudo-random proficiency have been proposed where inputs are biased by changing the probability of a "0" or a "1" for given input from 0.5 (for pure pseudo-random tests) to some other value [4], [6].

Wang [2], [12] proposed a 3-weight random pattern creator based on scan chains using weights 0, 1, and 0.5, in a way similar to [4]. Recently, Zhang et al. [3] renovated the interest in the 3-weight pattern generation schemes, proposing an efficient compression strategy for the 3-weight patterns 0, 1, and 0.5. From the above we can conclude that 3-weight pattern generation based on weights 0, 1, and 0.5 has rational interest since it combines low implementation cost with low test time.

However, absolute value containing hard-to-detect faults still require extra test hardware either by inserting test points into the chore logic or by storing additional settled test patterns [15], [16]. In order to overcome this problem, an accumulator-based weighted pattern generation strategy was proposed in [10]. The scheme generates test patterns having one out of three weights, 0, 1, and 0.5 therefore it can be utilized to drastically reduce the test application time in accumulator-based test pattern generation. All the same, the scheme proposed in [5] possesses three major drawbacks: 1) it can be used on condition that the adder of the accumulator is a ripple carry adder; 2) it requires rejuvenate of accumulator; this reconstruction, apart from being costly, requires rejuvenate of the core of the data path, a practice that is generally pessimistic in current BIST schemes; and 3) it increases delay, since it affects the normal operating speed of the adder.

II. STUDIES & FINDINGS

We shall elaborate the idea of an accumulator-based 3-weight pattern generation by means of an example. Let us consider the test format for the c17 ISCAS benchmark given in Table I.

Test Vector	Inputs A[4:0]
T1	00101
T2	01010
T3	10010
T4	11111

Table I: TEST SET FOR THE C17 BENCHMARK

Starting from this settled test set, in order to apply the 3-weight pattern generation scheme, one of the schemes put forward in [5], [8], and [9] can be used. According to these schemes, a typical weight assignment procedure would come about separating the test set into two subsets, S1 and S2 as follows: $s_1 = \{T1, T4\}$ and $s_2 = \{T2, T3\}$ eight assignments for these subsets is $W(S1) = \{-, -, 1, -, 1\}$ and $W(S2) = \{-, -, 0, 1, 0\}$ where a "-" denotes a weight assignment of 0.5, a "1" that the input is constantly provoked by the logic "1" value, and "0" estimate that the input is driven by the logic "0" value. In the first assignment, inputs A[2] and A[0] are constantly provoked by "1", while inputs A[4], A[3], A[1] are pseudo-randomly created (i.e., have weights 0.5). Similarly, in the second weight assignment (subset S2), inputs A[2] and A[0] are constantly provoked by "0", input A[1] is goaded by "1" and inputs A[4] and A[3] are pseudo-randomly created. The above argument calls for a configuration of the accumulator, where the following

circumstances are met: 1) an accumulator output can be constantly provoked by “1” or “0” and 2) an accumulator cell with its output continuously goaded to “1” or “0” allows the carry input of the stage to transfer to its carry output unvarying. This latter condition is required in order to efficaciously generate pseudo-random patterns in the accumulator outputs whose weight assignment is “_”.

#	Cin	A[i]	B[i]	S[i]	Cout	Comment
1	0	0	0	0	0	
2	0	0	1	1	0	Cout=Cin
3	0	1	0	1	0	Cout=Cin
4	0	1	1	0	1	
5	1	0	0	1	0	
6	1	0	1	0	1	Cout=Cin
7	1	1	0	0	1	Cout=Cin
8	1	1	1	1	1	

Table II: TRUTH TABLE OF THE FULL ADDER

Accumulator cell

The execution of the weighted-pattern generation scheme is based on the full adder truth table, presented in Table II. From Table II we can get a look that in lines #2, #3, #6, and #7 of the truth table Cout = Cin. Therefore, in order to bringing the carry input to the carry output, it is enough to set A[i] = NOT (B[i])..

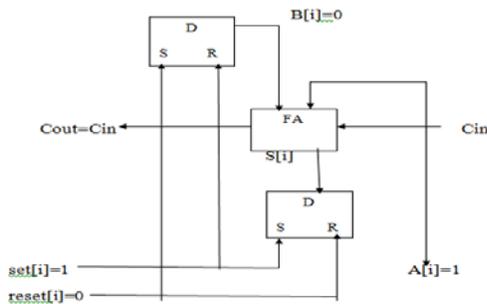


Fig.(a)

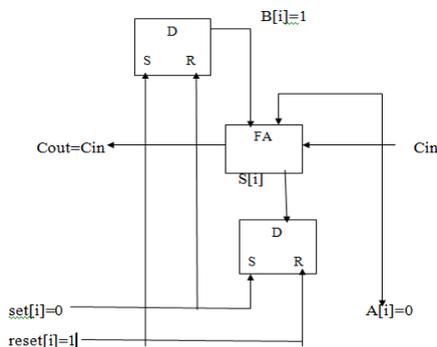


Fig.(b)

In Fig. (a) We present the configuration that drives the CUT inputs When A[i]=1 is required. Set [i]=1 and Reset [i] = 0 and thus A[i] = 1 and B[i]=0. Then the output is equal to 1, and Cin is transferred to Cout .In Fig. (b), we present the configuration that control the CUT inputs When A[i] = 0 is required. Set [i] =0 and Reset [i] = 1 and thus A[i] = 0 and B[i] =1. Then, the output is equal to 0 and Cin is transferred to Cout.

The D input of the flip-flop of register B is goaded by either 1 or 0, depending on the value that will be added to the accumulator inputs in order to develop satisfactorily random patterns to the inputs of the CUT.

BIST

Testing a circuit every time before they beginning, is called Built-In-Self-Test (BIST). Once BIST finds a fault, the readjustment in connections to convert the faulty part with a fault free one is a design problem and would be not be discussed here. The trend to include more test logic on an ASIC has already been mentioned. Built-in self-test (BIST) is a format of structured-test techniques for combinational and sequential logic, memories, multipliers, and other embedded logic blocks. In each case the principle is to generate test vectors, apply them to the circuit under test (CUT) or device under test (DUT), and then check the response.

KOGGE-STONE ADDER

Adder is one among the basic arithmetic operates. Currently implementing a high speed VLSI style could be an important point and as adders are utilized in various fields of applications, coming up with a high speed adder is one among the necessary surface. In this paper we designed and imposed a high speed Kogge Stone parallel prefix adder of 8, 16 to be meted out and contrast with Carry Look Ahead adder (CLA) and Carry Skip Adder (CSA) and also pointed out the potency of Kogge Stone adder with relevance delay.

The Kogge Stone has low logic depth, high node count, and minimal fan out. While a high node count implicit a larger area, the low logic depth and minimal fan out allow faster performance. There are mainly three estimation stages in Kogge Stone Adder. They are:

1. Preprocessing
2. Carry generation network
3. Post processing

Preprocessing Stage Preprocessing is the first stage where the generate and transmit signals of all the input pairs of signals A and B are created separately for each bit. The logical equations of the transmit and generate signals are given as in following equations: $P_i = A_i \oplus B_i$ (1) $G_i = A_i \cdot B_i$ (2) Carry Generation Phase Carry generation is the second phase of the KSA. At this stage the carries of all the bits are generated separately for each bit. They are divided into smaller pieces and this overall procedure is carried out side by side for all the bits. Carry generate and Carry propagate bits are used as halfway signals and their logical equations are given as follows: $C_{P_i:j} = P_i \cdot C_{k+1}$ and $P_{k:j} \dots$ (3) $C_{G_i:j} = G_i \cdot C_{k+1}$ or $(P_i \cdot C_{k+1} \text{ and } G_{k:j}) \dots$ (4) Post Processing Stage This is the last stage of the KSA which is

typical for all types of adders, i.e. calculation of summation of the bit given by the logical Equations (5) and (6):

$$C_{i-1} = (P_i \text{ and } C_{in}) \text{ or } G_i \quad (5)$$

$$S_i = P_i \text{ x or } C_{i-1} \quad (6)$$

The Kogge Stone adder is quickest layout, because it sequences logarithmically. Every time we add a merging step, it doubles the number of bits that can be added. The one and only Problem in KSA is that the number of wires gets incremented as the number of bits increments. The diagram of the 8bit KSA is as shown in Figure 2. As shown in Figures 1 and 2 the wiring increments with respect to the number of bits thus incrementing on chip area. A substantial part of delay is because of the route delay as the KSA has additional wiring Thus in KSA design the area parameter is to be adjust to get the high speed..

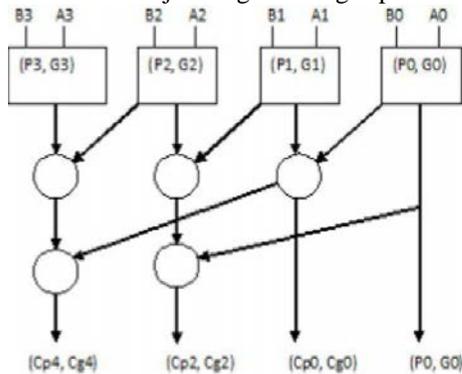


Fig (a): Schematic of the 4 Bit Kogge Stone Adder

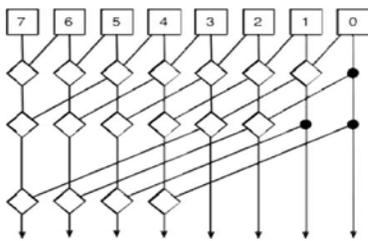


Fig (b): Schematic of the 8 Bit Kogge- Stone Adder.

III.COMPARISONS

If we used the 8 bit adder accumulator require delay is 3.328 ns but if we use the CLA require 3.441ns .If we used the 16 bit adder accumulator require delay is 5.462 ns but if we use the CLA require 5.655ns [19].

a) Proposed System:

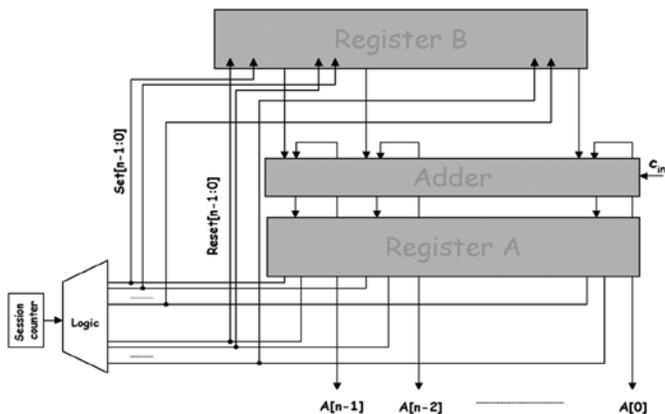


Fig.(a): Proposed scheme.

In Fig.(a), the general configuration of the implemented scheme is presented. The Logic module provides the Set [n-1:0] and Reset[n-1:0] signals that operate the S and R inputs of the Register A and Register B inputs. Note that the signals that operate the S inputs of the flip-flops of Register A, also drive the R inputs of the flip-flops of Register B and vice versa. In above fig adder is replaced by the Kogge stone adder.

b) Benchmark circuit:

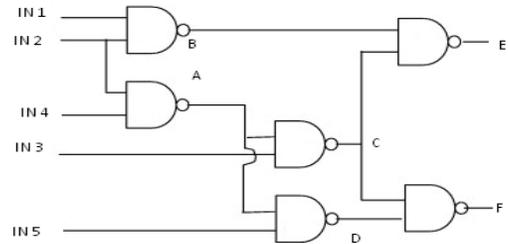


Fig. (b)(1): C17 Benchmark circuit

IV. Simulation Results

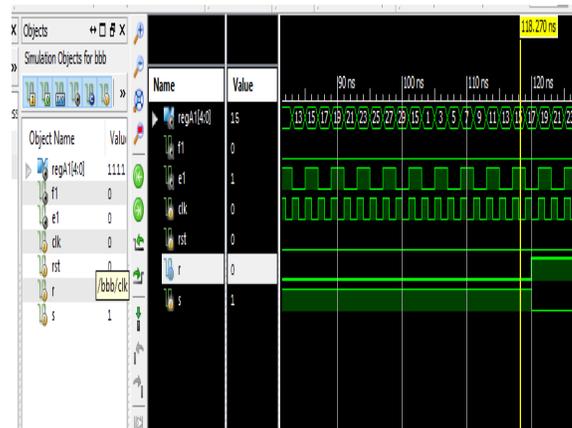


Figure (b)(2): C17 Benchmark circuit with inputs from accumulator cell output waveform

V. Reviewer Comments

>> This research paper represents research with adequate factual analysis & findings.
>> Reviewer board after full consideration accepted for publication

VI. Conclusion

An Accumulator-based 3-weight technique can reduce the hardware implementation cost and fault coverage is more. The power is get reduced and increased fault coverage. The fault coverage is more and it is proved by testing a c17 benchmark circuit. The time for testing a circuit is more and very simple method, because of its automatic test pattern generation. The test patterns are generated automatically for applied test vectors.

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Professionalisation Approach of Developing Polytechnic Education Management in Ghana

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Abstract- The number of tertiary level educational institutions in Ghana has significantly increased from three government-owned universities in 1992 with the establishment of both public and private institutions that have additionally gained tertiary status. The proliferation of private universities has become a matter of public concern because some do not have full-time professionally trained staff for both academic and administrative engagements, and good infrastructure and facilities for provision of conducive environments that would enhance teaching, learning, and research. This study sought to examine the impacts of giving professional training to managers of polytechnics in particular, and tertiary level educational institutions in general. Qualitative research paradigm was used and purposive and stratified sampling methods were employed for data collection. The output of the research indicates that managers of tertiary level educational institutions need to be equipped with professional administrative skills to enhance training of high calibre graduates for both research and the job market. The National Council on Tertiary Education could establish an institute and design training modules for the award of professional certificates in Tertiary Level Educational Management to newly recruited administrators and academic heads of tertiary educational institutions.

Index Terms- Professional Managers, Polytechnic Education, Tertiary Level Educational Institutions

I. INTRODUCTION

The upgrading of Government Technical Institutes to polytechnics, the establishment of new universities, approval of accreditation for the running of private universities and upgrading of post-secondary institutions into tertiary status attracted attention of this research that sought to find practices in managing polytechnic education and other tertiary educational institutions in a professional manner. This would enhance smooth running of the academic process to produce high calibre graduates for academic and professional careers.

The number of tertiary educational institutions in Ghana has increased over the last twenty two years. In 1992 the then, University College of Education, Winneba (UCEW), now University of Education, Winneba (UEW) was established to train teachers for the Education system of Ghana (www.uew.edu.gh) after which University for Development Studies (UDS), University of Mines at Tarkwa (UMaT), University of Health and Allied Sciences (UHAS), University of

Energy and Natural Resources (UENR), and Ghana Telecom University were also established. Additionally, the first three polytechnics namely; Accra Polytechnic, Kumasi Polytechnic, and Takoradi Polytechnic together with upgrading of some Ghana Education Service Technical Schools to gain tertiary status, and establishment of new polytechnics have significantly increased the number of tertiary level educational institutions in the country. Other professional institutions including the Institute of Professional Studies (IPS), National Film and Television Institute (NAFTI), Ghana Institute of Management and Professional Administration (GIMPA), and Ghana Institute of Journalism (GIJ) have all become tertiary institutions. The government is gradually working towards the upgrading of some post-secondary colleges like Nursing, Midwifery, and Colleges of Education in the tertiary system.

Statement of the problem

Tertiary level educational and professional institutes in Ghana are the highest academic and professional training fields for both middle and top level managers of academic and professional institutions, and industry.

In most academic institutions, only those belonging to academia are mostly mandated to take key or managerial positions as Chief Executive Officers (CEOs) without any background in professional management and skills training. Vice Chancellors, Rectors, and Principals are often nominated and selected based on academic achievements and experience through previous positions held as Sectional or Departmental Heads, Deans, Directors, and Provosts. They are however, bound to work with their registrars most of whom might be professional managers or in some cases have gone through the ranks becoming heads of administrative departments.

Even though, there seems to be a well-defined way in which people are appointed to top management positions in the polytechnics, often times, such people do not have the requisite professional training. This may usually have an adverse impact on performance and growth of their institutions. Appointing people who lack the basic competencies to positions of responsibility may corrupt the organization.

With new and mounting challenges faced by higher education, for instance, upgrading of polytechnics to technical universities, there should be the establishment of a more formal career path into management of polytechnic education in the country. The need to establish a process of professionalising management staff of polytechnics to meet the needs of stakeholders cannot, therefore, be overlooked any further.

Macpherson (2009) defines the process of professionalisation also known as credentialism as 'mastering a specialist, validated and reliable knowledgeable base, demonstrably acquiring the practical skills of the field, being socialized into the culture of the body of people engaged in the calling, and adhering to the principles and ethics of best practice in that profession'.

Professional development through in-service training enhances the acquisition of skills to effective management of an organization. However, Macpherson (2009) reiterated that, a systematic leadership development strategy is needed to enable aspirant and serving leaders to acquire role-specific understandings, skills and attitudes prior to appointments. Such training would progressively deepen their knowledge of professional leadership as their careers unfold to guarantee successful leadership services that combine as increasingly strategic contributions in classrooms, school staffrooms, and system boardrooms. Combining individual and organisational perspective imply the need for a systematic leadership development strategy that aims to sustain leadership capacity building in all people providing leadership services, and simultaneously, capability building at each level of leadership service from team to system.

As "knowledge-based business", professionalisation of polytechnic management could enhance the delivery of success through such highly-skilled personnel who will act swiftly and decisively. Since ideas come from people and it is people who make those ideas happen, professionalised management could transform and enhance management communication capacities to engage stakeholders and partners in achieving the mission and goals of the polytechnics.

On the other hand, professionalism if not followed or used effectively, may hinder the brand name or efficiency of the polytechnics. It could even lead to hurdles in the path of growth and interest of the institutions.

The main aims and objectives of setting up the polytechnics, according to the Polytechnic Law of 1992 (PNDC Law 321) include:

- (a) Provision of tertiary education through full time courses in the field of manufacturing, commerce, science, technology, applied social science, applied arts and such other areas as may be determined by the authority for the time being responsible for higher education;
- (b) Encouragement of the study of technical subjects at tertiary level; and
- (c) Provision of opportunities for the development, research and publication of research findings. (Nsiah-Gyabaah et. al. 2005)

Effah (2005) reported that, the objectives of the polytechnics are reinforced by the Government White Paper on the report of the Education Reform Review Committee (ERRC)-2004, which indicates that Government will continue to equip the polytechnics to make them offer tertiary education in their own right, to emphasise practical skills that are needed to run the productive economy and build a nation. Government further underscores the importance of hands-on experience and

undertakes to resource polytechnics to enable them offer degree programmes.

Polytechnic education has over the years played an important role in the development of this nation. The need for its establishment was primarily warranted by the need for skilled technical workforce to keep the wheels of industry running. The second was as a result of the inadequate middle-level manpower supply for both the private and public sectors of the economy (Kludjeson, 2005).

On his part Boakye (2005) stated that, Polytechnics are the breeding grounds for critical middle-level manpower required by the nation to build its industrial base which will ensure the growth and comprehensive one which trains the mind and the hand and, therefore, has the potential to contribute immensely towards the achievement of the development objectives set for various sectors of the economy. Against the foregoing, an evident link can be established between Polytechnic education on one hand, and training and entrepreneurship on the other. Indeed, this fact is emphasised in the Technical Vocational Education and Training (TVET) section of the Growth and Poverty Reduction Strategy (GPRS) where it is clearly stated that without the enhancement of the technical skills development system of the country, the set objectives for poverty reduction and wealth creation cannot be achieved.

These opinions are corroborated by the Polytechnic Act (2007), Act 745 that empowers polytechnics in Ghana to become autonomous. The approach to develop managers of the polytechnics, therefore, becomes unquestionable in the drive to achieve autonomy for the polytechnics.

The Merriam-Webster's College Dictionary (2009) defines profession as a calling requiring specialised knowledge and often long and intensive academic preparation. Danso-Mensah (2007) defined the severally accepted features of any entity recognised as professional to include the following:

- An entry qualification
- Explicit minimum standard of knowledge or performance
- Stated range of specific skills
- A condition not too fragmented to allow free entry by people, that is its boundaries must be wedged in such a way that laymen cannot easily enter to lay claims to professionalism
- Exertion of influence on its practitioners and employers
- A professional body or association entry into which demands some kind of specialised entry requirement

Consequently polytechnics need to provide professional and specialised training skills to their management staff other than the usual in-service trainings which are based on workshops and seminars.

Polytechnics in Ghana have been mandated to train students, and award degrees in Master of Technology (M. Tech.), Bachelor of Technology (B. Tech), Higher National Diplomas (HND), Diplomas, and other certificates accredited by the National Accreditation Board (Polytechnic Act, 2007). In carrying out the mandate by polytechnics, some professionals including Accountants and Computer Engineers are employed as middle level managers to head administrative departments. Although, they are professionals in their own fields they need to

have some skills training in educational management to enhance efficiency in the performance of their functions.

This study focused on polytechnic education even though, it is on tertiary education in general.

Objectives of the study

1. To inquire into the general public and stakeholders' perception on polytechnic education management as a recognised profession.
2. To examine how polytechnic management staff acquire professional skills to enhance effective work.
3. To critically assess the needs of polytechnics in terms of developing and equipping management staff with professional training skills.

Research questions

In order to achieve the objectives of the study, the following research questions were developed:

1. How is polytechnic management perceived as a recognised profession?
2. How do management staff of polytechnics acquire professional skills to manage their institutions?
3. What do polytechnics need to develop in order to equip management staff with professional skills?

II. MATERIALS AND METHODS

Research design

Both primary and secondary data sources were used for the study. The primary data used were obtained from the views of respondents expressed through a set of questionnaire. Secondary data were based on review of related literature from libraries and internet sources.

Qualitative research paradigm focusing on exploratory, descriptive and contextual data was adopted for the purpose of this study. These designs were considered as a result of suitability. Babbie and Mouton (2001) state that, exploratory research is based on an inductive approach and aims to arrive at a dense description of the phenomena under inquiry. Furthermore, descriptive research aims at unfolding situations or events and it implies that the representation of reality of participants should be clearly related. Contextual research is based on the attempt to understand events, actions and processes in participants' contexts instead of generalising results.

Survey instruments

The survey instruments used for data collection were questionnaire, interviews, and focus group discussions. Participants included educational managers, researchers, teaching and non-teaching members of tertiary educational institutions, parents of university and polytechnic students, managers of industry, students, and the general public.

Population and sampled population

The population for the study covered management of tertiary institutions. However, 190 respondents were sampled for the study. Purposive sampling was used to select the 190 respondents from management staff in all the 10 polytechnics, Management staff of public and private universities,

administrative staff of tertiary level educational institutions, Research fellows, Staff of Analogous institutions (NCTE, NAB, NABPTEX, and CSIR), and Management staff of industry; whereas, the stratified sampling method was used for data collection from lecturers, students of tertiary level educational institutions, and parents of university and polytechnic students.

Methods

A lot of information for the study was based on review of literature including internet sources particularly on professionalisation of leadership and management of higher education in general.

The qualitative method using a semi-structured questionnaire with open-ended questions was used to obtain descriptive data. Data collection did not depend so much on demographic information and variables of respondents as all the respondents identified were parents or Senior Members of organisations. However, out of the 30 questionnaire distributed to top management staff of selected institutions, 3 went to females and 27 to males, and all the females responded. The 160 questionnaire administered to staff and students of various institutions involved 103 males and 57 females. The instruments were self-administered and semi-structured questionnaire.

Data collection

Data were collected from the sampled population through self-administered questionnaire. The first set of 30 self-administered questionnaire was distributed to the polytechnic and university management staff, and management staff of industry including financial institutions, manufacturing industries, and construction firms. Another set of self-administered data was collected from respondents including senior members of polytechnic analogous institutions, senior members of tertiary educational institutions, students of universities and polytechnics, parents of tertiary level students, and members of the general public with the minimum of secondary school education. The questions prepared were set based on the following research questions:

1. How is polytechnic management perceived as a recognised profession?
2. How do management staff of polytechnics acquire professional skills to manage their institutions?
3. What do polytechnics need to develop in order to equip management staff with professional skills?

III. FINDINGS

Analyses and interpretation of data

Table 1 shows the distribution of questionnaire to respondents. Top management of polytechnics, and universities constituted about 8 % of respondents. The single largest category of respondents was tertiary level students, constituting about 32 % of respondents.

Table 1. Distribution of Questionnaire to respondents.

Respondents	Status	Number of Questionnaire	Percentage
Polytechnic & University Management Staff	Vice Chancellors, Rectors, Vice Rectors, Registrars, Provosts, Deans	15	7.89
Senior Members of Analogous Institutions	Administrators & Research Officers	20	10.52
Senior Members of Tertiary Educational Institutions	Teaching and Non-Teaching Staff	50	26.31
Management Staff of Industry	Directors & Managers	15	7.89
Students of Tertiary Level Educational Institutions	University & Polytechnic Students	60	31.57
Parents & General Public	Members with Minimum of Secondary Education	30	15.78
TOTAL		190	99.96 (Approx)

Source: Field survey (2014)

Table 2 shows the return level of both sets of questionnaire. Overall return rate was about 93 %. Again, the return rate of students was higher (about 32 %) while the return rate among industry management (3.68 %) and polytechnic, and university management (4.73 %) were among the lowest.

Table 2. Data return level.

Respondents	Status	Number of Questionnaire returned	Percentage
Polytechnic & University Management Staff	Vice Chancellors, Rectors, Vice Rectors, Registrars, Provosts, Deans	09	4.73
Senior Members of Analogous Institutions	Administrators & Research Officers	20	10.52
Senior Members of Tertiary Educational Institutions	Teaching and Non-Teaching Staff	50	26.31
Management Staff of Industry	Directors & Managers	07	3.68
Students of Tertiary Level Educational Institutions	University & Polytechnic Students	60	31.57
Parents & General Public	Members with Minimum of Secondary Education	30	15.78
TOTAL		176	92.59 (Approx)

Source: Field survey (2014)

Table 3. Questionnaire returned with responses.

Code	Respondents	Status	Returned with responses (176)	Percentage
A	Polytechnic & University Management Staff	VCS, Rectors, Vice Rectors, Registrars, Provosts, Deans	09	5.11
B	Senior Members of Analogous Institutions	Administrators & Research Officers	20	11.36
C	Senior Members of Tertiary Educational Institutions	Teaching and Non-Teaching Staff	50	28.40
D	Management Staff of Industry	Directors & Managers	07	3.97

E	Students of Tertiary Level Educational Institutions	University & Polytechnic Students	60	34.09
F	Parents & General Public	Members with Minimum of Secondary Education	30	17.04
TOTAL				99.97 (Approx)

Source: Field survey (2014)

While about 93 % of questionnaire were retrieved, some did not have any responses at all. This is presented in Table 3. Answered questionnaire retrieved from polytechnic and university management constituted 5.11 % of the entire questionnaire returned with responses. While the corresponding percentage for industry management was 3.97 %. The largest category was response from students (34 %).

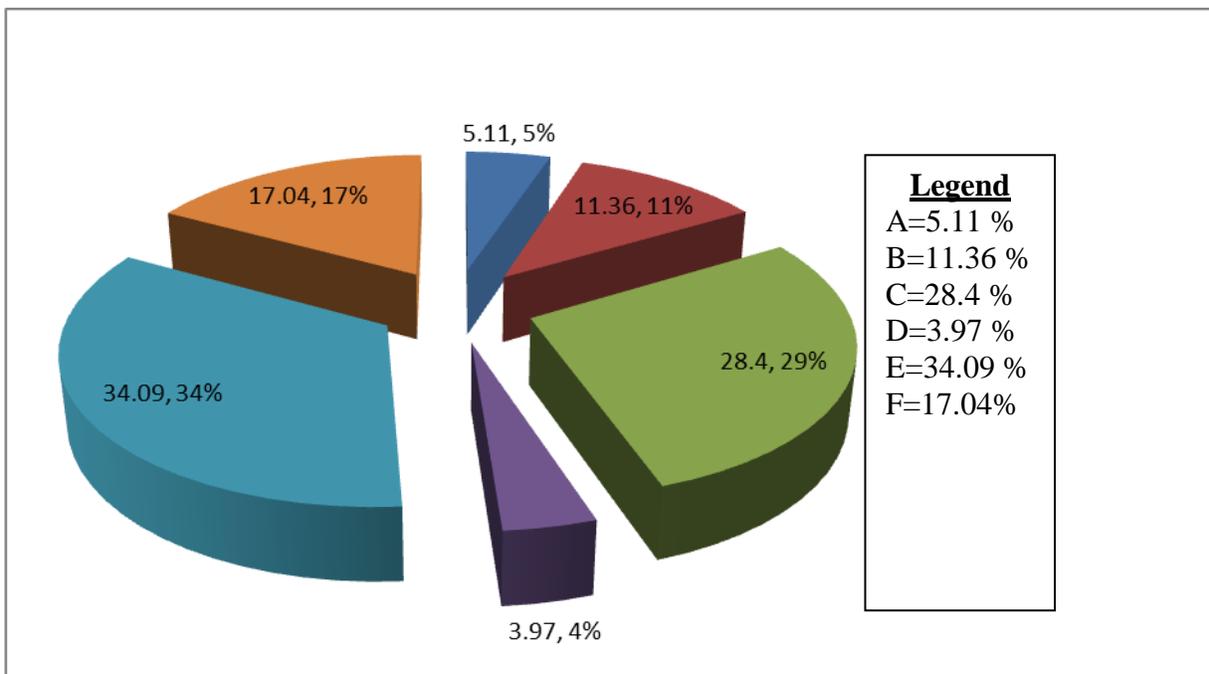


Figure 1. General response of returned questionnaire.

Source: Field survey (2014)

IV. DISCUSSION OF FINDINGS

The general responses to the group of questions set under the three research questions:

- Under how polytechnic education management is perceived as a recognized profession, majority of the respondents stated that, the general perception of polytechnic management as a recognized profession is lower than expected. Although polytechnics are institutions that train middle-level professionals at the Higher National Diploma (HND), Bachelor of Technology (B-Tech), and Master of Technology (M. Tech) levels, most of their management staff members gain pre-service skills from their fields of training. Majority of the respondents perceived the polytechnic to have lower than expected professionalism in management.
- On how management staff of polytechnics acquire professional skills to manage their institutions; majority indicated that some staff acquire pre-service professional skills before they are recruited but their skills are not usually related to tertiary education. They might, however, be made to do in-service training through workshops and seminars to equip them with some form of skills but that is still not enough in terms of the professionalisation process.
- On what polytechnics need to develop in order to equip management staff with professional training skills, majority contended that a professional training institute be established by government to carry out the task of professional training as soon as practicable. The general response of participants indicated that managers of polytechnics and tertiary educational institutions in general need to belong to a professional institution or body that would exert influence on the members to be

able to exhibit certain standard of skills in carrying out their performance as tertiary educational managers.

Specific views

The response rate of participants was very encouraging as seen in Table 3 and Figure 1. As a result, the following views emanated which would enhance the professionalisation approach.

1. Need to a use professionalising approach in developing management staff

A greater number of respondents were of the view that management of polytechnics and other tertiary educational institutions must be professionalised to enhance confidence, work efficiency, consistency, quality of service, value, prestige and maintenance of appropriate standards in terms of leadership and student academic and skill performance.

2. Educational qualifications of management staff

Majority of the respondents believed that the academic qualifications of staff in leadership positions of polytechnics are very good. However, they are generally purely academic and need professional development to make them more skillful.

3. Field experience

The study revealed that most respondents were not happy about staff who had no field experience but are made to head academic departments and administrative departments. Their inexperience is a barrier to professionalisation and could lead to irreparable losses in the organization.

4. Entry requirement to the profession

All the respondents accepted a basic requirement of a Master’s degree before being recruited to the pre-service professional training. This they believed would prepare them fully for the tertiary level educational institutions’ job market.

5. Role of the industry

Majority of respondents argued that industry must play an active role in the professionalising approach because polytechnics have been mandated to train middle level manpower to feed industries and that the industry is the main beneficiary of the total output of polytechnics. Industry should lead the way in pushing for professionalisation in the polytechnics as this would impact positively on the quality of graduates from the polytechnics and subsequently their output in industry.

6. Award of certificates and registration

All the respondents agreed that a professional certificate be awarded to participants of the training programme and they should be made to register as members of a professional body. They shall periodically pay dues, attend meetings, organise seminars and conferences, and make publications to keep them abreast with current developments in their profession and management functions.

Table 4: List of polytechnics in Ghana and their institutional mottos.

S/N	NAME OF INSTITUTION	INSTITUTIONAL MOTTO
1	Accra Polytechnic	Truth, Excellence and Service
2	Kumasi Polytechnic	<i>Nimdee Hyeren</i> (Knowledge is power)
3	Takoradi Polytechnic	<i>Nsa na Adwen ma Mpuntu.</i> (The Hand and Brain Enhance Development)
4	Ho Polytechnic	<i>Adanu Nazu Kekeli</i> (Knowledge is Light)
5	Cape Coast Polytechnic	<i>Nyimdee na Nkyerekyere ma Nyansa.</i> (Knowledge and Education Culminate in Wisdom)
6	Koforidua Polytechnic	Technology for Development
7	Sunyani Polytechnic	Education for Progress
8	Tamale Polytechnic	Knowledge and Skill
9	Bolgatanga Polytechnic	<i>Nuuse Tuma Nde Bere</i> (Practical Work is the Future)
10	Wa Polytechnic	Knowledge, Application and Service

Source: Field survey (2014)

A short analysis of keywords in the institutional mottos of the ten polytechnics in Ghana.

The study identified 16 keywords in the mottos of the 10 polytechnics namely; Truth, Excellence, Service, Knowledge, Power, Light, Hand, Brain, Development, Education, Wisdom, Technology, Progress, Practical Work, Future, and Skill. With reference to Table 4, Knowledge appeared four times, while each of the following- Development, Technology, and Education appeared twice.

Okyere-Boateng (2012) states that, among the 10 logos of polytechnics in Ghana the sprocket is a feature that appears most. The sprocket is a wheel that has teeth which engage the links of a chain and it is technically used in controlling movement, hence, the incorporation of the sprocket in the logo design of the Journal of Polytechnics in Ghana (JOPOG). The study, therefore, develops this slogan from the keywords that appeared more than once; *Polytechnic means knowledge acquisition through the power of technical education for the enhancement of technological development in Ghana*. Polytechnics therefore, play a pivotal role in national development, and at the time that government is considering converting polytechnics into technical universities, stakeholders and the general public should embrace the professionalising approach of polytechnic management. In view of this a number of professional programmes including the following are suggested to enhance the professionalisation agenda of Ghanaian polytechnics:

Suggested professional programmes offering

1. Higher educational leadership and innovation management
2. Academic Process Management
3. Academic Facility Management
4. Curriculum development
5. Student Affairs Management (Admissions, Examinations, Quality Assurance and Control)
6. Conflict and riot management
7. Financial management
8. Community education and extension
9. Educational ethics
10. Research and publication
11. Internally Generated Fund mobilization
12. Monitoring and evaluation

V. CONCLUSIONS

Analyses and discussions of results place premium on the following:

The need for additional professional skill training to managers of polytechnic education as most of the professionals who are recruited have the deficiency of educational leadership and management.

Establishment of a professional institution that would be made a direct professional body to develop polytechnic managers in particular and managers of other tertiary level educational institutions in general.

VI. RECOMMENDATIONS

This study sought to explore and describe the opinions of stakeholders of polytechnic education and consultancies about the need to use a professional approach in the process of developing the management staff of polytechnics in particular and other tertiary level educational institutions in general. Majority of educational stakeholders consulted gave their full support to the professionalisation of management staff of the polytechnics even as they seek upgrading to Technical University status. Among many other benefits, professionalisation is seen as enhancing the value and prestige of tertiary level education.

- The NCTE as the main agency of professionalising the administration of tertiary educational institutions could come out with the establishment of an Institute of Professional Academic Educational Managers (IPAEM) as a registered professional body to provide professional training to polytechnic management
- Heads of polytechnics and other tertiary level educational institutions, and all Senior Members who hold offices should be made to undergo mandatory in-service professional development at the proposed IPAEM or either appropriate training institutes
- Newly recruited administrative officers should be made to complete the training at pre-service level before their appointments are confirmed after the probationary period
- Professional certificates should be awarded to beneficiaries of the training programme
- The NCTE should design modules for the training and engage the services of both academic and professionals to facilitate the running of the programme.
- All trained personnel must be made to register and be inaugurated and inducted as full members of the appropriate professional body
- All registered members could practice as full time managers of tertiary level educational institutions
- A proposal for the establishment of this professional body could be drafted from this research report to government and stakeholders of higher education for consideration

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Automatic Garbage Separation Robot Using Image Processing Technique

Saravana kannan G, Sasi kumar S, Ragavan R, Balakrishnan M

Abstract — Solid waste management is a big challenge in urban areas for most of the countries throughout the world. An efficient waste management is a pre requisition for maintain a safe and green environment as there are increasing all kinds of waste disposal. Many technologies are used for waste collection as well as for well managed recycling. The Information gathering is cumbersome. The robot capable of detecting the object in the random movement after detecting the object the robot senses by webcam and followed by image processing, after the segmentation process the robot classifies the waste into de gradable and non-degradable waste. The robot run with 60 rpm motor and the arm movement of the robot run with 10 rpm motor and the process is interface with serial port by interfacing device. By Image processing technique, modifications in the robotic arm, navigation, image, and interfacing modules the encountered various problems in garbage collection.

Keywords: Automatic, Garbage, Image Processing, Separation, Micro-Controller, Mobile Robot.

1 INTRODUCTION

To make our environment sustainable handling of solid waste in household and industrial cleaning and ocean conservancy is a complicated task [1]. To reduce the human work in cleaning and sweeping, to develop artificial intelligent robots in industries, to decrease the human effort and manpower in the cleaning, and there by separating the garbage into degradable and non-degradable wastes. The whole purpose of assigning robots to do a man's work is to reduce our work load and most importantly, do the job for us in environment that is too hostile for us. we are trying to design a robot that is capable of automatic cleaning with the help of its arms that can be able to reduce the man power for the cleaning purpose mainly in industries , and there by separating the waste into degradable and non-degradable to avoid polluting environment. The concurrent effects of a fast national growth rate, of a large and dense residential area and a pressing demand for urban environmental protection create a challenging framework for waste management [2]. The complexity of context and procedures is indeed a primary concern of local municipal authorities due to problems related to the collection, transportation and processing of residential solid waste today the garbage collection is manual which takes a lot of efforts and is time consuming [3].

2. EXISTING SYSTEM

The robot capable of collecting the garbage within the line by the Arduino controller (cop toplayan robot) and the robot can

able to collect the garbage within the line and after the collection of certain quantity of garbage the robot search for the trash bin and dispose wastes to the collected.

3. PROPOSED SYSTEM

proposed system, the robot detect the object by the ultrasonic sensor can collect the garbage automatically by sensing using web camera by the image processing technique using mat lab, the robot can be able to separate the garbage into degradable and non-degradable waste. Embedded c programming used for the arm and gripper movement by the PIC micro-controller and the separation of garbage is done by the image processing technique of size[4], color and texture as shown in fig 1.1.

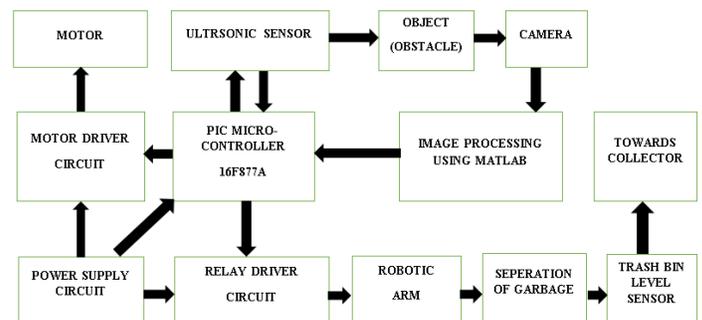


Fig 1.1 Flow Chart

A. REQUIREMENT SYSTEM ANALYSIS:

The automatic garbage separation robot used in the category of mobile robot to follow the wall and the waste garbage.

The requirement is obtained as follows:

- Robot is programmed with embedded c programming with pic-controller of PIC-16f877A. Which consist of 40 pins and 5 ports.
- The vehicle movement is carried out by the two gear motor of 60 rpm at 12 v DC motor gearbox of 125 gm weight and followed by the castor wheel.
- Arm used for picking the object, which consist of two motors, one motor is for forward and backward moment and another is for left and right moment. (10 rpm).
- The gripper is fixed at the end of the arm.
- And the motor driver circuit [5] of L293D which is used to drive the gear motors [6] consist of 4 inputs and outputs.

- The relay driver circuit is placed in order to work as a Electromagnetic switch for on and off.
- The power supply circuit is placed in order to supply the power according to each power input capacity.
- Webcam which is connected and is interfaced with RS 232 (Recommended Standard 232) with serial ports.

B. DESIGNING HARDWARE AND SOFTWARE:

- The PIC16F877A Micro-controller [7] has major advantage of 40 pins and 5 ports with brown out circuitry detection and the watch dog timer.
- The vehicle, arm and the gripper moment is controlled by embedded C programming.[8]
- Processing of the image is done with Mat-lab image processing as shown in fig 1.2 and by the Euclidian classification it classifies the waste into degradable and non-degradable and interfaced with RS232 [9].

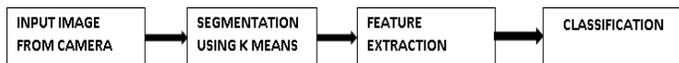


Fig 1.2 Mat lab Image Processing

K-means Algorithm for Segmentation:

The K-means algorithm is used to segment the paper and vegetable separately.

- 1) Randomly select 'c' cluster centers.
- 2) Calculate the distance between each data point and cluster centers.
- 3) Assign the data point to the cluster center whose distance from the cluster center is minimum of all the cluster centers.
- 4) Recalculate the new cluster center using:

$$V_i = \frac{1}{c_i} \sum_{j=1}^{c_i} x_j$$

where, 'c_i' represents the number of data points in ith cluster.

- 5) Recalculate the distance between each data point and new image is obtained from cluster centers.
- 6) If no data point was reassigned then stop, otherwise repeat from step 3.

FEATURE EXTRACTION:

1. Color feature extraction
2. Size feature extraction
3. Texture feature extraction

1. COLOR FEATURE EXTRACTION:

In color image features in R, G, B color projection values are extracted and stored in database using specified programming methods.

Step 1:- All ten thousand images are taken in to working

directory of MATLAB.

Step 2:- Using MATLAB programming all image features in R, G, B color projection values are extracted and stored in database using specified programming methods.

Step 3:-Threshold calculation is taken for categorizing the images into a similar feature groups. In this step, threshold value is computed based on the histogram calculation. If the image is a color image it will convert into gray color image.

Step 4:-In usual methods, image color values are storing in matrix form. Using Image matrix, all R, G, B components in image are extracted and separated into three different array forms.

Step 5:- Using the feature vectors, each image color wise means are computed. In this method row and overall image mean are computed and stored into the database. Based on all this features different computing methods are formulated.

2. SIZE FEATURE EXTRACTION:

Size feature extraction is used to find the size of the vegetable fruit and shape. It is depend upon the size parameter of the Mat lab command.

3. TEXTURE FEATURE EXTRACTION:

These filters are based on multichannel filtering, which emulates some characteristics of the human visual system. The human visual system decomposes an image formed in the retina into several filtered images, each of them having variations in intensity within a limited range of frequencies and orientation.

CLASSIFICATION:

Euclidian distance classifier:

Let assume 'n' as to seek and estimate the density function P(x) from a dataset of examples n P(x) can be approximated by the expression n The volume V is determined by the D-dim distance RkD(x) between x and its k nearest neighbor Where cD is the volume of the unit sphere in D dimensions.

The unconditional density is, again, estimated with n And the priors can be estimated by n The posterior probability then becomes n Yielding Discriminant functions g This is known as the k Nearest Neighbor classifier is given by N V k P(x |) i i i = N N P () i i = k k N V k N N N V k P(x) P(x |)P(| x) i.

4. WORKING PRINCIPLE

The robot works under the random movement of the vehicle and if any scrap is detected by the ultrasonic sensor the vehicle stops and the object is sensed using camera by the image processing technique of size, color and texture. After the processing of the image the robot can able to analyse whether the object is degradable or non-degradable waste, which is done by programming in the Matlab and then it is collected by means of Gripper and there by separating the waste into two bins of one is for degradable waste and another one is non-degradable waste which is kept at the back end of the

vehicle. LCD (Liquid Crystal Display) is used in a project to visualize the output of the application. We have used 16x2 LCD. So we can write 16 characters in each line. Total 32 characters we can display on 16x2 LCD. LCD can also use in a project to check the output of different modules interfaced with the microcontroller. Thus LCD plays a vital role in a project to see the output and to debug the system module as shown fig 1.3 .

5. CONCLUSION

Although the final AGSR (Automatic Garbage Separation Robot) was a relative success, the team has created an outline for future improvement in terms of research and theory, implementation, and program management. On a high level, more research should have been done regarding the interfacing between modules so that a specific implementation plan could have been created. This would have allowed the team to avoid on-the-fly creation of code with limited functionality and debugging. In addition, more time should have been spent researching mechanical design of the robotic arm, whose problems led to a limited functionality of the robot.

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Fig 1.3 Automatic Garbage Separation Robot

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The Assessment of Undergraduate Physiotherapy Education in Sri Lanka.

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Abstract- Background: Learning environment in any degree program is found to be important in determining students' academic success. It has been suggested that a positive learning environment as a student can lead to increase satisfaction, achievement and success as a practitioner post-graduation. The purpose of this cross sectional study is to investigate student perceptions of learning environment among B.Sc. Physiotherapy undergraduate students in Sri Lanka. Various aspects of environments are compared between year of levels and gender. **Methods:** The Dundee Ready Educational Environment Measure (DREEM) and demographic questionnaire were completed by 104 undergraduate students enrolled in B.Sc. Physiotherapy degree program, Allied Health Sciences Unit, Faculty of Medicine, University of Colombo from first year to fourth year. Convenient sampling was used and scores were compared across different grouping variable identified in demographic information. **Results:** Total DREEM scores across the sample were fairly high (M= 141.02; SD = 47.86), indicating an overall perception of learning environment among students. Total scores were higher for males (M= 140.16; SD= 47.12) than females (M= 136.09; SD= 43.89) but it is not significant ($p>0.05$). Perception of environment was varied between year-level of enrolment, with second and fourth year students producing more positive DREEM scores than first year students, but it is not significant ($p>0.05$). **Discussion:** This study suggested that students enrolled in B.Sc. Physiotherapy degree program generally hold positive perceptions toward their course environment while males held superior perceptions than females for overall DREEM scores. All the students produced higher ratings for their atmosphere than the other environmental perceptions and finding was similar across gender and year of enrolment. This suggests that the educational atmosphere or background may lead to positive outcomes for the students.

Index Terms- Educational environment, Learning, Teaching, Academic perception.

I. INTRODUCTION

Innovation and quality improvement are essential for any health professional degree program^[1]. Health professional student's level of competence is a reflection of their educational institution they attended; and it is utmost important to all their future patients and to the community. The positive learning environment can lead the student to increase satisfaction, achievement and success as a health professional practitioner post graduation^[2]. Medicine and health sciences degree programs have moved in recent decades to more student-

centered curriculum^[3,4]. The DREEM had been used in medical and healthcare related courses many countries across Europe, Asia, Africa, North America, South America, and the Middle East^[5,6]. Their findings of above studies have been able to generate a profile of their institution / course's strengths and weaknesses within their institution and another institution and test and apply it as a predictor of student performance. The assessment of education environment in any degree program can assist to identify the development areas and evaluate the changes in the program to be implemented^[7,8].

Faculty members from around the world involved to generate criteria for the desirable education climates for health professions in the new curriculum standards^[10]. Even though the DREEM has been used mainly for medical students,^[11] few past studies had shown that DREEM is applicable to several undergraduate courses for health professionals worldwide^[6]. The recent Australian study had shown that the DREEM is very much applicable to the health science setting, but the application of DREEM questionnaire has not been more widespread across Australian health sciences courses^[10]. There were some occasions where the DREEM has been applied the disciplines such as Nursing,^[7] Dentistry^[12] and Chiro-practic^[13,14]. The DREEM was refined into 50-item self-report questionnaire using a 5-point Likert scale, with scores reflecting a student's overall perception of the environment as well as their perceptions of 5 main aspects of this environment, namely: their learning, the teachers, academic self-perception, atmosphere, and social self-perception.

There is no any previous studies has used the DREEM to assess the perceptions of Physiotherapy education in Sri Lanka other than evaluating medical student's perceptions on their degree program. In Sri Lanka, the Allied Health Sciences degree courses are still in the development phase. Therefore it would be valuable to investigate the perception towards education environment among undergraduate physiotherapy students in Sri Lanka.

II. METHODS

The Dundee Ready Educational Environment Measure (DREEM) and demographic questionnaire were completed by 104 undergraduate students enrolled in B.Sc. Physiotherapy degree program, Allied Health Sciences Unit, Faculty of Medicine, Colombo. Ethical clearance was obtained from the Faculty of Medicine, University of Colombo, Sri Lanka. The development and validation of the 50-item Dundee Ready Education Environment Measure (DREEM) has been reported^[7]

using a 5-point Likert scale, with scores reflecting a student's overall perception of the environment as well as their perceptions of 5 main aspects of this environment, namely: Student's perception of learning (SPL), Student's perception of teachers (SPT), Students' academic self perception (SAP), Students' perceptions of atmosphere (SPA) and Students' social self-perception (SASP) [7]. Each item is scored 4–0 with 4 = strongly agree, 3 = Agree, 2 = Unsure, 1 = Disagree and 0 = strongly disagree by the respondents. The students enrolled in different year of level from first year to fourth year. Convenient sampling was used and scores were compared across different grouping variable identified in demographic information. The data analyzed using SPSS. The data will be initially analyzed using descriptive statistics. Independent sample t test was used to compare responses between male and female students. ANOVA was used to compare responses of different groups. Ethical clearance was obtained from the Faculty of Medicine, University of Colombo, Sri Lanka.

III. RESULTS

Table 1 shows the total DREEM scores across the sample were fairly high (M= 141.02; SD = 46.86), compared with Dundee Medical School (139). This is indicating an overall perception of learning environment among physiotherapy students. This was 70.0% of the maximum DREEM score. Students produced maximum percentage (72.2%) for the perception of teaching while mean scores ranged from 57% to 72% for each subscale.

Table 1: Physiotherapy students' perception to learning environment

Students' perception	Total DREEM Mean (SD)	Percentage
SPL	35.29 (10.9)	57.15%
SPT	31.77 (10.28)	72.20%
SAP	18.63 (6.41)	58.21%
SPA	36.14 (11.93)	60.23%
SASP	19.19 (7.34)	68.53%
Total DREEM	141.02 (46.86)	70%

The DREEM score by gender is presented in Table 2. The Total DREEM scores for male and female were (M= 140.16; SD= 47.63) and (M= 136.09; SD= 43.89) respectively. It was not significant for total DREEM score (P= 0.403) and its subscales.

Table 2: Physiotherapy students' perception to learning environment according to the gender

Students' perception	Mean (SD)		t	P value
	Male	Female		
SPL	37.97 (11.68)	28.78 (10.26)	0.58	0.47
SPT	28.72 (10.45)	28.00 (8.13)	0.10	0.29
SAP	17.94 (6.56)	19.14 (6.20)	-1.06	0.48
SPA	36.01 (11.89)	36.22 (11.82)	0.41	0.13
SASP	19.52 (7.05)	18.95 (7.48)	0.34	0.28
Total DREEM	140.16 (47.63)	136.09 (43.89)	0.010	0.403

Both male and female students produced the highest mean scores for the perception of atmosphere. It was noted that female percentage (57.7%) was higher than male percentage (42.3%) in the sample and the finding was similar for all the year of enrolment except in 3rd year (Table 4).

Table 3: The number and percentage of participants by gender, and year-level of enrolment.

Gender	1 st Year (2010)	2 nd Year (2009)	3 rd Year (2008)	4 th Year (2007)	Total
Male	10	05	16	13	44 (42.3%)
Female	15	19	12	14	60 (57.7%)
Total	25	24	28	27	104 (100%)

Physiotherapy students' perception to academic environment by year of enrolment is presented in Table 5. Perception of environment was varied between year-level of enrolment, with second and fourth year students producing more positive DREEM scores than first year students. Third year students produced positive DREEM scores than first year students, but less than 2nd and 4th year students. But significance differences were not found between year levels and total DREEM score or its subscales. When considering, individual subscales, first year students indicated low ratings for SPL and SPT than fourth year students.

Table 5: Physiotherapy students' perception to academic environment by year of enrolment

Students' perception	Mean (SD)				F	P value
	1 st Year	2 nd Year	3 rd Year	4 th Year		
SPL	31.59 (8.14)	35.48 (10.04)	33.59 (9.96)	37.49 (13.00)	1.764	0.272
SPT	26.30 (6.70)	27.94 (8.41)	27.58 (8.36)	31.29 (10.59)	4.942	0.060
SAP	17.48 (4.80)	21.05 (6.01)	18.08 (6.38)	18.09 (6.96)	3.816	0.281
SPA	35.08 (11.14)	38.29 (11.82)	34.54 (10.77)	36.87 (12.74)	1.956	0.256
SASP	18.40 (6.35)	19.02 (7.62)	19.32 (6.67)	19.93 (7.94)	1.964	0.394
Total DREEM	128.85 (37.13)	141.78 (43.90)	133.11 (42.14)	143.67 (51.23)	2.962	0.216

IV. DISCUSSION

Total DREEM scores were high (M= 141.02; SD = 46.86) across the study, indicating that students' perceptions of classroom learning environments were quite positive across the sample study. This was fairly consistent with previous studies that the mean of 141.02 (70.0%) fell well inside the range (101-150) said to indicate a "more positive than negative" perception of environment [1,15]. The global mean score was higher than what was observed in studies from University of Dundee (139) and the results from Faculty of Medicine, University of Colombo in Sri

Lanka (107)^[16]. Similar DREEM score (140) was shown by Physiotherapy undergraduate students in Australia^[10]. A few studies have yielded higher total DREEM scores than the present study^[17] which may indicate that these institutions are fairly innovative in terms of providing a student centered approach to education^[11]. The higher averages scores in the present study also suggest that the education environment is perceived positively by the students and it also suggest that B.Sc. Physiotherapy degree course is also student-centred.

As a percentage of the maximum possible score, mean scores ranged from 57% to 72% for each subscale in the present study and vast majority of past studies appear to have also yielded mean overall scores within this range^[11]. However, most published studies have yielded mean scores lower than the present study – anything from 45% to 65% of the maximum score^[1,14,18].

Total scores were higher for males (M= 140.16; SD= 47.63) than females (M= 136.09; SD= 43.89). Male students indicated a more positive perception of their environment than females but this trend was not statistically significant for overall DREEM scores and across all aspects of environment subscales. This finding was not consistent with previous studies which had shown that female students showed more positive environment than males^[10,11].

Though there were higher proportions of females in the present study, male students showed higher means score for perception of learning than females. But, this was not consistent with previous studies done by Lokuhetty,^[16] with the medical students in Sri Lanka and different health professional students in Australia^[10] showed that the males scored more negatively on several aspects of the educational environment than females. This difference makes evidence that males and females typically exhibit different learning styles^[19]. However, this gender based difference of perception was not analyzed for subsequent DREEM analysis; as it was not statistically significant. The present study indicated that female students require more support to develop the learning skills in comparison to males.

In the present study, the perception of environment was varied between year-level of enrolment, with second and fourth year students producing more positive DREEM scores than first year students but this trend was not significant for overall DREEM score and any DREEM subscales. The Allied health degree courses are in initial stage in Sri Lankan health context; Therefore, Physiotherapy students faced lot of difficulties in infrastructure facilities and there were lack of qualified lectures to deliver the physiotherapy lectures. This reality is not satisfying the student's needs especially for first year students who just entered to the university; will create negative attitudes towards low DREEM scores about their learning environment. But, when there are getting enter to the 2nd year onwards; they will be able to understand the challenges in Sri Lankan health context to conduct the Allied Health Sciences degree courses and therefore 4th year students will show the highest DREEM score in 4th year. Third year students showed low DREEM ratings might be due to heavy workload and commencement of daily clinical practice in the third year. The above findings were not consistent with previous study done by Brown,^[11] had shown that second year

students producing more positive DREEM results than fourth year students and it also indicated that fourth year students generating the lowest ratings on most the DREEM subscales. Therefore, further analysis is required to explain these differences in Sri Lankan educational setting not only physiotherapy students but for other health professional students too.

V. CONCLUSION

The data presented in the present study will be useful in Sri Lankan Allied Health programs and Physiotherapy education around the world. In addition, this is the first time data using DREEM has been presented in Physiotherapy education in Sri Lanka. This study suggested that students enrolled in B.Sc. Physiotherapy degree program generally hold positive perceptions towards their course environment while males held superior perceptions than females for overall DREEM scores. All the students produced higher ratings for their atmosphere than the other environmental perceptions and finding was similar across gender and year of enrolment. This study also suggests that the educational atmosphere or background may lead to positive outcomes for the students.

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Bluetooth Security Analysis and Solution

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Abstract- Bluetooth technology has become an essential part of this modern world where it provides a short distance wireless communication between devices and other network with low cost and low power making it convenient for the users. Bluetooth utilizes the standard 2.4GHz signal range. The security issues in Bluetooth network are malicious entities may gain unauthorized access, internal attacks may be possible via ad hoc transmissions, data may be extracted without any detections, viruses or other vulnerable attacks may corrupt data on the wireless devices, etc. These vulnerabilities in the security sectors are increasing which can be possibly dangerous to the privacy of a user's personal information. To overcome these issues the network security in Bluetooth is introduced. There are many new risks created in Bluetooth network, a good security design is essential for it to be successful. This paper will be focused in what Bluetooth, the vulnerable risks associated with it, network securities related to the Bluetooth, how it works. Through this paper the solution for the above mentioned problems will be solved by giving some safety tips and the possible solutions like conducting seminars regarding the security issues and also doing some workshops for the user Majority of devices now communicates using this Bluetooth technology, the risk of the security issues are high. Due to the security issues, users will aware from Bluetooth attacks. User privacy protection methods for every new security as the device user's personal information's should be secured.

Index Terms- Bluetooth, network security, wireless network, piconet.

I. INTRODUCTION

Bluetooth was created in 1994, Bluetooth technology was considered as a wireless alternative to data cables by interchanging data using radio transmissions. The name Bluetooth arrived from a 10th century Danish King, Harald Blatand or, in English, Harold Bluetooth. Bluetooth technology was created as an open standard to gives connectivity and association between disparate products and industries. The Bluetooth Special Interest Group (SIG) is the supervisor and creator of the core specification and services. That working groups make sure the specification and services work to the highest exchangeability standards so users can identify, with confidence, their Bluetooth products simply work [1].

In this 21st century all the devices are embedded with the Bluetooth technology. Bluetooth is a wireless technology where it is connect within the short distance with the low power and low cost. Bluetooth utilizes the standard 2.4GHz signal range. Bluetooth is connected to the devices with radio waves instead of cables. This wireless network connection between the devices

makes it convenient to transfer the data between devices. Bluetooth is low in cost as they are embedded with a small chip into the devices. This wireless connection need to make sure that the signals are not interrupted to secure the connection. To secure the connection, there are several security methods are available. Bluetooth can perform a trusted connection that can exchange data without asking the permissions. When the other device establishes the connection the user has to decide it to allow it. When transferring the data from one device to another devices. So the security issue arises. Security is one of the major challenges faced by this era of wireless technology. In the section II the paper discuss about the past researches done in the Bluetooth security. After discussing the literature review, Sections III talks about the solutions found to solve security issues in the Bluetooth security. And finally in section IV, V the conclusion and future work for the researches are discussed.

II. HISTORY OF BLUETOOTH

Bluetooth is a lower cost, low power, short range technologies intended to replace the cable connection between hand phones, PDA and other portable devices. It can clear up your desk considerably, making wires between your workstation, mouse, laptop, computer and many other devices. Bluetooth technology was invented by a group of scientists working for the Swedish company Ericsson in 1994. Awaiting for replacement to the cables joining their hand phones and their accessories. The Bluetooth system is named after a 10th century Danish King Harold Bluetooth who united and control Norway and Denmark. The first Bluetooth devices hit market around 1999[2].

III. OVERVIEW OF BLUETOOTH

Bluetooth is a classic for short-range radio frequency (RF) communication. Bluetooth is used mainly to establish wireless personal area network (WPAN). Bluetooth technology has been integrated into many variety of business and consumer devices consist of cell phones, laptops, automobile, printer, keyboard, mouse and headsets. This gives users to form AD hoc networks between a wide range of devices to transfer voice and data. Bluetooth is lower cost, low power technology that provides a mechanism for making small wireless networks on an AD hoc basis accepted as piconets. A piconet is collected of two or more Bluetooth devices in nearest physical proximity that operate on the same channel using the same frequency hopping sequence. Bluetooth based connection between a cell phones and headset are an example of piconet. Bluetooth piconets are often recognized on a temporary and changing basis which offers

communications flexibility and scalability between mobile devices.

Some main benefits of Bluetooth technology

Cable replacement. Bluetooth technology recover a variety of cables, such as those commonly used for peripheral devices (e.g., mouse, keyboard, printers, wireless headsets and ear buds that interface with desktops, laptops, cell phones, etc.

Ease of file distribution. A Bluetooth-enabled device can form a piconet to support file distributing capabilities with other Bluetooth devices, such as laptops, phones.

Wireless synchronization. Bluetooth can provide automatic synchronization between Bluetooth-enabled devices. For example, Bluetooth allows synchronization of contact information consist of computerized address books and calendars.

Internet connectivity. A Bluetooth device using Internet connectivity can share that connection with other Bluetooth devices. For example, a laptop will use a Bluetooth connection to direct a cell phone to establish a dial-up connection so that the laptop can access the Internet through the phone[3][4].

IV. HOW DOES BLUETOOTH WORK

Reported by Bluetooth website, the technology “works in the unlicensed industrial, scientific and medical (ISM) band at 2.4 to 2.485GHz, using an advance spectrum, frequency hopping, full-duplex signal at a simple rate of 1600 hops/sec”. If you dropped asleep part way through that, let’s break it down to find out absolutely how your headset knows to choice a calls from your phone. Bluetooth chips produce wavelengths that are constraint to frequencies operating within a range specifically set aside for this sort of short-range communication. Other devices you may catch that use this frequency include cordless telephones and baby monitors. However, there is a problem with always using the same frequency. Other devices operating at the same, or nearest, frequencies will cause interruptions in the signal.

To prevent this from being an issue, the signal is expand over a wider range of frequencies. In order to manage this, the signal hops around the frequency, and in the case of Bluetooth that come into 1600 times per second. The frequent change in wavelength means that even a consistent signal will not interrupt, and will not be interrupted, for longer than 1/1600th of a second. Bluetooth headsets can identify in two different styles, using a full or part duplex connection. A full-duplex signal means that all connected devices are capable to send and receive signals – in this case a two-way conversation – simultaneously, as opposed to a half-duplex signal, alike a walkie-talkie, where each side can still talk and listen, just not both at the same time and Table I explain about Bluetooth device classes[5][6].

Source: (http://file.scirp.org/Html/1-9701762_33221.htm)

Table I
 Bluetooth Device Classes

Class	Power (mW)	Power (dbM)	Distance (m)	Sample Devices
1	100	20	~100	BT Access Point, dongles
2	2.5	4	~10	Keyboards, mice
3	1	0	~1	Mobile phone headset

Table I explain about Bluetooth device classes

Bluetooth Security Methods

There are several methods of security to secure the Bluetooth. These securities are divided into service level security and device level security. These both together secure the devices from the unauthorized access / data transmission. Bluetooth secure methods briefly explained below

- Authorization

Authorization in Bluetooth is the way that describes access control the information in general .For example, data in a device normally authorized to access other devices information is usually formalized as access control rules in a device system. During operation, the system uses the access control rules to choose whether access requests from authenticated the device user shall be approved or rejected. Resources include individual files and the personal data, provided by applications or device. In simple term it allows only the granted devices.

- Authentication

Authentication is the process of deciding the identity of the other user. For that authentication it uses the key that already in the devices so it is no need to generate new key for every new connection with the same device connected already.

- Key management

In the key management they have different types of key management they are link key, Pin, encrypted key. In the link key are sometimes permanent or temporary. This permanent key may store in a non-volatile memory, this can be used in the present situation and it will be terminated, but the temporary key is limited by lifetime in the present situation. In the pin key it is selected by the use of a fixed number. Encrypted key will be get from the present link key in that encryption is activated.

These Bluetooth securities are divided into 3 modes [7].

Mode 1:

A Bluetooth device will not initiate any security. This is a non-secure mode. In essence the authentication and encryption security procedures to allow any Bluetooth device to connect to it.

Mode 2:

A Bluetooth device does not initiate security procedures before connection establishment. This mode allows different and flexible policies for applications, especially running applications

with different security requirements in the same. This is a service level enforced security mode. The concept of a security manager is introduced in this mode to control access to services. The centralized security manager maintains access control policies and is responsible for interfacing with other protocols and device users. Authentication, confidentiality, and authorization are supported in this mode.

Mode 3:

A Bluetooth device initiates security procedures before the link set-up is completed. This is a link level enforced security mode and is fixed. Since this security mode is fixed it is not aware of any application layer security. Authentication and encryption are supported in this mode. Authentication and encryption are realized using a shared secret link key that is derived during the pairing process.

Bluetooth Security Related Work

1). Bluetooth Security and Vulnerabilities

Bluetooth® technology is a wireless substitute to data cables by exchanging data using radio -transmissions. Bluetooth technology was created as an open standard to authorize connectivity and collaboration between disparate products and industries. Like any wireless technology, Bluetooth also has a number of security vulnerabilities. These vulnerabilities may comprise the device or the networks that the device connects to. However if the common Bluetooth security features are used properly, it should provide adequate security.

2). Mechanism of Bluetooth Security

When devices connect to each other, Bluetooth creates a link which uses optional pre-shared key authentication and algorithms which is considered to be strong when used correctly. The strength of the Bluetooth security mainly relies on the randomness and the length of the passkey used at the time of their first connection. Discoverability and connectivity settings also play an important role in determining the security strength. These settings control whether the device can be searched by other Bluetooth devices and how it can be connected. Also optional user authorization for connection requests provides extra security.

3) Bluetooth Vulnerabilities

Through design, Bluetooth uses peer-to-peer technology. Bluetooth has a very complex specification and provides support for a lot of services. Some of these services include input output devices like keyboard and mouse, headphones, speakers, networking, file transfer and printing. In order for these service to work and communicate with devices, designers and programmers implements Bluetooth for a wide variety for operating systems, chipsets and devices. Settings like discoverability, connection preferences and security of the interface are not always the same and depend on the programmer. Due to this, Bluetooth is open to a lot of security vulnerabilities. Some of the known Bluetooth attacks include the following:

Identity detection;
Location tracking;
Denial of service;
Unintended control and access of data and voice channels;
Unauthorized device control and data access.

As an example, researchers have shown that Bluetooth headset use can compromise devices in several ways. This compromise is due to the headset profiles' support for powerful telephony signaling commands and the all too common use of weak established passkeys (typically "0000") [8].

4) Types Bluetooth Attacks

Since there are billions of Bluetooth devices in use, malicious security violations are general events now and it is expected to rise in the near future. On the contrary, the rise usage of Bluetooth devices makes security worries even more disturbing. Hereafter, Bluetooth security architecture needs a constant development to avoid new unidentified threats. Like any further wireless communication system Bluetooth transmission can be deliberately jammed or block. False or modified information can be delivered to the devices by the cyber criminals. Security threats in Bluetooth can be branched into three major categories as follows:

- Disclosure threat: The information can flow from the target system to an eavesdropper that is unauthorized to access the information.
- Integrity threat: The information can be deliberately corrected to mislead the recipient.
- Denial of Service (DoS) threat: The users can be blocked to get connect to a service by making it either unavailable or severely limiting its availability to an authorized user.

Bluetooth security is presently a very active research area in both academia and industry. Security threats like disclosure and integrity attacks commonly compromise some sensitive information and therefore, can be very dangerous. On the other hand, DoS attacks commonly disturb Bluetooth network users and are considered to be fewer dangerous. Powerful directional antennas can be used to greatly increase the scanning, eavesdropping and attacking range of almost all kind of Bluetooth device. One great example of a long-distance attacking tool is the Blue Sniper Rifle. It is a rifle stock with a dominant directional antenna involved to a small Bluetooth-compatible computer. The scanning, eavesdropping and attacking can be complete over a mile missing from the target devices. Therefore, the possibility that an attacker is using range improvement tool for disclosure, integrity and DoS attacks should be taken extremely [9].

Literature review

D.Djenouri and N.Badache discussed about the ad hoc networks, these ad hoc networks are he collection of mobile nodes supplied with wireless communication adaptors, among that it forms a temporary network without any infrastructure. There is no permanent or centrally infrastructure network because of that the network may face many challenges. They discussed result for the essential problems, but these solutions are vulnerable to threats. Some of the security requirements are explained here. The features of mobile ad hoc network

(MANET) may lead to vulnerable attacks. The features are infrastructure less, wireless link use, multi-hop, nodes movement autonomy, amorphous, power limitation, memory and computation power limitation. The threats have been divided into two classes, they are attacks and misbehavior. In the attacks it is divided into categories; external attacks, internal attack passive attack and active attack. These attacks are explained briefly here. Then the misbehavior it define as the unauthorized of internal nodes that can result unintentionally in damage to the other nodes. Some of the proposed solutions to overcome the security issues are as follows. They have discusses about the routing security issues, data forwarding security issues, security against misbehavior and the intrusion detection system. Finally securing the ad hoc network is greater challenge [10].

This is explain background study of research paper. Wireless Network Security 802.11, Bluetooth and Handheld Devices journal which relevance to our research area. As we know wireless networks have broadcast nature so there are different security problem in the wireless communication. The security conventions intended for the wired systems can't be extrapolated to wireless systems. Hackers and intruders can modify utilization of the loopholes of the wireless communication. In this paper addresses two wireless technologies that wireless local area networks (WLAN) and ad hoc or Bluetooth networks. According to the literature survey there were many information have been discovered on Wireless Network Security 802.11, Bluetooth and Handheld Devices.

However, there are some existing method used in this journal such as Bluetooth network, Ad Hoc Networks, Wireless Standards, Wireless Security Threats and Risk Mitigation. This paper gave the solution to developers.

Our research attempts to provide an effective and efficient. Because we are especially go throw on Bluetooth security. We will give the solution to users [11].

Bluetooth have automatic and wireless connection. Bluetooth is support for over two diverse voice and data. Bluetooth is completed by designers using a variety of chip set. Bluetooth is attack to a diverse set of vulnerabilities. Some security vulnerabilities are access of data and voice channels and unauthorized device control. User can use Bluetooth headset as compromised in multiple ways. They sent the data on low power radio waves. It's one of the big disadvantage. In other word any one can easily receive your sensitive information. Need to have security features to exchange the data with the only known devices [19].

Current invention related with a network Security architecture for guiding security activities in a Mobile network platform, and directing security response Activities to a particular user access point having an important Network address.[12]A mobile network is a unique group of mobile devices (laptops, smart phones, sensors, satellites, etc.) that communicate with other wireless links and connect in a distributed manner to give the necessary network functionality in the absence of a fixed infrastructure. This type of network, operating as stand-alone network [13].the security architecture is more operable to command a security response in conform a security policy. 12].The network is an autonomous transitory connection of mobile nodes that interact with each other over

wireless links.[13]Functions and complexities of mobile ad hoc networks are Autonomous and framework less Multi-hop routing, Dynamic network topology, Device collection, Energy obligated operation Bandwidth obligated variable capacity links, Limited physical security, Network scalability, Self-establishment, self-organization and self-administration [13]. Below Table II explains about related researches.

Table II
Related Research

Wireless Network Security :	Security of Wireless LANs	Bluetooth Security	AD HOC Networks	Wireless Handheld devices
Security of 802.11 Wireless LANs[14]	V	X	X	X
Security apparatus and method during BLUETOOTH pairing[15]	X	V	X	X
Routing and mobility management	X	X	X	X
protocols for ad-hoc networks [16]				
Recommender system and method for generating implicit ratings based on user interactions with handheld devices	X	X	X	V
Our Research's Name [17]	V	V	V	V

The IEEE specification found numerous services to offer a secure working environment. The security services are provided mostly by the Wired Equivalent Privacy (WEP) protocol for safety of link-level data through wireless broadcast among clients and access points. WEP does not afford end-to-end security, but only for the wireless part of the connection [14].

A BLUETOOTH device is provided wherein the output RF transmission power level during pairing is purposefully minimized from otherwise conventional or usual communication levels to a low power level, greatly reducing the series of possible interception. Security can be enhanced more and more by further reducing the transmit power even below that clear for a class 2 radio to a really low power level. After the link keys have been passed and/or other pairing processes, the BLUETOOTH devices may return to normal power levels safely to last communications [15].

There are two network communication protocols, one for routing and one for mobility management, are introduced that are

mainly compatible for use with ad-hoc networks. The routing protocol is a proactive-reactive hybrid routing protocol that limits the possibility of the positive procedure to the node's local neighborhood. Routing areas are described for each node that contain nodes whose distance from the subject node in hops is at greatest some predefined number, stated to as the zone radius. Every single node is need to know the topology of the network within its routing zone well [16].

An expert system employs implicit evaluations created from showing user interaction with an item, such as while listening to a music path on a MP3 player or reading an electronic book. A method for generating item suggestions include: offering an item to a device having an application for appealing a repetitive activity with the provided item, wherein the repetitive action happens mainly during separate operation of the device; creating a history of user interaction with the provided item, where user interaction contains engaging in the repetitive activity with the provided item; altering the past of user interactions into an implied ranking of the provided item; and using the complete rating of the provided item to cause recommendations of other items [17].

Solution

Establish that Bluetooth users are made aware of their security-related responsibilities Regarding Bluetooth use.

A security awareness program benefit users to follow security practices that help prevent security loopholes. Participate seminars about Bluetooth security

Set your device's visibility to "Off." This will stop other devices from seeing your Bluetooth name.

Change the default name of the Bluetooth device to something unidentified and without meaning. By default, we mean the name of the device which usually identifies the model and type of device (e.g. Samsung S4), which could make it a target of attack.

After use turn off your Bluetooth. If your Bluetooth is off, nobody can connect with you.

Use a PIN code whenever pairing with another Bluetooth device. If the other device doesn't know the PIN code, it will not gain access to your device.

Remove all pairings for devices that have been lost or stolen and frequently checkup to ensure devices are only paired with current and recognized devices.

This will prevent attackers from using a lost or stolen device to connect the other Bluetooth devices that it was paired with. It will also ensure your device pairings stay ongoing and you will be made aware of any illegal pairings.

Select PIN codes that are comfortable and long. Avoid static and weak PINs, such as PINs consist of all 0's or 1's.

PIN codes should be random so that they cannot be simply guessed by attackers. Lengthy PIN codes are resistant to brute force attacks. The use of a fixed PIN is not.

Ensure that portable devices with Bluetooth interfaces are configured with a password.

This helps prevent unauthorized access if the device is lost or stolen.

Install mobile security software on your Bluetooth device like as antivirus, firewall. This is in order to prevent, or reduce the Bluetooth attacks [18].

V. CONCLUSION

This paper gives an overview of some of the big attacks that Bluetooth has challenged over the years along with some possible solutions. Some security tips for the users have also been gave to instantly create awareness among them to be more careful about their important personal information. Although all majority of devices now communicate using this technology, the risks are deep greater if the security threats are neglected by our peers in this industry. Bluetooth security specialists will have to provide automatic updates to its security protocols and user privacy protection methods for every new security open up so that protection of the device user's personal information becomes the primary objective. Due to limitations in time and resources, only an overall literature survey has been presented in this paper. Emerging devices all have Bluetooth as a essential feature and its potential applications are increasing, so its future vulnerabilities needs to be analyzed through further research in this field. The bottom line is, we need technology to survive and technology needs us to evolve ensuring our safety first.

VI. FUTURE WORK

As the future work, we have given some solutions for the users to secure their Bluetooth network. But for the developers we didn't give any suggestions, if the developers can increase the rate of security in the Bluetooth network the users will be benefited by it. And also the developers can increase the encryption of the password it will be better and they should secure the Bluetooth network with new protected network layers.

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Economic and Financial Crimes Commission (EFCC) and the Challenges of Managing Corruption in Nigeria: a Critical Analysis

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Abstract

The present Global system is confronted with multiplicity of challenges which threaten the survival of many nation states. One of these challenges is corruption. The viral nature of this phenomenon is such that combating it is consistently proving difficult. The menace is present in varying degrees in different countries at different times. Countries in the Global North and the Global South are scourged by it differently. Nigeria is not an exception to this. The phenomenon consequently brings about economic backwardness, political instability, social insecurity, infrastructural decay, unaccountability, negation of the principle of law, etc. Efforts towards curbing it in Nigeria have suffered various setbacks. However since the emergence of the Economic and Financial Crimes Commission (EFCC) to manage it, some reasonable achievements have been recorded. Based on secondary data this paper examined the EFCC and the challenges of managing corruption in Nigeria. Bearing in mind that corruption as a complex phenomenon manifests in virtually every known social institution and has transnational as well as global web of connectivity, an integrative theoretical approach was used in this explanation. Findings reveal that the Commission is confronted with myriad of challenges which include: meddling in its activities by the power elites; unwholesome judicial process; weak anti-graft laws; job insecurity for its Chairperson etc. To enhance the smooth operation of the Commission, it is recommended that: special courts are granted the Commission; repealing of laws which hinder their operation; the Agency must be free from any form of executive and legislative influence among others.

Keywords: Challenges, Corruption, Managing Corruption, Nigeria.

I. INTRODUCTION

The EFCC is making significant efforts towards effective management and control of corruption in Nigeria. Yet it appears as if nothing is being done. It is indeed factual that the Agency is faced with multiplicity of challenges in executing this onerous task. It is on this premise that this paper attempted an examination of the EFCC and the challenges it faces in managing corruption in Nigeria. To achieve this, the paper is divided into seven sections consisting of: background; the powers of the EFCC in managing corruption in Nigeria; the coordination of the activities of the EFCC aimed at controlling corruption in Nigeria; the impact of the EFCC on the control of corruption in Nigeria; impediments against

effective control of corruption by the EFCC in Nigeria; conclusion; and recommendation.

II. BACKGROUND

The structure of the Nigerian society from its inception as a socio-political and economic entity has been shaken and is still being threatened by the phenomenon of corruption. In recognition of this, the colonial administration in fashioning out laws for the various component units (regions) which constitutes it un-mistakenly enshrined legislations against it in the constitutions of these areas. Specifically, Section 115-112 of the Penal Code which prevailed in the Northern part of the country emphasized this. This notwithstanding, the phenomenon still prevailed over the country in varying degrees, though not as serious and as systematic as it has become nowadays. This led directly or indirectly to the first Military intervention in Nigeria's politics on 15th of January 1966. The Brigadier Murtala Mohammed regime which seized power from General Yakubu Gowon in 1975 accused the regime of entertaining high handedness and various forms of corrupt practice among top military officers. Same reason was advanced by the Major General Muhammadu Buhari's military regime which overthrew the civilian government of Alhaji Shehu Shagari on 31st December 1983, as well as those of Major General Ibrahim Babangida on 27th August 1985 which ousted Buhari from office. Very importantly, Nigeria has multiple legislations for controlling corruption. These include: the provisions of the Code of Conduct Bureau and the Code of Conduct Tribunal; the provisions of the 1999 Nigeria constitution; the money laundering Act of 1995; provisions of the Criminal Code, Penal Code, Criminal Procedure Act etc; the ICPC Act of 2000; as well as the EFCC 2004 Act. There are a number of agencies and statutory bodies for managing corruption in Nigeria. These include: Code of Conduct Bureau and the Code of Conduct Tribunal; the Public Complain Commission; the Independent Corrupt Practices and other related offences Commission (ICPC); the Economic and Financial Crimes Commission (EFCC). It is equally important to note that before the emergence of the EFCC, various mechanisms have been used by various administrations in Nigeria in managing corruption. For example: the Public Officer Investigation Asset Decree No. 5 Of 1969 Of General Yakubu Gowon Military Regime; General Murtala Muhammed's 1975 Operation Purge The Nation; the Public Complain Commission established under decree 31 of 1975; the Ethical Revolution of Shehu Shagari (1979-1983); War Against Indiscipline (WAI) of Muhammadu Buhari (1984-

1985), and the National Security Organization (NSO); Mass Mobilization for self-reliance, Social Justice and Economic Recovery (MAMSER) of Ibrahim Babangida (1987-1993), and the Presidential Monitoring Committee (PMC); War Against Indiscipline and Corruption (WAIC) of Sani Abacha (1994-1998), as well as the failed Bank and Financial Malpractices Decree No.18 of 1994; and the money laundering decree No. 3 of 1995, as amended in 2003 and 2004 Money Laundering Acts. It is non arguable that the fight against corruption was never systematic and deliberate until the civilian administration of Olusegun Obasanjo with the emergence of the ICPC and the EFCC. However the inability of the former to effectively secure conviction in the law courts of individuals who Nigerians regarded as high profile corrupt individuals in its first three years of operation brought about some form of discontent among Nigerian itching for justice on these individuals regarded as sacred cows by the society, as well as the desire to redeem the country's image which was increasingly being dented in the international circle due to corruption resulting to the inclusion of Nigeria into the Financial Action Task Force (FATF) list of non-Cooperative Countries and Territories (NCCTS) in 2002 due to non-domicile of a Financial Intelligence Unit (FIU) in line with FATF laws. These conditioned the emergence of the EFCC (Enweremadu, 2011:8; Samuel., Aju.,and Elaiwu, 2014:25). Having identified the fact that the EFCC has the capacity to control corruption in Nigeria due to its wide range of power as well as support internationally, it is considered the most vibrant as far as combating corruption is concerned in Nigeria at least for the time being. Thus it is important to examine the EFCC and its role towards managing corruption in Nigeria. This is because "Nigeria cut an image in the world community as a country where no act of indiscipline would be too despicable to be imagined" (Federal Ministry of Information, 1984:16). Furthermore, "corruption in Nigeria has passed the alarming and entered the fatal stage and Nigeria will die if we keep pretending that she is only slightly indisposed" (Achebe in Agedah, 1993:67). From the foregoing, (Osoba, 1996:373-381), made a chronology of corruption development in Nigeria which he identified as: the monopoly of power by the colonialist which eventually transcended to the use of powers by politically influential Nigerians who become ministers, chairmen and members of public corporations (this power was only limited by the veto of ultimate colonial authority) over award of contracts for public projects, issuance of commodity buying agents' licenses, etc. This resulted in the emergence of ten percent "kickbacks" and other forms of corrupt practices during the period of decolonization (1952-60); During the immediate post independent era (1960-1966), the governing elites used state power and the state treasury to better their lot as well as other forms of corrupt practices which include fraudulent awards (including outright sale) of unsecured government loans, produce buying and import-licenses to cronies, inflation of contract values, etc. The intervention of the military in Nigeria's politics between 1966 and 1979 saw the foundation of kleptocracy in the nation's body polity especially the immediate post-civil-war era due to the emergence of the oil boom so that the Gowon's regime became seriously embattled with the Nigerian public over

wide spread corruption within the rank and file of his lieutenants. The Murtala regime's effort at sanitizing the body polity was short lived. On return to civilian government between 1979 and 1983, the country was plunged into deeper crisis of kleptocracy due to various forms of profligacy by the second republic politicians. On the second coming of the military and afterwards (1984 till date) corruption was developed to its highest possible level so that it has become what can be termed a 'viable industry' in that sense in Nigeria. On the other hand, (Ohiorhenuan, 2015:97-125), conceives corruption as the driving force for the evolution of institutions in Nigeria. It is however important to note that the various communities which were brought together to form what is presently defined as Nigeria negated the basic fundamentals of merit in one way or the other. Hence the basic characteristics of present forms of corrupt practices were present in their pristine form in these communities. All these have affected the development of the country in one way or the other. The above and more put the EFCC on the global spotlight due to its efforts at combating corruption in Nigeria.

III. THE POWERS OF THE EFCC IN MANAGING CORRUPTION IN NIGERIA

The role of EFCC in combating corruption in Nigeria lies within the legal framework relating to its powers and functions. These roles as guaranteed by the EFCC Act of 2004 are as follows:

- a. The enforcement and the due administration of the provision of the Act;
- b. The investigation of all financial crimes including advance fee fraud, money laundering, counterfeiting, illegal charge transfers, futures market fraud, fraudulent encashment of negotiable instruments, computer credit and fraud, contract scam, etc.
- c. The co-ordination and enforcement of all economic and financial crimes laws and enforcement functions conferred on any other person or authority;
- d. The adoption of measures to identify, trace, freeze, confiscate or seize proceeds derived from terrorist activities, economic and financial crime related offences or the properties the value of which corresponds to such proceeds;
- e. The adoption of measures to eradicate the commission of economic and financial crimes;
- f. The adoption of measures which include coordinate, preventive and regulatory actions, introduction and maintenance of investigative and control techniques on the prevention of economic and financial related crimes;
- g. The facilitation of rapid exchange of scientific and technical information and the conduct of joint operations geared towards the eradication of economic and financial crimes;
- h. The examination and investigation of all reported cases of economic and financial crimes with a view to identifying individuals, corporate bodies, or groups involved;
- i. The determination of the extent of financial loss and such other losses by government, private individuals or organization;

- j. Collaboration with government bodies both within and outside Nigeria carrying on functions wholly or in part analogous with those of the Commission concerning-
- I. The identification, determination of the whereabouts and activities of persons suspected of being involved in economic and financial crimes;
 - II. The movement of proceeds or properties from the commission of economic and financial and other related crimes;
 - III. The exchange of personnel or other experts;
 - IV. The establishment and maintenance of a system for monitoring international economic and financial crimes in order to identify suspicious transaction and person involved;
 - V. Maintaining data, statistics, records and reports on person, organizations, proceeds, properties, documents, or other items or assets involved in economic and financial crimes;
 - VI. Undertaking research and similar works with a view to determining the manifestation, extent, magnitude and effects of economic and financial crimes and advising government on appropriate intervention measures for combating same.
- k. Dealing with matters connected with extradition, deportation and mutual legal or other assistance between Nigeria and any other country involving economic and financial crimes;
- l. The collection of all reports relating to suspicious financial transaction, analyze and disseminate to all relevant government agencies;
- m. Taking charge of, supervising, controlling, coordinating all the responsibilities, functions and activities relating to the current investigation and prosecution of all offences connected with or relating to economic and financial crimes;
- n. The coordination of all existing, economic and financial crimes investigating units in Nigeria;
- o. Maintaining a liaison with the office of the Attorney-General of the Federation, the Nigeria Customs Services, the Immigration and Prison Service Board, the Central Bank of Nigeria, the Nigerian Deposits Insurance Corporation, the National Drug Law Enforcement Agency, all government security and law enforcement agencies and such other financial supervisory institutions involved in the eradications of economic and financial crimes;
- p. Carrying out and sustaining rigorous enlightenment campaign against economic and financial crimes within and outside Nigeria; and
- q. Carrying out such other activities as are necessary or expedient for the full discharge of all or the functions conferred on it under the 2004 Act.

Special Powers of the Commission

The Commission has power to:

- a. Cause investigations to be conducted as to whether any person, corporate body or organization has

committed an offence under the Act or other law relating to economic and financial crimes;

- b. Cause investigations to be conducted into the properties of any person if it appears to the Commission that the person's life style and extent of the properties are not justified by his source of income.

In addition to the powers conferred on the EFCC by the Act, it is also saddled with the responsibility of the coordinating agency for the enforcement of the provisions of:

- a. The money laundering Act 2004; 2003 No. 7. 1995 No. 13;
- b. The advance fee fraud and other related offences Act 1995;
- c. The failed banks (Recovery of Debt and Financial Malpractices in Banks) Act, as amended;
- d. The Banks and other Financial Institute Act 1991, as amended;
- e. Miscellaneous Offences Act; and
- f. Any other law or regulation relating to economic and financial crimes including the criminal code and penal code.

In summary, the EFCC is empowered to prevent any form of economic and financial crime in Nigeria; investigate and prosecute those involved in money laundering, embezzlement, bribery, smuggling, illegal arms transactions, oil bunkering, unauthorized mining, human trafficking, child labor, tax related offenses, cyber crimes, foreign exchange malpractices, currency counterfeiting, tracking, freezing as well as confiscation of sleaze wealth including those of terrorist outfits. Given the aforementioned functions of the EFCC as stipulated by its establishment Act 2004, the Commission would require other constitutional backing that would make it function more effectively and attain great height of success given the enormous task of controlling corruption in Nigeria, as well as the supervisory role which it is to play over other existing economic and financial crime investigating units in Nigeria. This is to avoid conflict within and between the corruption enforcement systems in Nigeria i.e. conflict between the EFCC, the Police, the Judiciary as well as the Independent Corrupt Practices and other Related Offences Commission (ICPC) in terms of reference with regards to arrest and prosecution of culprit(s) within the context of the rule of law.

It is equally important to note that the task of collecting all reports relating to suspicious financial transaction, as well as analyzing the same and disseminating them to all government agencies would limit the operations of the Commission. This is owing to the fact that the Commission would confine itself only to reports of such suspicious financial transactions as forwarded to it, as much may not involve itself in cases of like manner no matter how grievous if it does not receive reports on it. Furthermore the Commission is wanting with respect to section 7(1) of the EFCC 2004 Act. This is because the lifestyle and the extent of properties of a lot of past and present public officers in Nigeria cannot be justified by their source of income. As such one wonders the effort the

Commission is making towards the investigation of these set of individuals, or better still if the Commission would require another set of legal instrument to investigate these 'power elites.' The above may not be unconnected with the fact that the emolument of especially both the federal and state executives as well as federal legislators in Nigeria which would aid the efforts of the Commission in determining whose lifestyle is averse with his/her income are not published for the public. More so, the limits of the Commission's power in line with the 2004 Act have in one time or the other been subject to controversy. This was evident in the battle of supremacy between the EFCC past leader Mrs. Farida Waziri and the former Attorney-General and Minister of Justice, Muhammed Adokie whose assertion of supervisory authority over the Commission's activities especially the issues of arrest and prosecution of suspects which Waziri vehemently resisted. This said power tussle was born out of the provision of the Act 2004, 43 which states that: *The Attorney-General of the Federation may make rules or regulations with respect to the exercise of any of the duties, functions or power of the Commission under the Act.* Therefore, to avoid a repeat of the aforementioned, the Commission needs a clearly defined and unrestricted power to function optimally. This is because the present EFCC Act leaves more questions than answers in its present form.

IV. THE COORDINATION OF THE ACTIVITIES OF THE EFCC AIMED AT CONTROLLING CORRUPTION IN NIGERIA

The EFCC as an anti-graft agency has spelt out modus operandi in terms of how it coordinates its activities with regards to the control of corruption in Nigeria. The first step towards this is the fact that for the Commission to initiate any move towards involving itself with any case of corruption, it must receive petition with regards to the said issue. Such petitions would be forwarded to the Commission by individuals or organization(s). On the receipt of the petition(s), the Commission will evaluate them to determine whether the case falls within its schedule or mandate. Where the said petition(s) falls within its schedule or mandate, it would be accepted. Take for example as revealed by a witness on allegation of corruption against the former speaker of House of Representative.

On June 16, 2010, my colleagues and I were called by our unit head and our attention was drawn to a petition written against the accused person by Mr. Dino Melaye and some other members of the House. It bordered on the procurement of capital running in 2010, where it was alleged that there was a diversion of public funds, abuse of office and of due process. (Ogundele, 2012:8)

If the said petition falls within the purview of the EFCC, the next stage would be to investigate the claims as indicated in the said petition(s). To achieve this, the Commission would send a letter of invitation to the said individual(s) with the aim of questioning with regards to the allegation(s) in the petition. According to the EFCC Act 2004 (38)

1. The Commission shall seek and receive information from any person, authority, corporation or company without let or hindrance in respect of offences it is empowered to enforce under this Act.

2. A person who-

- a. Willfully obstructs the Commission or any authorized officer of the Commission in the exercise of any of the powers conferred on the Commission.....or
- b. Fails to comply with any lawful enquiry or requirements made by any authorized officer in accordance with the provisions of this Act, commits an offence under the Act and liable on conviction to imprisonment for a term not exceeding five years or to a fine not below the sum of N500,000 or to both such imprisonment and fine.

The Commission may arrest the said individual(s) alleged by the petition to be corrupt, detain them in order to effectively investigate the said claims against them. In which ever situation (whether the alleged corrupt person(s) were issued letters of invitation or arrested), the Commission would

1. Detain the said person(s) for more interrogation especially where it perceives no or low level of compliances with the said individual(s).
2. Release the said individual(s) where they find no concrete evidence with regards to the petition against the person(s); or on personal worth.

The second option accounts largely for the multiple of issues reported by the national dailies which by and large ends without further information on the individual(s) concerned. These arrests and investigations are usually carried out by the general and Assets investigation unit of the Commission. According to the EFCC Act 2004, 13(1) the General and Assets Investigation Unit shall be charged with responsibility for-

- a. The prevention and detection of offences in violation of the provisions of the Act;
- b. The arrest and apprehension of economic and financial crime perpetrators;
- c. The investigation of assets and properties of persons arrested for committing any offence under the Act;
- d. The identification and trace of proceeds and properties involved in any offence under the Act and the forfeiture of such proceeds and properties to the Federal Government; and
- e. Dealing with matters connected with extradition and mutual assistance in criminal matters involving economic and financial crimes.

With regards to extraditions, the Commission works in collaboration with other FIUs globally for the extradition of person(s) either into Nigeria or out of the Country to answer corruption charges leveled against them.

3. Prosecute the said individual(s) where through investigations, concrete evidence shows that the said individual(s) were indeed corrupt as stated or otherwise by the petition. The legal and prosecution unit of the Commission files a motion of corruption in court against the said individuals(s) given the number of charges discovered by the investigation unit against the person(s).

According to the EFCC Act 2004, 13 (2a), *the Legal and Prosecution Unit shall be charged with the responsibility for prosecuting offenders under the Act.* Once a motion of corruption is filed, the Commission through this unit follows the required legal procedure until the case is concluded in the law court which may be a conviction of the accused, a discharge or striking out of the case for lack of substantial evidence. It is however important to note that once proceeding in respect of any criminal (corruption) matter brought before the court by the Commission commences, the court will not entertain an application to stay the Proceedings (appeal against interlocutory ruling) until the High Court delivers judgment on the matter(s). This fact is made clear by the EFCC act 2004, 40. "Subject to the provisions of the constitution of the Federal Republic of Nigeria 1999, an application for stay of proceedings in respect of any criminal matter brought by the Commission before the High Court shall not be entertained until judgment is delivered by the High Court."

V. THE IMPACT OF THE EFCC ON THE CONTROL OF CORRUPTION IN NIGERIA

The impact of the EFCC in combating corruption in Nigeria can be correlated to the number of arrests, prosecution and conviction of individuals, corporate bodies, etc involved in one form of corrupt practice or the other from its inception in 2004 till date in Nigeria. The EFCC operation at fighting corruption in Nigeria has resulted to a good number of arrests, detentions, trials and conviction of about 200 persons on various charges of corruption in 2007 alone, and higher with about 25% of the above figure in 2008. The Commission arrested, prosecuted and secured conviction on some past chief executives of some state and some well placed Nigerians e.g. Jolly Nyame of Taraba state, Joshua Dariye of Plateau State, Saminu Turaki of Jigawa state, Diepreye Solomon Alamiyeseigha of Bayelsa state, Oriji Uzoh Kalu of Abia state, Tafa Balogun former Inspector General of Police. Mrs. Irene Chigbue Director-General of Bureau of Public Enterprise (BPE) was also questioned by the EFCC on issues bordering on some transaction of the Privatization Agency. Other efforts include: charging of ex-US vice President- Dick Cheney in 2010 over bribery scandal involving an engineering firm, KBR, a subsidiary of Halliburton which pleaded guilty of paying 180 million dollars in bribe to Nigeria officials prior to 2006 when it was a subsidiary of Halliburton; the arrest of six top Ogun state government house officials in July 2010 over alleged N41.7billion fraud. Those affected include: Badejo Ajiola, Ganiyu Sa'id, Sola Okanlawon, Odunlami Toyin, Modupe Akinlola, and Ibrahim Aladele. All the officials were staff of the Ogun state government House Accounting Department. (Aiyetan, 2007:23-25; Adeyemo, and Yishau, 2007: 27; Onyechere, 2004:3-6); The arrest and detention of former House of Representatives speaker Dimeji Bankole in June 2011 over N10billion loan obtained by the House which was alleged grossly mismanage (Yusuf, 2011:1&2); the arrest of former governors Adebayo Aloo-Akala of Oyo state, Aliyu Akwe-Doma of Nassarawa state, and Gbenga Daniels of Ogun state in October of 2011 for allegedly misappropriating public funds amounting to about N101 billion while in office as Chief Executives of their various states (Ganagana., and Adebayo, 2011: 5); the

slamming of one time governor of Bayelsa state, chief Timipre Sylva on a six-court charge in February 2012 for alleged mismanagement of N2.45billion state fund. (Ogundele, 2012:5); seizing of six properties including a hotel and four falling stations in March 2012 from a former director of Pension Administration in the office of the Head of Civil Service of the Federation Dr. Sani Teidi Shuaibu who stood trail over N4.56billion pension scam (Yusuf, 2012:1&2). The arrest of the Ondo State Oil Producing Communities Development Commission's chairman Mr. Debo Ajimuda in march 2012 over alleged N61.63billion fraud (Yusuf, 2012:6); prosecution of one time governor of Adamawa state Muritala Nyako and his son-Senator Abdullaziz Nyako on allegation of N15 billion money laundering offences, in July of 2015 (Oyesin., and Onani 2015:6); the interrogation of former governor of Kebbi state-Saidu Dakingari over alleged mismanagement of N3.8 billion by the EFCC in October of 2015 (Yusuf, 2015:5), the investigation and prosecution of about ₦2 billion arms deal by the former National Security Adviser Sambo Dasuki and others (Obalonye, 2015: 18; Yusuf, 2015:1&6) just to mention but a few.

While the ICPC charged 4 individuals to court for various acts of corruption in its first year of operation, 23 persons by the end of its second year of operation, 49 persons towards the end of 2003, and 185 persons in 2006; by October of 2008 the figure rose to 309. Correspondingly, the ICPC recovered N212 million in 2005, N3.9 billion in 2006, and about N4.7 billion in 2007; the ICPC seized cash and assets worth about N8 billion between November 2011-october 2015, received about 4,299 petitions out of which 3,764 were referred for investigation, 899 were concluded, while 170 of these filed for prosecution for various financial crimes (Enweremadu, 2011:8; Ojo, 2015:6; Ogunesan, 2015:43). The EFCC on its own part recovered about 11 billion dollars, and prevented the loss of over 15 billion dollars through scam business proposals and contracts; The Commission secured over 650 convictions between 2008 and 2011 under Farida Waziri's leadership, prosecuted about 75 high profile cases in court. Furthermore, over 5,000 fraudulent email addresses have also been shut down by the Commission and 80 suspects with regard to the fraudulent address faced trails between 2008 and 2011 (Nanaghan, 2011:20). Under the leadership of Ibrahim Lamorde: the agency secured about 117 court convictions in 2013; secured 126 convictions in 2014; and recovered about 925,000 dollars between January 2013 and August 2015. According to (Ndujihe, 2015) most of these convictions are low profile cases or what he termed "petty thieves" due to the fact that cases involving a host of former governors, ministers and lawmakers are pending, The EFCC made enormous contribution towards controlling advance fee fraud (a.k.a. 419), illegal oil bunkering, as well as investigation of corrupt practice in both the upstream and down-stream sector of Nigeria's petroleum industry, capital market fraud, bank fraud as well as recovered over N5billion from investigation into oil subsidy fraud and prosecuted more than 40 suspects in connection with the fraud; secured at least one conviction on the pension fraud matter and recovered property worth over N1billion as at 2014. On a general note, the EFCC stopped corrupt politicians from contesting election in 2007 in Nigeria.

(League for Human Rights, 2007:1; Ewerenmadu, 2010:10; Ojo, 2012:7), and recorded over 1000 convictions in its first 10 years of operation as well as recovered about \$2trillion in 12 years (2004-2016) as revealed by the Attorney-General of the Federation and Minister of Justice Abubakar Malami, SAN in February of 2016 (Nochiri 2016:1 and 5). The effort of the Commission helped greatly in banking consolidation as well as guaranteeing of depositors' monies in the bank due to its check on failed banks (Zero Tolerance, 2008:26; Our Milestone, 2010:6) The Commission was instrumental in the restoration of foreign direct investment (FDI) in Nigeria. The activities of the EFCC was critical in securing the extraordinary 18 billion dollars debt forgiveness to Nigeria by the Paris Club in 2005, and the subsequent payment of 12 billion dollars to upset the remaining. The Commission was also instrumental to the removal of Nigeria from the Financial Times –Financial Action Task Force (FT- FATF) list of non – Cooperative countries and Territories (NCCTS), and the admission of Nigeria's Financial Unit (NFIU) into the Elite Egmont groups of Financial Intelligence Unit (FIUs) in 2007 (Zero Tolerance, 2009:51). The Commission's effort assisted in the improvement of Nigeria's rating by the transparency international from a rock bottom no. 2 listing in 2007 to the modest rise of no. 143 out of 183 countries on a global scale of integrity profile in 2011. In 2012, the country was ranked 139th out of 176 countries surveyed with 2.7 points; in 2013 it ranked 136th out of 144 with 2.5 out of 10 points; in 2014, the nation was ranked 136th out of 174 countries surveyed with 2.7 out of 10 points; while in 2015, it ranked 136th out of 168 countries surveyed with 2.6 points out of 10 (The TI rating considers scores below 5 out of 10 points as corruption area; from 5 to 10 out of 10 points as non-corrupt area. This means the more a country is rated below 5 points down to 0 point determines how corrupt the country is, and the closer to 10 points from 5 points determine how corrupt free the country is. However, 10 points out 10 means absolutely free from corruption, while 0 out of 10 points means absolutely corrupt) more so, factors which accounts for the rating of countries as either corrupt or non-corrupt include: level of press freedom; access to budgetary information including proper public accountability; level of integrity among public office holders; level of judicial independence as well as proper dispensation of justice between and among the classes in the country otherwise referred to as *equality before the law*. (Transparency International: 2012; 2013; 2014 and 2015). The same can be said of the Fitch rating of Nigeria's economic outlook from negative to stable in 2011 and beyond. In August of 2015, the UK established the International Corruption Unit (ICU) under the UK National Crime Agency (NCA) to investigate incidences of bribery as well as money laundering by corrupt foreign officials (particularly involving the Global South countries) and their associates; trace and recover these sleaze wealth in any part of the world; as well as assist foreign anti-corruption Commissions investigate incidences of graft involving their nationals in the UK and other places. This is aimed at making the UK unsafe for these power elites who maybe above the laws of their countries, hence cannot be touched. However the ICU acts on the basis of information provided to it by the foreign government(s) and the NCA. The

EFCC is enjoying a great deal of collaboration and support from this agency with the aim of tracking stolen monies from the country over the years.

On the issue of accountability by public office holders and bureaucrats as a result of the operations of the EFCC on the control of corruption, evidence shows that:

since the founding of the EFCC till date there are more than enough examples to illustrate the Culpability of public officials who abused the process, there are cases of serving ministers offering bribes to pass budgets, cases of permanent secretaries who compromise themselves through outright theft, cases of ministries where deals were made of salaries and numerous abuses at state level of the ecology fund, fertilizer scams and other examples of sleazy practices in government. (Ribadu, 2004:5-8).

The aforementioned result was achieved due to improvement in accountability by public officials and bureaucrats to avoid indictment by the EFCC. Further evidences show that:

Before 1999, there were laws, regulations, constitutional provisions that addressed issues of accountability in public service and by extension corruption.... but these provisions and institutions were weak or rendered weak especially by military interventions in governance. But the texture of our focus on combating corruption changed after 1999 with establishment of... the economic and financial crimes commission (EFCC). The focus has been to bring to book those who contravene the law against corruption by diverting public resources into private pockets. Good results have been achieved and are being achieved. (Hambagba, 2007:2-3)

Furthermore the EFCC's operation is enhanced by:

1. The Code of Conduct Act which demands an obligation on assets declaration which is somewhat functioning now;
2. Financial intelligence Unit (FIU) which is now actively in place monitoring and implementing the money laundering laws of the country. Its membership of the Egmont group of global FIUs means that no unwholesome deal by Nigerians anywhere in the world is total hidden
3. Money laundering prohibition Act 2004, (1) and 2(1) i.e., no person or body corporate shall, except in a transaction through a financial institution, make or accept cash payment of a sum exceeding

a. N500, 000 or its equivalent, in the case of an individual, or

b. N2, 000,000 or its equivalent in the case of a body corporate

The transfer to or from a foreign country of funds or securities of a sum exceeding US 10,000 dollars or its equivalent by any person or body corporate shall be reported to the Central Bank Of Nigeria or Security and Exchange Commission.

4. Money laundering prohibition Acts 2004: 10(1) which says a financial institution or designated non-financial institution shall report to the Commission and Agency in writing within 7 days any single transaction, lodgment or transfer of funds in excess of

a. N1, 000,000 or its equivalent in the case of an individual or

b. N5, 000,000 or its equivalent in the case of a body corporate

Given the issues discussed, one cannot but appreciate the impact of the EFCC in controlling corruption in Nigeria so far. Notably: the arrests; detention; arraignment; and conviction of some ex-chief executives of states, and other highly placed Nigerians. However, these can be said to be pseudo-results or partial success owing to the fact that the Commission's operations towards corruption control appears to be selective if placed on revelation by Lai Mohammed in January of 2016 that 55 Nigerians stole 1.34 trillion naira between 2006 and 2013 from the national treasury. Those involved include: 15 former governors, alleged with 146.84 billion; 4 former ministers, alleged for 7 billion; 12 former public servants at federal and state levels, said to have stolen over 14 billion; 8 persons in the banking sector, alleged to have stolen 524 billion; and 11 businessmen alleged with 653 billion. According to (Fayose in Balogun 2016:11),

...the publicized arrest of president Buhari's associate and All Progressive Congress (APC) chieftain, Jafaru Isa, and the reported refund of N100 million to the EFCC as the first trick used by the federal government in its attempt to deceive Nigerians into believing that the fight against corruption was not selective.

The point being made is that what is good for the goose is good for the gander. The fact remains that for the EFCC to perform beyond average, and deliver excellent and efficient anti-graft crusade, Nigeria needs a Federal Chief Executive (President) who will be ready to commit class suicide i.e. Damn all consequences and negate all the ethics and principles which sustain the power elites groups in the country. It is not out of place to note that this is the direction the current anti-corruption war in Nigeria is directed towards, but more needs to be done. One question which needs to be addressed is, if the 'strong General' Sani Abacha was alive, would there be anything referred to, or termed the 'Abacha loot?' which the Federal Government and the EFCC pursued with so much vigor and professionalism to recover (about 1 trillion dollars in sum) from Switzerland (Akano, 2015:1). This question is important because a good number of past political leaders at both the Federal and State levels have not been questioned with regards to their stewardship let alone attaching the concept 'loot' to their names. Therefore, one would be tempted to ask what action(s) the EFCC has taken with regards to section 7(1) of the EFCC Act 2004 especially with regards to: the excess oil revenue which the country immersed during the gulf-war (1990-1991) during Babangida regime which about N12billion oil wind fall was not accounted for during the period as revealed by the Okigbo Panel which was submitted to late General Sani Abacha on August 29, 1994; the allegation of over 900 billion dollars which was contained in a petition by the Conference of Nigeria Political Parties (CNPP) to the EFCC against on time president of Nigeria, (Ogundele, 2007) just to mention but a few. Therefore, for the EFCC to be free from bias and the accusation of being biased there must be no sacred cow in its operations towards real or imagined corrupt individuals in Nigeria. Their operations should be void of favoritism and respect for power elites. As such all past public office holders should be invited for questioning by the Commission to determine the level of

their uprightness while in office, whoever is found to have enriched him/her self through corrupt means should not be spared the full wrath of the law. This is the only way the Commission would free Nigeria from the hands of assumed or real power elites who divert public funds into their pockets and turn around to make policies or sponsor policy makers in Nigeria. This is important because according to (Dewey in Guerin, 1993:10), "because response is in effect a classification of stimulus, the organism is in effect confronted with the problem of an indeterminate stimulus. How the conflict is resolved will shape how the organism responds to future stimulus." The import of this statement is that, the measure(s) taken in response to corruption, would determine the extent to which the particular corrupt act(s) reduce(s) or otherwise in the given society as well as shape the general outlook of the agency in charge of its management and control. Therefore being selective in fighting corruption would in no way bring about its reduction let alone elimination in any society and Nigeria will not be an exception.

VI. IMPEDIMENTS AGAINST EFFECTIVE CONTROL OF CORRUPTION BY THE EFCC IN NIGERIA

Given the impact of the operations of the EFCC in controlling corruption in Nigeria, one would be tempted to assume that the Commission is not confronted with challenges. However, on the contrary, the EFCC in its bid to regulate or combat corruption in Nigeria is faced with Hercules challenges. One of the challenges confronting the EFCC as such stands as impediment against effective control of corruption by the Commission is the unfriendly judicial process in the country. The legal tools of stay/delay of proceedings in the prosecution of corruption cases has resulted in about 2,000 unfinished cases of the Commission outstanding in courts spread across the country as at 2011 (Nanaghan, 2011:20). This is an impediment to effective control of corruption by the EFCC in Nigeria. This is so because the Commission's duties end with the arrest investigation and prosecution of offenders. While on the other hand the trial (delayed or speedily) as well as passing of judgment on persons on corruption charges, is the exclusive reserve of the judiciary. The dragging of feet by the judiciary in the execution or dispensing of justice concerning corruption cases brought before it by the EFCC is a challenge to effective control of corruption by the EFCC. To overcome some of these judicial encumbrances faced by the EFCC in its effort towards combating corruption in Nigeria, establishing special courts for the Commission have been suggested a number of times by concerned Nigerians and indeed the Commission itself. However, the judicial reform panel kicked against this idea in 2012. Closely related to this is the weak legal instrument which guides the functions of the agency. It is pertinent to note that the inadequacy of anti-graft laws which works hand in hand with the judicial process in Nigeria grossly hampers the activities of the Commission. Perhaps the most challenging within the context of judicial process and legal provision is the attempt of placing the Commission's activities (arrest and prosecution) under the supervisory authority of the Attorney-General of the Federation. If this move succeeds, it means that the Commission has been turned into a toothless bulldog – since their operations would be

conditioned by the dictate of the Attorney General. According to section 43 of the EFCC Act 2004, "the Attorney-General of the Federation may make rules or regulations with respect to the exercise of any of the duties, functions or power of the Commission under the Act."

Another impediment to the effective control of corruption by the EFCC in Nigeria is the issue of meddling in the Commission's activities by politicians interested in the cases of arrested persons suspected to be corrupt by the EFCC especially if the individual(s) in question are high profiled individuals in the country. For example,

...controversies may have offered the government a rare opportunity to re-assess its war against corruption crusade and take real steps at building a real institution that is free from the encumbrance of political interference which has been the bane of the commission.....it was a common knowledge that Ribadu's achievements were impaired by the undue interference from his principal, former president Olusegun Obasanjo. (Agbaje, 2011: 7)

There are evidences that the EFCC was constantly under pressure from formidable political interests which cut across political lines from both the executive and legislative arms of government, especially at the National Assembly and the Governor's forum most importantly where one of their own is involved. A good example is the outright condemnation by Olusegun Obasanjo of the report of the investigation of corruption against Chief Olabode George, the Chairman of the Nigerian Ports Authority (NPA) which indicted him (George) and other management members of the NPA over violations of government rules and regulations with regards to award of contracts and as such should be sanctioned for contract splitting and inflation of the prices of contracts (ibid), even though (him) chief Bode George was later arrested in August 2008 and arraigned on a 163 count-charge which include conspiracy, disobedience to lawful order, abuse of office and illegal award of contracts to the tune of 84 billion with regards to the aforementioned report which the former president Obasanjo had earlier rejected. Chief George was found guilty and sentenced to 30 months imprisonment in October 2009. Ribadu the foremost EFCC chairman put this succinctly by commenting that there are other criminals walking Nigeria streets free because of either their smartness or connection to certain or some influential individuals. In his view, the efforts made by the Commission in its first five years of operation in stamping out corruption in Nigeria was deliberately weakened by corrupt individuals (power elites) in high places who handed the Commission to those it had brought to justice in time past. To him, corruption is fighting back and one of the ways it hopes to succeed is to have a weak or completely compromised Commission.

Effective control of corruption by the EFCC in Nigeria is hampered by the non-security of job of the EFCC chair person. Take for instance, the EFCC Act 2004, 2(3), and 3(2) states that:

The chairman and members of the commission other than ex-officer members shall be appointed by the president and the appointment shall be subject to confirmation of the senate. A member of the committee may at any time be removed by the president for inability to discharge the function of his office

(whether arising from infirmity of mind or body or any other cause) or for misconduct or if the president is satisfied that it is not for the interest of the commission or the interest of the public that the member should continue in office.

The implication of the aforementioned is that the Commissioner's high ranking officials are by extension part of the executive arm and as such expected to walk and work in line to the expectation of their boss (the president) as well as trade with caution on issues which concerns the legislative arm in order not to be seen or perceived as being ungrateful to those that sanctioned their appointment. This is an impediment to the effective control of corruption by the EFCC. This is so because if in any case, the president or members of the legislature places a demand on the Commission to, for example stay off a particular case of corruption and it acts otherwise, the possibility of someone losing his/her job is very high. The removal of Farida Waziri as the EFCC chairman is a typical example. *....there had been intense lobby especially from the House of Representatives and some highly Influential politicians to get her out of office. The ex-speaker Dimeji Bankole case actually gave her a lot of trouble and at a point, she was in a dilemma. (Murphy., and Adetutu 2011:6).* The case cannot be said to be different with the laying off of Ibrahim Lamorde as the EFCC boss by the Buhari government in November of 2015 without any stated reason thus bringing in Ibrahim Mustafa Magu as the Commission's new boss even though "the EFCC went into slumber under Lamorde. All the things you are seeing today are mere cosmetics to show to get the attention of President Buhari" (Abdullahi., Wakili., and Mudashiru, 2015:1 and 6). The point being made is that in so far as the Commission's high ranking officials are at risk of being fired by those that employed them, or better still by the Commander in-Chief, they (the EFCC officials) would be tempted to act in accordance with the dictates of their boss in order to stay on their job. The possible outcome would be the agency acting swiftly and with full vigor in any case of corruption, which their employers give their blessings to and acting slowly or completely inactive in any case of corruption which is not sanctioned by their employers. Closely related to the aforementioned is the issue of constitutional immunity which guarantees that certain public office holders in Nigeria are not justiciable while in office. Simple put that no matter the degree of their action(s) which may generally be defined as corrupt, the EFCC do not have the constitutional backing to investigate, arrest or prosecute these set of public office holders (power elite) while they are still serving. This immunity is an impediment to the effective control of corruption by the EFCC in Nigeria. It is clearly states that:

- (1) Notwithstanding anything to the contrary in this Constitution, but subject to subsection (2) of this section-
 - a. No civil or criminal proceedings shall be instituted or continued against a person to whom this section applies during his period of office:
 - b. A person to whom this section applies shall not be arrested or imprisoned during that period either in pursuance of the process of any court or otherwise; and

- c. No process of any court requiring or compelling the appearance of a person to whom this section applies, shall be applied for or issued;

Provided that in ascertaining whether any period of limitation has expired for the purposes of any proceedings against a person to whom this section applies, no account shall be taken of his period of office.

- (2) The provision of subsection (1) of this section shall not apply to civil proceedings against a person to whom this section applies in his official capacity or to civil or criminal proceedings in which such a person is only a nominal party.
- (3) This section applies to a person holding the office of President or Vice President, Governor or Deputy Governor, and the reference in this section to "period of office" is a reference to the period during which the person holding such office is required to perform the functions of the office.

Section (308) of 1999's Constitution of the Federal Republic of Nigeria.

Despite the efforts being made at controlling corruption in Nigeria by the EFCC, the fight against corruption in the country is still a long one. This can be attributed to the impediments which stands against the effective control of the phenomenon by the EFCC which cannot be pushed aside just by mere wave of the hand or wishful thinking. Take for instance if the president and his vice, state governors and their deputies are corrupt and the anti-graft agency is incapacitated at the face of such actions due to constitutional provision(s) which compels them to stay action, this is more than enough impediment to the effective control of corruption, according to (Yusuf, 2012:1&4) "Is this not why the country's anti-corruption efforts have not achieved anything? Can the EFCC... Honestly and boldly fight corruption when the president is knee-deep in the mud of corruption." The point being made is that "Nobody in Nigeria deserves the right to be protected by law when looting public funds" (Fabi, 2008).

Another impediment to the smooth operation of the Commission's activities is lack of financial autonomy. It is important to note that whoso pays the bills largely determines what or what ought not to be. For instance in 2013, out of the N10.32billion approved for the Commission, N10.21billion which represents 99 percent was utilized by it. On the other hand, the 2014 fiscal year indicates that the agency proposed N21.058billion while N10.245billion was proposed by the Budget office for the same period for it. It is important to note that insufficient funding of the agency pose great challenge to its operations as such may make its staff vulnerable. The point being made is that if the Commission has an independent means of generating its finances and not reliance on government, it will make adequate budget on the basis of its requirement for effective operations. Furthermore, no power elite would use any form of influence or conspiracy to weaken it due to reliance on government for its funding or insufficient funds. This may not be unconnected with the allegation that corruption occurs within confide of the Commission itself. The EFCC was accused of diverting proceeds realized from

convicted corrupt individuals. For example a onetime Inspector General of Police, Tafa Balogun and onetime governor of Bayelsa state, Chief Diepreye Solomon Alamiyeseigha for which the Federal Government okayed the probe of the then Commission's chairman- Ibrahim Lamorde based on a petition written by a whistle blower, one George Uboh which accused the Commission of diverting about N1trillion of recovered loot (Nnochiri, 2015); and the allegation of the Agency being used as witch hunting instrument for settling of political scores by the powers that be. Simply put that the Commission sometimes misuse its powers. This view is held by some sections of the Nigerian public especially those within the legal profession (some lawyers and human right activist). Some journalist and academicians who perceive the impact of the operations of the EFCC in its control of corruption in Nigerian as not a success story even though they recognize the fact that some reasonable achievements have been recorded by the EFCC since its inception especially in such cases like advance fee fraud, money laundering and other related offences. Their argument is premised on the fact that dread and not reverence for the Commission is what seems to make the Commission successful i.e., it is not because of thoroughness by the Commission in its operations such that suspects cannot successfully defend the allegations leveled against them, rather, the manner in which the Commission carry out its operations – exercise of its powers over issues of corruption. It is revealed that the Commission engages in unlawful arrest, or acts beyond its powers as indicated by Keyamo (2007, August 12) open letter to Yar'adua on EFCC Sunday Sun pp.15. For example, the EFCC was asked by the Federal High Court in Lagos to pay N5million damages to Hair Prestige Manufacturing Nigeria limited and Prestige Hair Fashion Nigerian limited as well as their directors Gnanhoue Nazaire and Senou Modesta for sealing up their companies and freezing their bank accounts without a court order (Jibueze, 2015:7). The above may not be unconnected with the Steve Orosanye Report of Nation's enquiry in 2012 which recommended the scrapping of both the EFCC and the ICPC (Yishau, 2012:10), or better still, merging the two Agencies as have been further suggested.

VII. CONCLUSION

Corruption is a viral ailment which hinders the socio-political and economic development of the entire global system. Efforts have been made and still ongoing in different parts of the world to at least bring it to a bearable minimum. Nigeria after various attempts with little or no success in managing the menace, established the EFCC. The agency has recorded significant achievements toward this end but these are not void of various challenges. These challenges stand as impediments to the smooth operation of the Commission towards making Nigeria corruption free. This paper holds that if the impediments against the EFCC in controlling corruption are addressed, the Commission's effort would go a long way in addressing corruption in the country.

VIII. RECOMMENDATIONS

The Commission must be deliberately freed from the shackles of the hindering judicial process of the country by establishing

special courts for it to prosecute corruption cases. This will go a long way in reducing the number of awaiting cases and trials on account of corruption. There should be live coverage of the Commission's cases in these special courts. This is to clear any form of doubt or otherwise of the public with regards to the merit /demerit of conviction(s) or acquittal(s) of individuals indicted for corruption. This way, the general public will directly or indirectly become active players with regards to decisions on corruption matters.

The present legalist approach of the Commission in combating corruption must be augmented with intelligence gathering approach in order to build and establish strong substantial evidence(s) against those alleged to be corrupt as well as crowned with social justice approach which requires individual members of the public and indeed various communities and groups, to not only volunteer information on suspected corrupt individuals in their midst, but also desist from conferring award(s) on these individuals and also withdraw the privileges and primordial protection they enjoy from the said community or group (the importance of intelligence and social approach will transform the Commission's operation from reactive to proactive one. This will nip corruption in the bud-since the awareness that some unidentified individual are undercover agents in ministries, agencies, etc would force compliance to work ethics directly or indirectly as well as the prevalence of the rule of law. This we believe will bring about drastic reduction on incidences of corruption). This will provide these power elites with no place to hide especially now that the international community is taking the fight against corruption seriously and as such no longer provide safe haven for these corrupt individuals and their sleazy wealth.

According to section 23 of the 1999 constitution of the Federal Republic of Nigeria, the national ethics shall be discipline, integrity, dignity of labor, social justice, religious tolerance, self-reliance and patriotism. Section 24(F) stipulates that, it shall be the duty of every citizen to declare his income honestly to appropriate and lawful agencies and pay his tax promptly. The aforementioned need to be translated into practical reality by Nigerians, that is, reorientation of our daily conducts in line with these constitutional demands. If this is achieved, corruption will gradually fade in Nigeria and become history.

The Commission must be completely independent of both the executive and legislative influences (power elite influences) which militate against their smooth operations. To achieve this, the Commission's funding must be independent of government budgetary allocation. We advocate for the retention of between 5-10 percent of proceeds recovered from looters by the Commission as well as support from international agencies of repute.

Convicted corrupt individuals shall not only refund the said sums of stolen monies and assets acquired, but must pay calculated interest on this sleaze wealth as well as serve stipulated number of prison term(s). This we believe will serve as deterrence to others. The import of the above is that the country's anti-graft laws must be re-evaluated on the basis of its adequacy and inadequacy as such amended to repeal all forms of obstacle against the activities of the agency as well as

make penalty for corrupt practices to reflect the above recommendation. This will make the agency very effective and efficient in pursuing its objectives. Therefore to effectively control corruption in Nigeria, there shall not be sacred cows. This means that the constitution of the Federal Republic shall be above. As such, section 308 of the 1999 Nigerian constitution which shields Chief Executives in Nigeria through its immunity clause should be repealed if any meaningful progress is to be made towards reducing or eventual elimination of corrupt practices among public office holders. If federal and state chief executives (the president, vice president, state governors, and deputy state governors), are arraigned before the law court while still in office on account of corruption and convicted, then other private and public office holders would know that there are no sacred cows and as such, no place to hide when it comes to fighting corruption. This would help in no small measure in removing impediments on the path of the EFCC; as well drastically reduce corruption to the barest minimum in the country.

The emolument of political office holders at all tiers of government should be publicly published. This way the public and indeed the EFCC would not be in doubt of those living above their means. This we believe will translate section 7(1) of the EFCC 2004 Act to success it empirical evidences would abound with regards to property acquisition and amount of monies at one's disposal.

There should be continuous collaboration between the Commission and other Financial Intelligence Units (FTUs) across the globe, as well as exchange of ideas and continuous training of staff of the agency to meet with current technological changes brought about by the neoliberal telecommunication age. This is one of the ways in which the Commission can succeed in tackling cyber crimes and other transnational economic and financial crimes

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Secure User Data in Cloud Computing through Prevention of Service Traffic Hijacking and Using Encryption Algorithms

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Abstract- Cloud computing has become an emerging technology infrastructure in the IT industry. Reasons for the sudden boom of this model were the advantages it offers to the users. Cloud computing is a service over a network connection which shares enormous amount of resources rather than having to build the infrastructure in house. Other than sharing resources cloud computing offers flexibility, reduced capital costs, achieving economies of scale, globalize workforce etc. Cloud computing technology has some serious drawbacks which now has overrun the benefits it offers. The security of the user data is crucial when adopting a cloud computing model. Several methods have been implemented in securing user data such introducing encryption algorithms. Service traffic hijacking creates a major concern on using cloud computing for this allows the hacker to access the credentials of the genuine user hence he or she can eavesdrop on the user's activities and transactions, manipulate user data, return false information and redirect your client to illegitimate sites. In this paper we propose remediation to prevent intruders of accessing unauthorized data and using and encryption algorithm efficiently to neutralize the security threats.

Index Terms- Cloud Computing, Data Security, Encryption, Algorithms, Service Traffic Hijacking, Issues and Threats.

I. INTRODUCTION

Today CLOUD COMPUTING represents one of this era's most significant shift in the IT industry. This model reaches the point where utilizing the resources among sharing through a virtual network while offering practical benefits to different sets of stakeholders which search upon different needs. By releasing a pool of resources to the network where to access requesting an authentication spanning of organization area has become much simpler than old days. Cloud computing can be referred as a system which provides IT facilities 'as a service' to the end user in the network. Achieving economies of scales, flexibility, capital-expenditure free, increased collaboration, competitiveness, globalizing workforce and document control are some major benefits cloud computing has to offer. Carrying all the advantages some concerns make us to rethink using this model. Mainly users are stuck with risks associated with cloud computing when security measurements are not implemented wisely. This results in hijacking the user credentials, data loss, data manipulation and various kind of issues.

II. BACKGROUND AND RELATED WORKS

The service model of the cloud computing is distributed into three key groups (a) IaaS (infrastructure as a service), compute properties, enhanced by storage and networking competencies are owned and hosted by a service provider and presented to consumers on-demand. (b) PaaS (platform as a service), is used for applications, and other development, while providing cloud components to software. (c) SaaS (software as a service) lets the external user to access online applications and software that are hosted by the third party [1] [7]. Cloud computing is also can compare to grid computing. By using the cloud computing users can access to the applications from anywhere in the world. Therefore cloud computing infrastructure is also can introduce as a kind of parallel and distributed systems [4]. There are many type of cloud infrastructures implemented. In private clouds; Services are provided exclusively to trusted users via a single-tenant operating environment. An organization's data center give cloud computing services to clients who may or may not be in the premises [16]. Public clouds are the contradictory: services are offered to individuals and organizations who want to retain elasticity and responsibility without fascinating the full costs of in-house infrastructures [16]. Public cloud users are treated as untrustworthy. There are also hybrid clouds [16] [17]. The Cloud Computing has been envisioned to the next-generation design of IT Enterprise. It transports the application software and databases to the integrated huge data cores, where the management of the data and services may not be fully trustworthy. This kind of unique paradigm brings about more new security problems, which have not been well recognized. The Security solutions have to make a trade-off between the amount of security and its performance and impact on the end-user experiences. This is the accentuated in a cloud computing environment users desiring different level of security share the same resources. An important issue for cloud computing is the observation of security, which is beyond the basic technical details of security solutions [18]. And the security is the most important factor in cloud computing. This issue make a threat in securing the consumer data. To make consumer data to be secure, it is necessary to implement an efficient and secure data access control method. There are so many security challenges and threats in cloud computing. These are some of them. Abuse and nefarious use of cloud computing, malicious insiders, shared technology weaknesses, data harm and service traffic hijacking and etc.

Attribute Based Encryption is a technique which we can use to secure consumer data. In encryption technique there are some advanced encryption algorithms that can be applied to the cloud computing to increase the protection of privacy. Attribute-based encryption is one of those algorithms [5]. Another encryption method to secure data in a cloud environment RSA encryption method. RSA encryption method uses a cryptographic algorithm where the encryption key is public and varies from the decryption key which is kept top-secret. DES is another method where it uses symmetric key for both encryption and decryption [1].

RSA is asymmetric encryption and decryption algorithm. How this algorithm does the magic is it encrypts the user data for security purposes so that only the genuine authorized user can access the data. Data will be stored on the cloud and depending on the user requests the data will be delivered. In this scenario the public key is known to everyone but the private key is known only by the authorized user. After the user authentication at the cloud environment data which was encrypted using the public key by the cloud service provider the requested data will be decrypted by the cloud user using the private key. Data encryption standard known as DES encrypt data within blocks with the size of 64 bits each. This produces 64 bits of cipher text. And the same key is used for encryption and decryption which the size of the key of this algorithm goes up to 56 bits. The initial vector size is 64 bit as mentioned above and the security is applied for both provider and user [2]. There are some more valuable and high quality encryption algorithms which can be applied into the cloud computing to increase the protection of privacy. ABE, Key-policy (KP-ABE), Ciphertext-policy (CP-ABE), ABE with Non-monotonic Access Structures are some of those algorithms. In the CP-ABE algorithm, it is the altered method of Attribute based Encryption (ABE) scheme to further. In CP-ABE, the policy of the access is converted in to the encrypted data. The set of attributes which are related with the user's private key and the user's access policy which is built in the cipher text. When the situation of set of attributes in the user's private key fascinate the structure of the access of encrypted data, the user can decrypt the encrypted data [6].

In cryptography a fully homomorphism encryption scheme is used. It allows data to be processed without being decrypted. SSL/TLS protocols are used here [10]. In front of every data packet Diffie- Hellman is used as the addition of message header. When a cloud server accepts an application for data storage from a user then it individually generate the public and private key with user identification [9] [11]. It send the user secret key and unique identification to user. Two task are performed at user end before a user sends the files to cloud by using secret key. At firstly, a message header is added to the data and secondly, data is encrypted in clouding message header, cloud server will pick the SID information and check the message header of received data when a user will make request for data [12].

Blowfish is block cipher 64-bit block- which can be used as a Substitute for the DES algorithm. Its structure is similar to IDEA algorithm [13] [14]. It takes a constant length key, fluctuating from 32 bits to 448-bits [15]. Blowfish is successor of two fish. The algorithm was presented in 1993 by Bruce Schneider, and has not broken until now. It is also noteworthy to point out that this algorithm can be enhanced in hardware applications, is often

used in software applications, although it is like most other ciphers. The encryption is almost like feistel network of 16 rounds. Blowfish is a symmetric block encryption algorithm. It can run in less than 5K of memory. It uses XOR, addition, lookup table with 32-bit operands. The length of key is variable, it can be in the range of 32~448 bits and the default 128 bits key length. This is very useful for applications where the key does not change often, or communication link like an automatic file encryption. In Blowfish symmetric block cipher algorithm it encrypts data of 64-bits at a time. It follows feistel network and this algorithm is divided into two parts. Key Expansion and Data Encryption are the two main parts. In Key Expansion it will converts a key of most 448 bits into several sub key arrays which makes totaling 4168 bytes. In Data Encryption, It is having a function to iterate 16 times of network. Every round consists of key-dependent permutation and data dependent substitution and a key. All operations are done in XORs and additions on 32-bit words. Four indexed array data lookup tables for each round is the only additional operations taken place here [13] [14] [15].

Another drawback of cloud computing is service traffic hijacking where an intruder uses the stolen credentials of the authorized user and access their information. This results in eavesdrop on the user's activities, sensitive data, transactions and manipulate user data. There are real world scenarios where intruder has return false information and redirect the client to illegitimate sites. In year 2012 intruders managed to get access of the CEO of CloudFare's personal Gmail account. Another incident occurred in the same year where hackers used usernames and passwords stolen from third-party sites to access Dropbox users' accounts [3].

Insider threat challenges the security of general data security including cloud computing. Insider threat might be caused by a problematic employee of a cloud provider accessing sensitive customer data. Yet despite these security concerns, cloud computing is developing and continues to grow [8].

III. SERVICE TRAFFIC HIJACKING

Service Traffic Hijacking Process

Account hijacking is carried out by the stolen credentials of the genuine user. Using the credentials the hacker can access sensitive data and manipulate data as per his likeness. Service traffic hijacking involves in hacker eavesdropping on activities, manipulating data, accessing data and returning falsified information. There are three states where the security breach can be occurred.

1. Transmission of sensitive data to the cloud server.
2. Transmission of sensitive data from cloud server to the client's computer.
3. The storage of sensitive data of the client's on the cloud servers which are remote and not owned by the client.

Fig 1, shows how the service traffic hijacking is occurred.

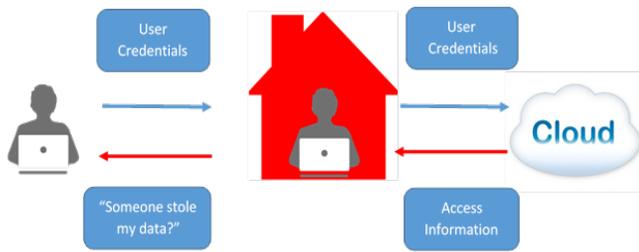


Fig. 1. – Service Traffic Hijacking

In fig 1, the left most side picture is where the genuine user enters the credentials to log in to the cloud server. This is where the intruder hacks and retrieve or eavesdrop on the activities and uses the sensitive data.

Security is the most essential aspect of the cloud computing technology. As this model’s approach sensitive data can be stored on both client as well as cloud server sides. This is why identity management and authentication are crucial in cloud computing.

third party authentication management providers to strengthen the security in the cloud infrastructure.

Areas of business to personal life can be ruined by the hackers manipulating or retrieving sensitive information stored on cloud. There are real life incidents where pictures of individual’s life events were published to the internet after hacking into their personal cloud account by hijackers. Attacker uses the stolen account data to conduct unauthorized activities. One instance is where an attacker uses a stolen credentials to act as the genuine account owner. Company integrity and reputations can be destroyed. Confidential data can be leaked or manipulated thus generating significant cost to industries or their consumers.

Prevention of Service Traffic Hijacking

There are few alternatives to be used to prevent service traffic hijacking. Observing user behavior can help to identify suspicious activities. Cloud user’s normal behavior stays as the same with the time. Proactively monitoring user behavior detect unusual events such as downloading massive amount of data in a short period of time. Some cloud service providers use this technique. Blocking the account for a period of time when suspicious activity occurs helps the genuine user to save his sensitive data.

Implementing a two factor authentication ease the security breach which the cloud technology currently undergo. Hijacker needs two authentications to enter in to the user information. One authentication will not satisfy the requirements to enter thus this way hacker would not be able to penetrate the system and manipulate sensitive data.

Prohibiting the sharing of the credentials between user and the service closes the door to hijackers on stealing the account credentials. This is where hijacker can easily access and retrieve the credentials.

Understanding cloud provider service polices as well as service level agreements can help to reduce the threats. At the contract level before signing the agreement the consumer should seek satisfying requirements to ensure the sensitive data is at a safe place.

To do so some recommendations should be followed. Check the security standard of the service provider and your ability to audit their compliance. The consumer should have the right to remove data which is been stored and the right to get them back whenever desired. The right to discontinue the service and remove all the information permanently should be done at the hands of the user and whenever there is a security breach customer should know how the information is protected as well as the remedies for failure.

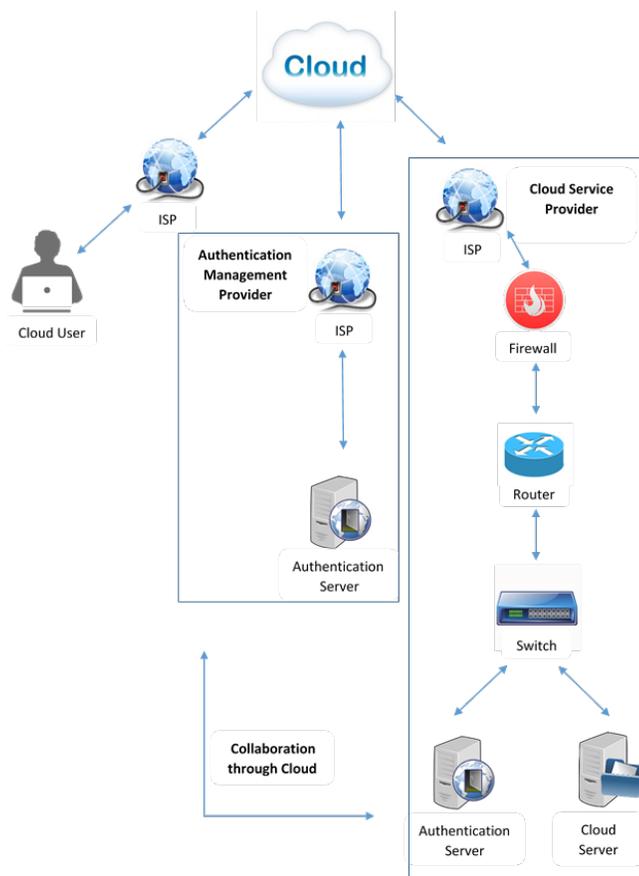


Fig. 2. –Cloud Authentication Process

Fig 2, explains the process of authenticating the user by the cloud service provider as well as the collaboration between a

IV. ENCRYPTION IN CLOUD COMPUTING

Encryption Process

Nowadays, cloud computing acts a very important role in modern IT technology. But there are so many security challenges and threats in cloud computing. As a solution for this cloud data encryption mechanism is introduced. In cloud encryption customer’s data in cloud service converted in to cipher text. Many organizations in the world, which already have basic protection also consider about implementing encryption solutions.

There are certain steps of process of data encryption .The data pass through a mathematical formula called algorithm which converts it into encrypted data called cipher text. Encapsulate the message with key create a key by these algorithms .There are two types of encryption and they are asymmetric and symmetric.

Firstly we talk about asymmetric encryption. There are two mathematically-related keys which are used. In public key (asymmetric) encryption: one to encrypt the message and the other to decrypt it. These two keys combine to form a key pair both data encryption and parties of the communicating identities validation and is measured more protected than symmetric encryption which is delivered by asymmetric encryption but is computationally slower.

Major parts of a public key are Plaintext: text message applied by to an algorithm, Encryption algorithm: performs scientific processes to manner substitutions and transformations to the plaintext; Private and Public key: pair of keys where one is used for decryption and the other for encryption; Cipher text: by using the algorithm to the plaintext message using key scrambled or encrypted message produced, Decryption Algorithm: this algorithm generates the marching key and the cipher text to produce the plaintext.

These are the steps of asymmetric data encryption process: using mathematical generated code formula encryption begins by converting the text to a pre-hash code; Using the senders private key this pre-hash code is encrypted by the software; Using the algorithm used by the software private key would be generated; The encrypted message and the pre-hash code are encrypted again using the senders private key; Then to retrieve the public key of the person this information is intended for sender of the message. The sender encrypts the secret key with the recipient's public key, therefore only the receiver can decrypt it using the private key, thus concluding the encryption process.

Private Key encryption also mentioned to as orthodox or single-key encryption is rest on secret key that is shared by both communicating parties to share a common key it enquires all parties that are communicating the distribution party uses the secret key as share of the scientific process to encrypt (or encipher) plain text to cipher text. The same secret key uses the receiving party to decrypt (or decipher) the cipher text to plain text.

the secret key and can figure out the algorithm. There is also the need for a strong encryption algorithm. They would be unable to determine the encryption algorithm, means of this is that if someone were to have a cipher text. Cryptanalysis is a method of attack that attacks the features of the algorithm to reduce whichever a specific plaintext or the key used. Brute force is just as it conveys; using a method to find every imaginable mixtures and finally decide the plaintext message one would then be able to symbol out the plaintext for whole past and upcoming communications that continue to use this compromised setup.

There are so many advantages in encryption. As one of a major advantage can take that encryption protect the cloud data completely. After encrypting the data it is very difficult to decode the information. And also provides the security for the encrypted data during transmission. This also can take as one of a major advantage in data encryption. Encryption supports to accomplish secure multi-tenancy in the cloud. Encryption key services avoid service providers from accessing and manipulating customer data. When the service providers have both client's encrypted information and encrypted keys, they will able to access to data. To avoid this problem, gives customer's own encrypted keys. Encryption allows customers to secure their remote offices.

Although there is having so many advantages in cloud data encryption there are some disadvantages too. The main basic purpose of encrypting data is that someone can decrypt it when it needed. The encrypted keys are the most necessary thing in encryption. If customer lose these keys, it will take uncountable time to access their data. Although with using data encryption can supply more security to cloud data, some of hackers and thieves will able to access the cloud data. Therefore as a solution for this problem can use a strong username and a strong password for decryption process. And also can encrypt the data more than one time. This will make more difficult for hackers to access to the encrypted cloud data.

Breach of the data also a major problem in cloud computing. When it comes to data encryption breach of data also can be happen. Most of organizations must be more specifically concern about this. As a solution for this can use advanced parity checking mechanism to check data while in encryption, transmission and decryption.

Proposed Encryption Method to Increase Security

Current encryption methods were able to reduce the security threat but have not completely removed the issue. To increase the efficacy of the encryption a new approach can be used.

Fig 4, conveys the process of using a symmetric encryption key in cloud computing infrastructure. Client will have two keys which the key one will be used to encrypt the symmetric key and the second key will be used to decrypt the symmetric key. Encrypting the encoded text and decrypting the text will be done by the above created symmetric key.

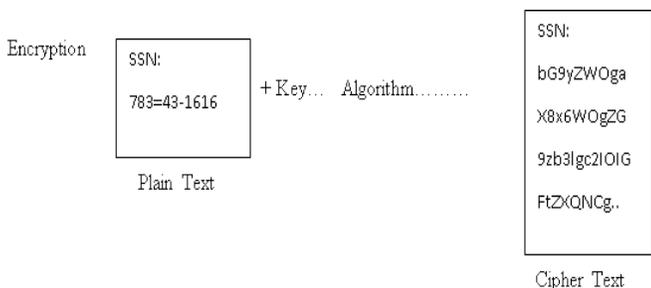


Fig. 3. –Encryption Process

Fig 3, describes the process of the encryption where the sub processes creates the cipher text and how the key is been used. It is required that the sender and receiver have a way to exchange secret keys in a secure manner when using this form of encryption. Communications will be insecure if someone knows

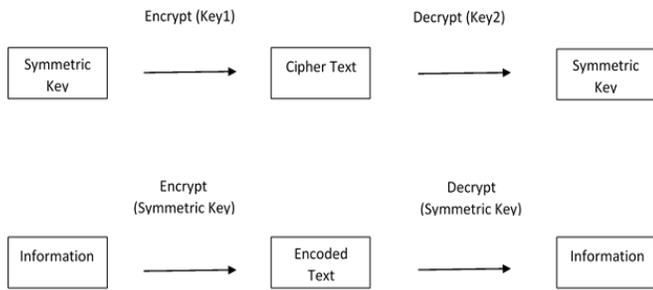


Fig. 4. –Proposed Encryption Method

V. CONCLUSION

This paper describes the process of encryption as well the process of service traffic hijacking. Based on the findings and discussed cloud computing is becoming an emerging technology which contribute individuals to the government level in various area. With massive amount of advantages breach of security in cloud system makes the user rethink of using the cloud technology. One disadvantage of the infrastructure is service traffic hijacking where the credentials of the user is stolen and sensitive data is manipulated and used by a hijacker. By implementing a two factor authentication and observing user behavior to identify malicious activities can ease the security threats. Prohibiting the sharing of user credentials as well as understanding service legal agreement can help business whenever there is a security breach. Using encryption methods to encrypt the user data makes it harder to decrypt for private key is with the genuine user and it is not published. Various encryption methods can be used to maximize the security in cloud infrastructure based on the current requirements and even third party authentication server can be used. By using two keys to encrypt and decrypt the symmetric key increased security status can be achieved. Symmetric key can be used to encrypt and decrypt the information thus the hacker needs to have more than one key to retrieve information.

FUTURE WORK

The main drawback of the encryption process is the complexity of the algorithm as well as the process of implementation. Information should be decrypt and encrypt in matter of seconds thus increasing the number of key needs to be optimized well to increase the efficiency. Prevention of hijacking should also be a responsibility of the cloud user as well. There need to be more steps done by the cloud user to prevent hackers obtaining the credentials which we did not discussed in this paper.

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The Effects of Cumulative Soil Moisture Evaporation on Light Intensity using He-Ne Laser Sensor

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Abstract- Soil moisture evaporation plays an important role in the fields of surface water balance and the surface energy balance. Measurements of cumulative evaporation on soil moisture have been carried out in the laboratory using laser sensor. In this study, moisture content of clay loam and beach sandy soils were monitored using an unexpanded 5 mW Helium-Neon Laser ($\lambda = 0.63 \mu\text{m}$) incident through an optical fibre on one side of an equilateral triangular glass prism which was partly buried in the soil sample. The total internal reflected beam from the sample through the prism was collected from an output optical fibre into a detector and a multimeter. In order to dry and evaporate water from the soil, a 60 Watts incandescent light and a fan were placed above the soil sample container and made to operate simultaneously. In calibrating the soil moisture content, various light intensities were measured with different values of moisture content in soil. Measurements were taken on Cumulative Evaporation for undisturbed soil samples to evaluate moisture content. The light intensity and cumulative evaporation relationship was observed with negative slope. Also, it was observed that the beach sand has a greater value of slope compared with clay loam at the undisturbed state due to its low retainability of water. Although, the relationship took a negative linear slope, the correlation coefficient for both were high ($r = 0.9$). Measurements of soil moisture by cumulative evaporation were used to evaluate the relationship between gravimetric moisture content and moisture monitoring by optical method, which was linear. The value of intercept of clay loam was found to be greater than that of beach sand due to their different chemical compositions. Hence, the findings prove that cumulative soil moisture evaporation by laser method was accurate.

Index Terms- Soil Moisture, Moisture Content, Cumulative Evaporation, Light Intensity, Total Internal Reflection, Laser

I. INTRODUCTION

Evaporation is one of the critical sinks in the water balance, of extreme importance in arid ecosystems. In arid ecosystems where vegetation is scarce and the water table is low, evaporation may make up the only water sink. Evaporation is also of importance to agricultural managers, as it can have an impact on field irrigation applications. Evaporation dynamics also play an important role in liquid waste management. A modeling exercise was undertaken to determine and quantify some of these evaporation dynamics. Two sets of models were run. The first

was designed to determine the effect of soil texture and evaporative demand on short and long term evaporation. This set investigated evaporation from short (0.5 m) saturated soil cores. The second set of numeric experiments modeled evaporation and salt redistribution from soil cracks. This set of experiments determined the effect of a 0.5 m soil crack on evaporation and salt redistribution, and the effect of pore salinity on evaporation rates. Therefore, evaporation is the transition of water from a liquid to a gaseous state. Anywhere, there is liquid water, evaporation is occurring. While the vast majority of evaporation (>90%) occurs over the ocean, lakes and other open water bodies, a considerable amount of water is evaporated from soil surfaces.

Philip (1957) in his research explained the term desorptivity which is a reverse of sorptivity which is a measure of the ability of the soil to absorb water [1]. Gardner (1959), Rose (1968) and Black et al. (1969) showed theoretically that in the absence of gravity effect, the amount of water removed through evaporation from soil with uniform water content and constant suction at the surface is proportional to the square root of time, where the constant of proportionality is termed desorptivity [2], [3], [4], [5].

Evaporation from the land surface is affected mainly by the following factors: degree of saturation of soil surface, temperature of air and soil, humidity and wind velocity. Several of these factors are greatly influenced by the vegetation cover. The density of vegetation is an important factor that influences evaporation from land surfaces. It is difficult to generalize on the amount of evaporation from land surfaces due to the differences in soil moisture characteristics of soils. At high moisture contents, evaporation from land surfaces is nearly equal to that from free water surface. At lower moisture levels, evaporation may decrease in proportion to the content of water remaining in the soil. Evaporation from land surface is usually confined to shallow depths and the evaporation rate reduces rapidly with the increase in depth below the surface [6].

Philip (1957a) and Gardner and Hillel (1962) explain the three stages in the evaporation of water from an initially saturated soil column into a constant environment. At the first stage which is referred to as the constant rate stage, water is not limiting and evaporation rate is controlled by meteorological conditions. At the second stage known as falling rate stage, evaporation rate falls rapidly because water loss is limited by the rate of water transport through the drying soil. This stage of evaporation is governed by the soil hydraulic properties. At the third stage, the soil surface layer is sufficiently dry. Evaporation at this stage becomes sensitive to the heat flux in the soil and

transmission of water occurs primarily by vapour diffusion due to external source of radiation [3], [7]. Idso et al.(1974) by the method of measurement of soil albedo known as coefficient of reflection of solar radiation, were able to detect all the three stages of evaporation[8].

Hillel (1971) explains atmospheric evaporativity as the maximum flux at which the atmosphere can vaporize water from free water surface [9]. Gardner and Hillel (1962) state that cumulative evaporation under higher atmospheric evaporativity is always greater than that under lower atmosphere evaporativity. However, the rate of evaporation during the falling rate stage is independent of atmospheric evaporativity since atmospheric evaporativity is controlled by the air temperature, the wind velocity and the relative humidity of the atmosphere[7]. Cumulative evaporation is therefore controlled by the water retention and transmission characteristics of the soil during the falling rate stage [3] . Cumulative evaporation from a bare soil can also be influenced by soil texture. Jalota and Prihar (1986) experimented that evaporation losses from silt loam was higher than that of sandy loam and loamy sand. This was due to higher transmission rate in the silt loam in the dry range. Their research indicates that evaporation from soil tends to be higher in the dry range as the soil becomes finer in texture. The rate of evaporation depends on a number of factors, including the energy needed for phase change from liquid to vapor states, the humidity of the surrounding air, soil texture, and initial water content, competing sinks and contributing sources and other factors [11]. Therefore, there is a need to measure the amount of water loss in the soil through evaporation using He-Ne laser sensor.

II. THEORETICAL BACKGROUND

2.1 Theory of Evaporation from Soil

Many researchers have given theory of soil water evaporation. These include Gardner (1959), Rose (1968) and Black et al. (1969). In the theory of evaporation, Gardner (1959) established the rate of evaporation, q , as

$$q = (\theta_i - \theta_f) \left(\frac{\bar{D}}{\pi t} \right)^{\frac{1}{2}} \quad (1)$$

Where θ_i is the initial soil water content, θ_f is the final soil water content, \bar{D} is the weighted mean of diffusivity and t is the time taken.

It is chosen that $\theta_f < \theta_i$ and by integrating equation (1) with respect to t , the equation (1) now becomes

$$E = 2(\theta_i - \theta_f) \left(\frac{\bar{D}t}{\pi} \right)^{\frac{1}{2}} \quad (2)$$

as proposed by Black et al (1969). Equation (2) is similar to the equation of Philip (1969) for the infiltration case with $\theta_f > \theta_i$.

It is assumed that \bar{D} is a constant, hence equation (2) becomes

$$E = S_d t^{\frac{1}{2}}$$

(3)

where
(4)

$$S_d = 2(\theta_i - \theta_f) \left(\bar{D} / \pi \right)^{\frac{1}{2}}$$

By analogy with sorptivity (Philip, 1957), the constant S_d has been termed desorptivity [5]. Therefore, it can be stated that cumulative evaporation from a uniform wet soil into a constant environment is proportional to the square root of time. This is true for $t > 0$ when the water content is reduced to the extent that the column still behaves as semi--infinite. Like sorptivity, desorptivity is a soil hydraulic property, but there is a paucity of quantitative data on desorptivity in the literature [6].

2.2 The Helium - Neon Laser

The Helium-Neon gas laser emitting at a wavelength of 633nm is a continuous light beam which is filled with an 80%-20% mixture of the noble gases helium and neon, the neon being the "lasing" medium and the Helium buffer gas to extract heating effect at the walls. A typical low-output power He-Ne laser operates between 1 and 10 mW for a tube length ranging between 20 and 50 cm. A laser of such length or less gives a single longitudinal mode and at TEM₀₀ mode, has a coherence length of about 25cm, beam of diameter of about 1mm and low overall efficiency of about 0.1%. The output intensity of the laser is Gaussian with a divergence angle of about 0.92° as such the laser is directional with a high focussing spot [12].

2.3 The Empirical Formula

An empirical relation can be deduced between light intensity and moisture content since the behaviour of moisture in soil seems exponential. It is observed that the light intensity increases as moisture content increases for the following soil samples at undisturbed states: Clay loam and Beach sand.

Thus the expression is given by $I = a \exp(b \theta_g)$
(5)

$$\ln I = \ln a + b \theta_g$$

The expression finally becomes
(6)

where I is the light intensity across the soil sample, θ_g is the moisture content by mass and a and b are constants. This is the regression equation for the soil samples and it differs from the type of soil sample, since the constants differ. The correlation between light intensity and moisture content for the soil sample resulted in a highly significant ($r^2 = 0.99$).

III. EXPERIMENTAL PROCEDURES AND MEASUREMENTS

3.1 Description of the Experimental Set-up

An equilateral prism sensor was buried initially 2mm deep in a soil sample contained in a 800 ml beaker serving as the container. Light from Helium- Neon Laser (wavelength=633nm

and output power 5mW) was carried through a plastic multimode optical fibre on to the surface of the glass prism. The optical plastic fibre was supported on the sensor surface by a polyethylene material. After being refracted and totally internally reflected, the light was refocused in a second fibre at the other side of the glass prism and carried onto the surface of the detector. The output light intensity signal was measured.

The working principle of this sensor relies on the light being propagated from a medium of higher refractive index to that of a lower refractive index. For glass-air interface when the soil is dry, the interface condition of equation

$$\theta = \text{Sin}^{-1}(n_2/n_1) \quad (7)$$

holds, which implies the critical angle of the totally internally reflected light is greater than 42° to obtain a maximum signal from the sensor. If the soil is completely filled with moisture the glass-water interface satisfies a condition for total internal reflection to be greater than a critical angle of 62° since refractive index of water is 1.33. In order to dry and evaporate water from the soil, a 60 Watts incandescent light and a fan were placed above the soil sample container and made to operate simultaneously. The whole experimental set up was mounted on an optical bench as shown in figure 1.

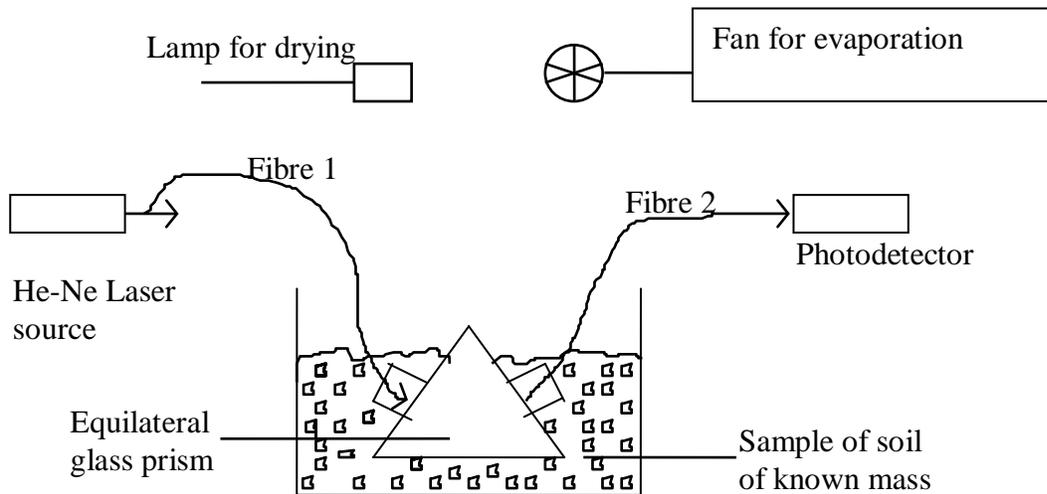


Figure (1): Experimental System Set-up

3.2 Monitoring of Moisture using Undisturbed Soil Samples (Cumulative Evaporation Method)

Clay loam soil from University Farm (Edina series) and beach sand from Cape Coast Beach were collected directly from the ground in the form of a core. These undisturbed samples were initially weighed and recorded after which the optical method was applied to determine the light intensities across each sample. The procedure was then applied by monitoring the light output from fiber 2 as the moisture in each soil sample changed over a period of time as a result of evaporation. Their corresponding light intensities were measured respectively. The moisture was also dried by heating the soil samples from above with a 60 Watts incandescent light and well-designed micro fan. This is shown in Figure 1. After that the samples were oven-dried at 105 degree Celsius for 24 hours to determine the end water content using the gravimetric method. The use of fan also helped to determine the evaporation. The difference in mass between any two successive hours gave the mass of the water that was lost through evaporation. This was determined for each of the samples. The moisture contents at various times were determined by finding the sum of the mass of evaporation and the ratio of the water lost to the oven-dried mass of the sample-gravimetric method. Data from soil moisture showing the variation of Light intensity and Cumulative evaporation was

plotted. Calibration curves were then determined using the above measurements.

IV. RESULTS AND DISCUSSIONS

4.1 The Calibration Equations for Undisturbed Soil Samples

The constants a and b for each soil sample using equation, $I = a \exp(b\theta_g)$ are obtained and presented in Table 1. From this table, the values of the constants a and b in relation to the two parameters (light intensity and moisture content) vary for different soil samples. These also describe the effects of the light intensity on moisture content for all the soil samples used, since the constants a and b were derived from the intercept and slope on the light intensity- moisture content plots.

The regression equations as determined in Table 2 showed that the light intensity was exponentially related to the soil moisture content under moist conditions. The semi-log plots of light intensity against soil moisture content gave an intercept which indicated that other soil factors such as organic matter, soil texture, bulk density, etc might also influence the light intensity. Finally, the correlation coefficients between the log-transformed light intensity (I) and untransformed moisture content (θ_g) were highly positive and significant ($r > 0.9$, $P = 0.1\%$).

Table 1 : Calibration equations relating Light Intensity to Moisture Content for different soil samples derived from measurements of Cumulative Evaporation Method

Soil Type	Location	Empirical Formula	R
Undisturbed Clay loam	U.C.C. Farm	$I = 38.34 \exp(0.011\theta_g)$	0.9996
Undisturbed Sand	Cape Coast Beach	$I = 19.67 \exp(0.015\theta_g)$	0.9988

Table 2 : Regression parameters for the Gravimetric Method and Moisture Monitoring by optical method for undisturbed soil samples.

Sample	Regression Parameters		
	a	b	R
Clay Loam	0.42051	0.7163	0.9918
Beach Sand	-0.64762	0.9238	0.9965

a - intercept on the gravimetric moisture content axis and it determines whether or not the plots obtained are perfect.

b - slope of the graph and it gives the linearity of the plots.

R - correlation coefficient and it gives the closeness of the two parameters (gravimetric moisture content and moisture content by optical method)

4.3 The Relationship between Gravimetric Method and Moisture Monitoring by Optical Method for Undisturbed Soil Samples

The plots of gravimetric moisture content θ_{gm} as a function of moisture content θ_{gc} by optical method for the samples at the undisturbed state are shown in figures 3a and 3b respectively. The plots showed a linear relationship between the gravimetric moisture content and the moisture content by optical method. Comparison of the gravimetric moisture content and moisture content by optical method showed that they are linearly dependent and has rank of 0.9918 for clay loam and 0.9965 for beach sand. The correlations were found to be highly positive

and significant. The linear dependency indicated that the optical values over-estimated the gravimetric values by 24% and 12% for clay loam soil and beach sand respectively.

For both clay loam and beach sand at the undisturbed state only, their coefficients of determination (R^2) were found to be 0.9836 and 0.9930, respectively. Therefore, using the plot of gravimetric moisture content versus moisture content by optical method values indicated that the moisture content was more than 80 percent reliable, when compared with the gravimetric moisture content values depicting that there were some errors in the optical technique based on some of the equipment used for the experiments.

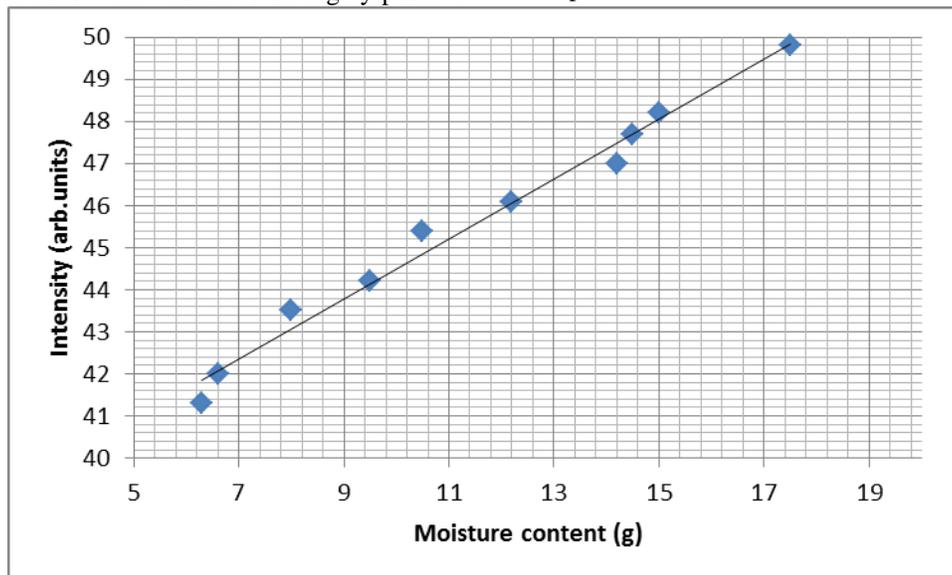


Fig 3 a: A graph of Intensity versus Moisture content for undisturbed Clay loam

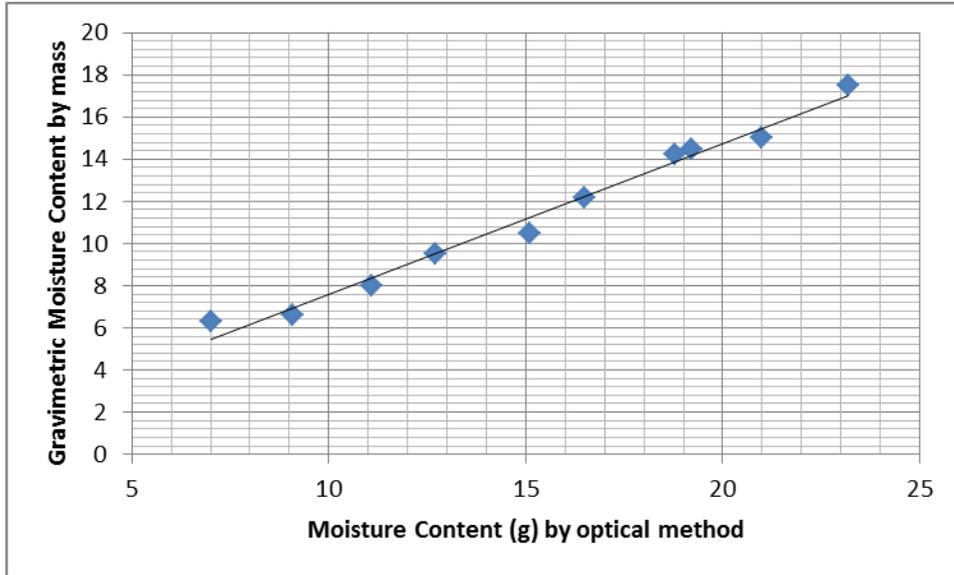


Fig 3b : A graph of Gravimetric moisture content versus Moisture content by optical method for undisturbed Clay loam

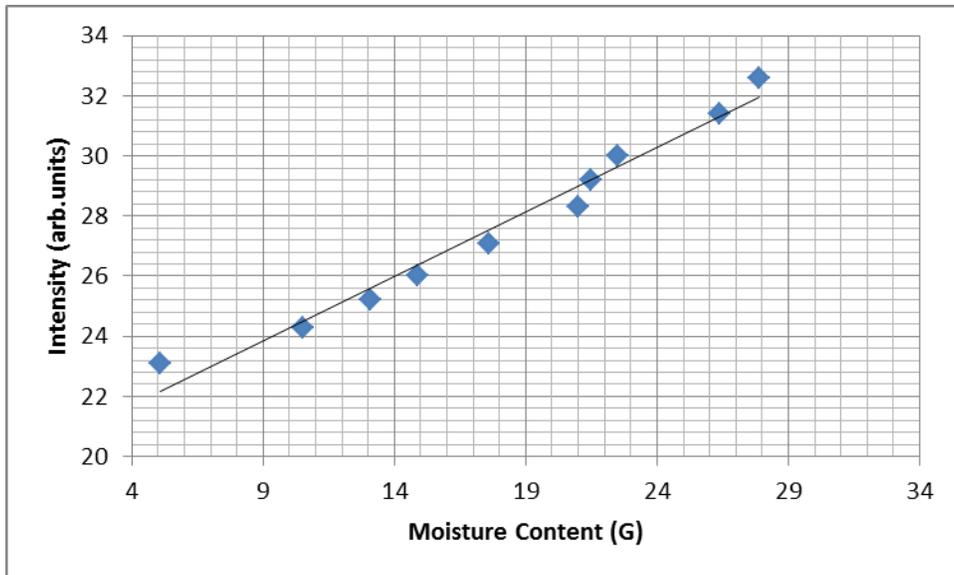


Fig 4a : A graph of Intensity versus Moisture content for undisturbed Sand

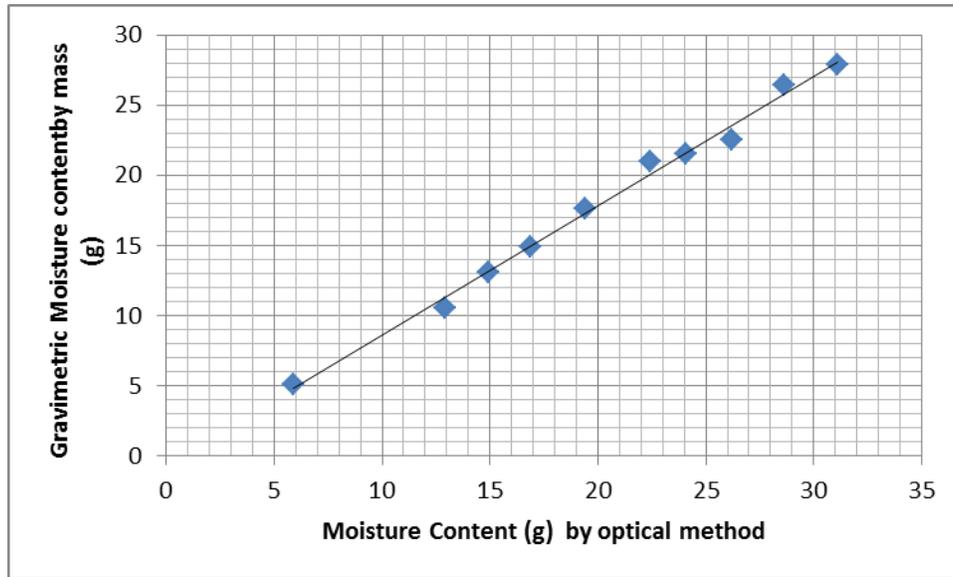


Fig 4b : A graph of Gravimetric moisture content versus Moisture content by optical method for undisturbed Sand

4.4 The Relationship between Light intensity and Cumulative Evaporation

The plots of these values are presented in Figures 5 a and 5 b respectively. The plots showed almost linear relationship between light intensity and cumulative evaporation with a negative slope. The beach sand has a greater value of slope

compared with clay loam at the undisturbed state due to its low retainability of water. Although, the relationship took a negative linear slope, the correlation coefficient for both were high ($r=0.9$).

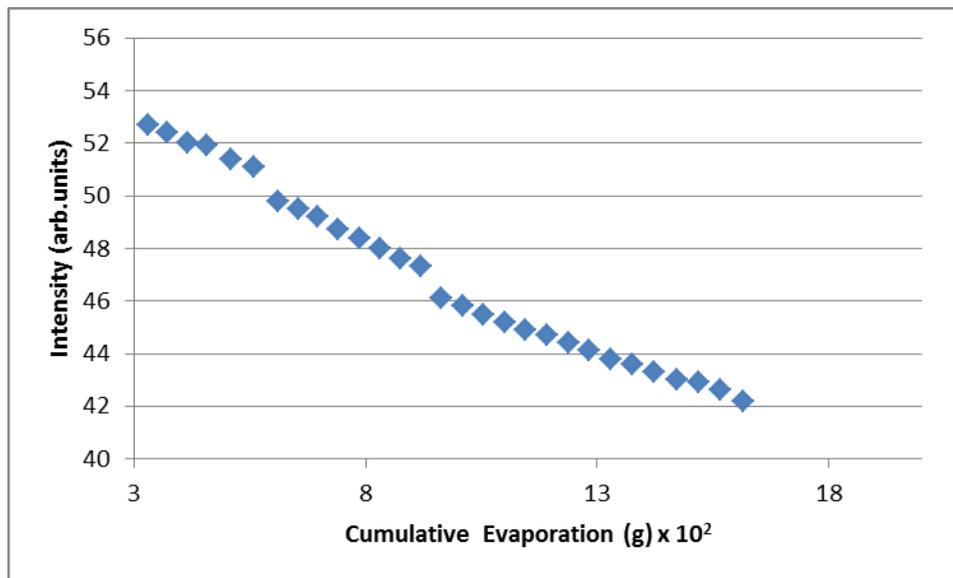


Fig 5 a: A graph of Intensity versus Cumulative Evaporation for undisturbed Clay loam

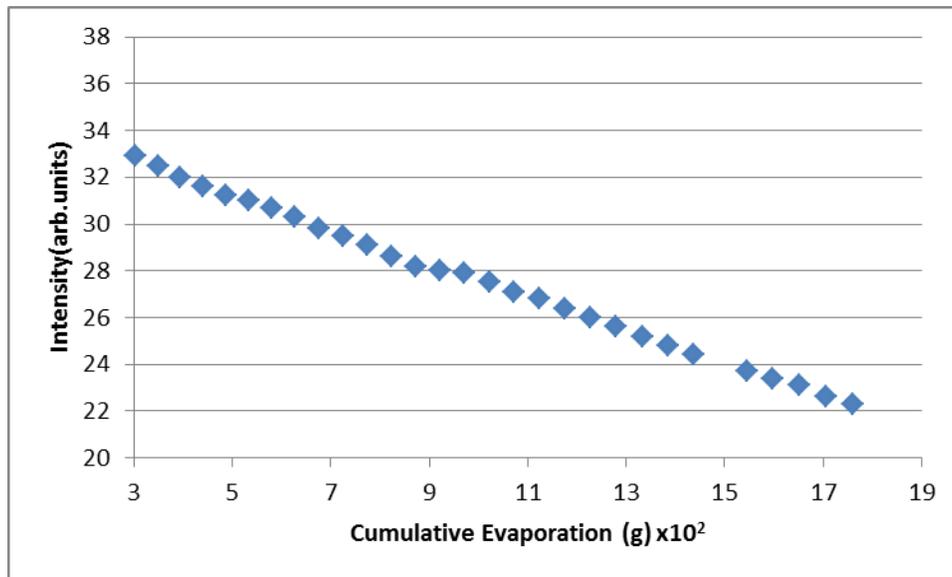


Fig 5 b : A graph of Intensity versus Cumulative Evaporation for undisturbed Sand

4.5 Effect of Cumulative Evaporation on Moisture Content and Light Intensity

For the undisturbed soil samples where evaporation was used to vary the soil moisture content, it was also found that the light intensity increased as the moisture content increased. The relationships between the log-transformed light intensity (I) and untransformed moisture content (θ_g) were also highly positive and significant ($r > 0.9$, $P = 0.1\%$).

The intercept values of both the clay loam and the beach sand for the semi-log plots of light intensity against moisture content were found to be 3.65 and 2.98 respectively. The values of slopes obtained for both the clay loam and the beach sand from the plots were 0.01 and 0.02 respectively. Again, although the two plots looked alike, the light intensities and moisture contents values for clay loam were greater than that of beach sand. This was because clay loam soil was able to retain more water than beach sand. The value of intercept of clay loam was found to be greater than that of beach sand due to their different chemical compositions. The plots of light intensity and cumulative evaporation were found to be negative slope and also continuous for undisturbed beach sand and not continuous for undisturbed clay loam, since beach sand is able to lose water easily.

$\exp(b\theta_g)$, where the constants a and b represent the intercept and slope on the plots and also differ for a particular soil sample.

The cumulative evaporation method was then used to evaluate the relationship between gravimetric moisture content and moisture monitoring by optical method for clay loam and beach sandy soil samples at undisturbed state. The relationship was found to be linear. The linear dependency and correlation analysis used indicated that the values of moisture monitoring by optical method overestimated that of gravimetric moisture content by 12 percent for beach sand and 24 percent for clay loam soil. Moreover, the relationship between light intensity and cumulative evaporation of the soil samples at undisturbed state gave a linear relationship and the correlation coefficients for the soils were highly positive and significant ($r = 0.9$), hence the laser sensor found to work perfectly at the lower moisture content. The results also suggest that some soil properties like organic matter, soil texture, and particle sizes may influence the use of laser beam in determining the effect of evaporation on soil moisture, since at the higher moisture content the plots deviated from the semi-log linearity. Finally, the above information shows that the laser sensing technique based on cumulative evaporation could be used in the field, since it agrees with the gravimetric technique.

V. CONCLUSION

The cumulative evaporation on soil moisture content as a function of light intensity is monitored using laser. The laser sensing instrument that uses prism as a sensor relies on the variation of moisture from the soil on the prism surface. This is monitored using the intensity of light from laser source onto the water-glass interface based on the total internal reflection. The light intensity is independent of the soil type. The cumulative evaporation method of measurements was for the soil samples to evaluate the moisture content. The empirical formula obtained from the intensity-moisture content plots was in the form $I = a$

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Students' Acquisition of Scientific Skills during Physics Practical Sessions at Saint John's Secondary School, Sekondi, Ghana

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Abstract- Students of Saint John's Secondary School, Sekondi-Ghana were made to acquire scientific skills in physics during the practical sessions. The treatment was investigated using a randomized pretest –protest experimental design. The performance of thirty (30) students who constituted the experimental group was compared with other thirty (30) students who constituted the control group. Both groups offered Biology with Physics and Chemistry as their electives. The homogeneity in the entry behaviors of the two groups was determined using the two-tailed F-test analysis of variance at 5 % level of significance. Similarly, the t-test analysis of means was invoked for the post-test. The two-tailed t-test performance for 58 degrees of freedom gave a critical value of 2.00 at the 2.5 % probability level. This value was then compared with calculated t-value of 3.17 and it was found that the treatment was effective. The research therefore recommended the approach for the use by teachers to help students to acquire some scientific skills in physics and science in general.

Index Terms- Physics, Practical, Acquisition, Scientific, Skills, Teaching methods

I. INTRODUCTION

Science is the aspect of education in this modern age where most of the technologies are developed. In view of this, most countries are encouraging their citizens to put more interest in science. The professionals such as teachers, technicians, engineers, medical officers, etc all over the world use the practical aspect of science to achieve their goals [1].

There is a relationship of physics to the other sciences- the methods and results of physics have wide applications to the other sciences particularly Chemistry, Biology, Geology, Psychology and Medicine. The development of physics has played an important part in the progress of the other sciences but it must not be assumed that this has been entirely a one-sided relationship. This advance in other sciences has proved a great value and importance of physics in applying new ideas in developing new tools for investigation and in opening new field of study [1].

In Ghana, there is a problem of teaching of physics and science in general. The fact is the most of the teachings are done in theoretical manner after which most of the students find it difficult to practice them, therefore not having interest in the subject. The concern has led many researches into investigating certain teaching methods for practicals [2] For example, Graham

(1986) investigated the impact of demonstration in teaching students of a secondary school in Cape Coast. He concluded that a topic is well understood by the students if the students are made to acquire the practical skills of the topic [3]. Similarly, Koomson (1991) investigated the effectiveness of the experimental method to teach selected physics concepts to students in a college at Kumasi [4].

The teachings of most tutors make the student have less or lack interest in the subject. Thus, most of the tutors do not put the students before the practicals. For effective teaching, the teacher should allow the students to be active contributing agents to their own learning. The teacher is not allowed to present the fact and theories to students so as to help the students to overcome any challenges before them[5]. Alexander Amediku (1995) gave his view on the effectiveness of the integrated method of guiding students to form their own physics concepts in Electricity [6].

By applying Piaget's Theory of Intelligence to problems of educational practice, Piaget provides a description of how the child's mental function spontaneously develop, while an educator wants to know what can be done or what must be done in order to achieve certain educational objectives which can be as simple as acquisition of information or as complex as adoption of described attitude [7]. Wahlberg (1970) in reviewing the results of educational research concluded that most variance in students performance can be attributed to differences in aptitude, a smaller amount to learning environment and that differences in instructional methods have least effect [8]. Brunner (1960) and Piaget (1971) sharing their views came out that there is little or no experimental evidence on which to base decisions on a great many aspects of the educational process [7, [9].

In this view, this study has been structured in such a manner as to cover both the theoretical aspect and hand-on activities in physics. This would encourage students to build up their interest in the scope of science, since the research covers the presentation and analysis of data.

II. OBJECTIVES

- To highlight the importance of practical work in the study of physics.
- To identify the roles teachers play during physics practical session.
- To identify whether, the hand-on activities are effectively being implemented by teachers in Senior Secondary Schools precisely Saint John's Secondary School during teaching and learning process.

- To identify any problems encountered by students during physics practical session.
- To give suggestions and recommendations as to how the scheme would be improved.

III. HYPOTHESIS

The hypothesis that can be considered for this study is as follows: **Students who spend more hours doing physics practicals acquire more scientific skills than students who spend less hours during physics practicals.**

IV. METHODOLOGY

A. Research Design

The study used for this purpose was randomised pre-test and post-test experimental design. This design was appropriate for the researcher because the data for this study were collected from sample of students from Ghanaian Secondary students in order to improve their level of physics through scientific skills acquisition.

B. Population, Sample Size and Sampling Techniques

Saint John's Secondary Schools has six classrooms for the science students with the total of 240. It was impossible however for the researcher to conduct the study on all the students due to factors such as time and financial constraints and proximity of the sample groups to the researcher. The researcher therefore made a sample of 60 students who were in SS2. The sampling procedure used was a random sampling. Sixty (60) students who were present took part in this exercise. Of these, thirty (30) students constituted the control group and the other thirty (30) constituted the experimental group.

C. Research Instrument

The instrument used to collect the data was randomised pre-test and post-test experimental design. The randomised pre-test-post-test experiment was designed to solicit the students to acquire scientific skills and to highlight teachers' roles during practical sessions. It was also intended to highlight problems students had encountered during practical session and solve problems not still solved and give suggestions and recommendations as to how the scheme could be improved.

The pre-test-post-test experiment consisted of some practical questions. The questions were in the form of standardized test that required the students' solutions by scientific skills (observation, manipulative skills, interpretation of diagrams, etc.) already required. After which the students drew their conclusion(s). This approach therefore helped the students as well as the teachers thereby improving the performance of students in practical physics and science in general.

The randomized pre-test-post-test design instrument which consisted of identifying Control and Experimental groups for the purpose of comparison was selected as the most applicable owing to the definite identifies of the sample fields. The two groups consisted of sixty (60) students who were SS2 students of Saint John's Secondary School, Sekondi for 1998 academic year.

Both groups were made to have physics practicals on selected topics in optics as a pre-test during the third term of the 1998 academic programme. They were then post-tested after a period of eight (8) weeks on selected topics in mechanics.

D. Subject

The selection of the subject did not require any sampling method. The groups were self-selected based on their placement in their Senior Secondary School programme as science students. Thirty (30) who constitute the control group and the other thirty who constitute the experimental group both offer Biology with Physics and Chemistry. Both groups were students of Saint John's Secondary School, Sekondi-Ghana. In order to statistically ascertain the homogeneity of these groups, the F-test was used to compare the groups' means on the pre-test practical assessment test instrument.

E. Treatment Procedure

The treatment (Experimental) group consisted of thirty (30) students enrolled in the elective physics course. The group met for four (4) hours each week over a period of two (2) months. The researcher believed that students completing the course should have acquired some scientific skills in practical physics. The students were presented with numerous hands-on activities centred on both optical and mechanical experiences. The practical physics test instrument on optics was administered as the pre-test for both the Experimental and Control groups.

The control group consisted of thirty (30) students were opposed to theoretical physics of some topics in Optics and Mechanics after pre-test. Therefore, the students encountered few practical physics after pre-test. Upon completion of the course, both the experimental and control groups were made to take a physics practicals on selected topic in Mechanics as a post-test.

F. Data Analysis Procedure

The pre-test and post-test means as well as the standard deviations of the control and experimental groups were first determined from raw data. In a manner of that gave a quotient whose value exceeds or equal to unity, the value obtained was compared with a critical F-value obtained for 29 degree of freedom of $P = 0.05$ significant level. Similarly, the post-test means and standard deviations of both experimental and control groups were substituted into the pooled sample t-test formula. The calculated t-value was then compared to the critical t-value determined at the 58 degrees of freedom at $P = 0.025$ significant level[10].

In the collection of data, the following assumptions were made:

- The samples of each group were randomly and independently drawn from the population.
- Both groups were normally instituted each with mean (\bar{x}) and variance.
- The two-tailed test statistical analysis at $P = 0.025$ level of significance was most appropriate for testing the hypothesis.

V. RESULTS

The F- test was used to compare the entry behaviours of the two groups using Pre-test data (Table 1). There was no statistically significant difference of $P = 0.05$ between the two groups. Similarly, the Post-test data was used to determine if the research treatment on the groups was effective. The groups were then compared using two-tailed test subject to the research

hypothesis. There was a statistically significant at $P = 0.025$ level grade difference between these means.

A. The Pre-test Analysis

Table 1 below summarizes the data on the pre-test assessment of the control and Experimental groups in order to compare their entry behaviour.

Table 1
Performance of Groups on Pre-test

GROUPS	MEAN (X%)	STANDARD DEVIATIONS (S)	NUMBER (N)
CONTROL	48.63	12.78	30
EXPERIMENTAL	49.70	13.13	30

From the table above, the standard deviation for the Control group $S_C = 12.78$ and that for Experimental group $S_E = 13.13$ with F- value calculated as 1.06. Using the F-test table, the critical F- value determine for 29 degrees of at $P = 0.05$ level of significance for each group is approximately 1.854.

Also, when the population ranges from samples normal and the population valances are equal, then the null hypothesis is supported as follows:

$$F_{calculate} \leq F_{critical} \quad [11]$$

Since the above values hold, the null hypothesis is supported. Thus, there was no statistically significant difference between the two groups' entry behaviours.

B. The Post-test Analysis

Table 2 gives a summary of data on the post-test assessment of the groups. This data is used to measure the effectiveness of the research treatment.

Table 2
Performance of Groups on Post-test

GROUP	MEAN (X %)	STANDARD DEVIATION(S)	NUMBER (N)
CONTROL	42.5	13.26	30
EXPERIMENTAL	53.0	15.40	30

The hypothesis being tested was that the post-test mean score of the control group (X_C) differs significantly from the post-test mean score of the Experimental group (X_E).

C. Decision

From the t-value obtained, the critical value $t_o = 2.00$ and the calculated t-value $t = 3.17$.

The null hypothesis, H_0 requires that $t_o = t$ whereas the research hypothesis H_1 requires that $t_o \neq t$, hence from the latter hypothesis there is a statistically significant difference between the two post-test mean scores of the control and experimental groups. Thus difference was not due to chance[12]

D. Result from Control Group

The highest and lowest scores obtained during the pre-test exercise were 75% and 25% respectively. It was found out that most of the students had an average score during the pre-test. Also, concerning the post-test exercise the highest and lowest score obtained were 73% and 22 % respectively. It was again found that most of the students had an average score during the

post-test exercise. By comparing the two students (pre-test and post-test scores) of each student, it was realised that there was a significant decrease in the scores of most students. Only few of the students had the same scores. This therefore confirms **the Law of Disuse: "When practice is discontinued after establishing a bond between a stimulus and response, the connection gets weakened resulting in forgetting"**[13].

F. Result from Experimental Group

The highest and lowest scores obtained during the pre-test exercise were 79% and 23% respectively. It was found out that most of the students had an average score in the pre-test exercise. Also, during the post-test exercise, the highest and lowest scores obtained were 80% and 20% respectively. It was found out that most of the students had an above-average score during the post-test exercise. By comparing the two scores (pre-test and post-test scores) of each student, it was realized that there was a significant increase in the scores of most students. This also confirms the Law of Disuse as stated above.

VI. DISCUSSIONS

The researcher began this investigation by subjecting the two groups of the experimental design to a treatment in some aspect of optics and mechanics. He then pre-tested the groups; the results indicated a mean of 49.70% for the experimental group and 48.63% for the control group. The standard deviations for both experimental and control group are 13.13 and 12.76 respectively. By considering, the two-tailed f-test analysis of variance at $p = 0.05$ level of significant, the means of the two groups were compared and it was found that there was no statistically significant difference observed at the 5% probability level. This suggested that the two groups were homogeneous and therefore comparable and it provided the necessary basis to pursue the investigation.

The hypothesis considered was that students who spent more hours doing physics practicals acquire more scientific skills than students who spent less hours doing physics practicals. This assertion was confirmed by the post test result of the two groups. It was found that average performance of the experimental group was better than that control group [that is 53.0% and 42.5% respectively]. A look at the post-test score lists [see tables 3 and 4] indicated that a maximum score of control was 73% and that of experimental was 74%. This narrow difference could be attributed to certain extraneous variables such as:

The effect of exposure to pre-test at the in caption of the experiment leading to practice effect and "test wiseness" or the part of some students who speculated a similar assessment in the target group instead of their being randomly selected (Campbell and Stanley, 1963). These factors notwithstanding, there was a generally more purposeful learning habit exhibited by the experimental group judging by their standard deviations of 12.40 as against 13.26 by the control group.

In testing the null and research hypothesis the t-test registered 2.00 at the 0.25 level of significance for 58 degrees of freedom. The calculated t-value was obtained as 3.17. The research hypothesis that the post-test mean score of the control group differs from the post-test mean score of the experimental group was thus accepted in preference to the null hypothesis, on the basis that $t(3.17)$ was greater than $t_0(2.00)$.

VII. RECOMMENDATIONS

The study recommends the appropriate methods used by teachers in delivering instructions at the early stage (Senior Secondary School 1). Also, students' cognitive styles should be promoted by allowing them to discover things for themselves through experiments. Again, studies should be conducted at all grade levels, all districts, secondary schools, etc. in physics as well as other disciplines such as Biology, Chemistry, etc. Furthermore, every Districts and Regional capitals should be encouraged to have furnished Science Resources Centres to

promote hands-on activities of students. Finally, this study should help reappraise the development of curricula by the Ghana Education Service.

VIII. CONCLUSIONS

In conclusion, the data obtained indicates that those students who spent more hours doing physics practicals acquire more scientific skills than those who spend lesser hours doing physics practicals. Therefore, the hypothesis stated above holds. Also, by comparing the critical t-value (2.00) for the post-test analysis with the calculated t-value (3.17) for the post-test analysis, it proves that exposing students to more practicals or hands-on activities and with good teaching methods, techniques and skills develop an acquisition of scientific skills, thereby enhances students' understanding of physics concepts.

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QuViCE to Improve Virtual Firewall Performance

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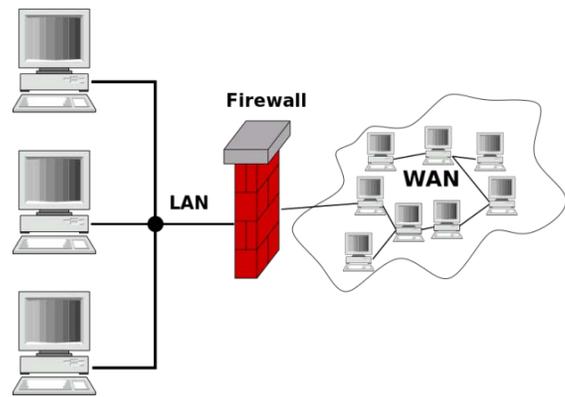
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Abstract- This is a time where usage of technology keeps growing. Along with a growth of using technology, so as it needs to increase the using hardware and server. It consumes more energy than past. As a solution virtual environment can be used to ease the usage and less hardware, server and energy consume. More than one Virtual Machine (VM) in a host can be run at once but virtual traffic between two VMs will never go out of the host. Therefore, this network traffic will never meet a physical firewall and also when data comes from outer networks must be filtered before they enter the related VMs. In case of that a Virtual Firewall (VF) must be deployed. When a network traffic generated it causes VF to slow it's mechanism down as well as the hypervisor's performance. To solve it, quantum mechanism approach will be used and will be given a solution to improve the VF performance as well as hypervisor performance.

Index Terms- Virtual Firewall; Virtual machine; Hypervisor; Hypervisor performance; Quantum hypervisor; Quantum Virtual machines.

I. INTRODUCTION

Literary firewall is a wall that stands against a fire and preventing the fire from spreading. In terms of computing / networking security a firewall is software or a hardware which monitors the network traffic. Here is the common simple definition of what firewall is "A firewall is a network security device that grants or rejects network access to traffic flows between an untrusted zone and a trusted zone." Example for the trusted network is a private or corporate network and example for untrusted network is the internet. The firewall acts as the only gate or the open space for other networks and as all the communication will flow through it and it is where traffic is granted rejected access. A firewall has set of rules and regulations. Those rules and regulations are the things which are deciding whether the particular packet going to be going through the firewall to the other network or not. When a large scaled network needs to be protected, normally the firewall software will run in a specific hardware device which do nothing other than act as a firewall. There are mainly two types of firewalls. Software based firewalls which are often run as additional programs or software on computers and hardware based firewalls which run on a dedicated computer. Often the hardware based firewall is better in performance than the software based firewall. Behavior of a firewall is depicted in Figure1.



([https://simple.wikipedia.org/wiki/Firewall_\(networking\)#/media/File:Gateway_firewall.svg](https://simple.wikipedia.org/wiki/Firewall_(networking)#/media/File:Gateway_firewall.svg))

Figure 1: Firewall

A virtual firewall (VF) is a service which provides the virtual machine user to filter and monitor packets and manage the network traffic in their virtual machines (VMs). When a virtual firewall is deployed it only can be executed and operated from a virtual machine. A VF operates in a virtual area network (VAN) which is connected to virtual machines (VMs). A virtual firewall includes Stand-alone software integrated OS kernel component. A virtual firewall operates in two different modes. Those are indicated as follow:

- Bridge Mode;
- Hypervisor Mode.

Bridge mode is like a typical firewall. This mode monitors and diagnoses all incoming and outgoing traffic bound for other virtual machines and other virtual networks.

Hypervisor mode is isolated from the actual network. It resides in the core hypervisor kernel and monitors the virtual host machine's incoming and outgoing traffic. Behavior of VF is shown in the below figure 2.

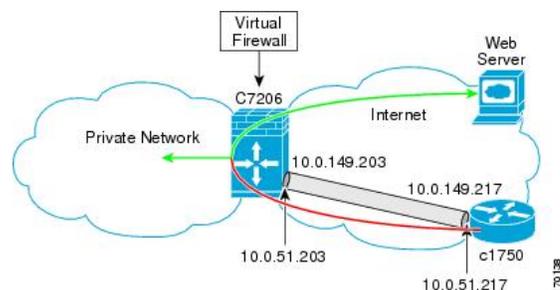


Figure 2: Virtual Firewall

(http://www.cisco.com/en/US/docs/ios/12_3t/12_3t14/feature/guide/gtIPSctm.html)

In virtual firewall the main issue that have found is the network traffic. In many virtual networks when many virtual machines are connected the network traffic is going to a very high and sometimes because of that network traffic very important operations are delayed. This network traffic is occurred because of the virtual firewall. In virtual firewalls the mechanism they have used is the bitwise operations. That means the set of instructions or rules given by the virtual firewall is executed using bit wise operators. (Bitwise operators are stated below). In bitwise operations the virtual firewall is taking one bit by one bit and check if that meets requirements which are stated in the rules or not. If they are OK the virtual firewall will give authentications to the bit to go through, if not it will discard the bit. Because of this bitwise checking the time taking to decide whether the bit is ok to go through the firewall or not is increasing. Bitwise operator usage is shown in following figure 3.

Operator	Use	Example
&	Bitwise AND	101&001=001
	Bitwise OR	110 101=111
<<	Left shift	110<<2=101
>>	Right shift	110>>2=011
~	One's compliment	~110=001

(<http://www.circuitgallery.com/2012/07/data-types-operators-and-operations-in.html>)

Figure 3: Bitwise Operators

For this matter proposed system will be seeking a solution by using quantum computing. In our solution typical virtual firewall is running in a conceptual virtual environment called quViCE in typical quantum computer. quViCE is a conceptual solution implemented by our research team by collaborating quantum theory and bitwise operations together. All the current existing virtual firewall technologies are based on bitwise operations. The solution that is suggested is based on quantum theorem. The descriptive explanation of our suggested quViCE concept is depicted under “Our approaches” heading.

In this research paper first chapter is about introduction to the research. In second chapter “Background and related work” states all the literature review that has been done. In third chapter “Our Approaches” have depicted a clear explanation about the solution which has been suggested. Fourth chapter is about conclusion. In fifth chapter “Future Works” have depicted the things that have to be implemented in the future. In sixth and seventh chapters, the acknowledgements and references respectively have stated.

II. BACKGROUND AND RELATED WORKS

The research is discussing and getting in to an approach for creating an intrusion detection system in the core of the cloud computing by using hypervisor metrics. They gathered hypervisor metrics like packets transmitted/received, block device read/write requests, and CPU utilization from the virtual machine performance. In the paper they have proved that suspicious activities can be monitored by detailed manner

without a vast knowledge of the operating system of the virtual machine. In their new suggested Hypervisor-based Cloud Intrusion Detection System no additional software has to install to the virtual machine in order to detect the intrusion [1].

The research paper is suggesting a Virtual Machine Contracts (VMCs). It is a platform independent method of automating the management and communication. In this paper they describe how VMCs expressed through Open Virtual Machine Format (OVF) standard. In this paper they also have used usecases and argued with the points that they have found in the related researches. Such as “Is it an essential step towards automated control and management of virtual machines” [2].

Quantum computing is a combination of computer science and quantum mechanics. Using computer science algorithms, computational models and quantum non-determinism, entanglement, superposition theories, building a new model of a computer to speed up the mathematical computations is the main goal of quantum computing. They refer Gate Model is the best model for a Quantum computer Virtual Machine because of its easy implementation, simple representation and well documented advantages. In Quantum computing Qubit is the term that used instead of a Bit in a normal computer. There are 2 basic states in bits but for a Qubit it'll be $2^2 = 4$ number of states for 2 Qubit representations. If there are N Qubits there will be 2^N basic states. Using this technologies and QRAM hybrid model with Classical instructions inspired from Intel x86 assembly and theoretically possible to build a Quantum Virtual Machine [3].

This research proposes a new theory named as Generic Quantum Algorithm (GQA) based on quantum computing theories such as Qubits, superposition of states. One Qubit can be defined with a pair of complex numbers of α and β . After a series of calculations it is possible to calculate the state of a system which has any number of Qubits. To check the performance of the GQA, knapsack problem which is a combinatorial optimization problem can be used. Three conventional GA methods are used to experiment with – knapsack problem. They are penalty functions, algorithm based on repair methods and algorithms based on decoders. For all these tests they have used a Pentium-III 500MMHz running Visual C++ 6.0. After all these cases GQA yielded superior results as compared with CGA. Even thou knapsack problem was used to discuss the performance of GQA, it showed up based results over CGA which proves effectiveness and the applicability of GQA [4].

Virtualization is revolutionizing how information technology resources and services are used and managed and has led to an explosive growth in the cloud computing industry, illustrated by Google’s Cloud Platform and Amazon’s Elastic Cloud. It brings unique security problems such as virtual traffic, denial of service and intrusion, resulting in penetration of virtual machines, which is disastrous for the enterprise, the user and the cloud provider. For avoid these problems it is possible to use hardware firewall solutions, but it should also be a virtual methods. This paper proposes a virtual firewall which allows managing the network security of the virtual infrastructure per-virtual machine basis, defining network traffic rules, and hardening the security of the virtual environment. In this research they have implement a Tree-Rule firewall technique, which filters packets in a tree-like way based on their attributes such as IP address and protocols. As advantages the virtual firewall will provide power to control the

bandwidth utilization of each virtual machine in the infrastructure, preventing overutilization and denial of service to critical applications. This makes the virtual security very easy [5].

The Pseudo-Telepathy is an extraordinary way to demonstrate the power of quantum computing. This power relies in the destructive interference used to completely delete the probability of unwanted answers for the considered problems. The author has introduced quantum Pseudo-Telepathy as a property of certain games which allows winning strategies only for players capable of using quantum information. The research has described briefly, what are the basic notions of quantum computing like Qubits and superposition. The research paper has claimed a formal definition of Pseudo-Telepathy in terms of a game before presenting the analyzed game. Finally in the conclusion, the author has stated that there is no real telepathy in quantum computing and it is only a smart combination of quantum gates applied in a way to produce destructive interference and delete unsuccessful answers that realizes the telepathy [6].

In this research has compared three different architectures, namely, trapped, ion architecture quantum computing using superconducting Qubits and Quantum computing Nitrogen vacancy center in Diamond with various factors as temperature requirements, coherence time of superposition states, fidelity, error correction, power dissipation and noise. Also the research team has given a brief introduction to quantum mechanics and examines quantum computing possibilities using above architectures [7].

Firewalls are designed to provide access control. Optimizing firewall policies are crucial of improving networking performance. The key technical challenge is that firewall policies cannot be shared across domains because a firewall policy contains confidential information and even security holes, which can be exploited by attackers. Here this project proposed a traffic aware top-N firewall approximation algorithm as solutions for increasing number of classification rules and for amount of traffic and network line speed.

The project has discussed about the issues such as cost increasing due to poor management, firewall policy with unnecessary rules that results in excessive complexity, overly permissive access, unnecessary risk and performance degradation. As the objectives improve the security among the third party users and policy owners like virtual traffic policies and provide an optimization framework to above challenges [8].

A good virtual firewall security has been enforced for obstruction and filtering the unwanted requests coming back from the purchasers before the request approaches the virtual machine. In this research they have research about how the virtual firewalls can be used to ensure the security of a cloud. They are tracking the security of the system when someone request high level knowledge from the cloud they are checking the payment fulfillments of that particular requester. They will use and access the data's from the cloud server. The MAC address, science address associated system data are going to be blogged [9].

The trend towards portable computing means that the traditional security perimeter architecture (Where a firewall protects computers in the LAN by controlling access to the

outside world) is rapidly becoming obsolete. This has resulted in a number of products described as "personal firewalls" that control that computer's access to the network and hence can protect it in the same way as a traditional firewall. Existing systems such as Windows and most UNIX and UNIX-like systems already provide security features that can be used to implement firewall functionality on every machine. However, the difficulty of securing general-purpose operating systems has impeded the widespread use of this approach [10].

The increased rate of virtual appliances, and more use of private/public cloud, is driving security controls such as firewalls from physical to virtual form factors. This research document discusses the competitive landscape of virtual firewall providers. Following Methodologies have been used, Host Agent Method, Virtual Switch Method, Hypervisor-Based Controls Method and Non-Hypervisor Based Controls Method [11].

Computer and network security are challenging topics among executives and managers of computer corporations. Internet security is the practice of protecting and preserving private resources and information on the Internet. Even discussing security policies may seem to create a potential liability. As a result, enterprise management teams are often not aware of the many advances and innovations in Internet and intranet security technology. Without this knowledge, corporations are not able to take full advantage of the benefits and capabilities of the network [12].

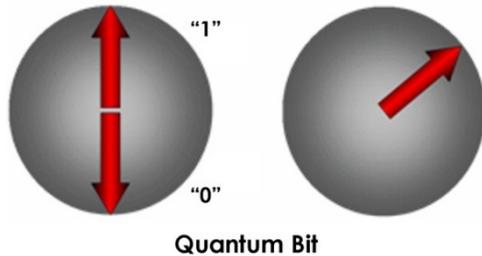
III. OUR APPROACH

In present world Classical Computers are devices that with the use Transistor, process information in the form of sequences a various combination of 0s and 1s known as Computer Binary Language. Transistor is type of a Switch. It can be turn on or turn off. Turn on can be described like Binary 1 and Turn off can be described like Binary 0. Classical Computer's processing power depend on the number of Transistors used. All information are represented using Binary. Furthermore, all calculations are done using Binary.

In 1980 Russian German Mathematician, Yuri Manin who is first proposed the idea about the Quantum Computing. Quantum computing is the area of study focused on developing computer technology based on the principles of quantum theory. Quantum Computing is future and researchable technology. Quantum computers are different from digital electronic computers (Classical Computers) based on transistors. Quantum computation uses quantum bits (qubits), which can be in superposition of states to perform operations. Qubit is the basic unit of information in a quantum computer. It is represented both 1 and 0 at a same time (Figure 4).

Figure 4: Quantum Bits

https://www.google.com/search?q=quantum+bits&source=lnms&tbm=isch&sa=X&ved=0ahUKEwj4-JG7hK7LAhXRcl4KHZfsDDAQ_AUICSgD&biw=1366&bih=657#tbm=isch&q=qubits&imgsrc=37g9iEtmXN70iM%3A

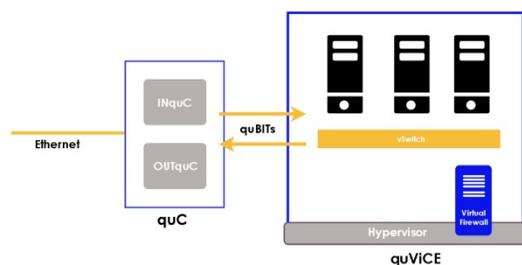


In present world, virtual firewalls the mechanism they have used is the bitwise operations. That means the set of instructions or rules given by the virtual firewall is executed using bit wise operators. Therefore, it is caused to major issue of the VF which is the heavy network traffic between the VM and WAN.

The research will be supposed quViCE (Quantum Virtual Computing Environment) as the solution for this issue (figure 5). It will be build a Virtual Environment in a Quantum Computer to deploy VM and VF. It will use Hypervisor Mode also. quViCE is a kind of Conceptual Virtual Environment to deploy VM. Qubit is a kind of bit runs in Quantum Computer. VF is runs in this Environment. All operations and information are handled using the Qubits. Therefore network traffic can be reduced because of the Qubits.

There is kind of a hardware component called quC (Quantum Converter). It will be used for convert to bits into quBits and quBits into bits. Outside the quantum computer, Data communication is done using normal bits because tradition data communication methods are more accuracy than quantum data communication. Therefore all input data are bits. Since all out data are qubit the proposed VF based on virtual environment cannot be processed using regular bits. It can be only processed by qubits. Therefore all inputs data should be converted to the qubits. This proposed concept will be used tradition data

Figure 5: Solution Diagram



communication methods. Therefore all output data should be converted to bits. The proposed quC component has two

individual hardware component called INquC (input quantum converter) and OUTquC (Output quantum converter). INquC will be converted all input data bits into qubits and OUTquC will be converted all output data qubits into bits. When using two individual hardware components to the conversion process, system will be more accurate and it will cause to reduced network traffic.

Tradition VF is using bitwise comparison method to check each data packet matching with the firewall rules. It is more time consuming process. If there is a two bits data packet, there are four kind of bits pattern. 00 01 10 and 11. Therefore VF should process four time comparison method simultaneously. It is more time consuming and less efficient and less accurate process. When proposed concept uses Qubit mechanism because of superposition concept one bit can have two states at once. Number of states can be calculated using 2^n equation. Once regular processor starts processing it takes one bit pattern for one calculation but in quantum processing all the bit patterns will be taken to the process at once. That will be speed up the quantum processing more than regular processing. Therefore it will cause to speed up the VF filtering process using quantum processor saving more time than a regular process usage and will give accurate results as well.

IV. CONCLUSION

Using quantum computing technology the proposed system is introducing a method to reduce the network traffic on a VF. Introducing a new device to convert Qubits to ordinary bits it can do the regular communication with the World Wide Web and other networks without reducing the VF performance and generating network traffic on the VF. Via QuC device incoming bit stream will converted to a Qubit stream. Converted Qubit stream will be passed through the Quantum VF that speeds up the packet scanning process without generating network traffic.

V. FUTURE WORK

Quantum computing is a new platform and still on the research area. D-Wave systems produced the word first quantum computer that extends both computer science and quantum mechanism. Therefore it might take a little time for people to get to know much about quantum computation and used to use quantum computers as well.

Since that Qubit architecture used in this research is still not widely known technology as the bit technology. New system had to introduce a module named as QuC to convert bits coming from outer networks to the inner quantum VF as well as convert Qubits in to bits that going out of the quantum environment. This QuC module is still a conceptual module that needs to be produced in future before quantum computers start to use within civilization.

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Hacking Techniques in IPV6 Networks and Prevention Mechanisms

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Abstract- Internet protocol version 6, the new version of the Internet Protocol has been developed to provide new services and to provide flexibility to the Internet's growth. An overview of the key security issues outlines the challenges in deploying and transitioning to IPv6. Protecting against threats, viruses, hackers can be regarded as the most difficult problems on the Internet today. One solution for these attacks is to trace the source of the attacks. However, it is not easy to trace since the attackers generally use the spoofed IP source addresses to hide own network location. The current Internet architecture does not provide any means to find the real sources of IP packets. Numerous trace back mechanisms have been proposed to this prevention method to overcome this issue. Most of such works have been focused on addressing the trace back issues based on the Internet protocol version 4 based network. In this paper, the research group analyze IPv6 hacking techniques and propose a combined solution from the existing solutions.

Index Terms- IPv6, Trace back issues, Wimax, Spoofed IP source, IPv4 network

I. INTRODUCTION

The number of connected devices is growing vastly where 6.4 Billion connected IoT (Internet of things) will be used in 2016 and it is predicted to go up to 21 Billion IoT devices by 2020. Since IPv4 has a theoretical maximum of about 4 billion addresses, IPv6 was introduced by The Internet Engineering Task Force (IETF) in 1998 to supplement (and eventually replace) IPv4 where IPv6 has an unthinkable theoretical maximum because it is 2¹²⁸ of total addresses. Figure 01 illustrates the IPv6 packet header. This ultimate growth, the potential expansion of security threats has made a big impact on IPv4 addresses. Therefore, IPv6 addresses were designed with enhanced security. Figure 02 illustrates how a network structure goes as hierarchy way in the proposed research.

Security enhancement was another key component in IPv6 development. Security was not considered when IPv4 was developed. IP Security, a set of protocols were introduced later to provide data integrity, confidentiality and authentication. IPv6 should provide better security because IPsec is mandatory in IPv6.

IPv6 has node auto configuration for devices such as PC, laptop etc. through DHCPv6 which a node can configure its IP address based on the local information without connecting to a server.

IPv6 also provides better methods for generating routing tables and better mobility support [1].

Even if IPv6 was designed for better performance, it faces some security challenges same as IPv4. IPsec is mandatory in IPv6 but its use is not, that makes the network and devices vulnerable to almost all the existing IP related threats. Further, there's uncertainty in some of the features of the IPv6 security suggestions because they are not yet completely understood by the networking administrators. It holds stakeholders back from making switch to IPv6. In addition to that the already existing threats such as application layer attacks, packet flooding can also affect IPv6 networks and devices [2].

IPv6 traffic is being tunneled over IPv4 connections and appears to be the regular IPv4 packets unless an organization has deployed a security mechanism that inspects tunneled traffic. Firewalls and network management tools which are used for IPv4 do not automatically block IPv6 traffic coming into networks. The typical IPv4 security devices are not tuned to look for IPv6 tunnels [3].

The development of a protocol to replace IPv4 started in 1990s. One major reason for that was the limited maximum number of IPv4 address space. A technology called NAT (Network Address Translation) was introduced to alter this space issue by providing internet access for a huge number of computers using small number of IP address. NAT was operated between the hosts and private network. Due to the increase of the Internet of Things (IoT) devices, NAT comes across vast management challenges to support communication [9].

Mobile Wimax is a broad band access technology which is growing rapidly that allows low-cost mobile Internet applications. Wimax is combined of OFDMA. Some of the main threats to Wimax security are man-in-the middle, privacy compromise, theft of service, Denial of service security attack (DOS)[6][7]. Due to the recent increase in e-crime, DoS/DDoS attacks, victims and security authorities need IP trace back mechanism that could trace back the attack to its source [11]. DDoS is a rapidly growing problem in IPV6. Grouping of DDoS attacks and defenses which gives problem and the current solution space [10].

Intrusion Detection Systems (IDSs) arranged in the virtual machines (VMs) of the cloud Systems with a data fusion methodology in front end and quantitative solution for alert generated by the IDSs. Detection uses the Dempsters combination rule to fuse from multiple evidence sources and solves the problem of analyzing the logs generated by sensors [4]. K-nearest neighbor (k-NN) and classifying the networks status, helps to utilized in the detection stage and to differentiate the network status into each phase [5].

The Router Advertisement (RA) Guard functionality examines the RAs and filters out RA packets sent by unapproved devices. The RA guard feature is deactivated by default. By

allowing, the RA packets received on the interface are dropped and the port be able to shutdown based on the interface configuration. The port can be restarted after the constituted time by configuring the auto-recovery option. RA Guard could be compared to the best practice of blocking DHCP server-side traffic from clients [8].

The most popular method of hacking technique is Man in the Middle (MITM). The tool used can be downloaded from THC website. MITM take advantage of spoofed neighbor advertisement and use it to perform sniffing FTP traffic. It is required at least 3 computers in the same IPv6 network to do MITM and sniffing. 1st test is to send the ICMPv6 echo request from client FTP server then take a look at the neighbor cache entry if it testing no anomaly the next test is started by enabling IPv6 forwarding and utilizing parasite on the attacker computer. The goal is to perform man in the middle using spoofed neighbor advertisement, this test is continued by transferring ICMPv6 echo call to FTP server from client by looking at the neighbor cache entry. If there is anomaly on the client neighbor cache attached attacker mac-address. Figure 03, 04 illustrates the Man in the middle. Hence the traffic from client to FTP server through the attacker [12].

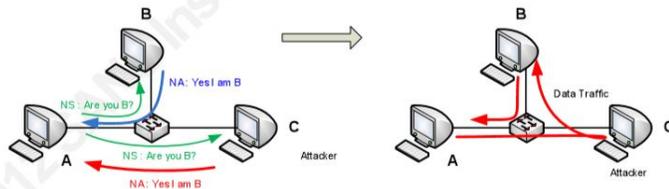


Figure 03: Man In The Middle

(Source: <https://www.sans.org/reading-room/whitepapers/detection/complete-guide-ipv6-attack-defense-33904>)

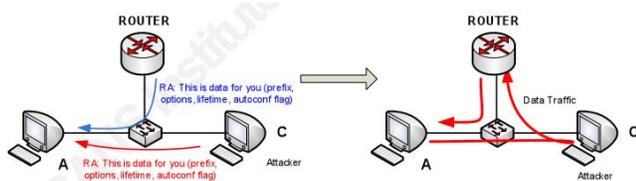


Figure 04: Man In The Middle Data Traffic

(Source: <https://www.sans.org/reading-room/whitepapers/detection/complete-guide-ipv6-attack-defense-33904>)

Another hacking technique which exist in IPv6 is Smurf, a type of DoS attack which aims to flood the target with network traffic so that it cannot be accessed. This can be performed by spoofed ICMP echo request to the broadcast address. Source address of the request is the target of this technique. IPv6 does not have a broadcast address, but it has a multicast address to reach all PCs in the network Figure 05 illustrates the Smurf attack [12].

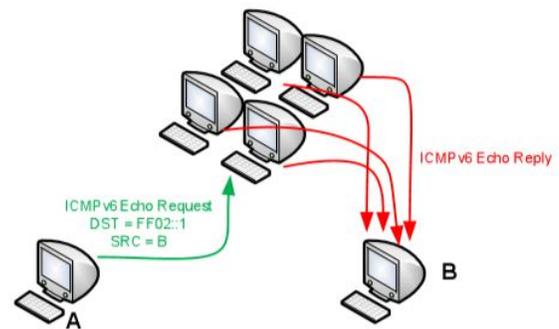


Figure 05: Smurf attack

(Source: <https://www.sans.org/reading-room/whitepapers/detection/complete-guide-ipv6-attack-defense-33904>)

The following sections of the document is as follows: section II describes about existing methods to prevent MITM and Smurf attacks; section III describes the solution, the research group proposed; conclusion, future work and acknowledgement. Solutions

There are vast number of hacking techniques and protection methods in IPv6. Some of the hacking techniques and methods are already mentioned in this paper in the introduction. To limit the scope of this paper, the research group will propose a solution which can be applied to prevent both MITM and Smurf attacks.

Packet filtering as a solution for Smurf attack

Firewalls can be a software or hardware element that is designed to protect network from one another. They are mainly used for controlling the traffic and filtering it, entering and leaving. They are kept areas between low and high trust like private and public network or between to different networks belonging to the same organization.

Firewalls maintain the traffic using filters. These filters are mostly set of rules which are defined in the order of priority. If the packet match the criteria of the rule then actions of the rule are being applied and if they are not matched then next, no action is kept and next set of rules are practicality checked.

These packet firewalls filters are based on evidence placed in the packet header similar protocols, destination address, source address, port number used etc. These firewalls works at the network layer (layer 3) and transport layer (layer 4). These are commonly called as routers.

How packet filter works

Packet filters work with individual packets, therefore every packet should be decided whether can pass or should undergo some other action. The basic steps of packet filtering are the following.

1. The filter system inspects the packet. It regularly checks the following information in the packet header:
 - Source/destination IP addresses.
 - IP options.
 - TOS/TTL fields.
 - Source/destination port numbers.

- TCP flags.
- Data part of packet.

State full packet filters can check the state of the given packet related to the known connections (whether this packet goes to an already seen connection or it is a different packet or it is a packet connected to an already established connection, like an ICMP control packet), or to other state full information (whether this packet fits in the TCP window of the link). This information provide the base for the decision. Of course, the firewall can test whether the packets checksum and packets in general are adequate.

2. After inspecting the packet and collecting state full information, the packet filter assesses the policy for the given packet. The policy and the demonstration of the policy might be different between various implementations, but usually Access Control Lists (ACL) are used. ACL are checked from the top of the list to the bottom. The list entries are usually called rules and these rules are calculated after one another.

A rule usually contains a match and a decision part. The match part is evaluated based on the information gathered from the packet before the rule check. If a packet matches the rule the rule's decision is taken for that packet. The several implementations change in how they run over the list. One stops evaluating at the first matching, while others might take the last match's decision.

3. After evaluating the ACL the packet filter can work with that packet as reported by to the decision. Usually, every ACL has a default decision which has authority to see what should happen with the packet if no match happens. Based on the main security rule a default reject or default drop approach is a good choice, but as natural it depends on the implementation and on the administrator.

There are many decisions, but usually all implementations support the following basic judgments. The meaning of the decisions though strength differ to some extent.

- Accept
Agreeing the packet to pass.
- Deny/Drop
Denying the packet soundlessly meaning
That no error packet is sent back to the sender.
- Reject
Denying the packet with sending back some caring of error packet (ICMP error message or TCP rearrange packet depending on the situation).

VPN as a solution for MITM

Virtual Private Network (VPN) is a commonly used for secure connections. A VPN extends a private network across internet and allow users to strongly access a private network and

share data remotely through public networks. Functionality of VPN is almost same as a firewall that defends data on computer, VPN protect it online. And while a VPN is technically a WAN (Wide Area Network) the front end holds the same functionality, security, and appearance as it would on the private network.

VPN use a combination of dedicated connections and encryption protocols to generate virtual peer to peer (P2P) connections. Attackers might manage to get access to transmitted data, but transmitted data will not be able to be read due to the encryption.

1. The user first connects to the public internet through an Internet Service Provider.
2. Then initiates a VPN linking with the company VPN server using client software.
3. The client software on the server starts the secure connection, contributions the remote user access to the internal network.

Many security protocols for VPN are available. The most common are,

1. IP security (IPSec)
2. Layer 2 Tunneling Protocol (L2TP)/IPsec
3. Secure Sockets Layer (SSL) and Transport Layer Security (TLS)
4. Point-to-Point Tunneling Protocol (PPTP)
5. Secure Shell (SSH)

VPNs are the best solution of securing traffic to protect personal data from an attacker.

II. PROPOSED SOLUTION COMBINING EXISTING SOLUTIONS

To protect personal data and computer networks in IPv6 from the mentioned attack techniques MITM and Smurf, VPN and Packet Filtering are already used separately. Theoretically VPN and Packet Filtering can be implemented together to provide enhanced security, privacy and will be low in cost and have better impact on network performance.

III. CONCLUSION

In this paper briefly defined about hacking techniques such as Man in the Middle, Smurf attacks their functionalities and how to protect each are in individual way. Then this paper gives the solution for this attacks used firewall in middle and used VPN for monitoring the online processing. Used these things together in the internal firewall it is protect network very efficiency.

IV. FUTURE WORK

In future this firewall add trackback mechanism in it purposes, it would be additional secured, because trace back mechanism will be check out the packets and packet filtering mechanism will be filtering the packets carefully so if intruders

get into a packet the both mechanism will block the intruder and protects the network. By adapting to high performance packet filtering firewalls the protections gets to the next level. If the packet filtering mechanism try to read tunneling traffic we can reduce hackers getting into the network in future VPN will get more techniques so this firewall become very helpful for protect the IPV6 environment.

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Table: 01

Project/Functions	MIPv6 Authentication method	PA Guard	Water mark Method	RFC 2827 Filtering AODV	AODV	NDP Protocol	Spoofing Prevention method	Teredo services method	Trace back mechanism
An authentication method for proxy mobile IPv6 & Performance Analysis	✓	✗	✗	✓	✗	✗	✗	✗	✗
Implementation Advice for ipv6 router	✗	✓	✗	✗	✗	✗	✗	✗	✓
Protection of digital centre in peer to peer network	✗	✗	✓	✗	✗	✗	✗	✗	✗
Secure routing & intrusions detection in ad hoc network	✗	✗	✗	✗	✓	✓	✗	✗	✗
Tunnelling IPv6 over UDP through network address translation	✗	✗	✗	✗	✗	✗	✗	✓	✗
Spoofing prevention method for IPv6	✗	✗	✗	✗	✗	✗	✓	✗	✗
Computer science/networking & internet architecture	✓	✗	✗	✗	✗	✓	✗	✗	✓

Existing Functionalities

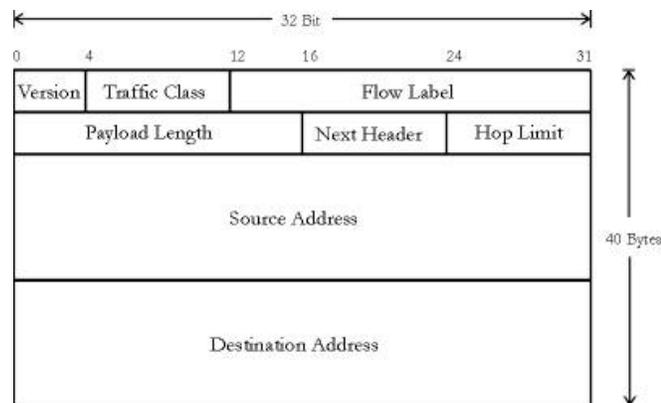


Figure 01: IPv6 packet header.

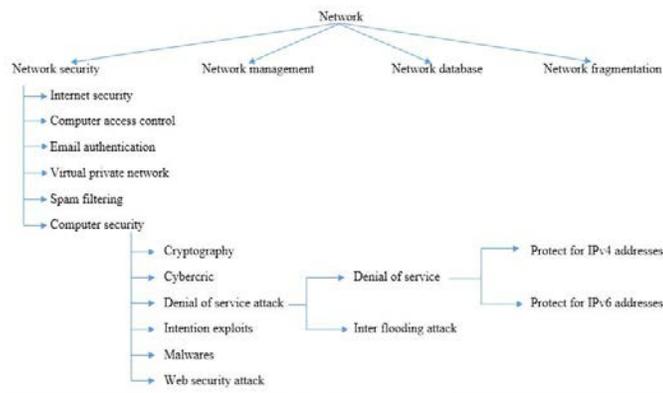


Figure 02: Network Structure.

Improve the Capabilities of Wireshark as a tool for Intrusion Detection in DOS Attacks

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Abstract- Network anomaly detection is a important and dynamic research area. Signal processing techniques have been applied recently for analyzing and detect network anomalies due to their potential to find novel or unknown intrusions. Flooding is a kind of attack, in which the attacker sends several floods of packets to the victim or associated service in an effort to bring down the system. There are unlike types of flooding attacks like ping flood, Syn floods, UDP (User Datagram Protocols) floods etc. The project simulates a ping flood scenario, by using the ping command on the OS(Operating System) and same time wireshark is installing the system on the victim, which would be used to analyses the number of ping packets acknowledged during a specified period with orientation to a threshold, based on which a flooding attack is detected. In wireshark one port received all ping request. Therefore is not accurate to handle the all request. In this paper briefly disused how is wireshark tool working, wireshark tool disadvantages use traceback mechanism and improved the wireshark tool.

Index Terms- Hardware, Software, Operating Systems, Windows, Linux, Switch, Wireshark, flooding attack, anomaly detection

I. INTRODUCTION

A Denial of Service (DoS) attack is a way of making computers resources unavailable to its user. It comes in many different ways and sub motifs. If the hacker carefully planned and execute the attack that the computer and the networks might disable. There are some ways of executing DoS attacks.

Flooding the network to prevent legitimate network traffic; Disrupting the connection between two machines, thus preventing access to a service; Preventing particular individuals from accessing a service; Disrupting a service to a specific system or individual; Disrupting the state of information, such resetting of TCP sessions.

Ping flooding is the most primitive form of DoS attack. Therefore anyone can do ping attack very easily. When the targeted computer is under ping flood attack what happens is the computer's network become backed up, trying to keep up with ping requests. Whenever the server gets a ping call for computer has to compute it then send reply with the same amount of data, ping flooding is when the attacker floods the server with ping needs and the server has to calculate tons of requests every split of second , which takes up a lot of resources.

In ping flooding attack uses ping which is a simple application that the source send ICMP request to some destination computer and the normal behavior is that the destination to replies with the ICMP reply, to the protocol use ICMP is a request and a reply.

Idea of the attacker is to send many of the ping requests to the target, not worrying about replies, what the hacker wants is just to send many ping requests to the target such that overflow the link with block the capacity. Idea is to be send data to some target and such that reflect from others, and that what attacker sending to actual respond for the data which get the target. General idea is to send enough data to overflow the link. Except the point of some variation is to when sender sends data, use a fake source addresses. Hide is a one of these methods. From this can find who is doing the attack and get actions against it. The action may be blocking or may be legal action.

Second one is facilitate the attack. That means make the attack more powerful. User does not know that it is under attack. In previous case from the target perspective receiving pings from more different source addresses and also it is receiving pings from many more different locations and different paths of the internal. Therefore it quite hard to tell whether this is just normal user traffic or if it is an attack.

To work this reflector attack user need these normal computers to be respond to the messages that receive? These normal computers are not infected in anyway. Therefore no need to have any virus, or any software on them. Therefore that is not under control the attacker. Those are just normal computers on the internet. User need a protocol such that if user sends a message to these normal computers that will respond. Now that limits the set of protocols that user can use such in attack. If user is using web brows protocol here, the attackers' perspective if user sends a message to a web server then how many normal computers on the internet run web servers. But most normal computers on the internet respond to ping requests. Therefore it is a typical behavior of the computer that routine to the operating system if user receives a ping request system sends a reply.

Ping is very easy to use. Most computers respond to it. The goal is the overflow the capacity of link to the target. Therefore that the normal traffic does not get to the target.

Following section II described about existing works of Dos, DDoS and Wireshark, In Section III A Described Uses of Wireshark, section III B described functionalities of wireshark, section III C described benefits of wireshark, section III D described problems in wireshark, Section IV Described solution for this problems, Section V described future works and Section VI described Acknowledgment.

II. BACKGROUND AND RELATED WORKS

Denial of Service attack is usually accepted with large number of systems attacking a specific victim. Such an attacking network is called the Botnet. Denial of service attacks are further classified into many categories there are Distributed Denial of Service; Low-rate TCP beleaguered Denial of service, Reflective Denial of Service The attack from hyenas packet creator could be initiated from the Linux terminal. The Following commands decide what kind of attack to be launched against the server when a path with more number of networking devices is attacked, the load on the network increase important to packet failure and retransmissions. However, the server is still safe from getting damaged by the forged or malformed packets [1].

The majority DDoS attacks apply either the transmission control protocol (TCP) or the user datagram protocol (UDP) as flooding methods. Those use some algorithms for this research. Those are ratio incoming/outgoing traffic, the total traffic volume and distribution patterns are the common algorithms. A packet jitter spectral density metric (PJSMD) is provided which deal with UDP attacks by explore and evaluate huge possible defense mechanisms. PJSMD detection method consists of three techniques: (i) compute the spectral density of packet timing intervals, (ii) calculate the Kullback-Leibler distance (KL-distance) among the spectral thickness and a uniform distribution, and (iii) go through a non-linear Gaussian amplifier. It provides automated analysis of the flow characteristics. The invention provides a technique answer that efficiently and effectively identify UDP attacks. One main advantage of this solution is that it uses the concept of traffic statistics analysis. Power spectral density (PSD) analysis has been used to identify normal TCP flows. The creation provide two fundamental difference compare with the PSD method. One is that the present invention defines a packet jitter method as the comparative timing set of packet arrivals for a UDP flow. The other is that DFT analysis is apply on the process itself instead of its autocorrelation function. The invention can be applied to all the cases of UDP applications in computer networks [2].

DDoS attack cause Consumption of resources, such as bandwidth, disk space, or processor time and disturbance of configuration in sequence, such as routing information, disturbance of state information, such as unsolicited resetting of TCP sessions and disturbance of physical network components and many more firewalls play a critical role in any organization is security explanation, those are not purpose-built DDoS avoidance devices. In fact, firewalls have certain inherent qualities that impede their ability to provide complete protection against today is most sophisticated DDoS attacks. IDSs provide brilliant application layer attack-detection capability, those do have a weakness: those cannot detect DDoS attacks using valid packets-and the majority of today is attacks use valid packets. Although IDSs do offer some anomaly-based capabilities, which are necessary to detect such attacks, those need extensive manual tuning by experts and do not identify the specific attack flows [3].

The group has addressed the problem of coordinated attack by multiple black hole acting in group wise. This research group has presented a technique to identify multiple black holes

cooperating with each other and a solution to discover a safe route avoiding cooperative black hole attacks. Ad Hoc networks can use where the infrastructure is difficult to make and high price. The group has used Ad Hoc on insist Distance Vector routing protocol to find out a solution for attack by multiple black holes. What happens in AODV is, Source node sends a Router Request Message to its neighbors to find out a fresh suitable route to send a packet to the Destination D. If not the Intermediate Node updates the RREQ to the destination D until it reaches to the destination. Once the Source node got the receiver message with the router request, the routing table adds the route and the Source node. A black hole attack always responds positively with a RREP communication to each RREQ even though it does not have a valid route to the destination [4].

SIFF enables the victim of a flooding attack to stop individual flows from reaching the victim before the flows saturate its network. All network traffic is divided into two classes: privileged and unprivileged. The packets of a privileged channel are given priority over those of unprivileged channel in communication. The paper describes the design of the SIFF system and a handshake protocol to establish a privileged channel through a capability exchange. SIFF provides the client and server can establish a privileged channel. The packets of the privileged channel take precedence over those of unprivileged channel; the receiving host of a privileged channel has the control and ability to tear down that channel; it prevents spoofing of source IP address with high probability; it does not require any inter-ISP cooperation. End hosts need not signal any state to the routers; it does not require intra ISP cooperation; Routers need to maintain a small, constant amount of state per router interface. The amount of state is independent of the number of channels traversing the router;

A SIFF router needs to perform very small per packet processing. It need only execute two equality checks for each privileged packet or a single hash computation for each unprivileged packet. Backward compatibility [5].

The design of the SIFF system is based on classification of Internet traffic into two types, privileged and unprivileged. A client establishes a privileged channel with a server through a special handshake protocol in which the client receives a capability from the server. The client initiates the protocol by sending a specific type of unprivileged packet called EXPLORER packet. Routers in the network mark a field in the header of the EXPLORER as the packet travels from the client to the server. Server returns this field to the client as a capability token for a privileged channel among the client and the server. Following the handshake, the client and the server communicate using privileged packets called DATA packets. DATA packets carry the capability obtained from the server in the packet header. Each router in the network forwards the packet only if capability in the packet header is verified, else the router drops the packet [6].

Presents new detection method of network traffic anomaly based on analytical discrete wavelet transform (ADWT) and high order statistical analysis. Those focus about anomaly detection. In anomaly detection there are some benefits. it is ability to detect novel attack, uncertainty regarding what activity the attacker can perform without triggering the alarm and capability to detect insider attacks. There are some drawbacks also, can be time

consuming, it means it is not possible to reduce a large number of false positives by such means and can cause poor performance. In terms of traffic premises, there are four types of situations. There is no intrusive activity and the system does not report alerts. The detection system falsely reports the absence of intrusion. Second one is, not intrusive but anomalous. The activity is reported by the system. The detection system falsely reports intrusion. Third one is, not intrusive not anomalous. The system fails to detect an intrusive activity. Therefore it is similar to the expected activity. Is not reported as intrusive. Last one is intrusive and anomalous. The activity is not intrusive, but different from the usual activity and reported to the system. Is reported as intrusive. Uses of these things those proposed new detection method based on Analytical Discrete Wavelet Transform. This consists of five components. Feature analysis, wavelet transform, statistical analysis and thresholding, wavelet combination and anomaly detection. In the first step, Dataset are converted into network flow logs. Next, employ the wavelet transform for numerical analysis by means of a sliding window. Then selectively rebuild the signal only from those wavelet coefficients that surpass the thresholds on each scale. Therefore, the reconstructed indication can be distinct from original signal to a greater degree. Final step is detection, in which attacks and anomalies are checked by thresholds. The thresholds are established through the research of historic traffics [7].

The goal of packet sniffing is to monitor network assets to detect anomalous behavior and misuse. This concept has been around for nearly twenty years but only recently has it seen a dramatic rise in popularity and incorporation into the overall information security infrastructure. Beginning in 1980, in 1988, the Haystack project at Lawrence Livermore Labs released another version of intrusion detection for the US Air Force. This project produced an IDS that analyzed audit data by comparing it with defined First network intrusion detection system. Commercial development of intrusion detection technologies began in the early 1990s. Haystack Labs was the first commercial vendor of IDS tools, with its Stalker line of host-based products. Nonetheless, commercial intrusion detection systems developed slowly during these years and only truly blossomed towards the latter half of the decade. The intrusion detection market began to gain in popularity and truly generate revenues around 1997. Current time network security is the one of the primary concern. But many hacking methods are available in these days. Wireshark is the most popular network protocol analyzer. It has rich and powerful feature set and runs on most computing platforms. Wireshark has tools for capturing, viewing, and analyzing the data packets. It uses sniffing tools, sniffing analysis, logging tool and pre-filtering analysis. Wireshark starts a new packet capture which configures the card in promiscuous mode and waits until the desired amount of traffic has been captured. Wireshark provides users the capability of capturing the packet traveling over the whole network on an exacting interface at an exacting time. Wireshark sniffing tool lists all available interfaces on the node and can enable capturing for any of them. Wireshark uses two filtering languages one used when capturing packets and other one used when displaying packet. Wireshark has some tools. One tool to support the mentioned arguments is the expert information table it visibly marks for checksum error, redundancy check and lost segment

accounting. Another tool for intrusion and filter analysis is menu item statistics. Statistics of various kinds can be provided for an already captured packet. Wireshark another tool static IO graph tool these graph tools show flow of a traffic over the network in entirety or for certain protocols only [8].

As Wireshark packet sniffer, Forensics Tool Kit and via Forensics mobile forensics toolkit. There are few key areas to discuss in this paper. A) Instant Messaging and Encryption. The most commonly used way to secure IM is by using encryption applications and using SSL feature in the Internet browsers. There are two encryption algorithms. That is Symmetric and Asymmetric encryption algorithms. A research paper proposed a way of combining Symmetric and Asymmetric cryptography methods to encrypt the communication channels. But this proposed method does not have efficiency and functionality on the peer-to-peer social network. B) Instant Messaging and Private Browsing Mode. This browsing mode has ability to protect and hide the user's identity over the internet and attempts to look through their browsing history. C) Web Based Internet Messaging with SSL. SSL means Secure Socket Layer. SSL encrypts the portions of network communication in the Internet. D) Instant Messaging Application and Encryption Tools. There are few IM applications which encrypt their IMs and protect their clients by malicious users. 1) Skype 2) Facebook 3) Yahoo 4) Google talk 5) eBuddy 6) Gmail 7) WhatsApp 8) SimPro. In this research paper, researchers found out the encryption level of the IM. Main goal of this research is to investigate the encryption stage of IM and find out a good way of encrypt the conversation between two parties [9].

Wireshark can be used to analyze packets transmitted in any of several hundred protocols, it has different types of filters which can be applied, act upon compressed files, supports several decryption schemas, and it has a different type for output format. Wireshark relies on the specification of capture types and protocol-specific dissectors to be able to analyze network traffic. The goal of the current work is to develop a standard XML specification or vocabulary for dissector and to create a proof-of-concept software program parse the XML file and produce a Wireshark dissector. The process of dissecting a packet starts with the frame dissector which processes the entire packet to remove its data. The frame dissector passes the data on to the lowest-level data dissector. The remaining data is then passed on to the next lowest-level dissector in the network communication protocol stack.

reports on a project to develop an open-source application written in Python which reads in an XML specification for a network communication protocol and generates C source code file that comprise a directly able to compile Wireshark dissector plugin. Such as a tool might make producing basic Wireshark dissector for proprietary or experimental communication protocols almost as simple as defining the protocol in the first place several aspects of the problem exist including the creation of an XML vocabulary defining the specification language, the dissector generator. Several example specifications for different protocols for test purpose. Since this work is leading to a deployable product for a company, the users' manual was also developed [10].

Introduce a stateless internet flow filter which end users can stop individual flows selectively from reaching its network, without mechanisms that currently required such as per-flow state at routers, ISP collaboration, or the deployment of an overlay infrastructure. In this research paper, the researchers not only identify attack flows from internet but also find and filter the attacks from any network through a flooding port using wireshark [11].

In order to run Wireshark within Traffic flow and Packet Analysis System. (TOPAS) those extended the collector to receive and process packet data, PSAMP and elastic Net flow apply the IPFIX and Net flow.v9 protocols respectively, therefore no changes had to be made to the protocol stack. Those developed a pcap writer module for TOPAS that transforms packet records into frames in pcap format. Processing the pcap stream from the pipe, Wireshark show the decode packet and protocol information just as if it was running at the observation point [12].

Wireshark window verification based packet capturing scheme to prevent DDoS related security issues in cloud network nodes mostly consider about the spam attack to the cloud networks. Through this research, the research team discuss and suggest solutions to prevent DDoS (Distributed Denial of Service) attack in cloud nodes were using dynamic window scheme in cloud nodes to determine a message confirmation to resolve unnecessary packet. With this research paper, researchers update these theories for work in any network [13].

IEEE 802.15.4 packet analysis by wireshark and off-the-shelf hardware demonstrate a simple but powerful solution for the ability to overhear and analyze packets is essential or the development of protocols for IEEE 802.15.4-based Wireless Sensor Networks. With a help of T-mote Sky sensor node and contain operating system, radio packets can be overheard and then analyzed by using wireshark connected Linux computer. researchers will use the results of this research to make an updated one the can ran on windows too [14].

The expert info is kind of log of the anomalies found by Wireshark in a capture file. Each expert information will contain Chat, Note, Warn, Error Using wireshark firewall can be applied for any of the IP address to reject/allow packet from that particular IP [15].

III. OUR APPROACH

Reason for Use Wireshark

Most of Windows only either on a narrow range of platforms, while open source Wireshark runs on several platforms including Windows, OS X, Linux and Solaris. Wireshark is also allowed, and many networking and security professionals have experience working with it. maybe be the best reason to use Wireshark is that it is the tool that a hacker will almost certainly be using. Therefore, using Wireshark places it

can equal footing. Wireshark is the standard in network analyzer tools. Now a days 500,000 downloads happening in every month, the IT industry has comprised Wireshark as the tool for [network troubleshooting](#), optimization and security. It is one thing to be able to [configure a TCP/IP network](#) it is entirely different to understand the internal workings of that network. It is called doctor of networking.

Functionalities of Wireshark

The new packet capture, which configures the card in loose mode and waits until the looked-for amount of traffic has been captured. A node can be connected to a network complete multitude of mechanisms. Wired and wireless, covering many topologies and creation use of wide variation of protocols. Wireshark provides users the capability of catching the packets traveling over the whole network. On a particular interface at a particular time one of the primary tools is the capture tool. The interface option as shown in figure 1 below lists all available interfaces on the node and can enable catching for any of these nodes.

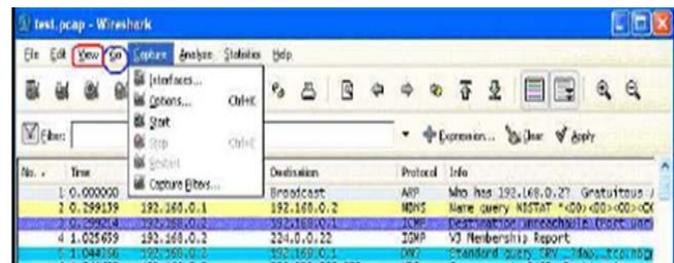


Figure 1 Capture Tool

(Source: www.researchgate.net/publication/46280039_Evaluation_of_the_Capabilities_of_WireShark_as_a_tool_for_Intrusion_Detection)

Wireshark have logging tools Log files can be capture hourly or weekly rate based on the requirement of the Network and the capability of handling devices. Those, files can be easily captured over a fast processing node and transferred to slower database.

Another interesting aspect is the feature of exporting the capture file into various other and more reasonable setups- the plain text, post script, the CSV etc. based on the analyzer tool used. Packets can be selected on the basis of protocol, the presence of a field, the values of fields, comparison between fields etc.

The queries which be able to be entered inside the field or the expression tab can be selected to provide with much innovative definitions and listing all the protocols from varied range of protocols in Wireshark.

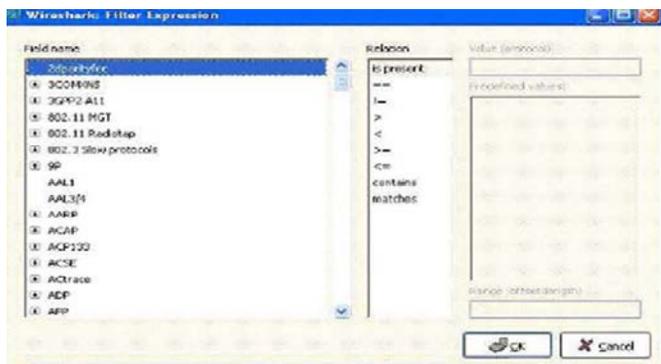


Figure 2 Information Table

(Source: www.researchgate.net/publication/46280039_Evaluation_of_the_Capabilities_of_Wireshark_as_a_tool_for_Intrusion_Detection)

No.	Time	Source	Destination	Protocol	Info
1	0.000000	192.168.0.1	192.168.0.2	ICMP	8 [Echo request] to 192.168.0.2
2	0.000000	192.168.0.2	192.168.0.1	ICMP	0 [Echo reply] to 192.168.0.1
3	0.000000	192.168.0.1	192.168.0.2	ICMP	8 [Echo request] to 192.168.0.2
4	0.000000	192.168.0.2	192.168.0.1	ICMP	0 [Echo reply] to 192.168.0.1
5	0.000000	192.168.0.1	192.168.0.2	ICMP	8 [Echo request] to 192.168.0.2
6	0.000000	192.168.0.2	192.168.0.1	ICMP	0 [Echo reply] to 192.168.0.1
7	0.000000	192.168.0.1	192.168.0.2	ICMP	8 [Echo request] to 192.168.0.2
8	0.000000	192.168.0.2	192.168.0.1	ICMP	0 [Echo reply] to 192.168.0.1
9	0.000000	192.168.0.1	192.168.0.2	ICMP	8 [Echo request] to 192.168.0.2
10	0.000000	192.168.0.2	192.168.0.1	ICMP	0 [Echo reply] to 192.168.0.1
11	0.000000	192.168.0.1	192.168.0.2	ICMP	8 [Echo request] to 192.168.0.2
12	0.000000	192.168.0.2	192.168.0.1	ICMP	0 [Echo reply] to 192.168.0.1
13	0.000000	192.168.0.1	192.168.0.2	ICMP	8 [Echo request] to 192.168.0.2
14	0.000000	192.168.0.2	192.168.0.1	ICMP	0 [Echo reply] to 192.168.0.1
15	0.000000	192.168.0.1	192.168.0.2	ICMP	8 [Echo request] to 192.168.0.2
16	0.000000	192.168.0.2	192.168.0.1	ICMP	0 [Echo reply] to 192.168.0.1
17	0.000000	192.168.0.1	192.168.0.2	ICMP	8 [Echo request] to 192.168.0.2
18	0.000000	192.168.0.2	192.168.0.1	ICMP	0 [Echo reply] to 192.168.0.1
19	0.000000	192.168.0.1	192.168.0.2	ICMP	8 [Echo request] to 192.168.0.2
20	0.000000	192.168.0.2	192.168.0.1	ICMP	0 [Echo reply] to 192.168.0.1

Figure 3 Wireshark action

(Source: www.researchgate.net/publication/46280039_Evaluation_of_the_Capabilities_of_Wireshark_as_a_tool_for_Intrusion_Detection)

A tool to support the stated arguments is the knowledgeable above figure 2 information table shown below as it visibly marks for checksum errors, redundancy checks and lost segment accounting. Additional tool for intrusion and filter examination is the menu item - statistics. Statistics a variety of packets canister be provided for an already captured packet, it is protocol and the conversation.

Figure 3 show how wireshark working. It can monitor conversation of nodes temporary packets between the m in the captured file in the given direction. Other geometric tools are the packet summary and protocol hierarchy tools. These second major tool is the statistical IO graph its shown in figure4 these graphs can show movement of traffic over the network in entirety or for certain protocols only. The tool also delivers the option of showing differently post filtered capture on the graph in several colors to enable easy identification, therefore making Wireshark not only one of the most easily reachable sniffing software but also one of the most user friendly and comprehensible utility. Time can be set comparative to the first packet or allowing to systems lock. Usage of system clock time is effective when User are merging several capture files captured at different times.

When the traffic is coming highly it is in wireshark show as it a graph its shown figure 5

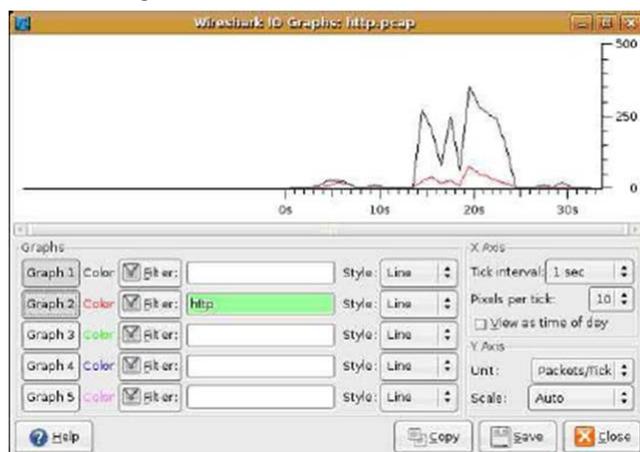


Figure 4 IO Graph

(Source: www.researchgate.net/publication/46280039_Evaluation_of_the_Capabilities_of_Wireshark_as_a_tool_for_Intrusion_Detection)

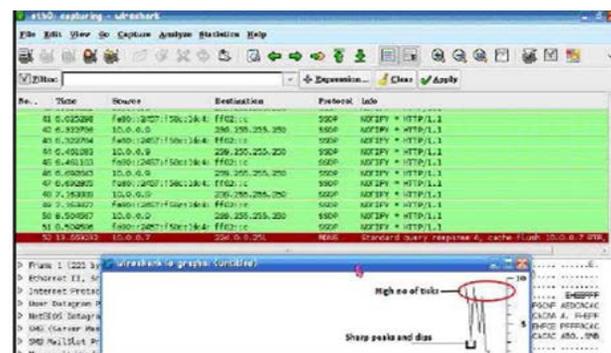


Figure 5 High traffic flow

(Source: www.researchgate.net/publication/46280039_Evaluation_of_the_Capabilities_of_Wireshark_as_a_tool_for_Intrusion_Detection)

Benefits of Wireshark

Wireshark offers a number of benefits that make it tempting for everyday use. It is aimed at both the journeyman and the expert packet analyst and offers a selection of features to entice each. The Wireshark interface is one of the easiest to know of any packet sniffing application. It is GUI based, with very clearly written context menus and a straightforward layout. It also provides some features designed to increase usability, such as protocol based color coding and detailed graphical representations of raw data. Unlike some of the additional complex command in driven alternatives, like tcpdump, the Wireshark GUI is great for persons who are just arriving the world of packet analysis. Since it is open source, Wireshark is pricing cannot be beat Wireshark is released as free software under the GPL. user can download and use Wireshark for any aim, whether personal or commercial. When dealing with freely distributed software such as Wireshark, there may not be any official support, which is why the open source community often relies on its user base to provide support. Luckily for us, the Wireshark is one of the greatest energetic of any open source project. Wireshark web page links directly to some forms of

support, with online documentation, a support and development wiki, FAQs, and a position to sign up for the Wireshark mailing list, which is observed by most of the program's top developers. Paid support for Wireshark is also accessible from CACE Technologies through its Shark Net program. Wireshark supports all major modern operating systems, containing Windows, Mac OS X, and Linux-based platforms. User can view a complete list of supported operating systems on the Wireshark home page.

Problems in wireshark

Wireshark is not an intrusion finding system. It will not warn when someone does strange things on User network that network is not acceptable to do. However, if strange things happen, Wireshark might help user figure out what is actually working on. Wireshark will not manipulate things on the network. It will only measure elements from it. Wireshark does not send packets on the network or do extra active things. Wireshark not automated tool and it is not support for long time monitoring.

IV. SOLUTION

Wireshark tool when used traceback mechanism. It is very helpful for network administrator. Therefore attacker uses multiple techniques to hide his real identity. Stepping stones intermediate host between an attacker a zombie machine typically used in DoS attacks.its shown figure 6.

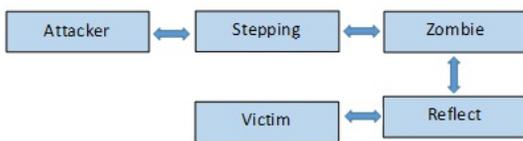


Figure 6 Process of Attacks

Current version of wireshark is 2.0 is only measure when the IP packets coming in the network. It is not protect the network. It allowed when attacker coming the network it is major disadvantage of wireshark. Therefore in this paper said add the traceback mechanism. This mechanism protect the network. Mostly attackers used spoofed IP address for hacking. If traceback mechanism attached in wireshark it is identify the address of the true source packets causing a Dos attacks. Traceback is able to trace attacker with single packet. Traceback mechanism have many classification that are Ingress Filtering, Link Testing, Input Debugging, Controlled Flooding;Logging;ICMP;Trackback;PacketMarkingAlgorithmF DDM trackback;TBPMtrackback. In wireshark tool implement Logging classification; ICMP trackback and Packet marking Algorithm then Wireshark update itself as very efficiency. In Wireshark tool implement Logging as option when click this it is start to monitor packet receiving.in attacking time it is determines the attacker path based on the packet traversing. In Wireshark tool implement ICMP as one additional option when the packet receiving time it not receiving all packets it trace out the full path. Generate when the packet in come from same destination it sends message to the packet destination. This makes reconstruction of the attack path. Wireshark used Packet

marking Algorithm, it will mark the packets when receiving time and it is unique Identifier to the Particular destination. This makes Wireshark take this things as his objectives wireshark work like Intrusion protect System.

FUTUREWORK

Wireshark as a Network Protocol Analyzer has by now confirmed its mettle in all necessary realms. However it still has capacity of development in it as far as alert making and heuristic development is concerned. Research group is working to introduce positive value in the source code of Wireshark to overcome the above Shortcomings by making Wireshark capable of alert generations.in this paper provide DoS attack used wireshark and traceback in future used this method for DDoS attack.

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Common Login (with ASP.NET)

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Abstract- This paper talks about
•Why Common Login?
•Features of Common Login?
•How to use?

Index Terms- Why Common Login, Windows authentication, how to use;

INTRODUCTION

Hello Readers,

First of all, I would say this paper is just for ASP.net developers.

Common login as the name implies, providing single interface for login into multiple websites. Are you an employee? Are you working in an organizing where you need to move from one website to another for completing your task? Are you fed up with keeping track of your Username and password for every website? If you say yes than this is for you. No need to remember password for website.

No need to type URL of every other website. Everything is present at one place.

This is best for intranet network like in an organization and now is the right time to move to common login.

You just need to use your System credential to move around multiple websites.

Now in this paper I have talked about common login and how to use them. I have also included code for the same.

Features of Common Login:

- Everything is present at one place. You can place all your websites in Common Login websites from where user can directly access their point of interest.
- User don't need to remember password or username you just needed your System credential.
- On your first login if you choose remember. Now you don't even need to type your credentials on accessing common login website.
- Common Login is based on Windows authentication which provide more security compare to others.
- Overhead on database will be reduced. Now the responsibility of authentication lies over windows not on database.
- No need to maintain that many user that we used for different portals. Database Maintenance is reduced.
- Database Administrator work load will be reduced, due to reduction in number of accounts. Managing those many accounts and their activities is hectic.

How to Use:

Step 1: First you need to create a website which is going to act as an interface for your other websites. Let's create a website name it CommonLogin. Now add an aspx page.

In your aspx define your websites that you needed in CommonLogin. Here I have defined three websites in my Common login.

```
<tr>
<td>
<asp:ImageButton runat="server" ID="imgTravelling" ImageUrl="Images/Travelling.jpg" Width="300" Height="300" OnClick="imgTravelling_Click" />
</td>
<td>
<asp:ImageButton runat="server" ID="imgSports" ImageUrl="Images/Football.jpg" Width="300" Height="300" OnClick="imgSports_Click" />
</td>
<td>
<asp:ImageButton runat="server" ID="imgMovies" ImageUrl="Images/Movies.jpg" Width="300" Height="300" OnClick="imgMovies_Click" />
</td>
</tr>
```

Step 2: In your CommonLogin.cs define the URL of the websites that you have included

```
protected void imgTravelling_Click(object sender, EventArgs e)
{
    if (User.IsInRole("Travelling"))
    {
        string strURL = "http://localhost:63464/TravellingHome.aspx";
        AccessPortal(strURL, UserName);
    }
    else
    {
        lblMessage.Text = "You are not authorized for Travelling Portal";
    }
}
protected void imgSports_Click(object sender, EventArgs e)
{
    if (User.IsInRole("Sports"))
    {
        string strURL = "http://localhost:18782/SportsHome.aspx";
        AccessPortal(strURL, UserName);
    }
    else
    {
        lblMessage.Text = "You are not authorized for Sports";
    }
}
protected void imgMovies_Click(object sender, EventArgs e)
{
    if (User.IsInRole("Movies"))
    {
        string strURL = "http://localhost:63839/MoviesHome.aspx";
        AccessPortal(strURL, UserName);
    }
    else
    {
        lblMessage.Text = "You are not authorized for Movies Portal";
    }
}

private void AccessPortal(string strURI, string UserName)
{
    RemotePost myremotepost = new RemotePost();
    myremotepost.Url = strURI;
    myremotepost.Add("UserName", UserName);
    myremotepost.Post();
}

public class RemotePost
{
    private System.Collections.Specialized.NameValueCollection Inputs = new System.Collections.Specialized.NameValueCollection();

    public string Url = "";
    public string Method = "post";
    public string FormName = "form1";

    public void Add(string name, string value)
    {
        Inputs.Add(name, value);
    }
}
```

```
public void Post()
{
    System.Web.HttpContext.Current.Response.Clear();
    System.Web.HttpContext.Current.Response.Write("<html><head>");
    System.Web.HttpContext.Current.Response.Write(string.Format("</head><body onload=\\\"document.{0}.submit()\\\">", FormName));
    System.Web.HttpContext.Current.Response.Write(string.Format("<form name=\\\"{0}\\\" method=\\\"{1}\\\" action=\\\"{2}\\\" >", FormName, Method, Url));
    for (int i = 0; i < Inputs.Keys.Count; i++)
    {
        System.Web.HttpContext.Current.Response.Write(string.Format("<input name=\\\"{0}\\\" type=\\\"hidden\\\" value=\\\"{1}\\\">", Inputs.Keys[i],
Inputs[Inputs.Keys[i]]));
    }
    System.Web.HttpContext.Current.Response.Write("</form>");
    System.Web.HttpContext.Current.Response.Write("</body></html>");
    System.Web.HttpContext.Current.Response.End();
}
}
```

Step 3: In your WebConfig define authentication and define roles which can access the websites. You can also use Membership users and roles functionality of sql server for authorization. I have used Active directory user and roles.

```
<authentication mode="Windows">
</authentication>
<authorization>
<allow roles="Sports,Movies,Travelling"/>
<deny users="*" />
</authorization>
```

Step 4: Host your websites on IIS and choose authentication mode Windows.

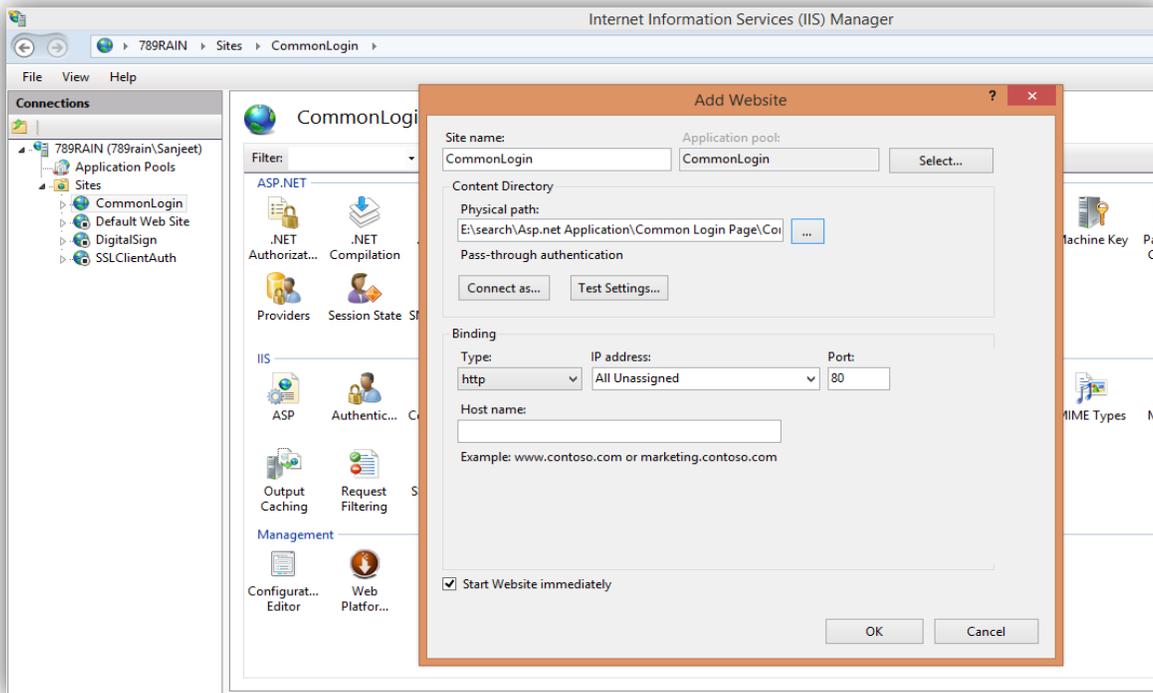


Figure 1: Hosting on IIS

Step 5: I have created three roles Sports, Travelling and movies and assigned to users. When I run the website windows authentication pop up will be shown. On entering the correct information user will be redirected to Commonlogin website.

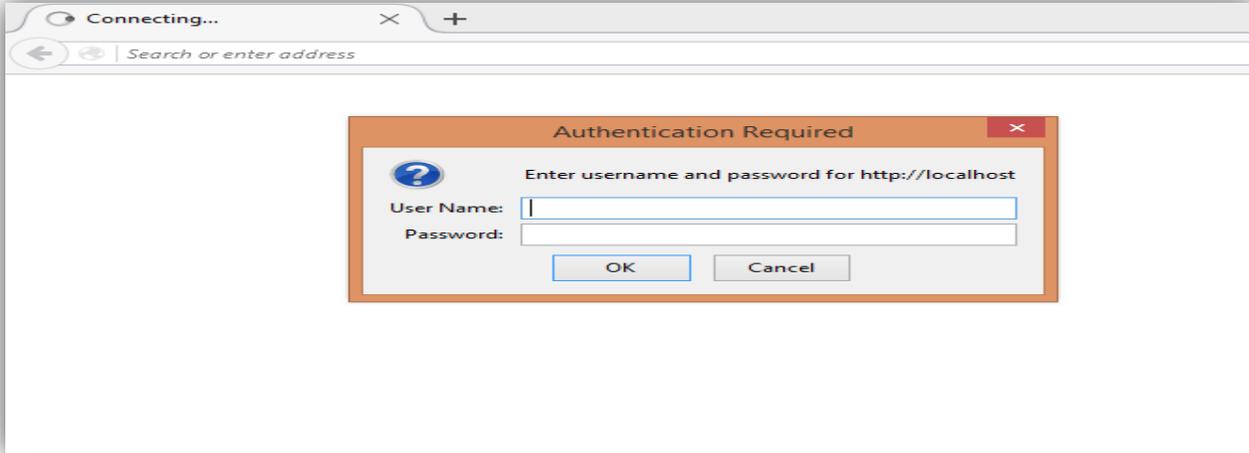


Figure 2: Windows Authentication

Step 6: I have provided the credentials of Sandeep who has the Sports roles.

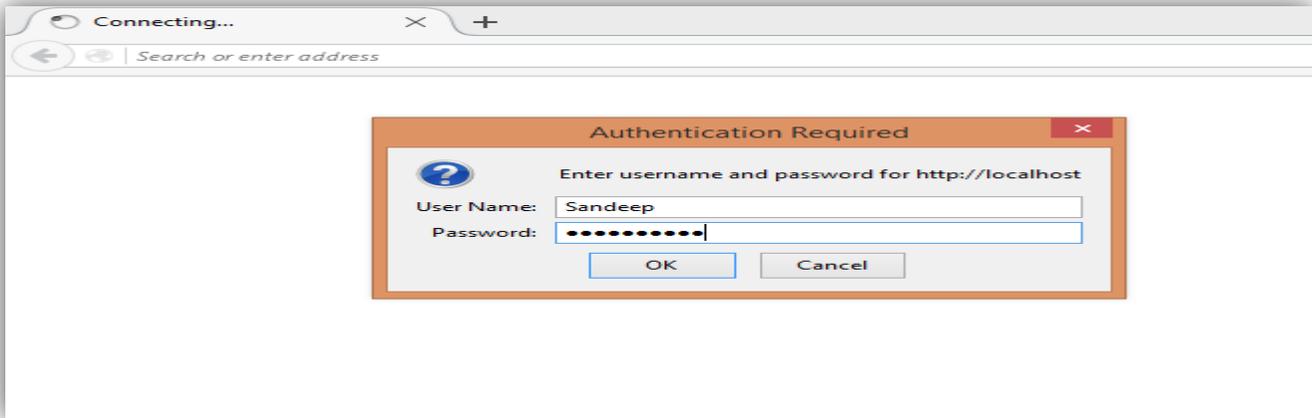


Figure 3: Windows Authentication

Step 7: common login home page will open when authentication is OK.



Figure 4: Common login

Step 8: When Sandeep will try to access portal other than Sports. You are not authorized message will be shown.



Figure 5: Unauthorized Access

Step 10: if he accesses the Sports portal he will Redirected to that portal.

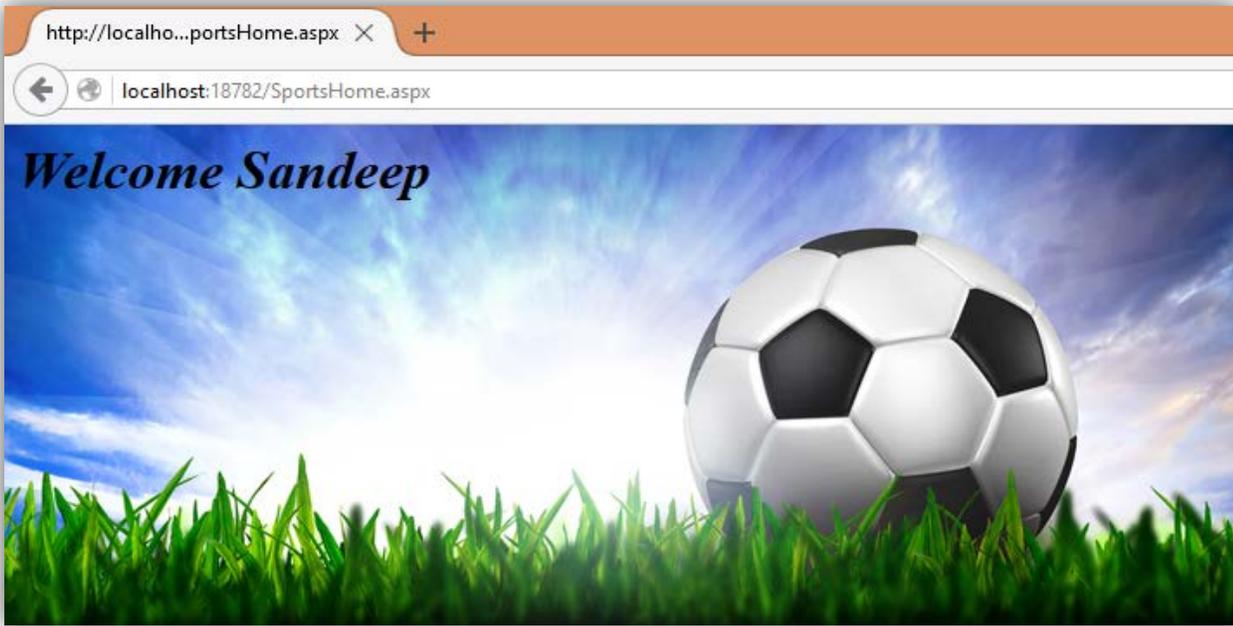


Figure 6: Sports home

Step 11: same goes with the other user they are only able to access that portal, which they are authorized of. Reena will only able to access movies portal while karishma will only able to access travelling portal.

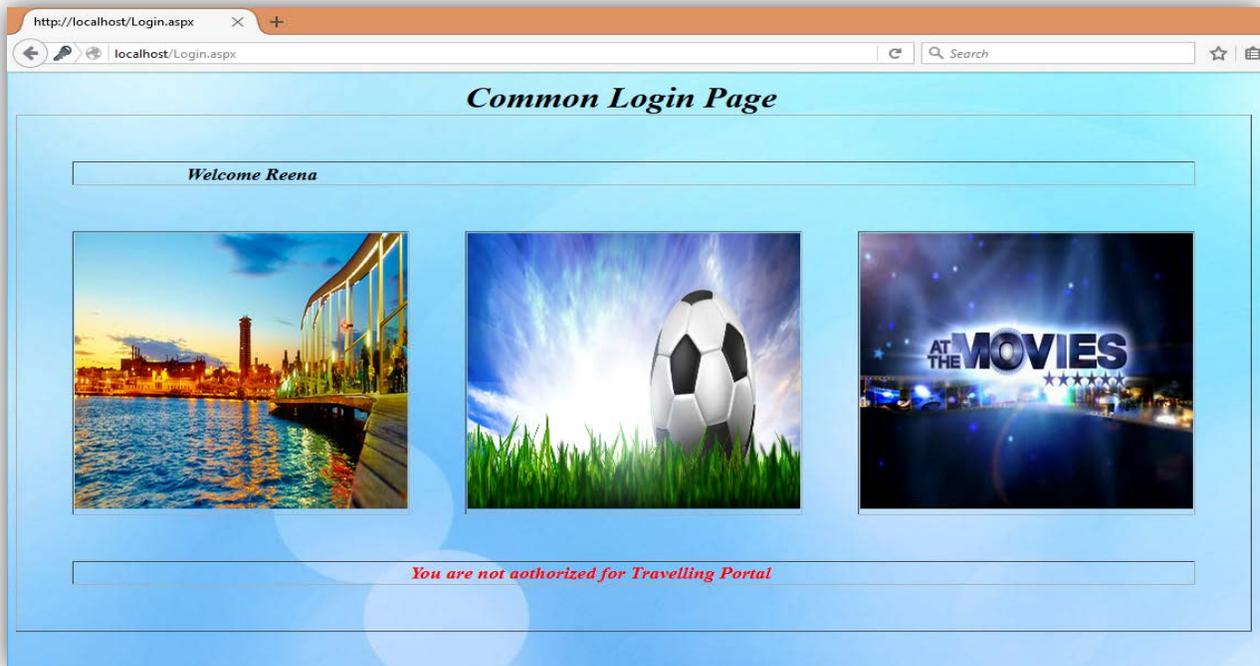


Figure 7: Reena Homepage



Figure 8: Movies Homepage



Figure 9: Unauthorized access

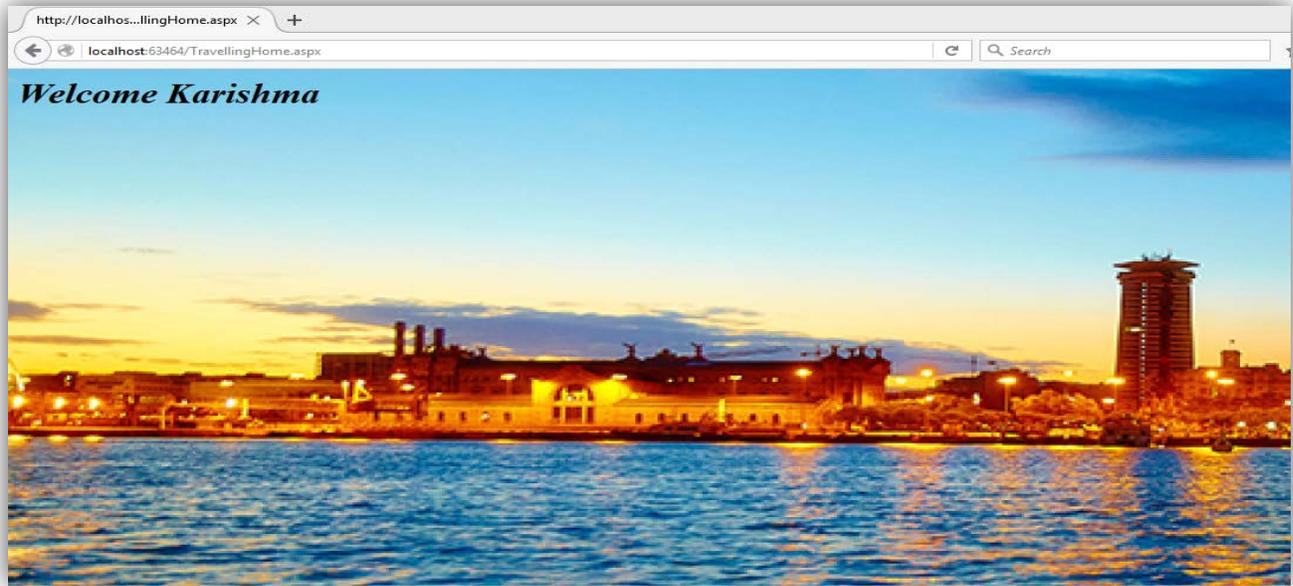


Figure 10: Karishma Homepage

IV. CONCLUSION

Common login is best fitted for intranet network. Provides single interface to access multiple portals/websites using their windows credentials.

Provides windows based security. Burden on database is reduced.

More user friendly, now user can roam around multiple websites using single interface. They don't have to take care of their different account for different websites.

Database maintenance will be reduced, now you don't have to take care of that many Users. Database Administrator work load of maintaining users, keeping track of their activities will be reduced.

At last it worth implementing in an organization.

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Analysis on determinants of students self employment intention in newly established Universities of Ethiopia

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Abstract- The aim of this study was to investigate determinants of Students' entrepreneurial intentions among newly established universities of Ethiopia by taking Dire Dawa University as a case study. To do so the researcher applied stratified proportionate random sampling technique in which 690 sample respondents from institute of technology, school of business and economics, school of social science, school of natural science, school of health and school of Law were taken as a sample via single population proportion formula of Kish and Leslie. Further primary source of data was collected via questionnaire from previous entrepreneurial intentions standardized questionnaires of different scholars. For the sake of analyzing the data Descriptive statistics was calculated using frequencies and percentages and then Binary Logistic regression analysis with 95% CI was used to assess the relative effect of independent variables on the dependent variable.

In multivariate analysis, students attitude towards entrepreneurship ($\exp(B)=6.348$, 95%=CI 3.28,12.26), risk taking propensity ($\exp(B)= 2.67$, 95%=CI (1.906, 3.755)), proactive personality ($\exp(B)= 1.57$, 99%=CI ((1.293, 2.603))), Participation in entrepreneurship course ($\exp(B)= 1.04$, 95%=CI (0.732, 1.500)), perceived behavioral control ($\exp(B)= 4.65$, 95%=CI ((2.342, 9.231), Attitude towards university entrepreneurial environment ($\exp(B)= 1.1$, 95%=CI (0.781, 1.550)) were found to be a statistically significant factor of student's entrepreneurial intention albeit subjective norm wasn't statistically significant in determining students' entrepreneurial intentions. Generally, the over level of entrepreneurial or self employment intentions of students newly established Universities of Ethiopia was too low. Further students perceived the way entrepreneurship course delivered and entrepreneurial environment created in the university is not adequate enough to urge students to pursue entrepreneurial career as an option for their future career

Index Terms- Determinants of entrepreneurial intention, Dire Dawa University, Entrepreneurial intention

I. INTRODUCTION

The university is an institution, which students pass on toward working life. Right after graduation, students decide where their career will start. Autio et al (2007) state the following: "It is our impression that career preferences of university students can be influenced, and that university students tend to gravitate toward fashionable career options."

Ajzen (2000) explains three factors, which are crucial in changing the intention and the actual behavior. First of all, the

belief and attitude somebody has toward the behavior. A student could for instance have a positive attitude toward entrepreneurship because one of the parents is an entrepreneur. Other factors influencing the attitude in the entrepreneurial situation are e.g. willingness to take risks, locus of control, need for independence, etc. (Krueger et al., 2007). The second factor is a social factor termed subjective norm. This factor refers to the social pressure from the environment on the individual to perform or not to perform the behavior; e.g. parents who encountered negative experiences with entrepreneurship, could pressure their children not to start their own business. The third factor influencing intention is the perceived behavioral control. The idea is that the actual behaviour does not only dependent on the motivation or intention to perform certain behaviour, but also on the perception of the difficulty of performing the behaviour. This perception can be developed through for instance experience.

Autio et al. (2005) suggest: "the greater the degree to which behavior can be controlled, the greater is the influence of intentions on the eventual behavior."

Studies of Gaddam, 2008, Gelderen et al., 2008, Souitaris et al., 2007, Raab et al., 2005) discussed business trainings have its own impact on the level of entrepreneurial skills among students.

It would appear that career choice is a cognitive process driven by beliefs, attitudes and experiences and prior research confirms that entrepreneurial careers fit a similar pattern (Davidsson 2004; Katz 2006; Shaver and Scott 2007).

Krueger et al. (2006) found that personal and situational variables indirectly influenced entrepreneurial intentions through influencing key attitudes and perceptions. However, the role entrepreneurship education, university's role in creating and promoting entrepreneurial environment wasn't in depth analyzed in previous studies. This research aimed at identifying determinants factors of undergraduate Dire Dawa University (DDU here after) students' self-employment/entrepreneurial intentions.

II. METHODS

Across-sectional study was conducted from March 2015-April2015.among students in six colleges found in Dire Dawa University.

A single population proportion formula was used to calculate the required sample size. This formula was used because of absence of prior knowledge of p (students who have intention to become self employed and q; taking the value of p and q as 0.5 each and margin of error 4% and a confidence

interval of 95%. The mathematical computation will give us a sample size of 600, but to offset some non-response rate, 15% of the determined sample size will be added and make the final sample size was be 690. Consequently, the sample determined was distributed as per the weights of each stratum.

Data were collected using self-administered questionnaire adopted from previous entrepreneurial intentions questionnaires. Since various questions were already tested by previous authors (Lüthje & Franke, 2003; Krueger et al., 2000; Carayannis, Evans, & Hanson, 2003; Autio et al. 2001; Francis et al., 2004; Kickul & Gundry, 2002; Hisrich & Peters, 2002; Hartog, Ferrer-i-Carbonell, & Jonker, 2000), their research could be seen as pre-test information. For instance Lüthje and Franke (2003) use an extensive validation process (e.g. preliminary study, validity and reliability criterion) for each construct of their questionnaire.

Regarding data analysis First descriptive statistics was calculated using frequencies and percentages in which the responses were summed up and a total score was obtained for each respondent i.e. the mean score was calculated and those scored above the mean have positive and scores below the mean meant negative for predictors of self employment intentions and then Logistic regression analysis with 95% CI was used to assess the relative effect of independent variables on the dependent variable. Data processing and analysis was done using SPSS version 20.0.

III. RESULTS

A total of 613 (out of 690 distributed questionnaire) students participated in the study making response rate of 88.8% of which 64.3% were male and 35.7% were female students. The majority 342 (55.8%) respondents were IOT students and the remaining 93(15.2%), 90(14.7%), 69(11.3%) 19(3.1%) sample students belong to School of Natural and computational science, school of business and economics, School of social science and humanities(social science + school of law) and school of medicine respectively. Regarding their year of study 192(31.3%) were first year students, 187(30.5%) were second year students, 143(23.3%) were third year students, 50 (8.2%) were fourth year students and 41(6.7%) were fifth year students. 49.3% respondents were orthodox religion followers and the remaining 26.1%, 23.8%, 0.7%, 0.2% were Muslims, Protestants, Catholics and others religion followers respectively. Respondents were also asked to indicate their mothers' and fathers' employment status

in which 236(38.5%) students mothers are self employed and 223(36.4%) of sample students fathers are self employed and the remaining are not. Table 1 below summarized socio demographic information of sample respondents:

Table 1: Demographic characteristics of students of Dire Dawa University

Characteristics	Frequency	Percentage
Gender		
Male	394	64.3
Female	219	35.7 %
Total	613	100
Program of study		
IOT	342	55.8
SNCS	93	15.2
SBE	90	14.7
SSSH	53	8.6
SM	19	3.1
SL	16	2.6
Total	613	100
Year of study		
1 st year	192	31.3
2 nd year	187	30.5
3 rd year	143	23.3
4 th year	50	8.2
5 th year	41	6.7
Religion		
Orthodox Christians	302	49.3
Muslims	160	26.1
Protestants	146	23.8
Catholics	4	0.7
Others	1	0.1
Total	613	100

77% of sample students have no Entrepreneurial intention where as the remaining 23% of students have an intension; indicating that the majority of the students won't show entrepreneurial behavior or becoming self employed (Table 2).

Table 2: Level of students' Entrepreneurial intention in Dire Dawa University

Entrepreneurial intention	Frequency	Percent
no intention	472	73
high intension	141	23
Total	613	100.0

Of the total respondents 52.9% of the students have unfavorable attitude towards entrepreneurship but the remaining 47.1% of sample respondents in Dire Dawa University have favorable attitude towards self employment. The majority 422 (68.8%) of sample respondents of the university didn't have

favorable subjective norm. This means that friends, the family or associates didn't have a great deal of influence in encouraging students to think or plan for starting their own firms after graduation. Only 191(31.2%) of students have expressed they have strong support from parents and close friends. 353 (57.6%)

of sample respondents lack some control over their current behavior to decide in becoming self employed. However, 260 (42.4%) of the students have relatively better internal locus of control and confidence in becoming successful entrepreneurs and consider self employment as their future career. 331(54%) of the respondents indicated they didn't enjoy facing challenges and trying to overcome challenges when they tried to realize their ideas whereas 282 (46%) did. Almost 60% of sample respondents didn't have the initiative to excel their skill and knowledge to scan opportunities i.e. the respondents didn't have the motivation to identify opportunities before others come up with it. Overall 51.4 of sample respondents have low proactive personality where as 48.8% of respondents have high proactive personality. 319(52%) of sample respondents holds high risk aversion and high fear of failure however the remaining 294(48%) sample of respondents were relatively willing to take risks while doing their business. 473(77.1%) of sample respondents perceived the Dire Dawa University environment isn't conducive in which students are not encouraged to pursue their own ideas and there is no a well functioning infrastructure to support the start-up of new firms by students. Further students who have taken entrepreneurship course in the university discussed the way entrepreneurship course delivered in the university didn't well prepare students for entrepreneurial career in which from those sample respondents\who took the course 121(93.1%) assured the issue (table 3).

Table 3: Percentage distribution of students' attitude towards entrepreneurship, subjective norm, perceived behavioral control, risk taking propensity, attitude towards University entrepreneurial environment and entrepreneurship course

Characteristics	Frequency	Percentage
Attitude towards Entrepreneurship	289	47.1
Favorable attitude	324	52.9
Unfavorable attitude		
Subjective norm		
Better subjective norm	191	31.2
Lower Subjective norm	422	68.8
Perceived Behavioral Control		
Better Perceived behavioral control	260	42.4
Lower Perceived behavioral control	353	57.6
Proactive personality		
High proactive personality	299	48.8

Low proactive personality	314	51.2
Risk taking Propensity		
High risk taking propensity	294	48
Low risk taking propensity	319	52
Attitude towards University's entrepreneurial environment		
Favorable attitude	473	77.1
Unfavorable attitude	140	22.9
Entrepreneurship courses at my university prepare people well for an entrepreneurial career (this question was answered by those who took the course)		
Positive attitude	9	6.9
Negative attitude	121	93.1

In multivariate analysis, attitude towards entrepreneurship was found to be a statistically significant factor of student's entrepreneurial intension. Those who have favorable attitude towards entrepreneurship more likely to have entrepreneurial intension than those who don't have favorable attitude towards entrepreneurship (exp(B)=6.348, 95%=CI 3.28,12.26). Better self employment/entrepreneurial intension was also observed in those students who are willing to take risk than those who don't in which those students who have high risk taking propensity almost three time entrepreneurial intension than those who have low risk taking propensity (exp(B)= 2.67, 95%=CI (1.906, 3.755)). Similarly those high proactive personality students have 1.57 times self employment intension than low proactive personality students (exp(B)= 1.57, 99%=CI ((1.293, 2.603)). Participation in entrepreneurship course also statistically significant in determining students entrepreneurial intension in Dire Dawa University albeit those who participate in the course didn't have that much significant difference in their self employment intension (exp(B)= 1.04, 95%=CI (0.732, 1.500)). Further those students who have high perceived behavioral control have 4.65 times self employment intension than low perceived behavioral control students (exp(B)= 4.65, 95%=CI ((2.342, 9.231)). Attitude towards university entrepreneurial environment was also statistically significant factor for students' entrepreneurial/self employment intension (exp(B)= 1.1, 95%=CI (0.781, 1.550)) . However, subjective norm wasn't statically significant in determining DDU students' entrepreneurial intensions (table 4).

Table 4: students self employment intension and its determinants

Variables	Exp(B) (95% CI)	P-Value
Attitude towards entrepreneurship Un Favorable attitude Favorable attitude	1 6.348 (3.28,12.26)	0.036
Risk taking propensity Low risk taking propensity High risk taking propensity	1 2.67 (1.906, 3.755)	0.04
Proactive Personality Low proactive personality High proactive personality	1 1.578 (1.293, 2.603)	0.01
Participation in entrepreneurship education No Yes	1 1.048(0.732, 1.500)	0.00
Attitude towards University Entrepreneurial environment Unfavorable attitude Favorable attitude	1 1.100 (0.781, 1.550)	0.024
Perceived behavioral control Low PBC High PBC	1 4.65(2.342, 9.231)	0.05
Subjective norm lower subjective norm higher subjective norm	1 3.931(2.054, 7.522)	0.481

Generally, the over level of entrepreneurial or self employment intensions of students in Dire Dawa University is too low. Further students perceived the way entrepreneurship course delivered and entrepreneurial environment created in the university is not adequate enough to urge students to pursue entrepreneurial career as an option for their future career.

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Analysis of Competitive Strategy PT Pustaka Pembangunan Swadaya Nusantara in the Publishing Industry in Indonesia

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Abstract- The objectives of this study was to identify internal factors and external factors that affect the business PPSN publisher, alternative business strategies and recommend strategies that can be applied to business development PPSN publisher. This research uses descriptive method with the case study and descriptive analysis, keys succes analysis, five forces of Porter analysis, value chain analysis, SWOT analysis, and the type of data used are primary data and secondary data. The technique of collecting data through interviews, focus group discussions, and questionnaires using purposive sampling tehnik. Based on the results, the strategies that can be done is increasing competitive through run competent business, product development, innovation product and technology, concept product of one source multi platform, increasing market penetration, enhanced the capabilities of human resources, and improve channel distribution.

Index Terms- publisher, keys succes factor, five force of Porter, value chain, SWOT

I. INTRODUCTION

Nowadays technology has become one of the main sources of change in the world. Technology has made the company find and introduce new products on the market (Muhammad, 2008). At the same time, technology has also become a cause of the exit of goods from the market because it has expired. The reason is the distance between technology and commercialization incubation period is getting shorter. Therefore, the technology can easily affect the market structure and performance of the company.

Similarly, technological developments helped influence on the book publishing industry. Gradually but surely the publishing industry were adapted to the new ecosystem in the realm of the book industry. This occurs in Encyclopaedia Britannica, having survived for 244 years, they ended the 32-volume print edition and switch to digital editions such as wikipedia (Tempo, 2012)

Not only in publishing, technological change also penetrated the bookshop into distribution channels mereka. The large bookstore in the world began to not only provide the printed version, but also offers a digital version (Ardiansyah, 2012).

Borders book store which has 399 stores throughout the world and mostly in the United States also feeling the change. They have closed all his stores because they can not compete with the closest competitor, the Amazon which had already

entered into the digital industry. Barnes & Noble, as one of the largest book distributor in the United States also closed his bookshop (Sanburn, 2011). In fact, the bookstore chain, which has stood since the late 19th century it has nearly 750 stores across the United States.

Based on data released by the Association of American Publishers (AAP) in 2011 stated that Barnes & Noble has suffered a loss of US \$ 69 million on revenue of \$ 7.1 billion. In the same year, the electronic book sales have increased in the amount of US \$ 90.2 million compared to printed books which only amounted to US \$ 81.3 million (Rachman, 2011).

Based on the research results, this time there has been a shift in the habit of reading books. The presence of an e-book that bundling with devices such as mobile phones and tablet PCs have become alternative when reading a book. However, that does not mean future print books are finished, because most e-reader is still to the library and the bookstore to buy a printed book (Tempo, 2013).

In Indonesia, according to data from the Association of Indonesian Publishers (IKAPI), growth in the book market grew by 6% (per year) during the year 2007-2012. However, starting in 2012-2014, the growth of the book market began to decline only about 2%. On the one hand, sales of digital books despite growing but still less than 2% of the book market as a whole.

Currently, there are 1,317 registered publishers as members of the Association of Indonesian Publishers (IKAPI). Among publishers, only 94% were registered as active publishers. Overall issuer is a private issuer, and only one publisher is listed as state-owned enterprises (BUMN) that Balai Pustaka. In addition, most universities in Indonesia also runs a publishing activities (university press) as well technical implementation unit or business unit.

Throughout the year 2015, based on data from Gramedia bookstore, bookstore sales in the relatively growing. Even the bookstore also gradually started to reduce the display space books, and expanding the space for other products such as stationary, office equipment, and merchandise. Some publishers are not able to survive, began to reduce and even laying off employees. Many publishers streamline its organizational structure, including Gramedia Group, also began to transform the digital content such as Balai Pustaka, or switch produces stationary and merchandise (Mizan Group).

Changes in the publishing industry is also felt by the publisher Pustaka Pembangunan Swadaya Nusantara (PT. PPSN) commonly known publishers Puspa Swara. PT PPSN is publishing groups which are under the group Bina Swadaya or

Trubus Group whose products are sold in bookstores throughout Indonesia with brand 9 issuer is Puspa Swara, Kaysa Media, Media Pusindo, Pustaka Bunda, Kriya Pustaka, Kata Media, Puspa Populer, Puspa Indria, dan Kanaya. Currently, the product issuer Puspa Swara largely distributed by PT Niaga Swadaya which is a distribution company in the group Bina Swadaya or Trubus Group.

In the last three years, sales at PT. Pustaka Pembangunan Swadaya Nusantara relatively grow even decreased. In fact, growth in previous years up to the year 2012 is in the range of 20% -30% annually. The decline in sales during the last three years can be seen from Table 1.

Tabel 1 Growth in turnover and PT.PPSN copies sold books from 2011-2015

Growth	2012 : 2011	2013 : 2012	2014 : 2013	2015:2014
Omzet (%)	23	5	-7	-9
Exemplar (%)	- 4	-9	-4	-29

Ashurst and Hodges (2010) states that the success of an organization depends on its ability to adapt and transform. Only organizations that have such capabilities, which still survive.

Therefore, in the face of competition and changes continue to happen, PT. Pustaka Pembangunan Swadaya Nusantara need to take strategic steps in order to survive and thrive. Heavy challenges in the form of technological change, the capitalization of the bookstore, and the bargaining position of the product requires a breakthrough in efforts to sales and production. The strategic steps are necessary for the survival of the company in the future.

Puspa Swara publisher as one national publisher who has core competence in the field of content, currently has nearly 4000 books content. The content in a variety of themes and packaging, ranging themes of health, craft, fashion, home, interior, language, education, children, to religion.

In accordance with the vision of the Puspa Swara publisher, became a recognized publishing company excels in providing practical knowledge and inspiring nationally and internationally, Puspa Swara publisher required to conduct a search for a breakthrough product innovation and business in order to keep up with developments in the publishing world.

In order to strengthen the foundation of the business forward in accordance with the vision and mission of the company, Puspa Swara publisher continue to do business development. Development undertaken include digitizing book content, strengthening tripose division (unit photography and product development), and e-commerce.

This business development is a breakthrough step taken by the Puspa Swara publisher to anticipate the changes in the external and internal factors. On the external side, along with the development of technology, the public interest to access information with computers and multimedia devices is increasing. This opens up new opportunities for the development of new content in the form of multimedia. In addition, capitalization bookstore books that began to shift to other products as well as the bargaining position of diminishing product books makes publishers must innovate. On the internal

side, book industry is currently experiencing stagnation and even decline impact on book sales revenue at the Puspa Swara publisher. These conditions make the Puspa Swara publisher strived to reduce dependence on revenue from book sales only printed version.

With the changes taking place in the publishing industry, the Puspa Swara publisher need to formulate appropriate strategies in order to compete and continue to grow the face of competition and industry conditions are constantly changing.

Pohan (2010) analyze the changes in the environment outside the company with market analysis, customers, and competitors in research at Pertamina. The analysis used to produce the power of the resources owned by Pertamina to maintain its market share. Suciani (2010) using the approach of the evaluation of internal and external factors to explain the conditions of the business environment of e-commerce PT. Telkom Indonesia. Competitor analysis resulted in selection of business strategy of what to do to improve competitiveness in the face of e-commerce competition competitive.

Research conducted by Bahri (2014) concerning the Business Transformation Analysis PT Balai Pustaka can also provide valuable input. The study became a reference and preliminary data for the research to be conducted for informing the data and the latest developments in the world of publishing.

Based on these matters, the issues that need to be answered in this study is what factors internal and external factors that could affect the company and what the business strategy for PT Pustaka Pembangunan Swadaya Nusantara (PPSN) to achieve excellence besaing in the future. For the purpose of this research is done by analyzing the internal factors and external that may affect the company and formulate business strategy for PT Pustaka Pembangunan Swadaya Nusantara (PPSN) to achieve excellence besaing in the future.

II. RESEARCH METHODS

Data used include primary data and secondary data. Primary data is data obtained from the original source or sources that have a correlation and capabilities in issues being studied.

There are two ways in tapping the primary data through observation and survey. Observation is the interview either directly or indirectly with sources that will provide the data or information that is needed in research. Survey is a technique to collect data or information by using questionnaires distributed to respondents who would serve as a source of data or information that is needed in research. Primary data this research came from the observation, interviews, and focus group discussion with the management team of PT. Pustaka Pembangunan Swadaya Nusantara and practitioners publication.

Meanwhile, secondary data is the data that already exists so the researchers are now looking for and collecting, including official reports either from management, corporate website, scientific literature, and writing other support such as newspapers, research reports, magazines, and the writings of previous related and can help the course of this study. Secondary data used include sales reports, financial reports, product data, and the company's annual report year period 2011-2015.

The techniques of data collection and information conducted by researchers as follows. 1) We conducted an

observation by direct observation in the study site to determine the activities and business activities. Observations see how business processes that occur in the PT. Pustaka Pembangunan Swadaya Nusantara, from product planning to distribution. 2) Researchers also conducted interviews as the primary method to get information from respondents related research focus. In addition, the researchers also conducted structured interviews using a questionnaire in accordance with predetermined criteria of the research object. 3) Next the researchers conducted focus group discussions. In FGD there is no questioning the specifics, but rather on efforts to hear testimony from various sources which are then formulated into a specific data. 4) The researchers also conducted a study of the literature. The literature used in this study comes from internal and external companies. Internal literature in the form of the company's official documents and external literature comes from books, journals, magazines, articles, theses, and dissertations berkaitan with research.

Processing data and analysis in this study through several stages 1) Qualitative descriptive analysis. Researchers examine and interpret the data obtained from the results of observations, interviews, focus group discussions, and documentation study. Results obtained in the form of the current condition of the publishing industry and the performance of PT. Pustaka Pembangunan Swadaya Nusantara which is expected to get the results of the identification of strategic issues. 2) Analysis of keys succes factor. Researchers formulate keys succes factors in

the publishing industry with benchmarking and conduct FGDs with practitioners in the publishing industry. 3) Analysis of the internal environment. Analysis of the internal environment using the value chain. Researchers will analyze the activities of the company to generate value added and how each of these activities are related to generate competitive advantage. 4) Analysis of the external environment. Analysis of the external environment using Porter's five forces (five forces of Porter). Researchers will analyze factors makes that affect the level of competition in the publishing industry as the threat of entry of new competitors (new players in the market), the threat of the emergence of substitute products, bargaining power of buyers, bargaining power suppliers, and the level of competition between existing players. 5) SWOT Matrix. Researcher using SWOT matrix to analyze the opportunities and threats from the external environment to produce several alternative strategies taking into account the strengths and weaknesses of the company.

I. RESULTS

Keys Success Factor Business Publishing

Keys Success Factor are all factors that are key competitive success in an industry. Based on the FGD and benchmarks derived factors that are key to success in the publishing business that can be seen in Table 2.

Tabel 2 Key succes factors publishing industry

Keys succes factor	
1. The ability to present quality script	7. The speed in distribution
2. Having a best-selling author and renowned	8. Ability market penetration
3. Network supplies comprehensive manuscript	9. Strength in promotion
4. Having a team of human resources publishing reliable	10. Ability to manage community of readers
5. Network of pre-press and printing modern	11. The ability to manage financial and stock that are reliable
6. The extensive distribution network	12. Ability to develop and maintain high quality human resources

External and Internal Factors Analysis

Based on the analysis of external and internal factors as well as interviews and focus group discussions with the respondents, the analysis of the opportunities, threats, strengths, and weaknesses are obtained are as follows.

Opportunities and threats of external factors

From the analysis of external factors, there are several opportunities for the company as follows.

1. The amount of minimum circulation in the economies of scale that are still affordable
2. The availability of human resources in the publishing business that is big enough
3. Availability of suppliers who are many and varied
4. Opportunities and content digital book market growing
5. The growth of e-store and online system

While external factors of the threat is as follows

1. The threat of new entrants is currently quite high because the publishing business is relatively open and the absence of

significant entry barrier to entry into this industry.

2. The level of competition is quite high considering the growth in the number of new publishers sizeable
3. Potential substituted product books with other products such as the internet and television media that is high enough
4. Threats suppliers (author) is quite high due to the low switching cost
5. The display space in bookstores increasingly limited

The strengths and weaknesses internal factors

Internal environmental analysis was conducted to determine what are the strengths and weaknesses of PT PPSN. Based on observations, interviews, and focus group then obtained some key factors that affect the internal strategic planning competitive strategy PT PPSN. These factors include the strengths and weaknesses that must be used or anticipated by PT. PPSN. The results of the analysis of the value chain of the resources owned by the publisher Puspa Swara that includes strengths and weaknesses internal resources as follows.

Strengths

The strengths is an internal strategic factors that should be utilized by PT PPSN in formulating future strategies. Based on observations, interviews, and focus group discussions with the

management of PT PPSN, obtained the category of force companies for the preparation of competitive strategy. The company's strengths can be seen in Table 3.

Tabel 3 The company's strength is based on the analysis of the value chain

Strengths	
1. Selection of manuscripts tested	22. Financial management
2. Review the script fast	23. Monitoring products
3. The ability to explore the potential writer	24. Planning of product realization
4. The ability to search and view the potential of the manuscript	25. Human resources Experienced employees
5. The ability to produce a quality script	26. Loyalty employees
6. The ability to process text	27. The creative idea of employees
7. The ability to publish a book best-seller	28. The work culture that supports
8. The production capacity is quite good	29. Ability to recruit potential employees
9. The ability to improve the efficiency of production processes	30. The ability to retain employees
10. The warehouse capacity	31. Cooperation management team
11. The ability to manage and program a good stock	32. The ability to improve the quality of human resources
12. Having a wide network of bookstores	33. The development of production technology
13. Having long recognized imprint	34. Innovation working device
14. Has the customer's reputation	35. Development of a working device
15. Having a product warranty	36. R & D Capabilities
16. Handling customer complaints	37. Access to the source text
17. Service customer consultation	38. Loyalty writer
18. The ability to conduct training	39. Has a good reputation writer
19. Capacity and loan companies	40. Ability procurement manuscript
20. Assets and capital	41. The ability to anticipate the rising prices of raw materials, paper, and printing
21. The company's offices and facilities	42. The speed in the purchase of manuscripts

Weaknesses

Weakness is the internal factors that can interfere with or inhibit the ability of competing PT. PPSN. Based on data obtained through observation, interviews, and focus group

discussions with the management of PT PPSN, the obtained categories weaknesses of the company as in Table 4.

Tabel 4 The weakness of the company based on the value chain analysis

Weaknesses	
1. Shipments of quality manuscripts still slightly	9. The promotion budget is limited
2. prolific writer still little	10. Database customers who are less well documented
3. The process of getting quality script long enough	11. Error printing is still possible
4. The process of treating a script that is quite time consuming	12. Not to use the funds out of business results for the capital increase and the scale of production
5. Ability to promote products that are not yet effective	13. The employee motivation levels vary
6. Added the number of chain stores slightly	14. Standard payroll is lower than other industries
7. Growth in the number of stocks rather high	15. Adjustment device still work gradually
8. Program the stock that are not yet integrated online	16. The ability to purchase the manuscript coyright best seller limited

SWOT Matrix

With the SWOT matrix, companies can develop a strategy based on a combination of factors internal and external, and thus obtained the appropriate strategy based on the condition of the

company. This strategy consists of SO strategy, strategy ST, WO strategies, and WT strategies.

1. Strategy SO

SO strategy is the company's strategy with the power that is used to exploit the opportunities that exist. The company's strength is a good team work, experience in creating products and key business processes, the amount of receivables that will mature, and the competence of human resources.

- a. Product development of print and e-content and digitizing all the content
- b. Market penetration
- c. Building infrastructure and e-commerce online
- d. Strengthen financial management and supporting documents
- e. Strengthen human resources and develop a network of content developers and application

2. Strategy ST

ST strategy is the company's strategy utilizing existing strengths to cope with external threats. The company's strength is used to deal with threats such as the limited display area in stores and declining STO, products and services that are easily substituted, a heavy reliance on the bookstore, partner commitment, and lack of human resources who are interested in the world of publishing.

- a. Selective determine the theme
- b. Develop a superior and unique products
- c. Creating a joint event store
- d. Selective in choosing partners and developing suitable raw materials
- e. Make a compensation package and maintenance employees

3. Strategy SO

WO strategy is the company's strategy to exploit opportunities in the external to overcome internal weaknesses of the company. Companies such as the buildup of internal weakness in the downstream process and the speed problem to catch the trend, the decreasing availability of products in stores terdisplay, production and marketing costs were great, and the commitment of human resources is not equitable.

- a. Improving digital content that is practical and fast
- b. Develop a system for recording
- c. Creating packages resellers and agents as well as developing sales incentive
- d. Ensuring the payment of accounts receivable project
- e. Strengthen the commitment of human resources

4. Strategy ST

WT strategy is a strategy to minimize the weaknesses of existing publishers to avoid any external threats.

- a. Adjusting oplag
- b. up the document
- c. Make a specific product
- d. The cost efficiency of production and strengthen the treaty
- e. Maintenance employees who excel

III. CONCLUSION

Puspa Swara publisher face market changes resulting from technological developments resulting in changes in reading habits that result in decreased sales revenue. However, the company has the power of the main business so that they have

the ability to increase its business by utilizing the existing potential. External factors that could affect the company include the level of competition is very high because the publishing business is a business that is open, whereas on the one hand products ranging book substituted by information from the Internet and television. Internal factors that make Puspa Swara publisher to survive among other strong ability on the main business, good team work, and the competence of its human resources. Business strategy for Puspa swara publisher to achieve competitive advantage in the future is to do product development in print, e-content and digitizing all the content that has been held, to penetrate the market by building the infrastructure of online and off line, strengthen financial management systems and supporting documents, and strengthening human resources by developing a network of content developers and online application.

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Green Building

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Abstract- Needs for performing business with aims of sustainability and implementing green building construction came from every day growing number of environmentally conscious people. People are having more awareness of the threatening ecological disaster on a global level. As much as is in their power they trying to convey others in ideas and need for sustainable coexistence with their environment. In our work we will pay special attention on sustainable development and especially green building as efficient and environmentally friendly construction practices. It minimizes damaging effects on human health and environment and improving productivity by using resources in most efficient way. Green building brings environmental, economic and social benefits. It also need to be safe and secure, so special attention must be paid to fire protection, impact resistance and blast resistance. We will study sustainability of high-performing building as great challenge in modern project management and architecture. Here, building team is consisted from project manager, architect, engineers, contractor, and many other highly educated and skilled members, who must act like one and each of them, must think about project as an entirety. We will introduce you with LEED standards which develop criteria for judging greenness of building.

Index Terms- sustainable development, environment protection, Green Building, engineering management, high-performing buildings, LEED

I. INTRODUCTION

In this work we pointed at attempt made in the direction of achieving sustainability in building and housing. Green building concept represents the practice of increasing the efficiency in using resources-energy, water, materials, while reducing building impact on human health and the environment. Environment all around the world has suffered high degree of pollution from buildings that led to degradation of ecosystem and ozone layer depletion. These products of negligence to our closest surrounding culminate in global warming phenomenon. People need a safe environment with adequate housing conditions and drinking water. The issue of energy security and stability is the cardinal question of the entire world's business, economic and social system. Correlation between the energy sector and the competitiveness of the economy leads to a willingness to earn profit hit by the importance of the struggle for sustainable development and survival.

Modern construction involves the application of energy efficiency standards, in existing as well as in the construction of new buildings. This implies need to provide conditions for the reduction of carbon dioxide emissions, while preserving existing

standards of construction quality and housing. The ultimate goal in building is to achieve energy-efficiency in rehabilitation and reconstruction of existing buildings, to provide comprehensive energy savings and thus contribute to environmental protection.

II. GREEN BUILDING

“Green building” is a term that is in use for strategies, techniques, and construction products that are less resource-intensive and pollution-producing. [1] Green buildings use energy, water, materials, and land—more efficiently and effectively than traditional buildings.

The green building movement originated from the need and desire for more energy efficient and environmentally friendly construction practices. There are a number of motives for building green, including environmental, economic, and social benefits. However, modern sustainability initiatives call for an integrated and synergistic design to both new construction and in the retrofitting of existing structures. [2]

Benefits of Green development:

- Financial
- ✓ Reduced capital costs
- ✓ Lower operating and maintenance costs
- ✓ Reduced risks and liabilities
- Environmental
- ✓ Less impact on the natural environment
- ✓ Healthy environments and improved productivity
- Social
- ✓ Stronger social networks
- ✓ Increased environmental awareness. [3]

There are several key steps in designing sustainable buildings:

- specify “green” building materials from local sources,
- reduce loads,
- optimize systems and
- generate on-site renewable energy. [4]

Perceptions of “green” are changing in people’s head, they beginning to understand that sustainable technologies are not necessarily characterized with extravagant interior or cost expensive, and these constructions need not be visibly different than other buildings unless so desired. Green buildings are products of intelligent, integrated design that meet standards for sustainable project.

Green building brings together several of practices and techniques to reduce and ultimately eliminate the impacts of

buildings on the environment and human health. It often emphasizes taking advantage of [renewable resources](#), e.g., using sunlight through [passive solar](#), [active solar](#), and [photovoltaic](#) techniques and using plants and trees through [green roofs](#), [rain gardens](#), and for reduction of rainwater run-off. Many other techniques, such as using packed gravel or permeable concrete instead of conventional concrete or asphalt to enhance replenishment of ground water, are used as well.

III. PRINCIPLES AND STANDARDS IN GREEN BUILDING

Guiding principles that should be complied in green building:

- Structure design efficiency,
- Energy efficiency,
- Water efficiency,
- Materials efficiency,
- Indoor environmental quality enhancement,
- Operations and maintenance optimization, and
- Waste and toxics reduction.[1]

A green material is one that simultaneously does the most with the least, fits most harmoniously within ecosystem processes, helps eliminate the use of other materials and energy, and contributes to the attainment of a service-based economy. Criteria for evaluating building materials include the general categories of resources, performance and pollution. The resources required for a material can be consumed in extraction, production, use or disposal. For each category of material, performance means something quite different. For example, the performance of insulation must be judged mainly in terms of its thermal resistance, while a floor tile would be evaluated more for its durability.[5]

Deciding what is “green” is sometimes quite relative. Some products in a certain category might be the greenest simply because the available alternatives are so destructive (for example, CCA-treated wood or PVC plastic). It is often inevitably comparing the energy-intensity of one product with the toxicity of another. Objective rating for every product and material will always be a difficult. It should be pursued, but evaluators, particularly those who synthesize available data to help consumers make the best possible choices, will simply have to do the best they can. [5]

As a result of the increased interest in green building concepts and practices, a number of organizations have developed standards, codes and rating systems that let government regulators, building professionals and consumers embrace green building with confidence. In some cases, codes are written so local governments can adopt them as bylaws to reduce the local environmental impact of buildings. [6]

This approach has since been formalized in a number of assessment and rating systems, such as the BREEAM (BRE Environmental Assessment Method), standard introduced in Britain in 1990, and the LEED (Leadership in Energy and Environmental Design) standards developed by the United States Green Building Council (USGBC) starting in 2000. [7] Systems for environmental certification, LEED and BREEAM were made

to support the construction of environmentally friendly and energy-efficient buildings.

The LEED standards are intended to produce “the world’s greenest and best buildings” by giving developers a straightforward checklist of criteria by which the greenness of a building can be judged. Points are awarded in various categories, from energy use (up to 17 points) to water-efficiency (up to five points) to indoor environment quality (up to 15 points); the total then determines the building’s LEED rating. Extra points can be earned by installing particular features, such as renewable-energy generators or carbon-dioxide monitoring systems. A building that achieves a score of 39 points earns a “gold” rating; 52 points earns a “platinum” rating. A gold-rated building is estimated to have reduced its environmental impact by 50% compared with an equivalent conventional building, and a platinum-rated building by over 70%. [8]

The example of platinum-rated building is Aldo Leopold Legacy Center, Baraboo, WI. This center is located in a Cold-humid climate region, with building type(s): Interpretive Center, Commercial office. It is a new construction on 11,900 ft² (1,100 m²), completed in April 2007. Rating: U.S. Green Building Council LEED-NC, v.2/v.2.1--Level: Platinum (61 points) Rating: Zero Energy Building.[9]

The Foundation located the project on a previously disturbed site, which it is restoring to native ecosystems. The project team used crushed gravel in place of blacktop or concrete paving, increasing rainwater infiltration and blending the developed areas into the surrounding landscape. The native landscaping requires no irrigation. Waterless urinals, dual-flush toilets, and efficient faucets reduce water consumption by 65%. An on-site well provides potable water, and an existing septic system treats wastewater. [9]

Thinning the Leopold forests improved forest health while providing 90,000 board feet of wood for use in the project. More than 75% of all wood used in the project was certified to Forest Stewardship Council standards, and 60% of all materials were manufactured within 500 miles of the project site. [9]

The Legacy Center was designed to use 70% less energy than a comparable conventional building. A 39.6-kW rooftop photovoltaic array produces more than 110% of the project’s annual electricity needs. This excess renewable energy, along with on-site carbon sequestration, offsets the greenhouse gas emissions resulting from the project’s operations. Day-lighting eliminates the need for electric lighting during most of the day. Ground-source heat pumps connected to a radiant slab provide heating and cooling, and an earth-tube system provides tempered fresh air. [9]

IV. HPG BUILDINGS

High-performance green (HPG) buildings are “green” or “sustainable” buildings which exhibit maximum energy efficiency of envelope, mechanical and lighting systems coupled with improved indoor environmental quality to enhance occupants’ well being. HPG buildings are conceived to reduce energy costs, and to improve the health and productivity of occupants. [10] Early decisions in the planning and the design process of a building project lead to improved building performance outcomes. Competence of project teams is essential

for HPG building project success. HPG buildings are designed to reduce resource consumption through recycling, water and energy conservation strategies, and emissions reductions. Low-energy buildings mean that building must have a high level of insulation, very energy efficient windows, a high level of air tightness and natural/ mechanical ventilation with very efficient heat recovery to reduce heating/cooling needs. Passive solar building design may boost their energy performance to very high levels by enabling the building to collect solar heat in winter and reject solar heat in summer and/or by integrating active solar technologies (such as solar collectors for domestic hot water and space heating or PV-panels for electricity generation). In addition, other energy/resource saving measures may also be utilized, e.g. on-site windmills to produce electricity or rainwater collecting systems.

High-performance green buildings have the potential to reduce the environmental and economic footprint of buildings by minimizing energy use, reducing resource consumption and waste, and providing healthy and productive environments for occupants. [11]

Irrational use of raw materials and consequently their disappearance created a need for using alternative energy sources while the rising costs of energy made a stimulus for consumers of energy to conserve. Initial construction costs: 60% to 85% of a building's real costs are associated with building operations while the construction cost totals 10%; the majority of operational costs are related to heating, ventilating, and air-conditioning (HVAC), and illumination loads of buildings consume 40% of energy in the United States. [11] High-performance buildings reduce energy consumption significantly through utilization of high efficiency HVAC, lighting, and envelope systems. The Sustainable Building Task Report, examining 33 green building projects in California, confirmed that high-performance green buildings are 25% to 30% more energy efficient and demand, on average, 10% lower, peak electrical loads when compared to traditional buildings.

V. NEARLY ZERO-ENERGY BUILDINGS

Many European countries started their energy efficiency policies in early eighties. Today in Europe there are new buildings whose annual energy consumption for heating per unit of useful floor area does not exceed 10 kWh / m² and existing buildings that consume a lot more and continue to participate in final energy consumption with 38 percent of the total consumption of the European states. Existing buildings account for about 90 percent of the building, which means that the technology is quite advanced, but still consumes a lot of energy because even in Europe did not perform significant energy rehabilitation of existing buildings. The biggest obstacles to the implementation of energy efficiency in existing buildings are residential buildings, i.e. their energy rehabilitation. [12]

A nearly zero-energy building is "a building that has a very high energy performance. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby". This is defined in Article 9 of Energy Performance of Buildings.

Article 9 requires that "Member States shall ensure that by 31 December 2020 all new buildings are nearly zero-energy buildings; and after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings". Member States shall furthermore "draw up national plans for increasing the number of nearly zero-energy buildings" and "following the leading example of the public sector, develop policies and take measures such as the setting of targets in order to stimulate the transformation of buildings that are refurbished into nearly zero-energy buildings". [13]

Plans and aim of Directive on the energy performance of buildings (EPBD) are that by 2020 all new buildings constructed within the European Union after 2020 should reach nearly zero-energy levels, all new buildings should demonstrate very high energy performance and their reduced or very low energy needs will be significantly covered by renewable energy sources. Principles for a nearly zero-energy buildings definition should take into account all financial, legal, technical and environmental aspects and should meet the present and future challenges and benefits. Various Member States have already set up long-term strategies and targets for achieving low-energy standards for new houses. [14]

Reduction of energy consumption and the use of energy from renewable sources in the buildings sector constitute important measures needed to reduce the Union's energy dependency and greenhouse gas emissions. Together with an increased use of energy from renewable sources, measures taken to reduce energy consumption in the Union would allow the Union to comply with the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC), and to honor both its long term commitment to maintain the global temperature rise below 2 °C, and its commitment to reduce, by 2020, overall greenhouse gas emissions by at least 20 % below 1990 levels, and by 30 % in the event of an international agreement being reached. Reduced energy consumption and an increased use of energy from renewable sources also have an important part to play in promoting security of energy supply, technological developments and in creating opportunities for employment and regional development, in particular in rural areas. [14]

European Union financial instruments should be used to give practical effect to the objectives of this Directive, without however substituting national measures. In particular, they should be used for providing appropriate and innovative means of financing to catalyze investment in energy efficiency measures. They could play an important role in the development of national, regional and local energy efficiency funds, instruments, or mechanisms, which deliver such financing possibilities to private property owners, to small and medium-sized enterprises and to energy efficiency service companies. [14]

VI. CONCLUSION

In today's modern world, when we look up to the future it seems uncertain. Necessary steps are to turn to programs aimed at sustainable development. Conventional natural resources are being consumed without any plan or control, energy production, has brought great damage to nature, and if we continue this way

the consequences will be fatal to the plants, animal world, atmosphere, and consequently to . Turning to sustainability is a necessary for protecting the environment. Great contribution in the manner of utilization of renewable energy sources, reduced emissions of greenhouse gases are giving teams of engineers also their achievements in the advancement of technology for achieving sustainability are of great importance.

In building applying the most widely used green building rating system, the LEED, is especially helpful. The impact of buildings and infrastructure on the environment has increased the need for building industry professionals to embrace sustainable practices. Sustainable design and construction is a major trend that is helping to drive process change within project, requiring an integrated workflow with more information brought into earlier stages of design.

Many countries have included energy requirements into their building codes. The European Union has addressed this issue in its Directive on the Energy Performance of Buildings (EPBD), which requires Member States to set minimum energy performance requirements for buildings, taking also into account the positive contribution of solar thermal and other renewable energy sources. The directive implies that from the year 2020 onwards all new buildings will have to be “nearly zero energy buildings” and comply with high energy-performance standards and supply a significant share of their energy requirements from renewable sources. For public buildings these standards need to be met by the end of 2018.

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Synthesis and Antimicrobial Activity of New Synthesized Paracetamol Derivatives and Their Acyclic Nucleoside Analogues

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Abstract- New paracetamol derivatives and their N-substituted acyclic nucleoside analogues were prepared. The synthesized compounds were tested for their antimicrobial activity against *Escherichia coli*, *Staphylococcus aureus*, *Micrococcus*, *Salmonella typhi* and *Salmonella para typhi*. The synthesized compounds were tested also against fungi species such as *Aspergillus flavus*, *Aspergillus fumigatus*, *Aspergillus ochraceus* and *Candida albicans*. Most of tested compounds exhibited moderate to high antimicrobial activity while few compounds were found to exhibit little or no activity against the tested microorganisms.

Index Terms- paracetamol derivatives, sugar hydrazones, acyclic nucleosides, antimicrobial activity.

I. INTRODUCTION

Paracetamol (*N*-acetyl-*p*-aminophenol or acetaminophen or 4-amino-acetyl phenol) has been used as an analgesic and antipyretic drug since more than six decades. It has been proved as an excellent and effective medication for the pain relief and control of fever in adults and children¹. However, the overdoses of paracetamol can lead to accumulation of toxic metabolites, causing severe and sometimes fatal hepatotoxicity and nephrotoxicity^{2,3}. Therefore, there has been a concerned search for the discovery and development of newer pharmacological active paracetamol derivatives. The synthesis of newer paracetamol derivative is in need of time. The development of new drugs is one of the fundamental goals in medicinal chemistry. Literature surveyed revealed that various paracetamol derivatives have been synthesized, such as acetyl-ether derivatives⁴, nitroparacetamol⁵, 4-(2,3-epoxy-propyl)acetaminophen⁶, polymeric derivative of 4-[6-(methacryloxy)hexyloxy]acetanilide⁷, 2-(2-carboxyphenylsulfanyl)-*N*-(4-substituted phenyl)acetanilide derivatives⁸ and dimer of paracetamol⁹. Varying substituent is a common method for drug design in medicinal chemistry. We aimed to synthesize new condensed paracetamol derivative and to test the analgesic and antipyretic activity by in-vivo test. The simple, efficient, sensitive, accurate and economical analytical technique for quantification of such newly synthesized derivatives is needed in pharmaceutical practice. The development of novel techniques was used for the estimation of drug in different in-vitro and in-vivo pharmacological parameters such as, in pharmacokinetics, pharmacodynamic and

bioequivalence study. The number of methods has been reported for the determination of paracetamol, such as flow injection method¹⁰, liquid chromatography¹¹, titrimetry¹², capillary electrophoresis¹³, chemiluminescence¹⁴, electrochemical techniques¹⁵ and spectrophotometric methods. Spectrophotometric methods are mainly based on nitration^{16,17}, oxidation¹⁸ and hydrolysis to paminophenol followed by diazotization and phenolic coupling^{19,20}. Paracetamol in biological fluids (blood, plasma, urine) is mainly determined by HPLC techniques²¹, electrochemical method²² and spectrofluorimetry²³, but there are very few spectrophotometric methods²⁴⁻²⁶ are known for determination of paracetamol in biological fluids. The present work describes the synthesis of new paracetamol derivative; [di(4-amino-*N*-acetyl)phenoxy]methyl ketone (DPMK). The DPMK was synthesized by condensation reaction^{27,28} of synthesized (4-amino-*N*-acetyl) phenoxy acetyl chloride (APAC) and (4-amino-*N*-acetyl)phenol. This derivative has been screened for their analgesic and antipyretic activities. A new spectrophotometric method based on nitrosation reaction²⁹ was developed for quantitative determination of synthesized DPMK. This method was successfully applied in biological fluids (blood and urine)^{21, 23}.

Apparent molar volumes and viscosity B-coefficients for paracetamol in aqueous sodium malonate solutions were determined from solution densities and viscosities measured at T = (298.15 to 318.15) K and at pressure p = 101 kPa as a function of paracetamol concentrations.³⁰ poly(Nile blue) modified glassy carbon electrode (PNBMGCE) was fabricated by electropolymerisation of Nile blue (NB) monomer using cyclic voltammetry (CV) and was used for the determination of paracetamol (ACOP), tramadol (TRA) and caffeine (CAF).³¹ a novel voltammetric sensor, butyl-3- methylimidazolium bis (trifluoromethylsulfonyl) imide ([bmim] NTF2) based carbon ionic liquid paste electrode (CILPE) with graphene/multiwall carbon nanotube (GR/MWCNT) hybrid composite as a modifier was fabricated and it was used for simultaneous determination of carbamazepine (CBZ) and paracetamol (PA) for the first time.³² the cocrystallization of antipyretic drug, paracetamol (PCA) with coformer 5-nitroisophthalic acid (5NIP) have been successfully prepared using solvent evaporation method.³³ Paracetamol, a drug with analgesic and antipyretic properties, is one of the most used substances in human therapeutics, being also frequently detected in aquatic environments. Recent studies report its toxicity towards aquatic species, but the overall amount of data

concerning its effects is still scarce. Global changes, likely alterations in a biotic conditions, including salinity, can modulate the interactions of contaminants with biota, conditioning the toxicological responses elicited also by pharmaceuticals.³⁴

II. RESULTS AND DISCUSSION

Paracetamol (**1**) was allowed to react with ethyl chloroacetate in acetone and dry potassium carbonate to afford ethoxycarbonylmethylparacetamol (**2**) in 85% yield. Hydrazinolysis of the ethyl ester **2** in ethanol at reflux temperature affording the corresponding hydrazide **3** in 90% yield which was allowed to react with diethylmalonate in dioxane at reflux temperature and in the presence of triethyl amine to afford 2-Paracetamolylacetylpyrazolidine-3,5-dione **4** in 79% yield. Treatment of **4** with the appropriate aldopentose (D-xylose and D-Galactose) sugar derivatives **5,6** in ethanol and in the presence of acetic acid as a catalyst under reflux afforded the corresponding sugar hydrazones **7,8** in 88-90% yields. Acetylation of **7,8** using acetic anhydride in pyridine at room temperature gave the corresponding acetylated derivatives **9,10** in 87-93% yields. Treatment of **4** with the aromatic aldehyde derivatives **11-13** in ethanol and in the presence of acetic acid as a catalyst under reflux afforded the corresponding arylidines **14-16** in 87-90% yields. Treatment of **4** with amine derivatives (2-aminonaphthol and 2-aminothiazole) in the presence of hydrochloric acid and sodium nitrite at room temperature to afford azo-dye derivatives **17, 18** in 70-72% yields. Treatment of **3** with acetic and/or formic acid under reflux afforded **19, 20** in 90-92% yields.

Treatment of **20** with aromatic amine derivatives **21-23** in absolute ethanol and in the presence of acetic acid as catalyst under reflux to afford the corresponding arylidines **24-26** in 75-80% yields.

III. EXPERIMENTAL

Melting points were determined with a *Kofler* block apparatus and are uncorrected. The IR spectra were recorded on a Perkin-Elmer model 1720 FTIR spectrometer for KBr discs. NMR spectra were recorded on a Varian Gemini 200 NMR Spectrometer at 300 MHz for ¹H NMR with TMS as a standard. The progress of the reactions was monitored by TLC using aluminum silica gel plates 60 F 245. Elemental analyses were performed at the Microanalytical data centre at Faculty of science, Cairo University, Egypt.

Ethoxycarbonylmethylparacetamol (**2**)

A mixture of paracetamol **1** (15.1g, 0.1 mole), dry acetone (300 ml), anhydrous K₂CO₃ (13.8 g, 0.1 mole) and ethyl chloroacetate (15.92 g, 0.13 mole) was heated under reflux for 5h (TLC). The reaction mixture was filtered off and the filtrate was evaporated under reduced pressure. The residue was recrystallized from ethanol to yield white needles in 85% yield, m.p. 158-160°C. R_f = 0.48 (5% MeOH in CH₂Cl₂). ¹H NMR (DMSO-d₆): δ = 1.17 (t, 3H, J = 8.1 Hz, CH₃CH₂), 2.01 (s, 3H, CH₃), 4.11 (q, 2H, J = 8.1 Hz, CH₃CH₂), 4.71 (s, 2H, CH₂), 6.83

(d, 2H, J = 5.5 Hz, H-2), 7.46 (d, 2H, J = 5.5 Hz, H-3), 9.79 (brs, 1H, NH).

Paracetamolylacetic acid hydrazide (**3**)

A mixture of **2** (2.37g, 0.1 mole), hydrazine hydrate (1.5 g, 0.3 mole) and ethanol (30 ml) was heated under reflux for 5h (TLC). The product was filtered off, recrystallized from ethanol to yield white needles in 90% yield. White needles (90%), m.p. 145-147°C R_f = 0.31 (5% MeOH in CH₂Cl₂). ¹H NMR (DMSO-d₆): δ = 1.99 (s, 3H, CH₃), 4.31 (brs, 2H, NH₂), 4.42 (s, 2H, CH₂), 6.89 (d, 2H, J = 5.5 Hz, Ar-H), 7.47 (d, 2H, J = 5.5 Hz, Ar-H), 9.30 (brs, 1H, NH), 9.79 (brs, 1H, NH).

2-Paracetamolylacetylpyrazolidine-3,5-dione (**4**)

A mixture of **3** (2.23 g, 0.1 mole), diethylmalonate (1.60 g, 0.1 mole), dioxane (50 ml) and triethylamine (20.2 g, 0.2 mole) was heated under reflux for 70h (TLC). The mixture was poured over (30 g) ice and the precipitate was filtered and recrystallized from ethanol to yield white powder in 79% yields, m.p. 220-222°C. R_f = 0.45 (5% MeOH in CH₂Cl₂). ¹H NMR (DMSO - d₆): δ = 2.00 (s, 3H, CH₃), 4.05 (s, 2H, CH₂), 4.56 (s, 1H, CH₂), 6.92 (d, 2H, J = 5.5 Hz, Ar-H), 7.48 (d, 2H, J = 5.5 Hz, Ar-H), 9.77 (brs, 1H, NH), 10.11 (brs, 1H, NH).

Sugar Derivatives of pyrazolidine-3,5-diones (**7, 8**)

A mixture of **4** (0.81 g, 2.80 mmol) in absolute ethanol (100 ml), L-(-) arabinose **5** and/or D-(+) galactose **6** (2.80 mmol) in water (15 ml) and acetic acid (0.6 ml) was heated under reflux for 5h (TLC). The excess of ethanol was removed under reduced pressure and the residue was triturated with diethyl ether (20 ml) and the product was filtered off, washed with diethyl ether and recrystallized from ethanol to give **7** and **8** in 88-90% yields.

2-Paracetamolylacetyl-4-(2,3,4,5-tetrahydroxypentylidene) pyrazolidine-3,5-dione (**7**)

White crystals (88%), m.p. 170-172°C, R_f = 0.33 (10% MeOH in CH₂Cl₂) ¹H NMR (DMSO-d₆): δ = 1.99 (s, 3H, CH₃), 3.03-3.51 (m, 4H, H-3', H-4', H-5'), 3.78 (m, 1H, H-2'), 4.24 (brs, 1H, OH), 4.53 (brs, 2H, 3OH), 4.77 (s, 2H, CH₂), 6.11 (s, 1H, CH), 6.88 (d, 2H, J = 5.5 Hz, Ar-H), 7.48 (d, 2H, J = 5.5 Hz, Ar-H), 9.80 (brs, 1H, NH), 10.24 (brs, 1H, NH).

2-Paracetamolylacetyl-4-(2,3,4,5,6-pentahydroxyhexylidene) pyrazolidine-3,5-dione (**8**)

White crystals (90%), m.p. 201-203°C. R_f = 0.35 (10% MeOH in CH₂Cl₂) ¹H NMR (DMSO-d₆): δ = 1.99 (s, 3H, CH₃), 2.03-3.78 (m, 5H, H-3', H-4', H-5', H-6'), 4.12 (m, 1H, H-2'), 4.74 (m, 2H, 2OH), 4.43 (brs, 1H, OH), 4.53 (brs, 1H, OH), 4.77 (s, 2H, CH₂), 4.90 (brs, 1H, OH), 6.11 (s, 1H, CH), 6.88 (d, 2H, J = 5.5 Hz, Ar-H), 7.48 (d, 2H, J = 5.5 Hz, Ar-H), 9.80 (brs, 1H, NH), 10.24 (brs, 1H, NH).

Acetylated Sugar Derivatives of Pyrazolidine-3,5-diones (**9,10**)

To a solution of **7** or **8** (1 mmol) in dry pyridine (10 ml), acetic anhydride (1.02 g, 10 mmol) was added with stirring at room temperature for overnight. The solvent was removed under

reduced pressure and the residue was coevaporated with toluene (3×5 ml) to afford **9, 10** (87- 93%) yields.

2-Paracetamolylacetyl-4-(2,3,4,5-tetra-O-acetylpentylidene)pyrazolidine-3,5-dione (9)

White powder (87%), m.p. 160-163°C $R_f = 0.76$ (3% MeOH in CH_2Cl_2). IR (cm^{-1}), 3470 (NH), 1783 (CO), 1723 (CO), 1640 (CO).

2-Paracetamolylacetyl-4-(2,3,4,5,6-penta-O-acetylhexylidene)pyrazolidine-3,5-dione (10)

White crystals (93%) m.p. 130-132°C. $R_f = 0.70$ (3% MeOH in CH_2Cl_2). $^1\text{H NMR}$ (DMSO-d_6): $\delta = 1.95$ (s, 3H, CH_3), 2.08 (s, 15 H, 5 AC), 3.20-2.90 (m, 5H, H-3', H-4', H-5', H-6'), 4.40 (s, 2H, CH_2), 6.20 (s, 1H, CH), 6.88 (d, 2H, $J = 5.5$ Hz, Ar-H), 7.48 (d, 2H, $J = 5.5$ Hz, Ar-H), 9.80 (brs, 1H, NH), 10.24 (brs, H, NH).

Reaction of Pyrazolidine-3,5-dione (4) with Different Aromatic Aldehydes to Afford the Corresponding Arylidines (14-16)

To solution of **4** (10 mmol) in absolute ethanol, different aromatic aldehydes (10 mmol) were added and then glacial acetic acid (1 ml) was added to the reaction mixture which refluxed for 4h (TLC). The solvent was evaporated or concentrated under reduced pressure and the product was filtered off to afford **14-16** (87 - 90%) yields.

2-Paracetamolylacetyl-4-[(5-methylfuran-2-yl)methylene]pyrazolidine-3,5-dione (14)

Yellow crystals (87%), m.p. 240-243°C. $R_f = 0.72$ (5% MeOH in CH_2Cl_2). $^1\text{H NMR}$ (DMSO-d_6): $\delta = 1.29$ (s, 3H, CH_3), 2.00 (s, 3H, CH_3), 4.29 (s, 2H, CH_2), 6.29 (s, 1H, CH), 6.89 (s, 1H, CH), 6.94 (d, 2H, $J = 5.5$ Hz, Ar-H), 7.37 (d, 2H, $J = 5.5$ Hz, Ar-H), 7.49 (s, 1H, CH), 9.81 (brs, 1H, NH), 10.44 (brs, 1H, NH).

2-Paracetamolylacetyl-4-(4-fluorobenzylidene)pyrazolidine-3,5-dione (15)

White powder (88%), m.p. >300°C. $R_f = 0.72$ (5% MeOH in CH_2Cl_2). $^1\text{H NMR}$ (DMSO-d_6): $\delta = 1.99$ (s, 3H, CH_3), 4.59 (s, 2H, CH_2), 6.88 (s, 1H, CH), 6.91-7.48 (m, 8H, Ar-H), 9.80 (brs, 1H, NH), 10.24 (brs, 1H, NH).

2-Paracetamolylacetyl-4-[4-(dimethylamino)benzylidene]pyrazolidine-3,5-dione (16)

White crystals (90%), m.p. 243-245°C. $R_f = 0.72$ (5% MeOH in CH_2Cl_2). $^1\text{H NMR}$ (DMSO-d_6): $\delta = 1.99$ (s, 3H, CH_3), 3.23 (s, 6H, 2 CH_3), 4.60 (s, 2H, CH_2), 6.89 (s, 1H, CH), 6.93-7.49 (m, 5H, Ar-H), 9.80 (brs, 1H, NH), 10.24 (brs, 1H, NH).

Preparation of Azo-Dye Derivatives (17,18)

A mixture of aromatic amines and hydrochloric acid was stirred in ice bath for 10 min then the solution of sodium nitrite (0.96 g, 10 mmol) was added dropwise to the reaction mixture and then **4** (2.91 g, 10 mmol) was dissolved in ethanol and added dropwise to the last mixture which was stirred at 0°C for 20 min to afford **17** and **18** in 70-72% yields.

2-Paracetamolylacetyl-4-(azo-2-naphthyl)pyrazolidine-3,5-dione (17)

Brown powder (70%), m.p. >300°C. $R_f = 0.33$ (5% MeOH in CH_2Cl_2). $^1\text{H NMR}$ (DMSO-d_6): $\delta = 2.00$ (s, 3H, CH_3), 4.55 (s, 2H, CH_2), 6.91-7.47 (m, 7H, Ar-H), 6.88 (d, 2H, $J = 5.5$ Hz, Ar-H), 7.49 (d, 2H, $J = 5.5$ Hz, Ar-H), 9.92 (brs, 1H, NH), 10.24 (brs, 1H, NH).

2-Paracetamolylacetyl-4-(azo-2-thiazolyl)pyrazolidine-3,5-dione (18)

White powder (72%), m.p. 290-292°C. $R_f = 0.45$ (5% MeOH in CH_2Cl_2). $^1\text{H NMR}$ (DMSO-d_6): $\delta = 1.99$ (s, 3H, CH_3), 4.60 (s, 2H, CH_2), 6.11 (s, 1H, CH), 6.82 (s, 1H, CH), 6.91 (d, 2H, $J = 5.5$ Hz, Ar-H), 7.49 (d, 2H, $J = 5.5$ Hz, Ar-H), 9.90 (brs, 1H, NH), 10.25 (brs, 1H, NH).

General procedure for preparation (19, 20)

A mixture of the hydrazide **3** and acetic or formic acid was refluxed for 4h (TLC). The reaction mixture was poured on ice and the precipitate was filtered off, washed with water and dried to give **19, 20** in 90-92% yields.

(Paracetamolylacetyl)acetylhydrazide (19)

Yellow powder (90%), m.p. 174-177°C. $R_f = 0.72$ (5% MeOH in CH_2Cl_2). $^1\text{H NMR}$ (DMSO-d_6): $\delta = 1.83$ (s, 3H, CH_3), 2.00 (s, 3H, CH_3), 4.56 (s, 2H, CH_2), 6.92 (d, 2H, $J = 5.5$ Hz, Ar-H), 7.49 (d, 2H, $J = 5.5$, Ar-H), 9.21 (brs, 1H, NH), 9.82 (brs, 1H, NH), 10.24 (brs, 1H, NH).

(Paracetamolylacetyl)formylhydrazide (20)

White powder (92%), m.p. 157-159°C. $R_f = 0.45$ (5% MeOH in CH_2Cl_2). $^1\text{H NMR}$ (DMSO-d_6): $\delta = 1.99$ (s, 3H, CH_3), 4.61 (s, 2H, CH_2), 6.99 (d, 2H, $J = 5.5$ Hz, Ar-H), 7.33 (d, 2H, $J = 5.5$ Hz, Ar-H), 9.08 (brs, 1H, NH), 9.82 (brs, 1H, NH) 10.24 (brs, 2H, NH, CHO).

(Paracetamolylacetyl) Arylidines Derivatives (24-26)

To solution of **20** (10 mmol) in absolute ethanol, different aromatic amines (10 mmol) were added and then glacial acetic acid (1 ml) was added to the reaction mixture which refluxed for 14h (TLC). The solvent was evaporated or concentrated under reduced pressure and the product was filtered off to afford **24-26** (75 - 80%) yields.

2-Paracetamolylacetyl-4-[4-(2-nitro)benzylidene] (24)

White crystals (75%), m.p. 243-245°C. $R_f = 0.72$ (5% MeOH in CH_2Cl_2). $^1\text{H NMR}$ (DMSO-d_6): $\delta = 1.99$ (s, 3H, CH_3), 2.04 (brs, 1H, NH), 4.60 (s, 2H, CH_2), 7.23 (s, 1H, CH), 6.97-8.02 (m, 8H, Ar-H), 7.50 (brs, 1H, NH), 8.00 (brs, 1H, NH).

2-Paracetamolylacetyl-4-[4-naphthylidene] (25)

White crystals (75%), m.p. 243-245°C. $R_f = 0.72$ (5% MeOH in CH_2Cl_2). $^1\text{H NMR}$ (DMSO-d_6): $\delta = 1.99$ (s, 3H, CH_3), 2.04 (brs, 1H, NH), 4.60 (s, 2H, CH_2), 7.23 (s, 1H, CH), 6.97-8.21 (m, 11H, Ar-H), 7.50 (brs, 1H, NH), 8.00 (brs, 1H, NH).

2-Paracetamolylacetyl-4-[4-(4-methyl) benzylidene] (26)

White crystals (75%), m.p. 243-245°C. $R_f = 0.72$ (5% MeOH in CH_2Cl_2). $^1\text{H NMR}$ (DMSO-d_6): $\delta = 1.99$ (s, 3H, CH_3), 2.04 (brs, 1H, NH), 2.35 (s, 3H, CH_3), 4.60 (s, 2H, CH_2), 7.23 (s, 1H, CH), 6.97-7.51 (m, 9H, Ar-H), 7.50 (brs, 1H, NH), 8.00 (brs, 1H, NH).

IV. ANTIMICROBIAL TESTING

Antimicrobial screening

The agar diffusion method reported by Cruickshank et al [41] was used for the screening process. The bacteria and fungi were maintained on nutrient agar and Czapek's-Dox agar media, respectively. The assay medium flasks containing 50 ml of nutrient agar for bacteria and Czapek's-Dox agar medium for fungi respectively were allowed to reach 40-50 °C to be inoculated with 0.5 ml of the test organism cell suspension. The flasks were mixed well and poured each into a Petri dish (15 x 2 cm) and allowed to solidify. After solidification, holes (0.6 cm diameter) were made in the agar plate by the aid of a sterile cork poorer (diameter 6 mm). The synthesized target compounds were dissolved each in 2 ml DMSO. In these holes, 100 μl of each compound was placed using an automatic micropipette. The Petri dishes were left at 5 °C for 1 h to allow diffusion of the samples through the agar medium and retard the growth of the test organism. Plates were incubated at 30 °C for 24 h for bacteria and 72 h of incubation at 28 °C for fungi. DMSO showed no inhibition zones. The diameters of zone of inhibition were measured and compared with that of the standard and the solvent alone was used as negative control, the values were tabulated. Ciprofloxacin [42,43] (50 $\mu\text{g/ml}$) and Nystatin [44] (50 $\mu\text{g/ml}$) were used as standard for antibacterial and antifungal activity respectively. The observed zones of inhibition are presented in Table 1 and table 2.

The synthesized compounds were screened in vitro for their antimicrobial activities against *staphylococcus aureus* (G+ve bacteria), *micrococcus* (G+ve bacteria), *salmonella typhi* (G-ve bacteria), *salmonella para typhi* (G-ve bacteria) and *Escherichia coli* (G-ve bacteria) in addition to strains of fungi species *aspergillus flavus*, *aspergillus fumigates*, *aspergillus ochraceus* and *candida albicans* which were isolated from milk and milk products. The diameters of zone of inhibition were measured and compared with that of the standard and the solvent alone was used as negative control. The values of minimal inhibitory concentrations (MICs) of the tested compounds are presented in Table 1 and Table 2. The MIC values of the results obtained revealed that compounds showed varying degrees of inhibition against the tested microorganisms. The results indicated generally that tested compounds did not show high activity against fungi under test except **17** that exhibited high antifungal activities against (*aspergillus fumigates* and *candida albicans*) and some antifungal activity against *aspergillus flavus*, in addition to **18** that exhibited some antifungal activities against *candida albicans*. Also the results indicated that among the compounds tested in antibacterial screening, **9**, **15** and **16** exhibited good antibacterial activities in addition to Compounds **14**, **15**, **19** that exhibited appreciable activity against *micrococcus*. Compounds **2**, **7**, **8**, **9**, **10** and **14** exhibited mild to moderate antibacterial activity against *salmonella para typhi*. Compounds **15**, **16**, **18**, **19**, and **20** exhibited notable antibacterial

activity against *salmonella typhi*. Compounds **2**, **10**, **14** and **16** exhibited notable antibacterial activity against *Escherichia coli* followed by compounds **9**, **17**. Compounds **8**, **17**, **18** and **20** exhibited notable antibacterial activity against *staphylococcus aureus*.

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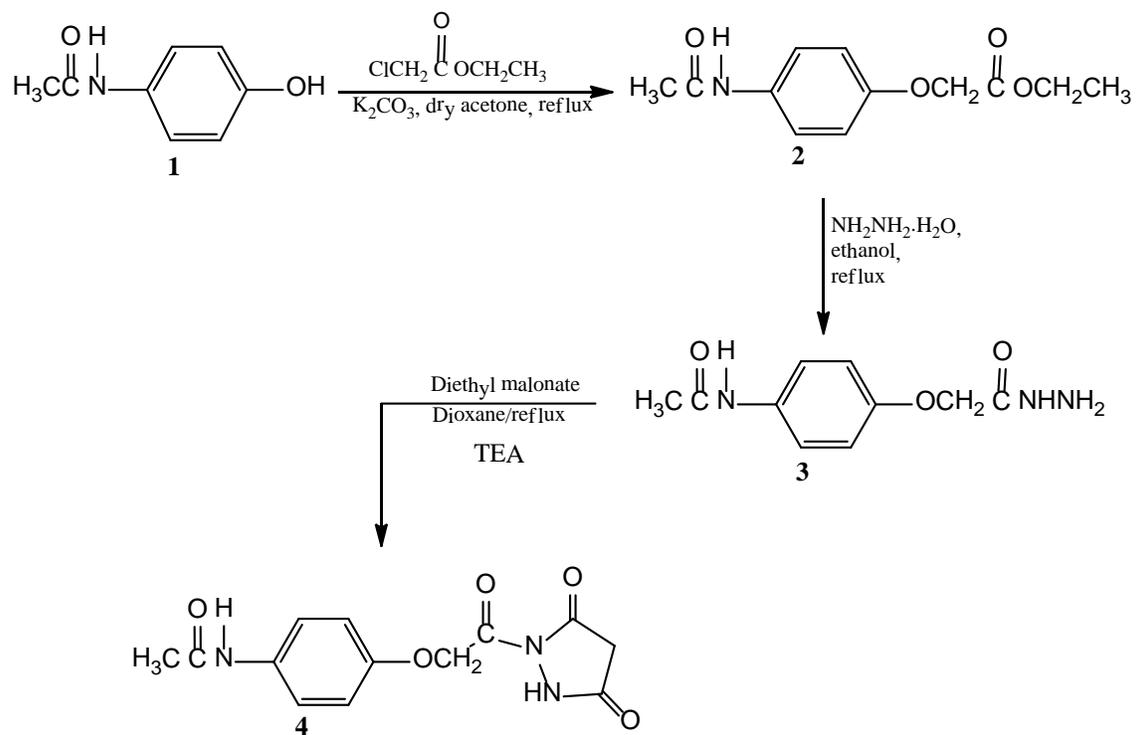
AUTHORS

First Author – Author name, qualifications, associated institute (if any) and email address.

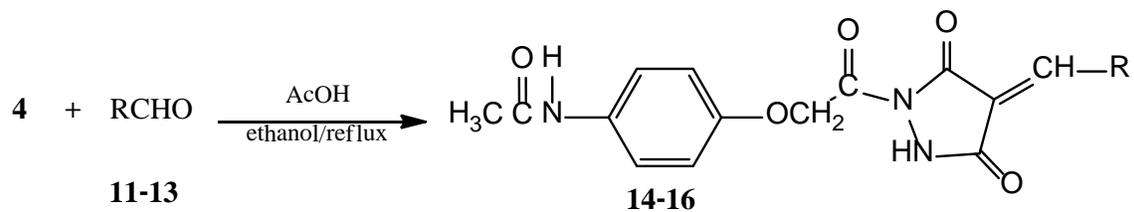
Second Author – Author name, qualifications, associated institute (if any) and email address.

Third Author – Author name, qualifications, associated institute (if any) and email address.

Correspondence Author – Author name, email address, alternate email address (if any), contact number.



Scheme 1



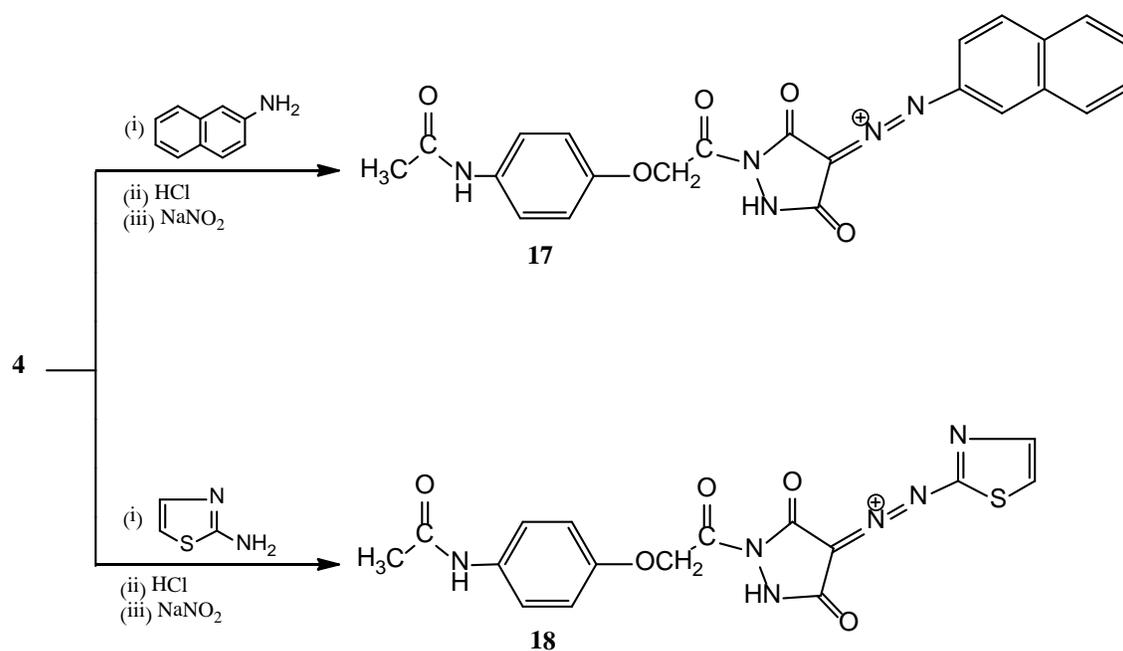
R

11, 14 = 5-methylfuran

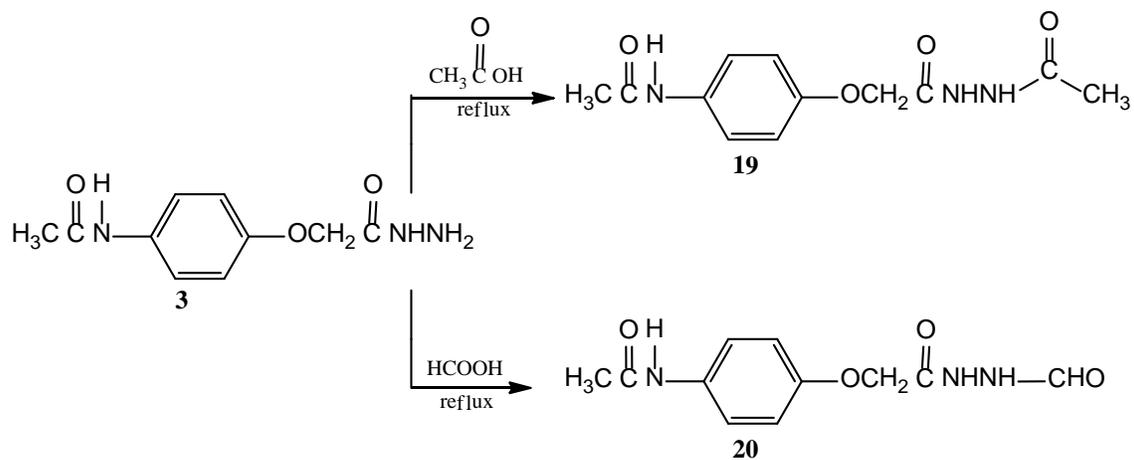
12, 15 = 4-fluorophenyl

13, 16 = 4-N,N dimethylaminophenyl

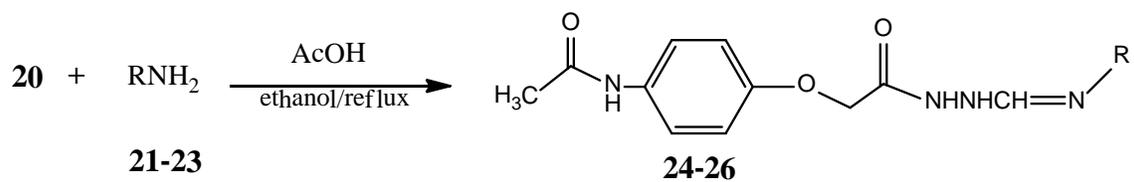
Scheme 3



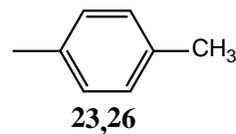
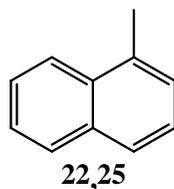
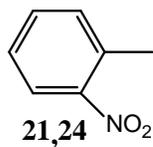
Scheme 4



Scheme 5



R=



Scheme 6

Table (1) Minimum inhibitory concentrations (MIC in µg/ml) of the title Compounds against bacteria species. The negative control DMSO showed no activity.

Compound	Gram-positive <i>staphylococcus aureus</i>	Gram-positive <i>micrococcus</i>	Gram-negative <i>salmonella typhi</i>	Gram-negative <i>salmonella para typhi</i>	Gram-negative <i>Escherichia coli</i>
2	0	0	0	240	0
3	0	0	0	0	
4	0	250	150	150	275
7	150	250	0	275	0
8	0	0	0	160	0
9	130	0	100	140	0
10	100	0	0	150	0
14	0	160	100	175	0
15	160	500	0	0	0
16	90	0	150	150	150
17	0	150	160	150	140
18	0	0	0	0	0
19	175	250	0	0	0
20	0	0	0	0	100
Ciprofloxacin	350	400	300	200	0
DMSO	0	0	0	0	250
					0

Table (2) Minimum inhibitory concentrations (MIC in $\mu\text{g/ml}$) of the title Compounds against fungi species. The negative control DMSO showed no activity.

<u>Compound</u>	<u>Fungi</u> <i>aspergillus flavus</i>	<u>Fungi</u> <i>aspergillus fumigates</i>	<u>Fungi</u> <i>aspergillus ochraceus</i>	<u>Fungi</u> <i>candida albicans</i>
4	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	150	500	0	450
18	0	0	0	150
19	0	0	0	0
Nystatin	250	300	350	250
DMSO	0	0	0	0

A Systemic Review of Hospital Operational Efficiency Studies

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Abstract- As such the health care systems in India is very complex and having various verticals. With the emergence of corporatization of hospital the measurement of efficiency has become the initial step in the process of individual performance audit of patient care centers. The term efficiency is largely used in the field of economics and it refers to the best utilization of resources. A very common example of operational efficiency is technical efficiency which means the effective use of resources (input) in producing outputs. In the Farrell framework, a hospital is judged to be technically efficient if it is operating on the best practices of the production frontier. Mainly there are two methods which are used in measuring operational efficiency. The first is Data Envelopment Analysis (DEA) which is a linear programming method enabling the measurement of efficiency consistent with the theoretically based concept. The role of DEA is to examine the relationship between inputs to a process and the outputs of that process. The second technique for assessing efficiency that is employed is Stochastic Frontier Analysis (SFA). However the DEA is used most commonly.

Index Terms- Efficiency, Operational efficiency, Hospital Efficiency, DEA

I. INTRODUCTION

In the older times the hospitals were considered as doctors workshop and more in charitable in nature hence they were not expected to be efficient or profitable though they consume vast variety and amount of resources in order to care patients.

Now with the passage of time and enhancement of resources used there is growing interest in examining and measuring its operational efficiency because the driving force for such efficiency is money. In the present day practice of demand and expectations of clients for quality services at all the outlets of hospital e.g OPD , IPD, diagnostics , Healthcheck etc. But at the same time the cost of care has also grown substantially which made mandatory supervision on the operational efficiency of the organization.

Over the past two decades, efficiency measurement has been one of the most intensely explored areas of health services research. The aim of this paper is to provide a detailed review of the concept of efficiency, its relevance in hospital industry, and review some related studies.

II. THE CONCEPT OF HOSPITAL OPERATIONAL EFFICIENCY

In the Farrell (1957) framework, a hospital is judged to be technically efficient if it is operating on the best practice production frontier in its hospital industry. Magnussen (1996) stated that measuring efficiency allows us to compare hospitals in terms of their real use of inputs and outputs rather than costs or profits. A hospital is said to be functionally operational efficient if an increase in an output requires a decrease in at least one other output, or an increase in at least one input. Or in other words it can be stated that a reduction in any input must require an increase in at least one other input or a decrease in at least one output.

In order to measure hospital's operational efficiency, it is mandatory to identify the hospital's output. These outputs can be identified as number of surgery done, number of admitted patients , number of patient days, bed turnover rate and bed occupancy rate, number of OPD patients, average length of stay etc. It depends on the level (organizational /departmental) at which these outputs are to be measured.

III. APPROACHES TO STUDY HOSPITAL EFFICIENCY

Recent academic research on measuring efficiency in various areas has shifted to frontier efficiency. Frontier efficiency measures deviations in performance from that of best practice firms on the efficient frontier. In general there are two main approaches a nonparametric piecewise-linear convex isoquant constructed such that no observed point should lie to the left or below it (known as the mathematical programming approach to the construction of frontiers); or a parametric function, such as the Cobb-Douglas form, fitted to the data, again such that no observed point should lie to the left or below it (known as the econometric approach).

The econometric approach specifies a production function and normally recognises that deviation away from this given technology (as measured by the error term) is composed of two parts, one representing randomness (or statistical noise) and the other inefficiency. The usual assumption with the two-component error structure is that the inefficiencies follow an asymmetric half-normal distribution and the random errors are normally distributed. The random error term is generally thought to encompass all events outside the control of the firm, including both uncontrollable factors directly concerned with the 'actual' production function (such as differences in operating

environments) and econometric errors (such as misspecification of the production function and measurement error). This type of reasoning has primarily led to the development of the 'stochastic frontier approach' which seeks to take these external factors into account when estimating the efficiency of real-world firm, and the earlier 'deterministic frontier approach' which assumes that all deviations from the estimated frontier represent inefficiency. In contrast to the econometric approaches which attempt to determine the absolute economic efficiency of firm against, the mathematical programming approach seeks to evaluate the efficiency of a firm relative to other firms in the same industry. The most commonly employed version of this approach is a linear programming tool referred to as 'data envelopment analysis' (DEA).

Ferrier and Lovell (1990) illustrated that stochastic frontier analysis and data envelopment analysis may be used as crosscheck with each other.

IV. REVIEW OF HOSPITAL EFFICIENCY STUDIES

Valdmanis (1990) applied the DEA method to a group of hospitals and found that government-owned hospitals were more efficient. The other surprising result is that for profit hospitals tend to be disproportionately represented among highly inefficient hospitals (Ozcan 1992) and are inefficient compared to not-for-profit hospitals when output is measure by discharging.

Zuckerman et al. (1994) used a cross-sectional stochastic frontier model to derive hospital-specific measure of inefficiency. The existence of high profits for some hospitals and losses for others, lead the authors to question whether profitable institutions are efficient and those experiencing losses are not. If this is the case, it follows that inefficient hospitals should cut their costs and profitable hospitals should expand production.

According to their findings, the authors concluded that inefficiency accounts for 13.6 percent of total hospital costs' and that the PPS which rewards efficiency and penalizes inefficiency, provides hospitals with appropriate incentives. This is because a reduction in inefficiency reduces costs. Hofler and Folland (1991) suggested that SFA is important in assessing hospital costs and efficiencies, because other methods do not necessarily identify what minimum costs should be. The authors suggested that DEA is not entirely satisfactory because it ignores random fluctuations present in the data observations. Ozcan and Bannick (1994) used DEA to study trends in Department of Defense hospital efficiency from 1998-1999 using 124 military hospitals and data from the American Hospital Association Annual Survey. These studies were conducted at the strategic level under a different operational paradigm, prior to the large-scale adoption of managed care.

Ozcan and Luke (1993) used the DEA technique to conduct a national study of the efficiency of hospitals in urban markets. Four variables were analyzed in this study: hospital size, membership in multihospital system, ownership and payer mix. Ownership and percent Medicare were consistently related to hospital efficiency. The Medicare percent was related negatively to technical efficiency. Government hospitals were more efficient and for profit hospitals less efficient than other types of hospitals. Other variables like hospitals size, and membership in a

multihospital system were related positively to efficiency. In 1998 Linna investigated the development of hospital cost efficiency and productivity in Finland by comparing both parametric and non-parametric panel models.

Parkin and Hollingsworth (1997) used a constant return to scale to measure efficiency of 75 Scottish acute care hospitals. They use an input vector consisting of three capital and three labor variables and output vector consisting of four categories of inpatient discharges as well as emergency attendances and outpatient attendances.

Also, panel data models require fewer assumptions because repeated observation on a number of decision making units, such as hospitals, can take the place of strong distributions assumptions.

Coppola (2003) conducted a DEA study of military hospital using 1998-2002 data. In his study he selected the following input variables: costs, number of beds, number of service offered. For output variables, he used surgical visit, ambulatory patient visit, emergency visits, and live birth. This study is focused on workload as the primary measure for efficiency, a point of view not fully congruent with the current operation of military hospitals.

Mangnussen (1996) measured the production efficiency of 46 Norwegian hospitals using labor and capital inputs and specifying various output vectors. Notably, he examined treated patients and patient days as alternative units of measurement for inpatient activity and found the rank correlation between the models to be 0.67, implying substantial differences between the two measurement specification. As well, he examined the disaggregation of outputs based on patient complexity and the type of activity and found the rank correlation between the models to be 0.78 again revealing significant sensitivity to the model specification.

Street (2003) provided another application of SFA to the hospital sector using cross-sectional data for English public hospitals. More specifically the author compared the results obtained using corrected ordinary least square with results obtained using the SFA cost function. There are two alternative results obtained for the SFA model since the model is run under two assumptions of the distribution of the inefficiency term. One of the SFA models assumed a half-normal distribution, and the other an exponential distribution.

Another study is by Stanford's (2004) examination of the performance by using DEA of 107 Alabama hospitals in the treatment of acute myocardial infarction patients because it too examined clinical efficiency and quality of care. Cross efficiencies were used to improve the efficiency discrimination between hospitals.

Bates (2006) used data envelopment analysis and multiple regression analysis to examine empirically the impact of various market-structure elements on the technical efficiency of the hospital services industry in various metropolitan areas of the United States. Market-structure elements include the degree of rivalry among hospitals, extent of HMO activity, and health insurer concentration. The DEA results showed the typical hospital services industry experienced 11 percent inefficiency in 1999.

Moreover, multiple regression analysis indicated the level of technical efficiency varied directly across metropolitan hospital

services industries in response to greater HMO activity and private health insurer concentration in the state. The analysis suggested the degree of rivalry among hospitals had no marginal effect on technical efficiency at the industry level. Evidence also implies that the presence of a state Certificate of Need law was not associated with a greater degree of inefficiency in the typical metropolitan hospital services industry.

V. CONCLUSION

The research methodology through the review of literature on the specific process of the hospital management is an effective and efficient approach to go further for the studies. The review of literature guide the researcher in understanding the complexities of the functioning of healthcare sector. However the researcher should make an genuine effort to have suitable blend of qualitative as well quantitative methodologies as and where necessary. The operational efficiency is the key factor in the success of the hospital hence the analysis of hospital operations should be done carefully by using suitable method of analysis.

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Origin of the Islamic Banking Business in Traditional Libyan Banks

Mohamed Zaed, Osama Garoum, Moftah Aldaif

Abstract- The phenomenon of turning conventional banks to Islamic banking has been accompanied by the phenomenon of the spread of Islamic banks in the second half of 20th century. Studies in this area are infrequent in Libya because of the absence of Islamic banks. Some conventional banks in Libya have recently started to transform into Islamic. From here the view of the researcher doing the study to help these banks to identify the measures are necessary to turn to Islamic banks and thus enter the Islamic banks to the Libyan arena to contribute to raising the level of dealing with banks, many of the Libyans do not prefer to deal with conventional banks, considering that Libyan society is an Islamic society. Islamic banking services include whether conventional banks close branches for Islamic finance and conventional banks to become Islamic. Libya is trying to impose a particular authorization for Sharia based banks.

Index Terms- banks, banking services, Islamic banking

I. INTRODUCTION

The phenomenon of turning conventional banks to Islamic banking has been accompanied by the phenomenon of the spread of Islamic banks in the second half of this century. It started in Egypt in 1980, when the Bank of Egypt's first Islamic branch was established in the area of Al-Azhar in Cairo. The same bank reached the number of 29 branches later. According to the statistics of Central Bank of Egypt on 30/8/2004, the total number of branches for Islamic transactions of conventional banks in Egypt was 54, while 12 banks still follow the traditional conventional banking. During last years, especially with starting of financial crisis in 2008, this phenomenon spread to many Arabic, Islamic and also Western countries.

II. PROBLEMS STANDING IN FRONT OF ISLAMIC BANKS IN LIBYA

Sharia based banks all over the world are in front of a number of challenges, and Libya is no exception. Islamic banks are still not well-devised mechanism banking without interest that could provide funding in the short term and are faced with the problem of financing of consumer loans and the government deficit. All Sharia based Libyan banks have resorted to financing that delivers a predetermined return on investment to avoid the increased risk of short-term financing, and then the banks have only changed the name of their transactions. Banks that are based on the Sharia do not have the support of the central bank of Libya, and a lack of trained staff to choose, evaluate and revise the projects require financial support. Thus, because of this they can not enlarge their portfolio, even if they have large monetary

resources. Free banking in Libya is faced with the following possible problems: [1]

A) Problems Related to Macro operation of Islamic Banks

1. Capital and liquidity,
2. Bank property estimation,
3. Monetary firmness,
4. Bank possessions,
5. Lack of capital market and interest,
6. Inadequate legal safety,
7. Control and supervision by the central bank,
8. Absence of Islamic money market,
9. Accounting principles and procedures,
10. Shortage of skilled and trained manpower,
11. Lack of support among Islamic banks,
12. Harsh rivalry in the financial sector,
13. Economic and political situation,
14. Lack of infrastructure for worldwide Islamic trade,
15. Evasion of borrowers culture,
16. Lack of courses on Islamic economics and banking,
17. Lack of uniform operational procedure,
18. Lack of harmonization of Islamic financial practices,
19. Missing of secondary securitization market,
20. Deficient of studies of Sharia based banking, economic and financing.

B) Problems related to micro procedures of Sharia based banking:

1. Enlarged price of information,
2. Cost of funds control,
3. Markup and despoiled financing,
4. Exploitation of interest rate for fix margins of profit,
5. Social concerns,
6. Deficient of constructive answer to the necessity of government financing,
7. Breakdown of Sharia based banks in financing projects with high return,
8. Loss of distributive effectiveness,
9. Profit depression,
10. Fraud, forgery or corruption,
11. Minimized budget for expansion and exploring,
12. Poor work surroundings,
13. Deficient of Sharia guidebooks or procedures,
14. Investment risk investigation and measurement methods,
15. Deficient of Sharia supervisory bodies.

It is evident from the list of problems that operational work and research must be undertaken in order Islamic banks may thrive with the highest quality and strength. A problem of Islamic

banking in general and especially in Libya, cause a challenge for survival and promotion of system in Libya. It should be the conventional banking system to review and adopt the advantages of Islamic banking has within the framework of the country's economy, not to Islamic banking fits into the existing classical banking system. [2] One of the latest research shows that Libya has not made more progress in the implementation of Islamic banks in the banking system of Libya.

III. DEVELOPMENT OF BANKING SERVICES

There are several steps to develop a replacement as are: the macro level, direction, and geographic locations of the demand for service and as a result of this selection is divided by the market and the wishes of the customers and learn how awareness of the competitors. The bank contains an internal analysis identify the sources of bank finance and knowledge of the bank in the selection of a specific number of sections of the market that the bank intends to provide banking services to new or existing. Finally, analysis of competitors, which is to specify the strengths and weaknesses of the bank and its light is excellent as a whole to determine the purpose or intensity of certain banking, and link those concepts with the analysis procedure of the bank it is direct and focus the strengths of the service to target market segments, it is through the integration of the three types of analysis the above-mentioned are as we analyze the market, competitors and internal environment of the bank and therefore we have a list of replacements, which are components of banking services offered in this market, and determine the willingness of the customer adoption of these services.

Marketing must be able to develop a specific marketing plan of action is linked to expectation of the estimated profits, and could therefore benefit from all the previous steps that lead to the development of work specific marketing of the bank, to take into account all the above considerations to the plan and take into account the initiation and guidance towards the development of service or action plan reached by the bank.

One of the important goals of the process of developing banking services to increase productivity of the bank and through the use of technology applications submitted in various banking services over the adequacy and effectiveness of the Bank's performance, through the speed of service delivery, through the precision in the implementation, and significant savings through the use of models in stock used in the various traditional methods for the implementation of banking services, it all eventually lead to increased productivity of the bank.

The progress of technology and information-gathering instruments and regulations in particular, lead to revolution in the running of banking services. Technology is not only improving the current banking services, but also is source of many new banking services, deserve information systems, including communications, special treatment in the search for competitive experience through technology and automation systems, has also opened up information systems and database systems for an entire area and new services, including banking services, new technology advanced, especially in the field of information processing, new What They need to deliver training and education of these new concepts for the efforts of clients in how to use those services (i.e. ATMs). There is a wide gap between

the implementation of different processes using paper from the hand or by using electronic means on the other hand, can also note that there is a big difference in costs, with regard to process checks, for example, the use of electronic means in implementing the various phases of this process, to reduce their own costs to the extent possible, while raising costs significantly by using a traditional party that relies on the use of paper.

There is also several areas of the use of technology in the development of banking services and increase its efficiency, using advanced computer systems, which Imam be able to find a service or group and advanced services, which may be able to find a service or a more complex banking services so that they are most important to customers and especially representatives Corporations, including - in addition to the use of sophisticated communications systems between the various branches of banks on the one hand and points of distribution of these services Neshanic to reduce the costs of these advanced banking services and raise efficiency.

As previously stated that the bank always worked to reach for new banking services to ensure the survival and continuation and growth, and is dangerous when the Bank is working this, on the other side and even if we assume that it is easy to make several new services. "How many of them can made success? That a new service needs to make the effort, as well as sufficient time to provide it with conditions and in spite of all this may be successful, or part of success. However, the risk of failure and the list of high rate of new banking services, in general, to reach both the amount of new products or services is not easy due to several reasons": [3]

1) With the technological development are based services we meet the multiple needs of difficult to discover new things.

2) The shift of competition on the market without control room fully but requires market segmentation and divides it into segments, and therefore aim to provide the new service.

3) It is imperative for the new service to achieve saturation of the consumer or the client give him adequate benefits at the same time achieve adequate profit.

4) There is a problem of the high cost of a new service, in fact, does not include the cost by the bank in order to deliver this service, but also the cost of services or other ideas that have been excluded at any stage of the development of new service.

5) There is a problem the number of services that fail as the probability of success is less than the probability of failure. Using the profit criterion for judging the success or failure of the service can be the distinction between three cases: when they do not nor have enough income to cover the new service, variable costs and thereby achieving a complete failure of the service. Second, as this partial failure of the new service, and clear, when revenues cover variable costs and fixed costs with a profit margin of slightly less than revenue achieved by the investment bank's other investment alternatives, are considered failures of this relatively to some extent.

6) The short duration of the success of the new service, reliance after passing the service to all stages of development, the success achieved by competitors may be attracted to the tradition is usually the bank or its products, leading to influence the degree of success of the new service to the bank.

IV. DEVELOPMENT OF BANKING SYSTEM IN LIBYA AS PRECONDITION FOR TRANSFORMATION

The development of the banking system is a key objective to attach the greatest importance in the present as an issue that is crucial in the future of the economy, so we can not activate the role to be played by the State and its various institutions, particularly the Central Bank to activate this development as:

1) Create a legislative environment to suit the latest developments in international banking, especially in light of globalization and global economic liberalization.

2) Acceleration of the enactment of Law, which aims to make certain the appropriate running of the bank structure and keeps pace with global trends and the development of the financial sector to support the banking system and positioned to face foreign competition.

3) The speedy enactment of legislation on electronic payment systems that govern the relationship between the parties to the process, along with the setting up of a body to oversee the documentation of electronic signature and resolution of any disputes that might arise between banks and customers, as well as studying the establishment of specialized departments for consideration in the conflicts of credit cards.

4) To develop and strengthen regulatory and supervisory role of the Central Bank on banks to suit the many risks that are faced by banks in light of the growing *Ikabbalha* to provide banking products developed, so is the development of process of making regulatory principles issued by the Basel Committee in 1997 and undergone modifications.

5) Work to strengthen the rules of accounting and auditing banks.

6) The need for the central bank to provide the technical staff required quantity and quality of the analysis of data from the banks of the survivor and to meet the exact needs of the field inspection and continuing throughout the banking system on the other.

7) Cooperation between the organs of banking supervision in different countries to ensure the subordination of any foreign bank no matter how many of its branches and its subsidiaries - for supervision and control necessary for the safety performance.

V. CONCLUSION

In the near future is necessary to make strategic promotion of Islamic banks in order to simultaneously promote Islamic solvent banks. [4] Banks operating under the rules of Shari'ah should be constantly monitored and they must check wider impact on business in the distribution of income between banks, depositors and entrepreneur, and only then to allocate income to various social groups. Banks operating under the rules of Shari'ah can improve their efficiency, while meeting the conditions for social benefits, as follows: they must operate in accordance with modern business performing through the development and growth of business in the banking sector. Therefore it is necessary to provide comprehensive banking and other services to clients and at the same time take benefit of new technological achievements in areas such as electronic infrastructure, computing, etc.

VI. RECOMMENDATIONS

After closely examining researcher can make the following recommendations about successful transition of commercial banks in Libya to Islamic banks:

1) Transition in the Libyan commercial banks to Islamic banking, from center of attention, to provide banking services on an ongoing basis to the stage to increasing quality and technology of banking services.

2) Conducting studies and analyzes the theory and field to find out the causes of success and failure of new Islamic banking services, to benefit from the results of these studies and find out problems relating to development and to find solutions to them, and to avoid weaknesses and errors, and to emphasize the strengths and opportunities to compete in the market.

3) Test the system to provide Islamic banking services and its implementation through the marketing strategy for its banking services, and determine the form and method of the geographical area.

4) The banks, training and forcing it using modern training for their employees at all levels of administrative terms objectives, levels and programs for trainers and trainees to raise the level of performance and skills development and opportunities for advancement and to consider the expenses of the training expenses are necessary and useful investment so that it is working on the allocation of annual budgets to achieve this purpose.

5) The need to adapt and develop the activities and elements of Sharia based banking marketing different accord with the development of banking services, and the need to note the importance of marketing is personal increasingly important with the increase in dealing with electronic devices to provide banking services to customers directly without the presence of staff members of the bank.

6) The trend towards specialization in service and building an integrated Islamic banking system in the Libya from commercial banks and banks that the current community needs to make in the future.

7) The necessity of commitment to strategic planning to the Libyan banks through the attention of senior management of the future direction of the Islamic Bank and its commitment to and support for the planning and work to develop a good database and the establishment of effective control systems, including systems of incentives for staff.

8) The need for a strategy to develop new Islamic banking services in the Libyan commercial banks.

9) It can be supposed that the development of Islamic banking intangible commodities have the quality of services how they are providing these services, so as to satisfy the maximum amount of unmet needs for customers to accomplish their work and achieve their goals.

10) Need to take advantage of developments in Islamic and other kind of banking services on a global level.

11) Exchange of expertise between the staff in Libyan Islamic banks and Arab and Islamic world through mutual visits, seminars and scientific conferences to exchange periodic and expansion of banking culture.

12) Attention to equipment machinery, including computers electronics that will improve banking services and to provide precise statistical data at full speed and diversity required for the management of Sharia based banks and open novel horizons to work based of the circumstances and economic considerations prevailing in Libya.

13) Libyan commercial banks play an effective role in giving advice and financial and economic advice to clients and work on the promotion of these essential services and development with the provision of internal organizations, including banks in allows you to do this role as effectively.

14) Need to work with marketing plans determine the detailed operational work programs for the various elements of marketing of Islamic banking (Product - Pricing - Distribution - Promotion).

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Herbage Yield of Stevia (*Stevia rebaudiana* Bert.) in Response to Organic Growing Media

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Abstract- Stevia (*Stevia rebaudiana* Bert.) is a fast rising horticultural herb with many therapeutic and economic benefits. The study was conducted at the Nursery House of the City Agriculture Office, Casisang, Malaybalay City, Bukidnon, Philippines from November 2015 to January 2016 to evaluate the herbage yield of Stevia shoot tip cuttings in response to various growing media. The study was laid-out in a Completely Randomized Design (CRD) with five treatments and replicated three times with twenty sample plants per replication. The different treatments are: T₁ – pure garden soil, T₂ – ½ garden soil + ½ vermicast, T₃ – pure vermicast, T₄ – ½ sand + ½ vermicast, and T₅ – 1/3 garden soil + 1/3 sand + 1/3 vermicast. Results showed that Stevia shoot tip cuttings in T₅ (1/3 garden soil + 1/3 sand + 1/3 vermicast) grown in polyethylene pots consistently had the tallest plants (48.64 cm); highest survival rates (100%); least incidence of leaf curling (1.33 rating) and leaf dark spot (1.33); most number of leaves (226.41) and branches (21.13); and highest percentage of expanded leaves (69%). It also obtained significantly the heaviest fresh and oven-dried herbage, leaf and stem weights. It also attained the highest herbage yield and oven-dried leaf yield in hectare basis with 3,903.50 kg and 355.01 kg, respectively, thus, obtaining the highest gross sale of US \$37,767.44 per hectare and a net income of US \$ 25,980.21 with an ROI of 220.41%.

Index Terms- Stevia, herbage, leaf curling and dark spot, return on investment, oven-dried

I. INTRODUCTION

Diabetes is one of the most alarming dreadful killer diseases in the world today especially in the Philippines which ranks eight in terms of prevalence in the world and second to Malaysia in Southeast Asia (NSO, 2014; DOH, 2014; <https://reginabengco.wordpress.com/tag/diabetes-in-the-philippines/>). This situation stems from sugar with low calorie sweeteners which may effectively alleviate obesity and diabetes related health problems. The consumption of too much sugar as well as carbohydrates has led to obesity, heart diseases, hypertension and diabetes (Sattigeri, 2012).

Sugar substitutes like saccharin, sucralose and aspartame have currently gained importance in reducing calorie intake as artificial substitutes. However, prolonged use of artificially sweetened beverages or use of aspartame lead to increased frequency of brain tumors in humans (Fowler et al., 2008). Moreover, studies showed that patients of phenylketonuria (PKU) cannot use aspartame in their diet due to the formation of

phenylalanine during its metabolism (Butchko et al., 2001). Likewise, saccharin is considered to be associated with bladder cancer (Pearson, 2001) while cyclamate has a major metabolite, cyclohexylamine, which causes testicular atrophy and at high doses, it has unwanted cardiovascular effects (Bopp and Price, 2001).

Stevia (*Stevia rebaudiana* Bertoni) is a natural and healthy alternative to sugar and artificial sweeteners. It is extensively grown in the subtropical regions, Stevia has long been widely used as sweetener in beverages in several countries like Brazil, Japan, Paraguay, etc. (Ghanta et al., 2007), however, it is not well known in the Philippines.

Its leaves are great sources of stevioside, a natural sweetener and is 250-300 times sweeter than sucrose, heat stable, pH stable, non-fermentable and has no effect on blood sugar (Geuns, 2003; Goyal and Samsher, 2010); hence considered and allowed to be called as sweetener by the Food and Drug Administration (FDA) of the US in 2008.

The stevioside once broken down into glucose during digestion is not absorbed in the blood stream, but instead is being absorbed by good bacteria in the gut; hence, prevents obesity and diabetes. Stevia alleviates hypoglycaemia and type 2 diabetes (Soejorto et al., 2002; Ramesh et al, 2006), nourishes pancreas and thereby helps restore its normal function. It also contains high percentage of phenols that reduce the cardiac and cancer diseases (Dragovi-Uzelac et al., 2010) and flavonoids which have high antioxidant activity (Tadhani et al., 2007; Shukla et al., 2009).

Stevioside related compounds such as rebaudioside A and steviol offer therapeutic benefits like antihypertensive, antidiabetic, anti-inflammatory, anti-tumor, antioxidant, antidiarrheal, diuretic and immunomodulatory actions. Steviol interacts with the drug transporters, hence proposed as drug modulator (Goyal and Samsher, 2010).

The economic importance, health benefits and high demand of Stevia in both local and export market provide great production, income and livelihood opportunities for farmers, hobbyists and households. Moreover, the crop is adapted over a wide range of climatic conditions in the country and apparently been successfully grown abroad (Qui et al., 2000).

At present, only few Filipinos are aware about Stevia as well as its propagation, post-harvest handling and processing practices. There are no protocols on rapid clonal propagation of the plants grown in organic growing media. Likewise, no enough research has been available on the herbage yield as well as the cost and return analysis venturing into production of this plant.

Thus, this study attempted to evaluate growth and yield of the two months old Stevia shoot tip cuttings grown in different organic media.

II. MATERIALS AND METHODS

The study was conducted at the Nursery House of the City Agriculture Office, Casisang, Malaybalay City, Bukidnon, Philippines for two (2) months starting November 2015 to January 2016.

The study utilized two (2) month-old Stevia propagated through shoot tip cuttings, B-net screened nursery structures (9.5 m long x 5.5 m wide x 3 m high) with 50-60% shade, cutting propagation tools, hose, garden soil, sand, vermicast, water sources, sprinklers, garden tools, wooden sticks, scissors/cutting tools, plastic twines, rulers/meter stick, weighing scales, cent-o gram balance, polyethylene pots/bags #150, stevia leaves and stems, blender, empty sacks/mesh nets, packaging/processing tools and equipment.

This study was, then, laid-out using a simple Completely Randomized Design (CRD) with five treatments and replicated three times with 20 sample plants per replication as follows:

T ₁	-	Pure Garden Soil (Control)
T ₂	-	½ Garden Soil + ½ Vermicast
T ₃	-	Pure Vermicast
T ₄	-	½ Sand + ½ Vermicast
T ₅	-	1/3 Garden Soil + 1/3 Vermicast + 1/3 Sand

The experimental lay-out of the study utilized the same area in cemented boxes of 10 sq. m. (10 m long and 1 m wide) as in Study I inside the B-net screened nursery. The area was divided into 15 plots of equal sizes (1 m x 0.75 m or an area of 0.75 sq.m. each plot) corresponding the five treatments and an alleyway between plots of 0.30 m as well as 0.5 m from plots to the nursery wall.

The same growing media and their combinations as in Phase I were utilized in this study. Hence, same data from laboratory analysis were considered.

A total of 300 polyethylene pots #150 were used in the study. These pots were filled with 1.5 kg of each growing medium corresponding the different treatments. The two months old Stevia plants propagated using shoot tip cuttings in Phase I were prepared for this phase.

The prepared plants were then transplanted to polyethylene pots #150 corresponding all the treatment plots utilizing the same growing media and/or their combinations. Labeling of respective treatments was done accordingly.

Watering was done twice a day, morning and afternoon or as needed by the plants. The plant environment was kept moist all the time but not water soaked, especially those grown in the sand.

Removal of weeds was done manually and using bolos since the plants were grown in pots. Cultivation of the media was also done to prevent them from compaction.

Since the plants were grown in a controlled environment under a nursery condition, only few symptoms of pest attacks or deficiency symptoms such as leaf curling and leaf dark spots were observed in some parts of plant leaves.

Since stems and branches of stevia are succulent, they are prone to lodging. Propping of the main stem for support using sticks would ensure their quality growth performance (Todd, 2010). Propping was done in every plant using bamboo sticks with attached pliable wire to support the growing branches of the plants. This was done when the branches of the plants started to lodge.

Harvesting of the herbage was done after four (4) months before or prior to flower bud opening so that the presence of sweet taste compound is at its peak of production. Harvesting was done in the late afternoon using scissors by cutting the main stem or stalk 5 cm above the ground. The harvested parts were then labeled accordingly and placed in plastic bags.

The herbage parts including the stems and leaves were weighed (in grams) using a Cent-o gram balance according to treatments and replications in determining their fresh weights. Weighing was done once only at the termination of the phase.

All fresh leaves of stevia were separated from the stems per treatments per replication manually. After separation, leaves and stems were then weighed to determine their respective fresh weights.

After separating the leaves from the stems or branches, they were air-dried for 2 days. After air-drying, they were oven-dried for 48 hours at 65°C.

Air-dried leaves were stored in plastic lined cardboard boxes, sealed, strapped and labeled for further processing. The labeled dried samples were then powdered using grinder and were stored in polyethylene bags at 4°C for further laboratory analysis.

Among the data gathered were plant height; survival rate; leaf curling and dark spot incidence; number of branches and leaves; percent expanded leaves; fresh, oven dried and percent moisture content for the total herbage, leaf and stem of Stevia; fresh herbage yield and oven-dried leaf yield per hectare; and the cost and return analysis.

The analysis of variance (ANOVA) using Factorial Arrangement in Completely Randomized Design (CRD) in Phase I and a simple CRD in Phase IIA were used to determine the level of significance. The Tukey Test was used to compare significant differences among treatment means.

III. RESULTS AND DISCUSSION

Average Plant Height

The average plant height of Stevia propagated through shoot tip cuttings using different growing media is shown in Table 1. Statistical analysis revealed no significant differences observed among treatment means.

Stevia shoot tip cuttings obtained the height ranging from 45.35 cm for those grown in pure garden soil to 49.24 cm in the growing media combination of T₂ (½ garden soil and ½ vermicast) four months and one week after planting. Those grown in T₅ (1/3 garden soil + 1/3 sand + 1/3 vermicast) had the second tallest height with 48.64 cm, while those grown in T₄ (½ sand and ½ vermicast) with 47.65 cm and pure vermicast with 47.36 cm. However, their differences were not that statistically significant from each other. This means that as the plants approached reproductive stage, their growth seemed to slower down (Hartman and Kester, 2013). Since Stevia plants don't

need so much nitrogen as well as other macrolelements, they can still thrive well even in a garden soil as long as soils are not compact. Stevias only need as low as 10 kg per hectare NPK (Todd, 2010).

Table 1. Average plant height (cm) and survival rate (%) of Stevia (*Stevia rebaudiana* Bert.) in response to growing media

TREATMENTS	AVE. PLANT HEIGHT(cm)	SURVIVAL RATE (%)
T1 - Pure Garden Soil	45.35	98.33
T2 - ½ Garden Soil +½ Vermicast	49.24	100
T3 - Pure Vermicast	47.36	100
T4 - ½ Sand + ½ Vermicast	47.65	98.33
T5 -1/3 Garden Soil+1/3 Sand+1/3 Vermicast	48.64	100
F-test	ns	ns
C.V. (%)	6.82	1.84

ns – non significant

Survival Rate

The survival rate of Stevia shoot tip cuttings grown in different growing media revealed no significant difference from among the treatments compared (Table 1). The survival rate of the cuttings was very high regardless of the growing media used. Shoot tip cuttings grown in T₂ (½ garden soil + ½ vermicast), T₃ (pure vermicast) and T₅ (1/3 garden soil + 1/3 vermicast + 1/3 sand) had 100% survival rate, while those grown in T₁ (pure garden soil) and T₄ (½ vermicast + ½ sand) obtained both 98.33% survival rate. Thus, propagating Stevias using shoot tip cuttings is the best method because only little mortality was achieved.

As Kassahun et al. (2013) emphasized that top cuttings or shoot tip cuttings with three nodes demonstrated significantly higher values of survival rate compared from those cuttings taken from the bottom. Pradeep (2005) supported that shoot tip culture can mass propagate Stevia very fast in a short period of time. Cells in the shoot tips are actively-dividing or meristematic and have higher concentrations of auxins (Hartman and Kester, 1997).

Leaf Curling and Leaf Dark Spot Incidence

Table 2 reveals the leaf curling and leaf dark spot incidence of Stevia shoot tip cuttings in response to growing media. Statistical analysis showed that growing media did not significantly affect the incidence of leaf curling and leaf dark spot on Stevia plants.

The incidence of insect pests was not a problem among Stevia since the study was confined inside a B-net nursery with

50-60% shade in an elevated environment. No insect pest was observed attacking the plants during the entire duration of the study. Only few symptoms of leaf curling and dark leaf spots were seen in some plants but in negligible amount in most of the treatments except for those grown in pure garden soil. According to UK Extension Service (2010), field-grown Stevia as well as those confined in nurseries is not known to have serious insect pest problems and is often reported as exhibiting insect-repellant qualities.

The agro-climatic condition of Malaybalay City is also favorable for growing Stevia with a mean temperature of 22.85 °C in September, 23.01 °C in October, 23.25 °C in November, 23.05 °C in December and 22.6 °C in January . Favorable precipitation had also been experienced by the plants in the entire duration of the study with 128. 8 mm in November, 158.9 mm in December and 53.3 mm in January and the constant watering of the plants daily.

On leaf curling significant differences were not found between treatment means. It showed that T₂ and T₅ had obtained both the least number of leaf curling occurrences with 1.33 from 20 sampled plants, while the most with an average of 2 as observed in T₁ (pure garden soil) . For the leaf dark spot, there was no significant difference observed among treatment means. Treatment 5 consistently showed the least number of plants infected with the symptom which had 1.33 occurrences, followed by those in T₂ and T₃ with both 1.67 and the least was obtained in T₁ and T₃ with both 2 occurrences from among the 20 sampled plants per plot.

Table 2. Leaf curling and dark spot incidence of Stevia (*Stevia rebaudiana* Bert.) shoot tip cuttings in response to growing media

TREATMENTS	LEAF CURLING	LEAF DARK SPOT
T1 - Pure Garden Soil	2.00	2.00
T2 - ½ Garden Soil +½ Vermicast	1.33	1.67
T3 - Pure Vermicast	1.67	1.67
T4 - ½ Sand + ½ Vermicast	2.00	2.00
T5 - 1/3 Garden Soil+1/3 Sand+1/3 Vermicast	1.33	1.33
F-test	ns	ns
C.V. (%)	26.83	25.80

ns– non significant

Average Number of Branches per Plant

Statistical analysis revealed that the number of branches per plant was not affected regardless of the growing media used (Table 3). Four months and one week after planting, the differences on the total number of branches per plant were not that significant, contrary to the branches produced by the plants two months after planting (Table 6) wherein differences were observed from among the treatment means. Treatment 5 showed the most number with 21.13, while the least by T₁ with 13.04.

Treatment 3 was third with 17.87, T₂ with 17.17 and T₄ with 14.54 average branches per plant.

The declining growth of the plant when reaches to reproductive stage has resulted to less production of plant organs, as the number of cells have declining increase but however, become differentiated (Hartman and Kester, 1997). At this stage on the growth of stevia cuttings, the differences of their heights did not statistically matter regardless of the kind of the growing media used.

Table 3. Average number of branches per plant of Stevia (Stevia rebaudiana Bert.) shoot tip cuttings in response to growing media

TREATMENTS	AVE. NO. OF BRANCHES PER PLANT
T1 - Pure Garden Soil	13.04
T2 - ½ Garden Soil +½ Vermicast	17.17
T3 - Pure Vermicast	17.83
T4 - ½ Sand + ½ Vermicast	14.54
T5 -1/3 Garden Soil+1/3 Sand+1/3 Vermicast	21.13
F-test	ns
C.V. (%)	21.30

ns – non significant

Average Number of Leaves per Plant

The average number of leaves per plant regardless of the sizes was influenced by growing media in propagating Stevias through shoot tip cuttings (Table 4). Significant differences were observed among treatment means with T₅ (1/3 garden soil + 1/3 vermicast + 1/3 sand) obtaining the most average number of leaves at 226.41 per plant. It was, however, not significantly different from those in T₃, T₄ and T₂ with 211.87, 176.53 and 171.60 leaves per plant, respectively. The control treatment, T₁ (pure garden soil) had the least with 135.03 average leaves.

maximization of the production of leaves of Stevias given the nutrients available for the use of the plants especially in the proliferation of various plant parts such as leaves (Hartman and Kester, 1997). Treatment 1 using only pure garden soil with no application of any fertilizer resulted to lesser production of leaves as compared to the rest of the treatments. Full maximization of the leaves was attained especially in T₅ due also to the fertile media in vermicast, proper drainage and aeration for sand, and with slight water holding capacity as exhibited by the use of garden soil which is favorable for the growth of the plants.

Treatments 2, 3, 4 and 5 with the combinations of vermicast, garden soil and sand as growing media contributed to the

Table 4. Average number of leaves per plant of Stevia (Stevia rebaudiana Bert.) shoot tip cuttings in response to growing media

TREATMENTS	AVE. NO. OF LEAVES PER PLANT
T1 - Pure Garden Soil	135.03 ^b
T2 - ½ Garden Soil +½ Vermicast	171.60 ^{ab}
T3 - Pure Vermicast	211.87 ^{ab}
T4 - ½ Sand + ½ Vermicast	176.53 ^{ab}
T5 - 1/3 Garden Soil+1/3 Sand+1/3 Vermicast	226.41 ^a
F-test	*
C.V.(%)	17.03

Means within the same column followed by common letters are not significantly different at 5% level of significance based on Tukey’s Test. *- significant

Percent Expanded Leaves

Table 5 shows the percent expanded leaves over the total leaves borne per plant per plot showing highly significant results among treatment means with growing media combinations. Thus, growing media as treatments highly influenced the production of expanded leaves of Stevia plants.

Treatment 5 (1/3 garden soil + 1/3 vermicast + 1/3 sand) produced 69% of the total leaves per plant and considered as expanded sizes. It was significantly different from the rest of the treatments (Fig. 7). Treatment 2 (½ garden soil + ½ vermicast) was second with 58% and was not significantly different from T₄ and T₃. Treatment 4 (½ vermicast + ½ sand) was third with 57.67% and T₃ (pure vermicast) in fourth with 49.33%. The least was obtained in T₁ (pure garden soil) with 42.33%.

The standard large or expanded leaves among Stevia plants have at least a dimension of 2 cm wide and 3 cm long (Abou-Arab et al., 2010; <http://www.thriftyfun.com/Growing-and-Harvesting-Stevia.html>). Large leaves are heavier than the small ones, thus higher content of herbage material. They have fully

developed chemical compounds especially the natural sweeteners called stevioside (Abdullateef and Osman, 2012). Hence, used for herbage production.

Table 5. Percent expanded leaves of Stevia (*Stevia rebaudiana* Bert.) shoot tip cuttings in response to growing media

TREATMENTS	PERCENT LARGE LEAVES (%)
T1 - Pure Garden Soil	42.33 ^c
T2 - ½ Garden Soil +½ Vermicast	58.00 ^b
T3 - Pure Vermicast	49.33 ^{bc}
T4 - ½ Sand + ½ Vermicast	57.67 ^b
T5 - 1/3 Garden Soil+1/3 Sand+1/3 Vermicast	69.00 ^a
F-test	**
C.V. (%)	6.47

Means within the same column followed by common letters are not significantly different at 5% level of significance based on Tukey's Test. **- highly significant

Fresh and Oven-Dried Herbage Weights and Percent Herbage Moisture Content

The average fresh herbage weights of Stevia leaves were taken from each Stevia plant in the plot by cutting the main stem 5 cm above the surface using scissors, leaving 2 to 3 nodes in the stem from the base of the plants.

The fresh herbage weights, oven-dried weights and the percent herbage moisture content of Stevia propagated through shoot tip cuttings using different growing media are shown in Table 6. Statistical analysis showed that fresh herbage weights of Stevia highly varied from each other depending upon the growing media used. The oven-dried weight and the percent moisture content in the dry herbage were not significantly affected by the growing media used in the study.

On fresh herbage weights, it showed that T (1/3 garden soil + 1/3 vermicast + 1/3 sand) obtained the heaviest average weight with 171.23 g per plot (Fig. 1). It was not, however, significantly

different from T₂ (½ garden soil + ½ vermicast) with 161.83 g, T₃ (pure vermicast) and T₄ (½ sand + ½ vermicast) with 140.99 g; but were statistically different from those in T₁ (pure garden soil) with 111.70 g. Treatment 4 (½ sand + ½ vermicast) was not significantly different from T₁ (pure garden soil).

The heavier fresh herbage weight obtained in T₅ was attributed to the consistent good growth performance of Stevia under this treatment such as high survival rate (100%), more branches (21.13), most number of leaves (226.41) and highest in percent large leaves per plant (69%). Treatments 2, 3 and 4 are likewise good performing treatments whose growing media were effective in producing heavier fresh herbage weights. The complexity of all growth parameters has been contributory to the development of the plant (Hartman and Kester, 1997; Bautista, 1994). Treatment 1 (pure garden soil) was the least performing treatment, showing the lightest fresh herbage weight of all.

Table 6. Fresh and oven-dried herbage weights (g) and percent herbage moisture content (%) of Stevia (*Stevia rebaudiana* Bert.) shoot tip cuttings in response to growing media

TREATMENTS	FHW (g)	ODHW (g)	PERCENT HMC (%)
T1 - Pure Garden Soil	111.70 ^b	21.86	19.57
T2 - ½ Garden Soil +½ Vermicast	161.83 ^a	30.61	18.91
T3 - Pure Vermicast	157.67 ^a	28.69	18.20
T4 - ½ Sand + ½ Vermicast	140.99 ^{ab}	26.80	19.01
T5 - 1/3 Garden Soil+1/3 Sand+1/3 Vermicast	171.23 ^a	33.29	19.44
F-test	**	ns	ns
C.V. (%)	9.41	15.42	12.41

Means within the same column followed by common letters are not significantly different at 5% level of significance based on Tukey's Test. ** highly significant, ns – non significant,

FHW – fresh herbage weight, ODHW – oven dried herbage weight, HMC – herbage moisture content

For the oven-dried herbage weight, T₅ (1/3 garden soil + 1/3 vermicast + 1/3 sand) obtained a slightly heavier weight of 33.29 g per plot, while the slightly lighter weight was in T₁ (pure garden soil) with 21.86%. Treatment 2 (½ garden soil + ½

vermicast) weighed 30.61 g, T₃ (28.69 g) and T₄ (26.80 g) (Table 6). However, their differences were not that significant from each other. All the sampled treatments were equally oven-dried for 72

hours at 40°C causing all the moisture in the samples to be equally removed in all treatments.

The corresponding percent herbage moisture content revealed that T₁ (pure vermicast) had the highest with 19.57% followed by T₅ (1/3 garden soil, 1/3 vermicast + 1/3 sand) with 19.44 %, followed by T₄ (19.01 %) and T₂ (18.91 %) (Table 6). The lowest was garnered in T₃ (pure vermicast) with 18.20% moisture content. However, their differences were not significantly different from each other.

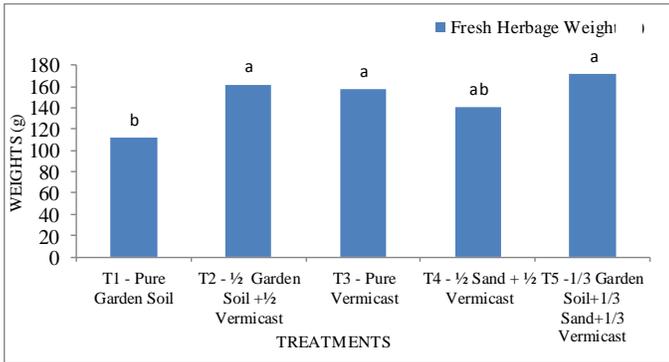


Fig. 1. Fresh herbage weight (g) of Stevia shoot tip cuttings in response to growing media

Fresh and Oven-Dried Leaf Weight and Percent Leaf Moisture Content

The fresh and oven-dried leaves of Stevia from the herbage and their respective percent leaf moisture content are shown in Table 7. Statistical analysis revealed that fresh leaf weight of stevia was highly influenced by the various effects of growing media. However when oven-dried for 3 days at 40°C, differences among treatment means did not significantly vary regardless of the growing media used.

Consistent with those in the fresh herbage weights, the fresh leaf weight in T₅ (1/3 garden soil + 1/3 vermicast +1/3 sand) obtained 97.78 g per plot as the heaviest, but was not significantly different from those in T₂ (1/2 garden soil + 1/2 vermicast), T₃ (pure vermicast) and T₄ (1/2 sand + 1/2 vermicast) with 86.46 g, 80.45 g and 74.21 g, respectively (Fig. 2). Treatment 1 (pure garden soil) had the lightest of all with 56.70 g per plot which in turn not significantly far from those in Treatments 3 and 4. Treatment 5, on the other hand, was the heaviest since it has the most number of leaves (Table 4) as compared to the rest of the treatments. The proper and balance nutrient uptake provided in T₅ for plant utilization has resulted to good growth and development of the plants especially the leaves.

Table 7. Fresh and oven dried leaf weights (g) and percent moisture content (%) of Stevia (Stevia rebaudiana Bert.) shoot tip cuttings in response to growing media

TREATMENTS	FLW (g)	ODLW (g)	PERCENT LMC (%)
T1 - Pure Garden Soil	56.70 ^b	12.22	21.55
T2 - 1/2 Garden Soil +1/2 Vermicast	86.46 ^a	15.37	17.78

T3 - Pure Vermicast	80.45 ^{ab}	14.37	17.86
T4 - 1/2 Sand + 1/2 Vermicast	74.21 ^{ab}	12.46	16.79
T5 - 1/3 Garden Soil+1/3 Sand+1/3 Vermicast	97.87 ^a	15.73	16.07
F-test	**	ns	ns
C.V. (%)	12.31	16.24	15.22

Means within the same column followed by common letters are not significantly different at 5% level of significance based on Tukey’s Test.

**- highly significant, ^{ns} – non significant

FLW –fresh leaf weight, ODLW – oven dried leaf weight, LMC – leaf moisture content

Consistent also with those in the oven-dried herbage weights, the oven-dried leaf weight in T₅ was the heaviest with 15.57 g per plot, followed by T₂ with 15.37 g, T₃ with 14.37 g and T₄ with 12.46 g (Fig. 2). Treatment 1 with pure garden soil had the ODW of 12.22 g. Their differences were, however, not significantly different from each other. At 48 hours oven-drying at 65°C temperature, all moisture content in all treatments was removed thus, leaving the dry weight of the leaves alone.

For the percent leaf moisture content, it showed that T₅ (1/3 garden soil + 1/3 vermicast + 1/3 sand) had the lowest percentage of moisture content from the fresh weight with 16.07 %, followed by T₄ (16.79 %), T₂ (17.78 %) and T₃ (17.86 %). The highest was obtained in T₁ (pure garden soil) with 21.55 %. Their differences were, however, not significantly far from each other. Thus, the percent moisture content of the oven-dried leaf weight of stevia grown in this media would range from 16.07 % to 21.55 %. This further implies that the lower the moisture content, the higher is the dry matter for processing utilization.

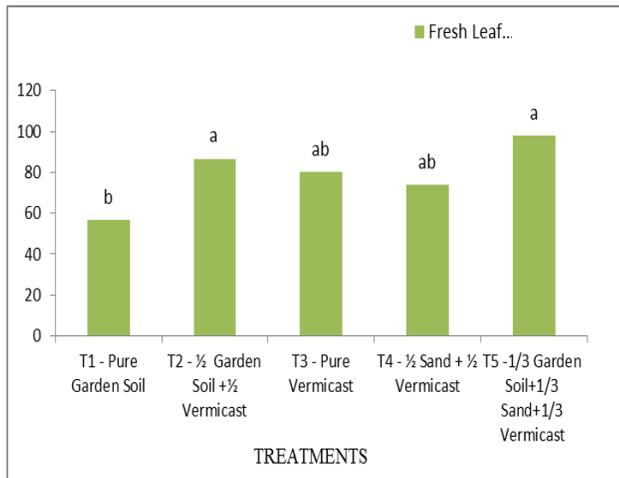


Fig. 2. Fresh leaf weight (g) of Stevia shoot tip cuttings in response to growing Media

Fresh and Oven-Dried Stem Weight and Percent Stem Moisture Content

The fresh and oven-dried weights of Stevia stems or branches as well as their respective percent moisture content are revealed in Table 8. Statistical analysis showed no significant differences found among treatment means on fresh stem weights and the percent stem moisture content. However, the oven-dried weights of all treatments were significantly influenced by the growing media used.

On fresh stem weights, T₃ (pure vermicast) obtained the heaviest weight with 77.14 g per plot and followed by T₂ (1/2 garden soil + vermicast), T₅ (1/3 garden soil + 1/3 vermicast + 1/3 sand) with 73.35 g and T₄ (1/2 sand + 1/2 vermicast) with 66.48 g. The lightest was observed in T₁ (pure garden soil) with 54.95 g. Their differences were said to be not significant from each other. Treatment 5 which exhibited best growth performance among the treatments had lighter fresh stem weight at 73.35 g. This is a good indication since more concentration of food reserves or photosynthates are in stored in the leaves than in the stems or branches. The good and balance media combinations for T₅ (1/3 garden soil + 1/3 vermicast + 1/3 sand) have resulted to the production of more and heavier leaves as compared to T₁ (pure garden soil) with fewer and lighter leaves, but heavier stem weights.

Table 8. Fresh and oven-dried stem weights (g) and percent moisture content (%) of Stevia (Stevia rebaudiana Bert.) shoot tip cuttings in response to growing media

TREATMENTS	FSW (g)	ODSW (g)	PERCENT SMC (%)
T1 - Pure Garden Soil	54.95	10.29 ^b	18.73
T2 - 1/2 Garden Soil + 1/2 Vermicast	75.34	15.24 ^{ab}	20.23
T3 - Pure Vermicast	77.14	15.69 ^{ab}	20.34
T4 - 1/2 Sand + 1/2 Vermicast	66.48	14.34 ^{ab}	21.57
T5 - 1/3 Garden Soil+1/3 Sand+1/3 Vermicast	73.35	17.71 ^a	24.14
F-test	ns	*	ns
C.V. (%)	12.46	14.06	12.21

Means within the same column followed by common letters are not significantly different at 5% level of significance based on Tukey Test.

** - highly significant, ^{ns} - non significant

FSW – fresh stem weight, ODSW – oven dried stem weight, SMC - stem moisture content

The respective oven-dried stem weights of various treatments were significantly influenced by the growing media used. Treatment 5 (1/3 garden soil + 1/3 vermicast + 1/3 sand) had the heaviest oven-dried stem weight with 17.71 g per plot. It was, however, not significantly different from those in T₃ (pure vermicast), T₂ (1/2 garden soil + 1/2 vermicast) and T₄ (1/2 sand + 1/2 vermicast) with 15.69 g, 15.24 g and 14.34 g per plot, respectively. The lightest was observed in T₁ (pure garden soil) with 10.29 g per plot. Treatments 1, 2, 3 and 4 were not statistically different from each other. This also implies that T₅ had the highest dried weight recovery from the rest of the treatments, while T₁ had the least (Table 8).

Thus, the percent stem moisture content of stevias from the fresh weight showed the highest in T₅ (1/3 garden soil + 1/3 vermicast + 1/3 sand) with 24.14%, while the least in T₁ with 18.73%. However, their differences were statistically insignificant from each other with the percent stem moisture content of all the treatments ranges from 18.73% to 24.14%.

Fresh Herbage and Oven-Dried Leaf Yield (kg/ha)

The fresh herbage yield and the oven-dried leaf yield of Stevia shoot tip cuttings propagated in different growing media are presented in Table 9. Fresh herbage yield was highly influenced by the different growing media; however, the oven-dried leaf yield was otherwise.

On the fresh herbage yield, it showed that T₅ with 1/3 garden soil + 1/3 vermicast + 1/3 sand obtained the highest herbage yield of 3,903.495 kg/ha, but was not significantly different from those in Treatments 2, 3 and 4 with 3,689.209; 3,567.558 and 3,213.981 kg/ha, respectively. It is however statistically far from those in T₁ (pure garden soil) with 2,546.353 kg. Treatment 5 obtained the highest herbage yield due to the fact that it had the heaviest herbage weight per plot. As Hartman and Kester (1997) emphasized that growth parameters are contributory to the yield of the crops.

For the oven-dried leaf yield, it showed that the combinations of different growing media did not significantly affect the yield of Stevia plants. Statistical analysis revealed no significant differences observed among treatment means. It showed that T₅ still obtained the highest leaf yield with 355.01 kg/ha as compared to the control, T₁ with 278.57 kg/ha. However, their respective weights were not that far from each other the fact that they were subjected to oven-drying where all the moisture contained in the leaves was removed, thus leaving only their respective dry matter contents.

Table 9. Fresh herbage and oven-dried leaf yield (kg/ha) of *Stevia (Stevia rebaudiana Bert.)* shoot tip cuttings propagated in different growing media

TREATMENTS	FRESH HERBAGE YIELD (kg/ha)	OVEN-DRIED LEAF YIELD (kg/ha)
T1 - Pure Garden Soil	2,546.35 ^b	278.57
T2 - ½ Garden Soil + ½ Vermicast	3,689.21 ^a	350.46
T3 - Pure Vermicast	3,567.56 ^a	327.58
T4 - ½ Sand + ½ Vermicast	3,213.98 ^{ab}	287.76
T5 - 1/3 Garden Soil+1/3 Sand+1/3 Vermicast	3,903.50 ^a	355.01
F-test	**	ns
CV(%)	9.22	16.50

Means within the same column followed by common letters are not significantly different at 5% level of significance based on Tukey's Test.

** - highly significant, ns – non significant

Cost and Return Analysis

Table 10 shows the cost and return analysis for the first cropping of oven-dried Stevia leaves. Treatment 5 (1/3 garden soil +1/3 sand+1/3 vermicast) obtained the highest gross sales of US \$37,767.45, T₂ had US \$37,282.55, T₃ with US \$ 34,849.36 and T₄ with US \$30,613.09. The lowest was garnered in T₁ (control, pure garden soil) with US \$29,635.21. For the incurred operational expenses, it revealed that T₃ (pure vermicat) had the highest with US \$13,297.87 and T₅ with US \$11,787.23, while the lowest at T₁ at US \$9,765.96 with only pure garden soil. Thus, T₅ obtained the highest net income of US \$25,980.21, while the lowest in T₄ with US \$18,336.49. Treatment 5 likewise showed the highest return on investment (ROI) with 220.41%.

Investing Stevias for powdered leaf production is quite viable. In just four months' time for the first cropping season, the ROI could reach as much as 203.45% even if no fertilizer applied, how much more if 1/3 garden soil + 1/3 sand + 1/3 vermicast will be used as growing media would yield as much as 200.41% ROI.

The second cropping season revealed that the ROIs of all the treatments were more or less doubled from the first, showing consistently T₅ with 671.77% as the highest ROI and T₄ with 525.57% as the lowest, while the T₁ had 566.44%. The addition of ¼ volume of vermicast in T₂, ½ volume in T₃ and ¼ volume in T₄ in the third cropping had increased the expenses incurred, thus, lowering the respective ROIs from the first cropping season. However, T₅ had the highest ROI also in the third and fourth cropping seasons, respectively with 610.03% and 671.77%, respectively.

Table 10. Cost and return analysis (US \$) of oven-dried leaves of *Stevia (Stevia rebaudiana Bert.)* shoot tip cuttings in response to growing media (First Cropping)

TREATMENTS	GROSS SALES	EXPENSES	NET INCOME	ROI (%)
T1 - Pure Garden Soil	29,635.21	9,765.96	19,869.26	203.45
T2 - ½ Garden Soil + ½ Vermicast	37,282.55	13,212.76	24,069.79	182.17
T3 - Pure Vermicast	34,849.36	13,297.87	21,551.49	162.07
T4 - ½ Sand + ½ Vermicast	30,613.09	12,276.60	18,336.49	149.18
T5 - 1/3 Garden Soil + 1/3 Sand+1/3 Vermicast	37,767.45	11,787.23	25,980.21	220.41
<i>Adjusted Prices: US \$ 106.38/kg (Source: http://www.aliexpress.com/price/stevia-dry-leaves_price.html)</i>				
<i>US \$287.23 – US \$478.72/ kg (Source: UK Coop. Extension Service, 2010)</i>				

IV. CONCLUSION

It is therefore concluded that propagating Stevias using shoot tip cuttings in combination with 1/3 garden soil + 1/3 sand + 1/3 vermicast media mixture either in polyethylene pots for four months showed the best growth and yield performance as well as increased profitability in hectare basis.

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Informal Economic Activities among Rural Women: with special reference to Southern Sri Lanka

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Abstract- Informal economic activities among women is a most popular phenomenon in the developing world as well as developed world. Many economists argued that official labor statistics does not reflect all the informal activities which carried out by women. Moreover the female who are engage in economic activities which belong to the informal sector, do not have proper operating place. Sri Lanka is a small Island in the world. Women of the Sri Lanka constitute more than half of the population. But official statistics reflects, contribution of the women to the economy is relatively low. Majority of women's work are not often measured in quantitative terms and it is not valued in national accounts. By this paper it is try to identify informal sector economic contribution of females who are living in Southern Province, Matara District in Sri Lanka. Among the whole DSD Divisions of Matara District three were selected to the sample. All the study respondents were selected by using the stratified random sampling technique. Hundred and twenty study respondents were chosen to the sample and both primary and secondary data were used to analyze the data. Data were collected through structured questionnaire and quantitatively analyzed them. According to this study most of the respondents were engage in trading sector informal activities. Less contribution was identified in service sector informal activities. Social recognition for their employment was not in a satisfactory level. Further 58% of the respondents have secondary level education. Fifty six percent of them have obtained primary level education. And also the results showed that there is a positive relationship between education level and the monthly income of the women.

Index Terms- Rural Economy, Rural Woman, Rural Development, Informal Activities,

I. INTRODUCTION

Lack of systematic information on women's economic participation is a much debatable subject among economists and researches. Women can contribute to raise economy in many ways. Because they are contributed to great deal of unremunerated work in the society. Focus of this paper is to identify rural woman contribution to build up the families or society without any/much recognition of the society/economy or country. She participates in the production of goods and services for the market and house hold consumption, in agriculture, food production or engaging in some other economic activity while building up her family.

Women in Sri Lanka often have to play different tasks like mother, wife in the house hold as well as income earner to the

family. They have to manage both family commitments and economic activities of the family. Women should be the major focus of the society in Sri Lanka because the majority of the people are women .But national income statistics showed that 68% of males have been participated in the workforce while the women participation is limited to 36% (Central Bank Annual Report, 2012).

Almost all the countries in the world have some kind of national income accounts measure the economic activities. It is an important entity to understand how a county's macro economy works. The national income accounts are based on the idea that the economic activities occurs during the considering period of time, by taking the amount of output produced, the income received by the producers of the output and the amount of spending by the ultimate purchases of output. Women greater majority of unremunerated domestic and community work is not often measured in quantitative terms and it is not valued in national accounts. This study gives special attention on Southern Sri Lanka. Southern Sri Lanka comprise with three districts. Namely Galle, Matara and Hambantota. Various steps have been taken by the successive governments to develop this province. But rural poverty is still exists in this area. Especially the women in rural areas are needed to develop and to sustain the economy of the country. However different approaches like product, income and expenditure gives different ideas on economy. Problems such as incomplete or misreported data must show reasonable measure about economic activities among the people who live in an economy. So this study will fill the gap of such studies among the women in rural economy and informal activities in Sri Lanka.

II. LITERATURE REVIEW

According to Khan and Khan(2006) informal employment include wage employment as well as the self-employment. They expressed that these employments are not legally protected.

More over scholars have stated that when an enterprise is established and controlled by women, it is not only boosts economic growth, but also has many desirable outcomes. Several recent studies on rural women's contribution to the rural development indicate that the contribution of rural women to the family budget and how it affects the rural economic development (Longman,(2011),Bano et al(2012). The most important feature is that when there is poverty, major vulnerable groups among the poor are women. A person who is landless, who has no assets, except their unskilled labour can be considered as a poor(Annual Report DCS,2011). Rural people largely depend on agriculture, fishing , small scale industries and services. Links to the

economy of rural poor is mainly determined by how they use their assets and participate in production. (Khan, 2006), Claros and Zahib (2005). According to the past researchers most of the rural people engage in both tradable, non tradable goods and services. Aikaeli (2010) has said that the quality of human capital is an important factor in explaining rural poverty. Further it says that education adds to the effectiveness of labour through, technical progress and also in general education allows people to adapt more easily to both social and technical changes in the economy and to change in the demand for labour. In a study on the determinants of Soviet household income had found that human capital and demographic factors were the main determinants of the income. Scholars have identified that major factors of women empowerment is defined their decision making capacity, control over resources and their own welfare practices (Sultana et al (1994), Lingman (2011), Riber and Nisha, (2012). Some of the researchers emphasized that empowering the women is a one of the key to human development.

Several other researchers have done researches on the determination of the labour force participation of married women. In their research labour force participation was taken as the dependent variable. Women's age, education, marital status, wage rate, number of children, type of the family, family size, employment status of husband, income and education level of the husband and monthly expenditure were taken as the independent variables of that researches. Descriptive statistics was used to determine the labour force participation of married women. Several researchers have found that contribution of women were a function of several socio-economic variables. They are related to socio cultural factors, environmental factors, competencies and to political factors.

Though some researchers used descriptive analysis method to analyse the data (Bibi and Afza, 2012) some others have used Probit Model, Ordinary Least Square Method (OLS) etc.. Naqvi and Shahnaz (2002) have applied legit and probit model in their study.

Thirty five years before, Chambers has done a research on economic activities. In Sri Lanka the age distribution of women in the labour force indicates that the highest number of women are in the economically active category between ages 30 and 60 years (Chambers, (1978) . Most of the past studies, those who have done their research on this title revealed that many rural women work on their home or any other place, are not covered by labour legislation. These women are not entitled to the holiday pay, or sick leave etc... And wages are low and link to the targets of productions rather than computation of number of hours worked. Argument here is, with the changes of technology, politics, policies, situation must change. And also with

globalization, situation must change. But still there exists unvalued worked amongst the women.

Problem Identification

As in the case of many developing countries, in Sri Lanka the contribution of rural women to the economy is ignored. But in Sri Lanka women in the rural areas occupy themselves in considerable amount of economic activities in order to enhance the family budget. According to the past literature in this regard clearly show a vacuum. Therefore filling the gap will be a good advantage for these ignoring people as well as to the country's economy.

Objective of this study

Development of rural areas becomes a major factor in many countries. Because they constitute the larger section of a country's land and they accommodate the larger percentage of a country's population. When consider the rural sector female population cannot be ignored. Hence the objective of this study is: to investigate informal activities among rural women in Sri Lanka.

Hypothesis

Ho :- There is a positive relationship between living standard of the household and the contribution of the rural women.

Vs

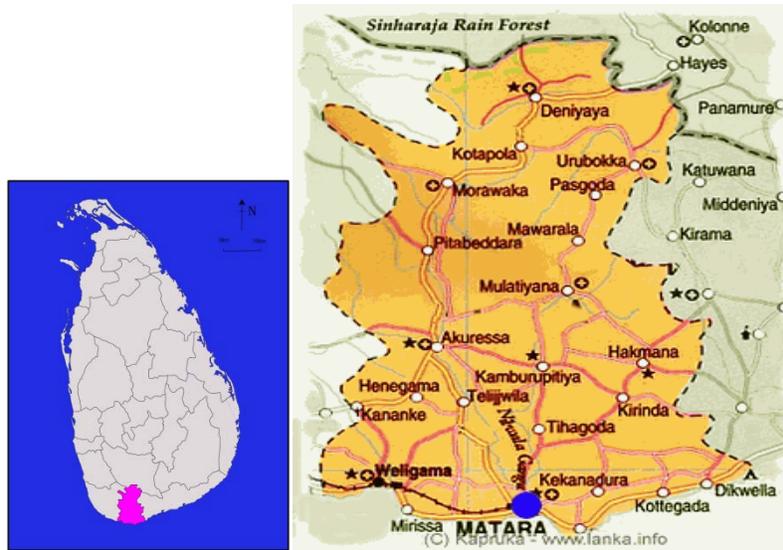
H1 :- There is no positive relationship between living standard of the household and the contribution of the rural women.

Methodology

Study Area

Matara district is located on the Southern Coast of Sri Lanka. Out of total Sri Lankan land 1.96% land is belong to Matara District. To the North it is covered by two Divisional Secretariats Divisions (DSD); Kolonna, Kalawana DSD Divisions of Rathnapura District. To the western Habaraduwa, Imaduwa, Yakkalamulla, Thawalama, Neluwa DSD Divisions of Galle District. To the Eastern DSD Divisions of Okewella, Beliatta, Katuwana of Hambanthota District. From Matara District DSD Divisions three were selected to the field survey. They were Devinuwara, Dickwella and Weligama. Matara District contributes a significant amount of national revenue in Sri Lanka by agriculture, agriculture based industries, fisheries industries and other industries. Paddy, Tea, Rubber, Cinnamon are main crops grown in Matara District.

Administrative Map of Matara District



Data and Data Collecting Instruments

Both primary and secondary data were used to analyze the data. Primary data collected through 120 women those who are engage in the identified informal activities in the areas. Self-administered structured questionnaire was used to collect the data

Sampling Technique

Women were selected through stratified random sampling techniques. Because population falls into natural groups and I can be divided into non-overlapping groups, stratified random sampling technique used as the most suitable sampling technique for collecting primary data in this study. Within the strata simple random sample technique was used to select the respondents (R.O. Thattil,1999).

Data Analysis and Discussion

Quantitative approach was used to analyze the data. Questionnaire were distributed among women who were engage in domestic industries such as coir, beeralu, lace making, weaving, fishery and tailoring etc.. Four main activities were identified as the major income activities of the area. They are Agriculture, Trading, Services and Manufacturing. Scholars have been identified following variables for their research to identify the contribution of business/jobs. Therefore, researcher used following variables as the dependent variable and independent variables.

Dependent variable: - Women participation in informal economic activities in Matara District in Sri Lanka

Independent Variables :- Family and cultural background, Educational Level, Risk taking and commitment, Environmental factors, Financial barriers, Self Confidence, Recognition by the society.

Sampling elements were selected as follows.

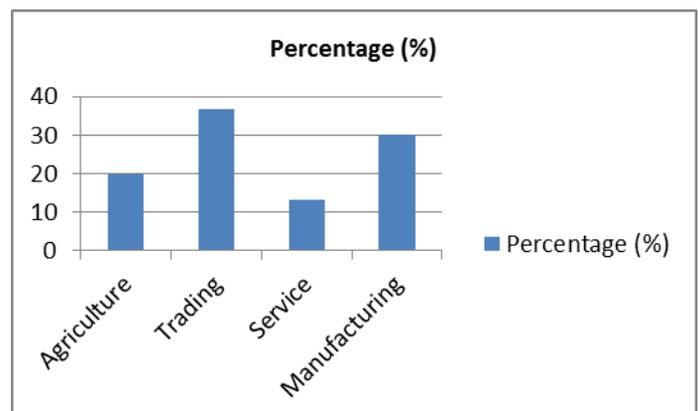
Table 1- Sample

AGA Division	Number of Women selected
Dickwella	45
Weligama	45
Devinuwara	30
Total	120

In the questionnaire six age groups were presented as , 20-30,31-40,41-50,51-60,61-70,70<.. From them 39% of despondence belonged to 41-50 age group.1% of despondence were belonged to 20-30 age group and over 70 age group. Others belonged to 41-50 age group.

According to the results of the sample survey , at young age labour force participation was low because of family responsibilities or any other reason. But they do child caring or any other house hold work at home without getting any income. But with age, when women get older they are able to spend more time on their income generating activities. In this age women tend to earn more money , in order to facilitate the children education and enhance the house hold welfare.

Figure1 - Participation of women in the economic activities



The above table revealed that most of the women engage in trading sector economic activities like selling food items, joysticks, bags, envelopes ,coir products ,garments etc.. Less contribution is indicated in service type activities like house maids, caring children, caring sick peoples and look after elders etc..

Table 3 - Recognition of the employment

Recognition by the society	Percentage (%)
Excellent	00
Good	13.33
Somewhat good	25.83
Poor	60.83

Source :- Sample survey

The above table shows the ideas of the participants on the recognition of their job activities performed in the society. Majority of them were not happy about how other people think about their economic contribution to the family as well as to the country. On the other hand, women still also perform a larger majority of unremunerated domestic work and community work, such as caring for children and older persons, preparing food for the family, cleaning the environment, and providing voluntary assistance to vulnerable and disadvantaged individuals and groups. This work is often not measured in quantitative terms and is not valued in national accounts. Women’s contribution to the development is seriously underestimated, and thus its social recognition is limited.

The table below shows the educational level of women in the sample survey. From the sample 56% of them attained primary level education and 58% of them have obtained secondary level education. No professional qualifications obtained by any of them.

Table 4 - Education Level of women

Educational Level	Percentage (%)
Primary	56
Secondary	58
Graduate	6
Professional	0

Source :- Sample survey

According to the information which was found out through the questionnaire from the investigated sample, some considerable factors are significant. The women who were engaged in nformal activities said that they had earned a very little amount of money from their informal jobs.

Though some women wanted to go for permanent job still they haven’t got that chance because of several reasons. And though some women wanted to expand their business, they haven’t get the chance to developed it because their job haven’t been registered anywhere. Other thing is they can’t spend much time to continue the business and find avenues to expand it. Among the barriers they face the less support from the family is significant. Very less support is given by the husband, children and other relatives. Instead of supporting they encourage them to

find some money anyhow for their day today survival. Most of them had no idea about expanding their business. Other special thing was they mentioned was that the people of the society did not care their activities and family members and other relatives also considered that they are unemployed.

Findings and

Present study is based on the field survey of informal activities where a majority of women are employed in the three DSD Divisions in the Matara District,namely Dickwella,Devinura and Weligama.Main objective of this study was to how rural women contribute to build up her family and related society around her. This study revealed that rural women are isolated and economically depressed. Poverty is the major issue of the rural areas. Specially poverty among the rural women is higher than the men. But women contribution is significant in many ways with regard to their house- hold economy and to the rural and national economy. This has resulted to for the wellbeing of the children and to the living standards of their lives. The main conclusion arrived from the analysis was that women’s contribution towards the family income has a positive effect on the living standard of the family. The relationship between women’s income and the house holds facilities too was a positive one. The results supported to prove the hypothesis that there is a positive relationship between living standards of the house hold and the contribution of the women. Further women’s individual characteristics affect their contribution to the family.

III. CONCLUSION AND RECOMMENDATIONS

Through this study it is revealed that multi task and work-life balance are significant features in women’s day today life. Women greater majority of unremunerated domestic and community work is not often measured in quantitative terms and is not valued in national accounts. However different approaches like product, income and expenditure gives different ideas on economy. Further the problems such as incomplete or misreported data , must show reasonable measure about economic activities among the people live in an economy.

To enhance the productivity of women they should be trained in the industry. New technology, financial support and other supports should be introduced to improve the quality of the informal activities. Awareness programmes and the availability of marketing facilities is essential, especially for those engaged in home based employment. Providing loan facilities to buy machinery and other equipment ,will help to increase the contribution to the house hold budget and will ultimately affect the contribution to the rural economy and to the national economy too. Also the relevant authorities should take necessary steps to recognize for them and should take the necessary actions to facilitate them.

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Experimental Effect of Gym Training On Bio-Chemical Variables of Urban Employees of District Budgam in Jammu And Kashmir State

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Abstract- To find out the effect of training on selected biochemical variables of urban employee of district Budgam. For the purpose of this study 50 urban employees from various departments were selected randomly from the district Budgam of Jammu And Kashmir State aged between 35 to 45 years. They were divided in to two equally groups (experiment and control). The experiment group containing 25 subjects underwent gym training programme. controlled group comprised of 25 subjects did not received any kind of gym training programme for the same period of time. After completing the eight weeks gym training programme (experiment) post test was conducted in the same way by testing the blood samples of the subjects. The data were collected on selected biochemical variables (determination of haemoglobin, serum urea, serum uric acid, total cholesterol, triglycerol, HDL-C and LDL-C.) The entire tests were done at IRAM CLINICAL LAB BUDGAM to get better results. The result concluded that the regular gym training programme contributes to the improve the selected biochemical variables indicating the good health status of urban employees.

Index Terms- Gym training, employee, Biochemical variables.

I. INTRODUCTION

The modern day is providing us with lots of technological luxuries like cars, computer, television, computer games and others. Often, these modern luxuries make us to adopt a sedentary life style particularly among the employees' govt as well as private employees. In fact, this life style has become a serious threat to our health. The lack of physical exercise increases the deterioration rate of human body and often leads to illness and pre-mature death. Many technological advances are now available which provide us regular physical activities in our everyday life.

Gym exercise is one among them which lowers the build up of plaques in the arteries by increasing the concentration of High density lipoproteins (HDL) cholesterol and decreasing the concentration of lower density lipoproteins (LDL) cholesterol in our body.

II. STATEMENT OF THE PROBLEM

Srinagar , Budgam , Baramulla and Anantnaag are the most populated cosmopolitan districts In the state Jammu and Kashmir with enough of job opportunities, therefore many men from urban areas rush here for employment. Such working men are

very much busy with their employment and they don't get time to take care of their health. There Psycho- physiological stress in the place of employment and home is over burdened so that they often suffer from various hazards. For such employed men there is a paucity of leisure time. For the non employee men in the urban the scenario of leisure time is different. They spend their leisure time by gossiping or watching television.

III. OBJECTIVIES OF THE SYUDY

On the basis of the back ground of the study, here are some objectivise

1. To assess the selected – biochemical profile and health status of urban employees of the district Budgam of Jammu and Kashmir state.
2. To identify their health related fitness and other physiological problems on the basis of scientific and clinical lab testing.
3. To design a specific gym training programme on the basis of their identified problems.
4. To conduct a controlled experiment for evaluating the efficiency of the gym training programme in tackling Health Related Fitness Problems and associate variables.
5. To suggest some measures and guidelines for a more fruitful and healthy life of urban employee.

IV. HYPOTHESIS

It was hypothesized that regular gym training in daily life would improve the selected biochemical variable status of urban employees of district Budgam of Jammu and Kashmir state.

V. METHODOLOGY

For the purpose of this study 50 urban employees from various departments were selected randomly from the district Budgam of Jammu And Kashmir State aged between 35 to 45 years. They were divided in to two equally groups (experiment and control). Blood samples were collected from the subjects during pre-test with 12 hours fasting. After the pre test the experiment group containing 25 employee underwent gym training programme at Life line gym centre at Budgam, Daily one hour in the evening except Sundays for a total period of eight weeks. Whereas the controlled group comprised of 25

employees did not received any kind of gym training programme for the same period of time. After completing the eight weeks gym training programme (experiment) post test was conducted in the same way by testing the blood samples of the subjects. The data were collected on selected biochemical variables (determination of haemoglobin, serum urea, serum uric acid, total cholesterol, tri glycerol, HDL-C and LDL-C.) The entire tests were done at IRAM CLINICAL LAB BUDGAM to get better results.

Measurement of Biochemical Variables:

1. Estimation of Haemoglobin: Haemoglobin concentration was estimated using colorimetric procedure by Cyanmethaemoglobin method. An aliquot of well-mixed whole blood was taken and reacted with a solution of potassium cyanide and potassium ferricyanide. The chemical reaction yields a product of stable colour, the cyanmethaemoglobin. The intensity of the colour is proportional to the haemoglobin concentration at 540 nm. The following reagents were used for the assay: (a) Reagent 1: Drabkin's Reagent (50 mg Potassium cyanide, 200 mg Potassium ferricyanide and 1000 ml Distilled water); (b) Reagent 2: Cyanmethaemoglobin standard. All reagents were supplied by Merck Ltd., India. A three sets of test tubes were taken and marked as Blank, Test and Standard. In the Blank 5.0 ml of Reagent 1 was taken. The tube marked as Test contained 5.0 ml of Reagent 1, then 20 μ l of an aliquot of well-mixed EDTA-anticoagulated blood specimen was added, mixed well and stand for 10 minutes. Another tube marked as Standard contained 5.0 ml of Cyanmethaemoglobin standard. Blank solution was used for setting the spectrophotometer. Absorbance (Abs.) of the Test and Standard was performed using spectrophotometer at 540 nm.

2. Estimation of serum Urea: Urea reacts with hot acidic Diacetylmonoxime in the presence of Thiosemicarbazide and produces a rose-purple coloured complex, which is determined colorimetrically. The following reagents were used for the assay: (a) Reagent 1: Urea Reagent; (b) Reagent 2: Diacetylmonoxime (DAM); (c) Reagent 3: Working Urea Standard, 30 mg%; Working solution was prepared with dilution of 1 ml of Reagent 1 to 5 ml with purified water (solution I). All reagents were supplied by Span Diagnostics Ltd., India. Three sets of test tubes were taken containing Standard (2.5 ml of solution I, 0.01 ml of Reagent 3 mixed well and 0.25 ml of Reagent 2 was added); Test (2.5 ml of solution I, 0.01 ml of serum sample mixed well and 0.25 ml of Reagent 2 was added) and Blank (2.5 ml of solution I and 0.25 ml of Reagent 2 was added). Then the samples were mixed well and test tubes were kept in the boiling water exactly for 10 minutes. After 10 minutes the test tubes were cooled under running water for 5 minutes. Measurement of the OD of Standard and Test was performed against Blank on a spectrophotometer at 525 nm within 10 min.

3. Estimation of serum Uric acid: Uric acid in alkaline medium reduces phosphotungstic acid to "tungsten blue" a blue coloured complex, which is measured colorimetrically. The following reagents were used for the assay: (a) Reagent 1: Sulphuric acid, 2/3 N; (b) Reagent 2: Sodium tungstate, 10% W/V; (c) Reagent 3: Sodium carbonate, 14% W/V; (d) Reagent 4: Phosphotungstate; (e) Reagent 5: Stock Uric acid standard, 100 mg%; Working Standard was prepared with dilution of 0.1

ml of stock Uric acid standard to 10 ml purified water and mixed well. All reagents were supplied by Span Diagnostics Ltd., India. The estimation of serum Uric acid was performed in two steps. Step I: Deproteinization of the serum sample was performed using 0.5 ml of serum, 4.0 ml of purified water, 0.25 ml of Reagent 1 and 0.25 ml of Reagent 2 taken in a test tube. The solutions were mixed well and stand for 10 minutes and then centrifuged at 2000 rpm for 15 minutes to obtain a clear supernatant. Step II: Three sets of test tubes were taken containing Standard (1.5 ml of working standard, 0.5 ml of Reagent 3 and 0.5 ml of Reagent 4); Test (1.5 ml of supernatant, 0.5 ml of Reagent 3 and 0.5 ml of Reagent 4) and Blank (1.5 ml of purified water, 0.5 ml of Reagent 3 and 0.5 ml of Reagent 4). Then the samples were mixed well and kept in darkness for 15 minutes. Measurement of the OD of Blank, Standard and Test was performed against purified water using a spectrophotometer at 710 nm.

4. Estimation of serum total cholesterol (TC), high density lipoprotein cholesterol (HDL-C): Cholesterol reacts with hot solution of Ferric Perchlorate, Ethyl Acetate and Sulphuric acid (Cholesterol Reagent) and gives a lavender coloured complex which is measured at 560 nm. High density lipoprotein cholesterol (HDL-C) is obtained in the supernatant after centrifugation. The Cholesterol in the HDL-C fraction is also estimated by this method. The following reagents were used for the assay: (a) Reagent 1: Cholesterol Reagent; (b) Reagent 2: Working Cholesterol Standard, 200 mg%; (c) Reagent 3: Precipitating Reagent. All reagents were supplied by Span Diagnostics Ltd, India.

5. Estimation of serum Total cholesterol (TC): Three sets of test tubes were taken containing (i) Blank (3.0 ml of Reagent 1); (ii) Standard (3.0 ml of Reagent 1 and 15 μ l of Reagent 2) and (iii) Test (3.0 ml Reagent 1 and 15 μ l serum samples). Then the samples were mixed well and test tubes were kept in the boiling water bath exactly for 90 seconds (1½ minutes). Immediately after 90 seconds, the cooling of test tubes was done in room temperature under running tap water. Measurement of the OD of Standard and Test was performed against Blank on a spectrophotometer at 560 nm.

6. Estimation of serum High density lipoprotein cholesterol (HDL-C): Estimation of HDL-C was performed in two steps. The first step was the separation of HDL-C from total cholesterol in the serum samples. Secondly, estimation of HDL-C from the supernatant obtained from step one. Step I: A 0.2 ml of serum samples and 0.2 ml of precipitating reagent were taken in centrifuge tube. They were mixed well and kept at room temperature for 10 minutes and then centrifuged at 2000 rpm for 15 minutes to obtain a clear supernatant. Step II: Three sets of test tubes were taken (i) Blank (3.0 ml of Reagent 1); (ii) Standard (3.0 ml of Reagent 1 and 15 μ l of Reagent 2) and (iii) Test (3.0 ml of Reagent 1 and 120 μ l of supernatant from step 1). The samples were mixed well and the tubes were kept immediately in the boiling water bath exactly for 90 seconds (1½ minutes). Immediately after 90 seconds, the cooling of test tubes was done in room temperature under running tap water. Measurement of the OD of Standard and Test was performed against Blank on a spectrophotometer at 560nm.

7. Estimation of serum Triglyceride (TG): In the presence of enzyme *lipase*, triglycerides break into glycerol and fatty

acids. Again, glycerol reacts with ATP and the reaction produces glycerol-3-phosphate and ADP. Enzyme *glycerolkinase* helps in this reaction process. Glycerol-3-phosphate reacts with oxygen in the presence of *glycerol-3-phosphate-oxidase* and produces dihydroxy-acetone-phosphate and hydrogen peroxide (H_2O_2). The hydrogen peroxide reacts with aminoantipyrine and chlorphenol in the presence of enzyme *peroxidase* and produces chinonimine and water. The following reagents were used for the assay: (a) Reagent 1: Reaction solution 4×25 ml [Good's buffer (pH 7.2): 50 mmol l^{-1} , 4-chlorphenol: 4 mmol l^{-1} , ATP: 2 mmol l^{-1} , Mg^{2+} : 15 mmol l^{-1} , glycerokinase: ≥ 0.4 KU l^{-1} , peroxidase: ≥ 2.0 KU l^{-1} , lipoproteinlipase: ≥ 2.0 KU l^{-1} , 4-aminoantipyrine: 0.5 mmol l^{-1} , glycerol-3-phosphate-oxidase: ≥ 1.5 KU l^{-1}]; (b) Reagent 2: Standard solution 1×3 ml [triglycerides]. All reagents were supplied by Merck Ltd., India. Three sets of test tubes were taken containing Standard (1000 μl of reagent 1 and 10 μl of reagent 2); Test (1000 μl of reagent 1 and 10 μl of serum sample) and Blank (1000 μl of reagent 1). Then the samples were mixed well and incubate for 10 minutes at 37°C. Measurement of the OD of Standard and Test was performed against Blank on a spectrophotometer at 500 nm within 60 minutes.

8. Assessment of low-density lipoprotein cholesterol (LDL-C): Low-density lipoprotein cholesterol (LDL-C) was indirectly assessed using standard equation.

$$LDL-C = TC - (HDL-C + TG/5)$$

TC (total cholesterol); HDL-C (high density lipoprotein cholesterol), and TG(triglyceride), All values are in $mg\ dl^{-1}$.

RESULT

To analyse the effect of gym training on the bio chemical variables "t" test were used and the result revealed that

1. There was a significant decrease in the cholesterol level of the experimental group compared to that controlled group.
2. There was a significant reduction in the triglycerides level of the experimental group compared then controlled group.
3. There was reduction in the low level lipoproteins level in the experimental group as compared to the control group.

4. There was significant improvement in high level lipoproteins level in experimental group as compared to controlled group.

VI. CONCLUSION

The result concluded that the regular gym training programme contributes improvement in the selected biochemical variables indicating the good health status of urban employees. A significant reduction in total cholesterol (TC) level was detected among the experiment group of urban employee of district Budgam, a significant reduction in TC level was reported, the triglyceride (TG) level reduced significantly among the experiment group of urban employee of district Budgam, a significant reduction in TG level was reported among the experiment group of urban employee of district Budgam. In addition, a significant reduction in LDL-C level was reported among the experiment group of urban employee of district Budgam. And significant change in LDL-C level was observed among the experiment group of urban employee of district Budgam.

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Biological and Molecular detection of leaf curl Begomovirus disease of sunflower (*Helianthus annuus* L.) in Tobacco (*Nicotiana benthamiana*)

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Abstract: The present study was conducted for detection of leaf curl begomovirus disease of sunflower (*Helianthus annuus* L.) in Tobacco (*Nicotiana benthamiana*). In the present study tobacco seedlings were inoculated with leaf curl virus of sunflower under laboratory through insect vector whitefly (*Bemisia tabaci*). The characteristic symptoms were observed 10-15 days after inoculation, further all inoculated samples were retested (3-4 weeks after inoculation) by molecular based Polymerase chain reaction diagnosis for the presence of virus. The results revealed that the causal virus of the disease was successfully transmitted from sunflower to sunflower (*Helianthus annuus*) and on Tobacco (*Nicotiana tabacum* L.) in a short incubation period and also confirmed the presence of coat protein (CP) of leaf curl begomovirus in virus inoculated hosts of Tobacco. Thus, findings substantiate that *Nicotiana benthamiana* is also a major source of the virus inoculum and served as potential alternate host of the disease during the off season.

Index Terms-Begomovirus, Polymerase chain reaction, Sunflower, Whitefly

I. INTRODUCTION

Sunflower is one of the important edible oilseed crops grown in the world after soybean and groundnut and crop has gained importance due to its short duration of maturity, excellent quality oil, and photo-insensitivity and drought tolerance (Muhammad *et al.*, 2012). In the world, sunflower being cultivated over an area of 20 million hectares and production around 30 million tonnes. In India, sunflower is being grown over an area of 0.72 million hectares with a production of 0.50 million tonnes. the crop has been found suffering from many diseases like *Alternaria* leaf spot, downy mildew, powdery mildew, charcoal rot, sclerotium rot or wilt, rhizopus head rot, sunflower necrosis virus, and cucumber mosaic virus (Saharan *et al.*, 2005). Among viral disease affecting sunflower, very recently leaf curl disease caused by begomovirus of the geminiviridae family was reported for the first time from Main Agricultural Research Station (MARS), University of Agricultural Sciences (UAS) campus, Raichur, Karnataka, India. Causal agent of the disease was confirmed as ss DNA begomovirus which is clustered next to Tomato leaf curl Karnataka virus isolate Lucknow (ToLCKV-[Luc] (Accession no. EU604297.2) and Tomato leaf curl virus - Bangalore II (ToLCBV-[Ban2]) (Accession no. EU604297.2) and shared 97.5 per cent nucleotide identities (Govindappa *et al.*,

2011). Further, viral full genome was sequence and the analysis of the study revealed that, leaf curl virus having DNA-A and the associated satellite beta DNA components of 2761 and 1375 (Nucleotides) in length respectively. The DNA-A molecule shared maximum identity with tomato leaf curl Karnataka clone IKH12 (ToLCKV- IKH12) (Vanitha, 2012). Although several reports revealed that whitefly transmitted geminiviruses (Geminiviridae, Begomovirus) are economically important pathogens causing serious losses in food crops globally. The emergence of the *B. tabaci* geminivirus complex around the world depends on various factors, such as evolution of variants of the viruses, changes in the biology of vectors, movement of infected planting materials, sources of volunteer and weed hosts plants, introduction of new crops and host susceptibility genes through the exchange of germplasm, changes in cropping systems and climatic factors (Ramappa *et al.*, 1998; Varma and Malathi, 2003). Host range studies revealed by Muniyappa *et al.* (2000) with tomato leaf curl virus (ToLCV), pumpkin yellow vein mosaic in pumpkin (Maruthi *et al.*, 2007), hibiscus leaf curl virus in hibiscus (Rajeshwari *et al.*, 2005) and croton leaf curl virus in cotton (Mahesh *et al.*, 2010) indicated that begomoviruses have wide host compatibility, however their infection and further symptoms expression varied between the host plants. Although, leaf curl disease on sunflower being the first occurrence of begomovirus on sunflower crop from south India, meagre research efforts are made in relevance to identification of alternate hosts of the virus by biological and molecular means in relation to its survival is not been understood properly. Hence, the present study was conducted to find out the alternate hosts of the causal virus based on biological and molecular assay in relation to disease spread.

II. Materials and Method

2.1. Maintenance of SuLCV Culture: Sunflower plants showing characteristic leaf curl virus symptoms of vein thickening, upward leaf curling, enation and stunted growth was brought to the laboratory from sunflower fields of Main Agricultural Research Station, University of Agricultural Sciences, Raichur, and virus culture was maintained by inoculating 8-10 days old healthy sunflower seedlings using whiteflies (*B. tabaci*). All process was carried out under nylon net (40 mesh) protected greenhouse (Plate 1).



Plate 1: Maintenance of SuLCV culture on sunflower hybrid KBSH-44 at MARS, Raichur

2.2. Maintenance of whitefly (*B. tabaci*) culture: Initially, whiteflies (*B. tabaci*) were collected from sunflower plants at MARS, Raichur and the colony was established on freshly grown cotton, *Gossypium hirsutum* plants kept in insect proof net house. There after a generation, freshly emerged whiteflies were collected using an aspirator and were transferred onto freshly grown cotton plants kept in an insect proof net house. The colony so developed was referred to be pure (a-viruliferous) and further periodically maintained by frequently introducing healthy cotton plants grown in pots (6 x 10 cm) into the insect proof net house which was maintained at temperature of 28 to 30°C in an insect proof polyhouse (Plate 2).



Plate 2: Maintenance of whitefly (*B. tabaci*) colony on cotton (*Gossypium hirsutum*) at MARS, Raichur

2.3. Raising of healthy seedlings: A healthy seedling of Tobacco crop plants were raised in polythene bags containing soil mixture in insect proof glasshouse. A seedling at two leaf stage was inoculated with ten whiteflies after 24 h acquisition access feeding on SuLCV infected plant. The inoculated seedlings were kept in insect proof glasshouse for symptom development. Observation was made on time for initial and final symptoms expression and type of symptoms on each plant for biological confirmation. At the same time un inoculated healthy plants were maintained for comparison in insect proof cages.

2.4. Biological confirmation of alternate hosts of the virus: Seedlings were cross inoculated by using prepared cages and aspirator (Plate 3) with virus using *B. tabaci* at two leaf stage. For inoculation study, healthy whiteflies were collected from culture house and allowed to feed on sunflowerleaf curl diseased plant for 24 hrs as an acquisition access period (AAP), Plate 4a. Such whiteflies were collected and inoculated onto test seedlings which were further allowed to feed on healthy host for 24 hrs of inoculation access period (IAP), Plate 4b. The virus inoculated seedlings were kept in insect proof glasshouse for symptom expression. Observation was made on per cent transmission, time to initial and final symptoms expression and type of symptoms on each seedlings. Healthy seedlings were maintained in an insect proof cage without inoculation of the virus for comparison studies.



Plate 3: Different sized tubes used for whitefly mediated virus transmission studies

- (a). Acquisition access feeding bottle, (b). Inoculation bottle
- (c). Aspirator



Plate 4: Method of acquisition and inoculation

- a. Acquisition of SuLCV by whiteflies
- b. Inoculation of SuLCV to tobacco seedlings using whitefly *B. tabaci*

2.5. Molecular confirmation of leaf curl virus in tobacco:

Further 3-4 weeks after virus inoculation, all virus cross inoculated seedlings were subjected to polymerase chain reaction (PCR) analysis for leaf curl virus detection using begomovirus specific primers. For the PCR analysis, initially total genomic DNA of the inoculated and uninoculated test plants were extracted by following CTAB (Cetyl Trimethyl Ammonium Bromide) method of Lodhi *et al.* (1994). Set of begomovirus coat protein specific primers 5'GCC(C/T)AT(G/A)TA(T/C)AG(A/G)AAGCC(A/C)AG 3' (AV494) and 5' G(A/G)TT(A/G/T)GA(G/A)GCATG(T/A/C)GTACATG 3' (AC1048) (Wyatt and Brown, 1996) which were capable of amplifying the core coat protein (CP) region of many begomoviruses (Brown *et al.*, 2001; Briddon *et al.*, 2002; Chowda Reddy *et al.*, 2005; Rajeshwari *et al.*, 2005) and hence in the present study similar primers were used for detection of virus in inoculated and uninoculated test samples. PCR reaction was carried out in 25µl reaction mixture containing 6.0 mM Tris HCl, 2.5mM dNTPs, 20µM of each primer, 2.5 units of Taq DNA polymerase (Bangalore Genie Pvt. Ltd., Bangalore) and 10-15µg of DNA of the respective samples. PCR was performed in thermocycler (Eppendorf, Cambridge, UK) according to Wyatt and Brown (1996). The PCR protocol consisted of 2 min- utes at 94°C (Initialisation step) followed by 30 cycles of 1 min at 94°C (Denaturation step), 1 min at 61°C (Annealing step), 2 min at 72°C (Extension step) and finally 10 min at 72°C (Final hold). Later PCR amplified products were separated by electrophoresis on 1% agarose gel and DNA fragments were visualised using ethidium bromide stain and analysed by alpha imager gel documentation system. DNA ladder set (1Kb, MBI Fermentas, Germany) was included as sized molecular marker.

III. RESULT AND DISCUSSION

Host range studies of virus inoculum through biological approach by using insect vector whitefly *B. tabaci* revealed that the virus was successfully transmitted to *Nicotiana benthamiana*. The characteristic symptoms were observed 10-15 days after inoculation (Table. 1) The initial symptom such as curling of leaves with clearing and thickening of veins, entire plant remains very much dwarfed and after 25-30 days the final symptom were obtained with twisting of petioles; puckering of leaves and brittle and development of enations with 80 per cent transmission (Plate 5). This difference in expression of virus symptoms could be associated with the insect preference and also due to host biochemical compositions interfere with virus multiplications (Colvin *et al.*, 2006; Sharma *et al.*, 2008). Similarly tomato leaf curl begomovirus (ToLCV) from tomato was successfully transmitted to weeds by *B. tabaci* in a varied period of incubation with *A. hispidum*, *Ageratum conyzoides*, *Bidens biternata*, *Conyza stricta*, *Datura stramonium*, *Euphorbia geniculata*, *Oxalis corniculata*, *P. hysterothorus*, *Solanum nigrum*, *Sonchus brachyotis*, *Stachyterpicta indica* and *Synedrella nodiflora* and tobacco (*N. Benthamiana*) (Ramappa *et al.*, 1998). In addition, leaf curl begomovirus of Hibiscus plant found infecting weeds (*Ageratum conyzoides*, *Croton bonplandianum* and *Euphorbia geniculata*) and tobacco species such as *N. benthamiana*, *N. glutinosa* *N. tabacum* (var. Samsun), cotton and tomato (Rajeshwari *et al.*, 2005). The hosts confirmed with the tomato

leaf curl begomovirus in tomato (ToLCV) (Ramappa *et al.*, 1998) and begomovirus of Hibiscus were similar with the present findings as the virus infecting sunflower crop is belongs to begomovirus of the family geminiviridae. In the earlier molecular evidences, leaf curl virus on sunflower which has shared highest coat protein nucleotide identity (97%) with tomato leaf curl Karnataka clone IKH12(ToLCKV- IKH12) (Govindappa *et al.*, 2011 and Vanitha *et al.*, 2013). Further in the present investigations, leaf curl virus infection was further confirmed in all virus infected hosts such as sunflower, chilli, tomato and tobacco and weed hosts such as *A.hispidum*, *A. viridis*, *D. stramonium* and *P. hysterothorus* by molecular diagnostic polymerase chain reaction technique using virus coat protein (CP) primers with the amplified PCR product of size ~575 bp (Fig. 1). These primers were specially designed to amplify the conserved region of the CP gene of begomoviruses infection in several crops employed by many workers (Muniyappa *et al.*, 2000; Brown *et al.*, 2001; Briddon *et al.*, 2002; Chowda Reddy *et al.*, 2005; Maruthi *et al.*, 2007) to confirm the association of begomoviruses in wide range of crop plants. Further, these primers used elsewhere for detection of begomovirus such as leaf curl disease in Hibiscus (HLCuD) (Rajeshwari *et al.*, 2005) and mosaic disease of jatropha (Narayana *et al.*, 2007), leaf curl virus (CrLCuV) disease in Croton (Mahesh *et al.*, 2010). Hence, biological and molecular evidence proved that the crops such as chilli, sunflower, tomato, and tobacco and weed viz., *A. hispidum*, *A. viridis*, *D. stramonium* and *P. hysterothorus* are major potential alternate hosts of the virus inoculum. A band of approximately ~570 bp was consistently amplified from total DNA extracted from virus inoculated sunflower and tobacco samples, while it was absent in healthy samples (Fig 1).



Leaf curling with vein clearing



Twisting of petioles, thickening of veins



Puckering of leaves with brittleness



Plate 5: Symptoms of SuLCV on tobacco plants inoculated through whiteflies

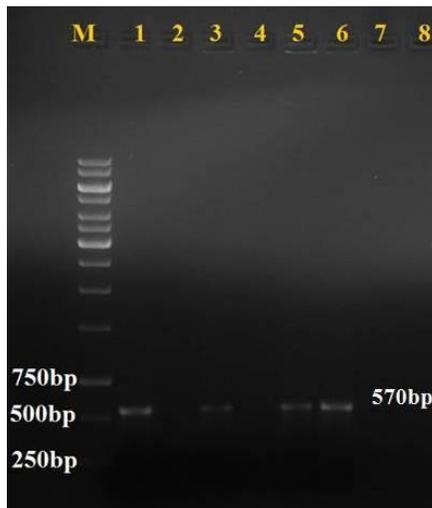


Fig 1: Agrose gel showing PCR products of SuLCV obtained with CP primers in Tobacco.

M: 1kb Ladder, 1. Infected Sunflower 2. Healthy sunflower
3. Infected Tobacco 4. Healthy Tobacco 5. Infected sunflower
6. Infected Tobacco

CONCLUSION

Host range studies of the virus inoculum of leaf curl virus disease of sunflower through biological and molecular approach revealed that tobacco acted as potential reservoir hosts.

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Table 1: Biological detection of SuLCV in Tobacco plants

Crops	Total No. of Plants tested	No. of plant infected	Per cent transmission	Per cent whitefly survival (%)	Days to first symptom	Days to final symptom	Early symptom appearance	Final symptom appearance	Cross inoculation to sunflower	PCR Test
Sunflower (<i>Helianthus annuus</i> L)	10	10	100	100	10-11	20-25	Vein clearing and thickening	Upward curling of leaves, reduction in the leaf size, enations on the lower surface of the leaves	+	+
Tobacco (<i>Nicotiana tabacum</i>)	10	8	80	70	10-15	25-30	Curling of leaves with clearing and thickening of veins, entire plant remains very much dwarfed	Twisting of petioles, puckering of leaves and brittle and development of enations	+	+

Adsorption kinetics, equilibrium and thermodynamics studies for the removal of Cadmium (II) Ions from aqueous solution by *Aspergillus nidulans*

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Abstract- The biosorption of Cd (II) ions from the aqueous solutions by *A. nidulans* strain isolated from contaminated soil was studied in batch system. The effect of pH (3, 4, 5 and 6), temperature (25, 30, 35, 40 and 45°C) initial concentration (100 – 500 mg/ L) of Cd (II) ions on biosorption were investigated. The maximum biosorption capacity of *A. nidulans* was 258 mg/L at 350 mg/L of Cd (II) ions. The experimental results suggest that the second – order equation is the most appropriate equation to predict the biosorption capacity by *A. nidulans*. Biosorption equilibrium data was best described by Langmuir isotherm model followed by Freundlich model. The free energy change (ΔG°) obtained for the biosorption of Cd (II) ions at the temperature of 298, 303, 308, 313 and 318 K was – 633, - 644, - 655, - 665 and – 676 by the fungal biomass at pH – 3. The high negative value of change in Gibbs free energy indicates the spontaneity and feasibility of the biosorption of Cd (II) by kJ/mol by *A. nidulans*.

Index Terms- *A. nidulans*, Cd (II) ions, Thermodynamics, Kinetic characterization and pH

I. INTRODUCTION

Cadmium is one of the components of the earth's crust and present everywhere in the environment. The natural occurrence of cadmium in the environment results mainly from gradual phenomenon such as rock erosion and abrasion that estimate for 15, 000 mt per annum. It is one of the toxic heavy metals with a greatest potential hazard to humans and the environment. Cadmium is used in a wide variety of industrial processes such as alloy preparation, metal plating and electronics (Akus, 1998). The major sources of Cd (II) release into the environment through wastewater streams are electroplating, smelting, paint pigments, batteries, fertilizers, mining and alloy industries (Iqbal and Edyvean, 2005) which might lead to cadmium releasing into the environment by waste streams (Holan *et al.*, 1993). Cadmium has a half-life of 10-30 years in the human body. Therefore, their toxic effects are especially pronounced in animals of higher trophic levels, particularly in humans. It causes kidney damage, bone diseases and cancer. Chronic exposure to elevated levels of cadmium is known to cause renal dysfunction, bone degeneration, liver damage (Iqbal *et al.*, 2007). During recent years, the study of microorganisms has contributed important insights into the basic problems an emerging technology that has received more attention in the development of biosorbents with high affinity and specificity

(Murugesan and Maheswari, 2007). Bioremediation is an emerging form of technology that uses microbes to remove or stabilize contaminants may offer a low cost and ecologically valuable means for the mitigation of heavy metal toxicity in the environment. Fungi cell wall contains large quantity of polysaccharides and proteins which offer many functional groups (such as carboxyl, hydroxyl, sulphate, phosphate and amino groups) for binding metal ions (Bai, *et al.*, 2012; Chen *et al.*, 2012). However, the efficiency of fungal cell as sorbents varies greatly and depends on the physiological states, surface properties of cells, pH and other physicochemical parameters of the metal solution (Sag and Kutsal, 1996). In this investigation the fungal biomass of *A. nidulans* was isolated from the contaminated soil were evaluated for their sorption efficiencies of Cd (II) ions from aqueous solution using batch systems.

II. MATERIALS AND METHODS

2.1. Isolation and Identification of Cd (II) ion resistant fungi

10 g soil sample were added into 90 ml sterile distilled water and agitated for uniform microbial suspension. Serial dilutions were performed by decimal dilutions made up to 10^{-7} from these dilutions 1ml aliquots were poured into sterile petriplates with 15 – 20 ml of sterile Sabour Dextrose Agar medium (Hi – media, Mumbai, India) supplemented with chlorotetracycline (10 mg l^{-1}). Plates were incubated at room temperature for 3 – 5 days. Fungal isolates were identified using the characteristics structures seen in culture which includes colonial morphology, hyphae, a-sexual spores, reproductive bodies and conidia arrangements (Alexopoulos *et al.*, 1996). Slide culture techniques were used to observe morphological characteristics of fungi (Aneja, 2001).

2.2. Biosorption Studies

The biosorption of Cd (II) ions on the isolated fungi from aqueous solution containing metal ions was investigated in batch biosorption equilibrium experiments. The metal concentration of 20–500 mg L^{-1} was prepared by diluting stock solution (1000 ppm) in deionized water. The diluted solution was sterilized by filtration through a flow pore filter with a $0.45 \mu\text{m}$ pore size and was used for further preparation of metal concentration. The fungal biomass was harvested from the medium by filtration through whatman No.1 filtration paper. The

filtered fungal biomass was re-suspended in purified water for washing and again filtered as above to make sure that no media remain on the cell surface. The fungal biomass was dried in a hot air oven at 40° C for 24 h to remove the water content in the fungal biomass. Biosorption studies were done using biomass as a function of various parameters such as pH, temperature, time and initial metal ion concentration.

The effect of pH on the biosorption rate in aqueous solution (100ml) by the resistant fungi with Cd (II) ion was investigated in the pH range (3, 4, 5 and 6) (which was adjusted with HCl or NaOH at the beginning of the experiment). The general experimental procedure was repeated for various values of temperature such as (25, 30, 35, 40 and 45° C) respectively. The pH was maintained at 3 (optimum). The effect of the initial Cd (II) ion concentration on the biosorption medium (100ml) was studied at different pH and temperatures described above except that the concentration of heavy metal ion in the adsorption medium was varied between 100 to 500 mg l⁻¹. After the desired incubation period the aqueous phases were separated from the fungal biomass by centrifuged at 1000 rpm. The concentrations of remaining metal ions in biosorption medium were determined by Atomic Absorption Spectrophotometer.

2.3. Data analysis

The amount of adsorbed Cd (II) ions per unit biosorbent (mg metal ions/g dry biosorbent) was obtained by using the following expression (Demirbas *et al.*, 2004).

$$q = \frac{(C_0 - C_1)V}{M} \quad (1)$$

where q is the amount of Cd (II) ions adsorbed onto the unit amount of the adsorbents (mg/g) and C₀ and C₁ are the concentrations of the Cd (II) ions in the aqueous solution (mg/l) before and after biosorption respectively ; V is the volume of the aqueous phase and M is the amount of the adsorbents (g)

2.4. Pseudo – first and second order equation

The study of sorption kinetics describes the adsorbate uptake rate and evidently this rate controls the residence time of adsorbate at the solid – liquid interface (Demirbas *et al.*, 2004). The kinetics of Cd (II) ions sorption on fungal adsorbents was analyzed using the pseudo first order (Lagergren, 1891) and pseudo second order.

The Pseudo first order equation (Lagergren, 1891) is generally expressed as follows,

$$\log(q_{eq} - q_t) = \frac{\log q_{eq} - (k_1 t)}{2.303} \quad (2)$$

A plot of Log (q_{eq} – q_t) against t should give a straight line to confirm the applicability of the kinetic model. In a true first - order process q_{eq} should be equal to the intercept of a plot of Log (q_{eq} – q_t) against t

If the rate of sorption is a second order mechanism, the pseudo second order chemisorption kinetics rate equation (Ho and Mckay, 1998) is expressed as Eq. 4

$$\frac{t}{q_t} = \frac{1}{(k_2 q_{eq}^2)} + \frac{1}{q_{eq}} t \quad (3)$$

A plot of t / q_t vs t should give a linear relationship for the applicability of the second order kinetics. The rate constant (k₂) and adsorption at equilibrium (q_{eq}) can be obtained from the intercept and slope respectively.

2.5. Adsorption isotherms

Sorption data is analyzed by widely used sorption models, such as the Langmuir or Freundlich isotherm, which relate sorption density q_e (metal uptake per unit weight of sorbent) to equilibrium sorbate concentration in the bulk fluid phase, C_e.

$$\frac{C_e}{q_e} = \frac{1}{q_m k_a} + \frac{C_e}{q_m} \quad (4)$$

Where q_e is the amount adsorbed per unit mass of adsorbent (mg/g), C_e the equilibrium concentration of the adsorbate (mg/l), q_m the equilibrium sorption capacity for complete monolayer (mg/g) and K_a the sorption equilibrium constant (l/mg). When C_e/q_e was plotted against C_e, a straight line with slope 1/K_a q_m and an intercept of 1/q_m were obtained

The Freundlich equation is described by the following equation

$$q_{eq} = K_F C_e^{1/n} \quad (5)$$

q_e – Metal uptake at equilibrium concentration (mg / g) ; C_e – Equilibrium metal ion concentration, (mg / g) ; K_F – Freundlich's constant of adsorption capacity ; n – Freundlich's constant of adsorption intensity. The K_F was estimated from the y – intercept and n was calculated from the slope.

2.6. Thermodynamics of biosorption of Cd (II) ions

In the present study, the biosorption experiments were carried out in the temperature (25, 30, 35, 40 & 45°C). The values of the thermodynamic parameters such as ΔG°, ΔH° and ΔS°, describing Cd (II) ions uptake by *A. nidulans* were calculated using the thermodynamic equations (Fraiji *et al.*, 1992). The biosorption process can be regarded as a heterogeneous and reversible process at equilibrium. The change in Gibbs free energy of the biosorption process is thus given as

$$\Delta G^\circ = -Rt \ln K_c \quad (6)$$

Where ΔG° is the standard Gibbs free energy change for the biosorption (J / mol), R the universal gas constant (8.314 J/mol/K) while T is the temperature (K). The effect of temperature on the biosorption of Cd (II) ions by *A. nidulans* from thermodynamics,

$$\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ \quad (7)$$

or

$$\Delta G^\circ = -\Delta S^\circ (T) + \Delta H^\circ \quad (8)$$

A plot of T against ΔG° gives a straight line with slope –ΔS° and an intercept of ΔH° was obtained

III. RESULTS

3.1. Identification of cadmium resistant fungi

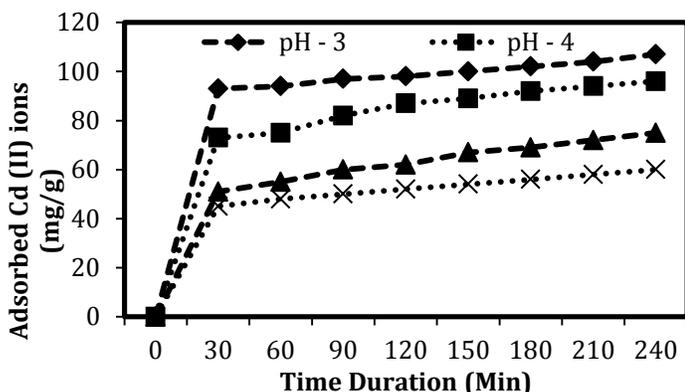
The ability of isolated cadmium resistant fungal biomass was to determine biosorbs Cd (II) ions from aqueous solution. In this preliminary screening the total count of fungus in the soil sample was ranged from 123 ± 7.31 x 10² to 3.7 ± 0.23 x 10⁷ CFU g⁻¹. Fungi with different colony morphology were selected, purified and stored in the Sabour Dextrose Agar

medium (Hi – media, Mumbai, India) supplemented with chlorotetracycline (10 mg ml⁻¹). The dominant cadmium resistant isolate was grown well at 35° C and they show green brown shade with velvety texture on sabour dextrose agar plate. The colony consisted of a cinnamon brown color of conidiophore and narrows down towards the foot cell. Conidia are short and columnar, globose and are rough. The sterigmata developed in two series as primary (5 – 6 µm x 2-3 µm) and secondary (narrower) sterigmata. Based on the microscopic observation the isolate was identified as *A. nidulans*. The resistant fungal mycelium was cultivated in fungal broth media amended with various concentration of Cd (II) ion. The resistant fungal mycelium isolated from the soil was cultivated in fungal broth media amended with various concentration of Cd (II) ion (100–500 mg l⁻¹).

3.2. Biosorption rate of Cd (II) ion at different pH

The biosorption capacity of Cd (II) ion at different pH by *A. nidulans* from solution containing 200 mg l⁻¹ of Cd (II) ion is shown in Fig - 1. As seen from the figure the saturation level was obtained after about 240 min. Biosorption capacity of *A. nidulans* increased at different pH (3, 4, 5 and 6) with increasing the time. As seen from Fig – 1 the amount of biosorbed Cd (II) ion at pH 3, 4, 5 and 6 was found to be 107, 96, 75 and 60 mg g⁻¹ respectively after 240 min.

Fig – 1 Biosorption rate of Cd (II) ions at different pH by *A. nidulans* from aqueous solution. Adsorption conditions: Initial concentration of Cd (II) ions - 200 mg l⁻¹; Biomass concentration – 0.1g



3.3. Effect of initial Cd (II) ion concentration on biosorption

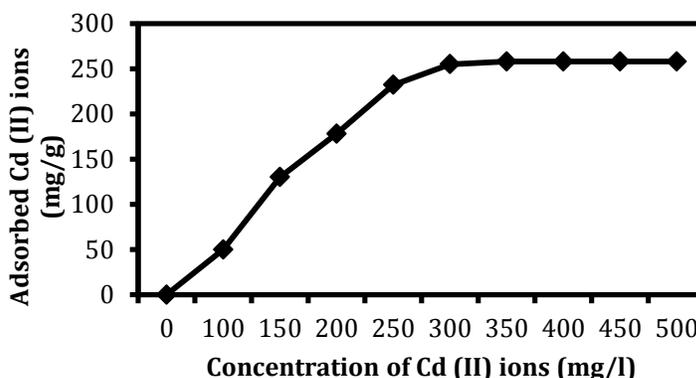
The biosorption capacity of fungal biomass at equilibrium concentration of Cd (II) ions in heavy metal solution is shown in Fig – 2. The biosorption capacity of the tested adsorbent was presented as a function of the initial concentration of Cd (II) ions (100 – 500 mg l⁻¹). Biosorption capacity of *A. nidulans* increased with increasing initial concentration of Cd (II) ions in the solution and reached a saturated value of 350 mg l⁻¹. As seen from the Fig – 2 the amount of biosorbed Cd (II) ions on the *A. nidulans* was found to be 258 mg g⁻¹.

3.4. Biosorption kinetic and equilibrium modeling

The comparison of experimental biosorption capacity and the theoretical values at different pH and temperatures were estimated from the first and second order rate equations are represent in Table 1a&1b. The theoretical q_{eq} values estimated

from the first order kinetics model gave significantly different values when compared to experimental values and the correlation coefficients for the linear plots of log (q_e-qt) against t were also found to be slightly lower than 0.995 for both pH and temperatures. The correlation coefficients for the linear plots of t / qt against t for the second order equation was greater than 0.995 for *A. nidulans* for contact times of 270 min at different pH and temperatures. The Langmuir constants (q_m and k_d) along with correlation coefficients (R²) have been calculated from the plots for biosorption of Cd (II) ion on the biosorbents and the results is given in Table 2. The maximum capacity q_m determined from the Langmuir isotherm defines the total capacity of the biosorbents for Cd (II) ion. It is clear that this increase in the q_m value is due to an increase in the adsorptive sites on the biosorbents

Fig – 2 Biosorption capacities of Cd (II) ions by *A. nidulans*. Biosorption conditions: volume of biosorption medium – 100ml; biomass concentration 0.1g; pH – 3; temperature - 35° C



3.5. Thermodynamics of biosorption of Cd (II) ions

The thermodynamic of biosorption of Cd (II) ions by *A. nidulans* the value of the entropy and enthalpy was 0.007 J/mol/K and 2.127 J/mol/K, respectively. The free energy change (ΔG°) obtained for the biosorption of Cd (II) ions by *A. nidulans* at the temperatures of 298, 303, 308, 313 and 318 K was found to be – 633, – 644, – 655, – 665 and – 676 kJ/mol respectively at pH – 3 (Fig – 3). The negative values of ΔG° indicate the feasibility of the process and indicate spontaneous nature of the sorption. The positive values of ΔS° show the increased randomness at the solid / solution interface during the sorption also reflects the affinity of the sorbent for Cd (II) ions.

Fig – 3 The free energy plot for the biosorption of Cd (II) ions using *A. nidulans* at pH - 3; initial metal ion concentration of 200 mg l⁻¹

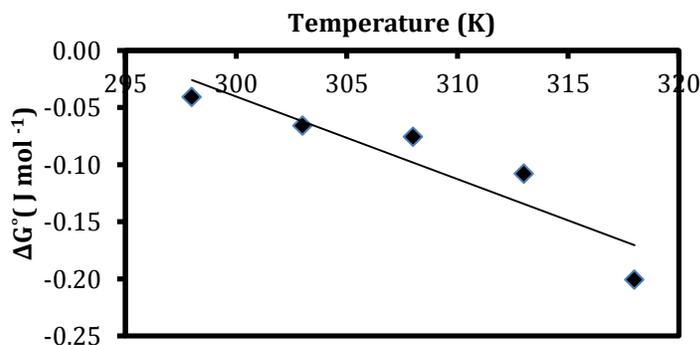


Table 1a The Pseudo first kinetics for biosorption of Cd (II) ion from aqueous solution by *A. nidulans* at different pH

Biosorbent at different pH	Experimental q_{ex} (mg g ⁻¹)	Pseudo first order		
		q_{eq} (mg g ⁻¹)	$k_1 \times 10^{-3}$ (min ⁻¹)	R ²
pH - 3	105	277	4.74	0.938
pH - 4	96	185	8.43	0.948
pH - 5	80	208	7.65	0.952
pH - 6	92	222	6.20	0.937

Table 1b The Pseudo second order kinetics for biosorption of Cd (II) ion from aqueous solution by *A. nidulans* at different pH

Biosorbent at different pH	Experimental q_{ex} (mg g ⁻¹)	Pseudo second order		
		q_{eq} (mg g ⁻¹)	$k_2 \times 10^{-3}$ (min ⁻¹)	R ²
pH - 3	105	108	0.83	0.998
pH - 4	96	102	1.82	0.997
pH - 5	80	81	4.27	0.992
pH - 6	92	63	5.01	0.995

Table – 3 Langmuir and Freundlich Isotherm model constant and correlation coefficient for biosorption of Cd (II) ion from aqueous solution by *A. nidulans*

Langmuir Constant		Freundlich Constant	
q_m (mg g ⁻¹)	588	K_F	1.15
$k_d \times 10^{-4}$ (M)	3.12	n	0.76
R ²	0.859	R ²	0.984

IV. DISCUSSION

The maximum biosorption capacity of *A. nidulans* from solution containing 200 mg l⁻¹ of Cd (II) ion is at pH – 3. The biosorption of Cd (II), Pb(II) and Cu (II) on inactivated *P.chrysosporium* was pH dependent and maximum biosorption was obtained at pH – 6 (Say *et al.*, 2001). The uptake of cadmium by *Spirulina platensis* at a period of 24 hrs showed up take to be maximum during the initial period of contact at 1.6 mg/L Cd (II) ions (Murugesan *et al.*, 2008). The biosorption equilibrium time of chromium (IV) on the dead and immobilized biomass of *R. arrhizus* was 2h (Prakasham *et al.*, 1999). The lead biosorption rate on *P. chrysosporium* is fast and reached saturation value within 2h

(Yetis *et al.*, 2000). Ana Claudia C. Nascimento *et al.*, (2015) revealed that 53%, 56.8% and 66.9% of 1mM of cadmium was removed by *Aspergillus nidulans* at pH values of 4.0, 5.0 and 6.0, respectively by native washed biomass. Maheswari and Murugesan (2011, 2016) studied the equilibrium biosorption of As(III) ions for all the fungal biomass preparations were similar at pH 4. From this study the biosorption capacity of *A. nidulans* increased with increasing initial concentration of Cd (II) ions in the solution and reached a saturated value of 350 mg l⁻¹. The higher biosorption capacity was obtained in fungal biomass may be increases the availability of the binding sites by fixing the soluble protein in the cell wall after denaturation with heat (Maheswari and Murugesan, 2009b, 2010). The biosorption capacity of dead *Fusarium flocciferum* was 19.2 mg Cd (II) g⁻¹ dry biomass (Delgado *et al.*, 1998). The fungal biomass of white rot fungus *Phanerochaete chrysosporium* used for heavy metal removal from artificial waste water had a cadmium capacity of the dry fungal biomass of 23.4 mg Cd/g (Say *et al.*, 2001). The adsorption capacity of *Rhizopus arrhizus* was 78 mg for Fe (III), 71 mg for Pb (II) and 62 mg for Cd (II) /g dry biomass (Ozer *et al.*, 1997). Raman Kumar *et al.*, (2014) showed the maximum uptake (13.15 mg/g) of Cd was observed in *Rhizopus arrhizus* and the minimum uptake of Cd (0.51 mg/g) was observed in *Penicillium chrysogenum*. *A. niger* and *A. parasiticus* species were reduced the Cr(VI) concentration of 96.3 % and 91.6 % respectively from an initial concentration of 20 mg/Lin 72 h (Shugaba *et al.*, 2012). The percentage removal of chromium was around 89% and 85% with initial metal ion concentration of 5mg/L for *Aspergillus oryzae* and *A.sojae* respectively. The percentage removal decreased as the concentration increased and it is due to lack of active sites (Reya Issac *et al.*, 2012). *Aspergillus* sp. was more tolerant to Cu, Cd and Ni metal ions than other fungi species such as *Curvularia*, *Acrimonium* and *Pithyium* (Akhtar *et al.*, 2013). The theoretical q_{eq} values for different pH and temperatures were very close to the experimental q_{eq} values in the case of pseudo second order kinetics. These results suggest that the second – order mechanism is predominant and the chemisorptions may be the rate limiting step that controls the biosorption process (Allen *et al.*, 2005). Therefore the results of this investigation showed that the biosorption systems best described in pseudo second order kinetic model. The living organisms induce the production of metallothioneins which are protein that contain large amounts of cystein and bind heavy metal ions in order to respond to the effects of heavy metals (Hafez *et al.*, 1997). The Langmuir constant (k_d) estimated from the intercept is a measure of the stability of the complex formed between metal ions and adsorptive surface layer of the biosorbents under specified experimental conditions. The Freundlich constants K_F and n shows easy separation of metal ions from aqueous medium and indicate favorable adsorption (Cetinkaya *et al.*, 1999). In the present investigation it is clear that freundlich model fits well than Langmuir isotherm model.

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Assessment of Health Problems for Internal Displaced Family and their Quality of life in Baghdad City

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Abstract- Iraq is the largest internal displacement wave in its history, after the invasion of terrorists to the north and west of the country and that the current places inhabited by IDPs, which was held hastily lacking mostly basic services and because of the lack of fit between the amount of space and number of families, the possibility of the emergence of health problems is significant, as the congestion Basically, contribute and easily in transition and the spread of communicable diseases

Objectives of the study: The present study aims to assess the health problems faced by displaced families and their quality of life

The study methodology: descriptive study of displaced families in camps for displaced people on the outskirts of the city of Baghdad and within the period of the second from January 2015 until 20 in February 2016, The 5 camps for displaced people of both sides of the Rusafa and Karkh and the number of households in the study were 374 displaced families in camps (university and Al-Dorrea camps in the Karkh district and the Prophet Yunus, appeal and Zayouna camp in Rusafa district) The researchers used A questionnaire form to achieving the objectives of the study which consisted of three domains (the first consist of two items related camp and second included the health problems suffered by the displaced families after displacement the third domain was used SF-36 to assess the quality of life a (-the researchers used version 23 of spss to enter data and using descriptive and inferential statistical analysis.

Results: The results of present study indicated the provision of a health center and an ambulance in four camps and free Zayouna camp of the health center and an ambulance, and the health problems suffered by the displaced families after the displacement was high blood pressure 71% and 47% in the camps of the university and the Prophet Yunus respectively and diabetes was 59% in the university camp and 57% and 41% was displaced families suffering from heart problems at the university and Prophet Yunus camp respectively, and 61% of respiratory problems at the university camp and proportion of 58 % of families suffering from skin problems and 62%, 47% of the displaced are suffering from joints problems in university and the Prophet Yunus camps respectively, the quality of life of the displaced families was low at role physical role and emotional in a quality of life in Zayouna, Prophet Yunus and appeal camps

Conclusions: The study concluded that most of the health problems suffered by the heads of families displaced in the five camps under study are high blood pressure, diabetes and heart disease and digestive system problems, and the quality of life of the displaced medium in general and low to the domain of physical and emotional role.

Recommendations: The researchers recommended that healthy visits to conduct laboratory tests within the complexes to investigate for all people at risk of chronic diseases and the emphasis on psychological support for the displaced

Index Terms- health problems, displacement, internal displacement, burden of displacement

I. INTRODUCTION

Every second there one person exposed to homelessness, leaves his home and leave the area where they live. There are more than 19.3 million people have been forced to leave their homes in 100 countries, an average of 26.4 million people a year, due to natural disasters, according to the report by the Internal Displacement Monitoring Centre. Those who have been displaced by conflict and violence, according to another report of the center itself, the year 2014 saw a record with the accession of 11 million newly displaced people to the list, which is equivalent to 30 thousand people a day. They are concentrated in the Middle East. While he is a displaced people in this region between 2001 and 2011, a rate of 7% to 14% of the global total, the ratio was at 31% this year. It's not even in the past four years have fled more than 7.8 million people from their homes as a result of violence, to join the 4.1 million people living in displacement prolonged (Bakhit,2016)

With the outbreak of violence in some of Iraq's provinces forced hundreds of thousands to flee, as the attack caused sweeping extremist organization, additional waves of displacement.

In areas of displacement begins again the suffering of displaced people, the first being: their abode; Some of the camps housing, and some of them housing an ancient ruin, others housing buildings under construction, including schools housing, while others got the best to put an end to that; that places of worship housing, The buildings processions places of worship. Despite the many displaced form of housing, but they share common features are all covered; in the harsh climatic conditions where extreme heat; housing, these do not meet the minimum requirements for protection from the heat. He also may not be available in some no adequate health services or appropriate. The current places inhabited by displaced people, and because of the lack of fit between the amount of space and number of families, the possibility of the emergence of health problems is significant, as the congestion Basically, contribute and easily in the transmission and the spread of communicable diseases. (Al-Jubouri , .2014)

Objectives of the study: The present study aims to

- 1- Assess the health problems suffered by the displaced families after the displacement in displacement camps
- 2- Assessment the quality of life for displaced families after displacement

II. RESEARCH METHODOLOGY

Study design: descriptive study was conducted in the city of Baghdad, for the period from 2 January 2015 until 20 February 2016.

Sample and place of study: the researchers selected five camps of both sides of Karkh and Rusafa in the parties and within the city of Baghdad, and they (the university , and Al-dora

camp in a part of Karkh and the number sample of two camps (105 and 110), respectively (and Zayouna and Prophet Yunus and the appeal camp) party Rusafa and the number (52,91,1nd 50) respectively. The study conducted on 374 displaced families in the five camps

The study Instrument: the researchers used questionnaire form o achieving the objectives of the study which consisted of three parts (part I deals the information about the camp; second parts included the health problems suffered by the displaced families after displacement third parts was used evaluate the quality consisting of 36 items (SF-36)

Statistical methods: the researchers used statistical system version 23 to enter data. Data were analyzed using descriptive statistics.

III. RESULTS

Table 1: Camps Information

Items	University Camp 105 families	Al-dora Camp 110 families	Prophet Yunus Camp 91 families	Zayouna Camp 52 families	appeal Camp 50 families
presence of a health center in the camp	presence	presence	presence	Not presence	presence
having an ambulance	presence	presence	presence	Not presence	presence

Table 1 shows that four camps of present study was available of health center in a camps, and there were an ambulance near the camps unless the Zayona camp it was not availability.

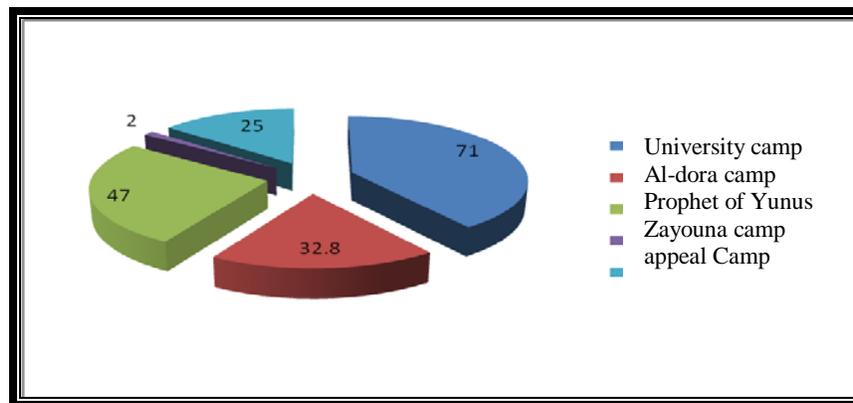


Figure 1: Incidence of Hypertension among families of study camps

This figure shows that the incidence of hypertension was high percent in camps of university, and Prophet of Yunus

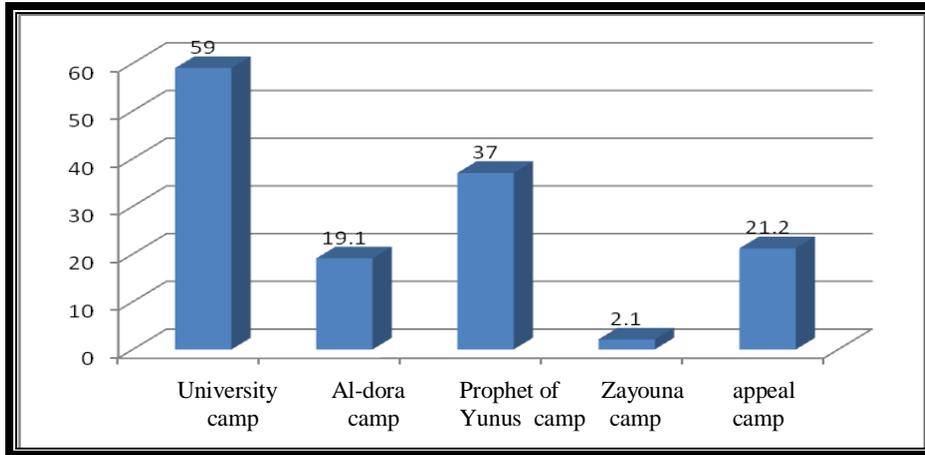


Figure 2: Incidence of Diabetes Mellitus among families of study camps

Figure 2 shows that the incidence of Diabetes Mellitus was high percent in camps of university, and Prophet of Yunus

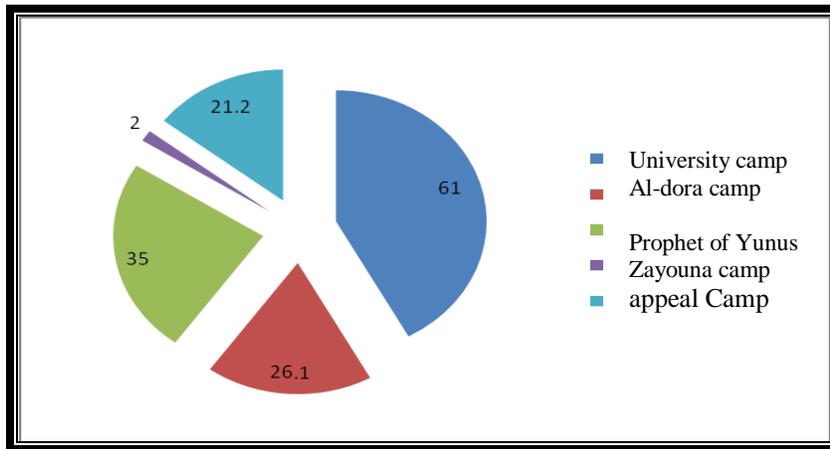


Figure 3: Incidence of respiratory problems among families of study camps

The high incidence of respiratory problems was clear in university camp (figure 3)

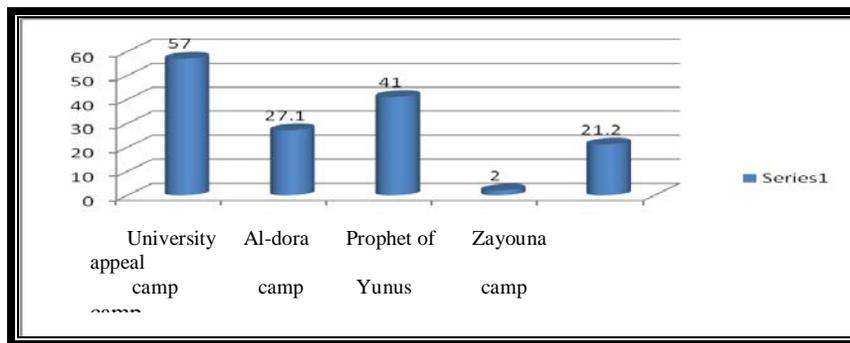


Figure 4: Incidence of heart disease among families of study camps

Figure 4 shows that the incidence of heart disease was high percent in camps of university, and Prophet of Yunus

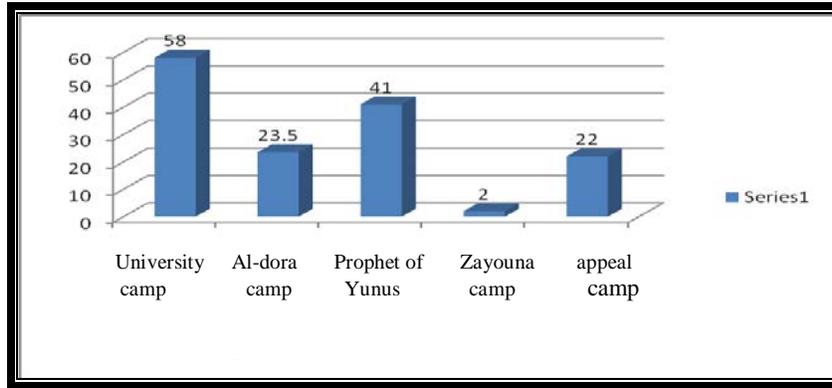


Figure 5: The Incidence of Digestive Problems in the Camps

High percent of digestive problems was clear in university and prophet of Yuns camps (figure 5)

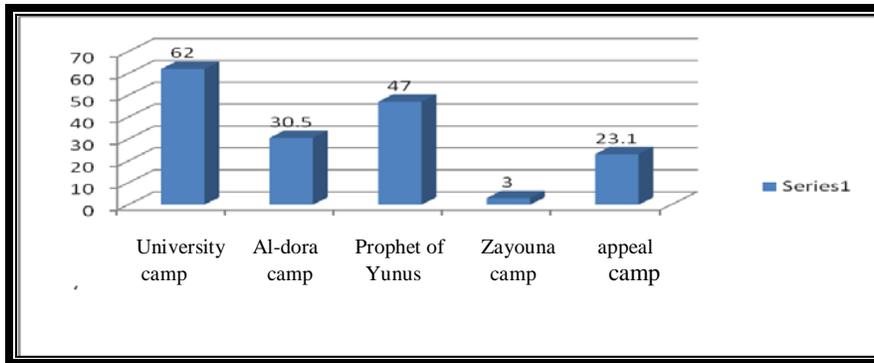


Figure 6: The Incidence of musculoskeletal Problems

Figure 6 shows that the high incidence of musculoskeletal problems in university and prophet of Yuns camps

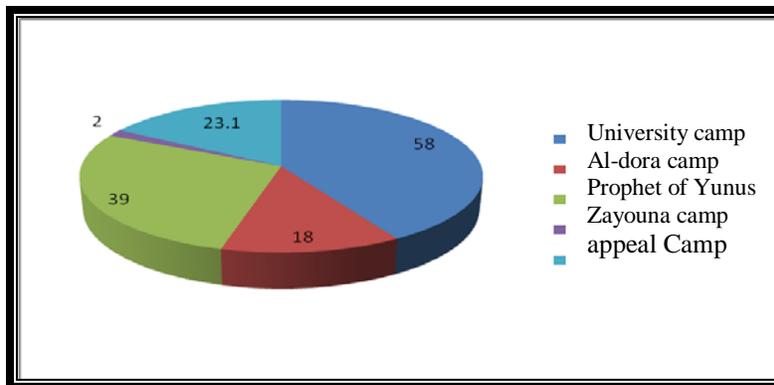


Figure 7: Skin Problems in study Camps

Figure 7 shows that the high incidence of skin problems in university and prophet of Yuns camps

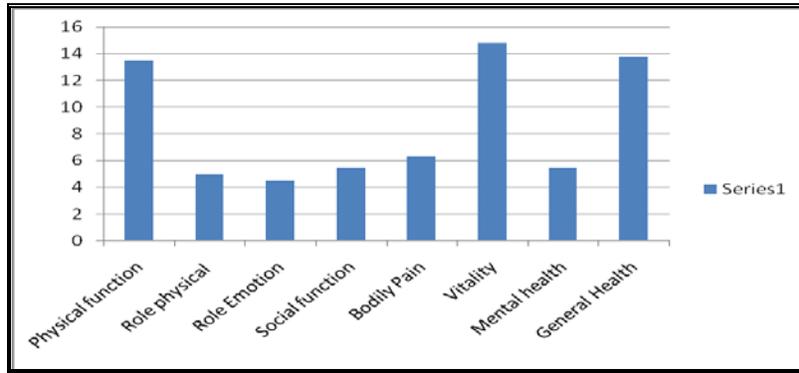


Figure 8: Quality of Life for university families camp

Figure 8 shows that the role physical, role emotion, social function, bodily pain, and mental health domains was low in a quality of life among the families of university camp

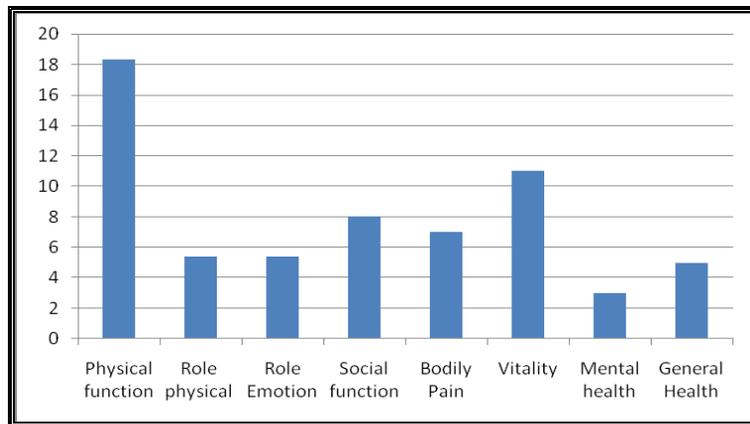


Figure 9: Quality of Life for Al-dora families camp

Figure 8 shows that the mental health, and general health domains was low in a quality of life among the families of Al-dora camp

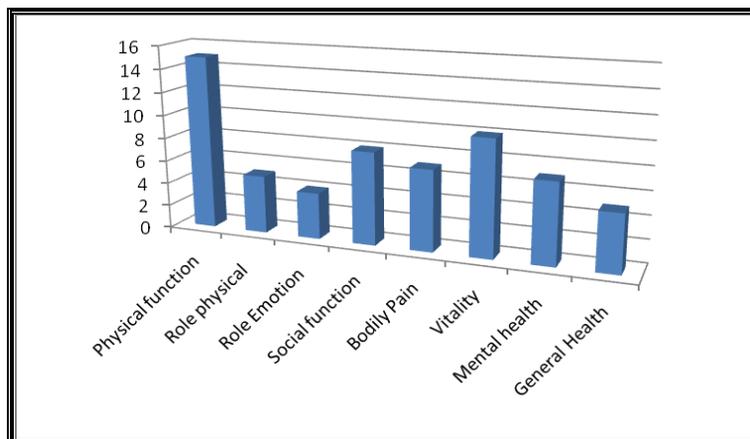


Figure 10: Quality of Life for Prophet of Yunus families camp

Low role physical, and role emotion was clear low in quality of life among Prophet of Yunus camp families (figure 10)

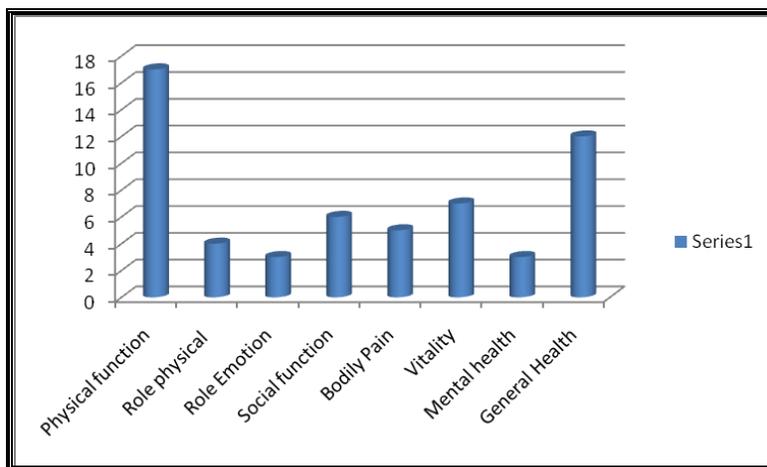


Figure 11: Quality of Life for Prophet of Zayouna families camp

Role emotion, and mental health was clear low in quality of life for Zayouna families camp (figure 11)

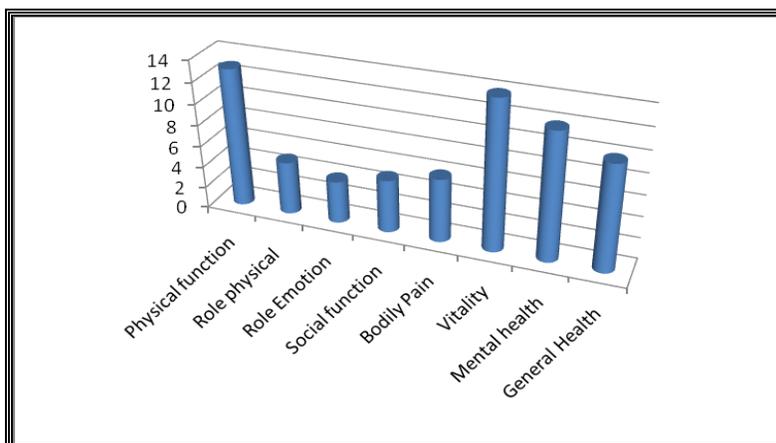


Figure 12: Quality of Life for Prophet of appeal families camp

Figure 12 shows that quality of life was low in domains role physical, role emotion, and social function among appeal families camp

IV. DISCUSSION

a health center and an ambulance was presence in the four camps of the study and is not available in Zayouna camp (Table 1) where the United Nations Office, (2015) the need to provide immediate assistance to the displaced and some cases need emergency care for women, children and the elderly, the disabled and survivors of torture and sexual violence through the provision of direct services by health centers and ambulances rushed from inside the camps.

Palepu, et al., (2012) in his revealed in their study that the people in the camps need to be their camps close to the hospital or clinic, as well as the presence of a doctor or nurse to call and the presence of a doctor or nurse about 24 hours a day in the camps is very necessary.

It emerged from the results of the current study that the health problems suffered by the displaced people after the

displacement from their home areas are developing high blood pressure, diabetes and respiratory, heart, gastrointestinal, joints and skin problems was highest rates in the university camp and Prophet Yunus.

Acharo Roberta and Den, (1995) in their study presented that the displacement effect more severe for children, women and the elderly, the disabled and moving the family to feelings of isolation and confusion, fear and pain and symptoms of mental illness, and morbidity of chronic and that the lack of a plan for their lives.

The current study found that the quality of life of families in the five study camps was low in domain of physical, emotional, social, mental and social health is clearly.

Giuliani, et al. (2015) presented in their results on 571 participants from the two conscripts who the earthquake city of L'Aquila, where they became displaced in other places and found that elderly people living in new cities and temporary housing have to imagine the worst of the quality of life of others and they feel a certain social isolation and want to live anywhere else.

In a study said Palepu, et al., (2012), which was conducted on 140 participants in the two Kinda of anhydrous them and their

answers were that health and access to health care is very important for many of the participants. Commented both youth and adult participants on the importance of being physically fit and mentally. While participants noted that they are suffering from health problems and these problems have a strong negative impact on their lives, and that "it is hard to be happy if you are not healthy".

Mannert, et al., (2014) in their study presented that the quality of life (QOL) tend to be lower among the homeless than the general population, and the painful events of these individuals have a negative impact on their quality of life. The results of his study that 83% of young people had been displaced into painful positions and 25% of them were post-traumatic disorder

Conclusions: The study concluded that most of the health problems suffered by the displaced families in the five camps are high blood pressure; diabetes mellitus, heart disease, digestive problems and the quality of life were low for displaced families at physical, emotional, and mental health domains.

V. RECOMMENDATIONS

1. Conducted continuous visits to conduct laboratory tests for risky people in the camps and emphasis on psychological support for the displaced families.

2. The importance of developing training programs that focus on improving the quality of life for the displaced in terms of physical, psychological and social coping.

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Analysis of Solar-Powered D.C Air Conditioning System

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Abstract- In this paper an attempt has been made to run a high capacity packaged type air-conditioner using solar energy. For this purpose the vapour compression cycle has been selected. In this the D.C powered compressor is used to save the losses of input energy. It is found that for cooling a given space 10TR capacity cooling unit is needed. As per market survey we found that package type vapour compression system can fulfil this requirement. To power this unit we need 12 photovoltaic modules of 345 W_p capacity connected in series. In this analysis the COP of system has been taken 2.52. Four quantities per panel of 24 volts battery are needed to give backup power for system.

Index Terms- PV modules, heat load, solar energy, package air-conditioner, package unit, D.C compressor, battery.

I. INTRODUCTION

Solar energy is one of the most available forms of energy on the earth's surface. The main purpose of using solar energy is to reduce the emissions of CO₂ and other harmful gases that are responsible for global warming and ozone layer depletion.

The air conditioning is an attractive field for the application of solar energy because of the availability of maximum solar radiation during summer season when we need cooling. This research program addresses the need for the development of new air conditioning. Now days we need such technologies that have lower operational cost and minimum impact on the environment.

Solar photovoltaic system and solar power is one of renewable energy system which uses PV modules to convert sunlight into electricity. The electricity generated can be stored or use directly, fed back into grid line or combined with one or more other electricity generator or more renewable energy sources. Solar PV system is very reliable and clean sources of electricity that can suit a wide range of application such as residential, industry, agriculture, livestock, etc.

Many studied have been done to develop efficient air conditioning system using solar energy. M. Okumiya et.al [1] had studied the performance of solar-thermal air conditioning system installed in an office building. X.Q. Zhai et. al [2] had designed and installed solar powered adsorption air conditioning system. N. Nakahara et. al [3] had discussed the roll of compound parabolic collector in this field. Z.F. Li and K. Sumathy [4] have been analysed the performance of solar absorption air conditioning system and found that generator inlet temperature of the chiller is the most important parameter in design and fabrication of solar powered air conditioning system. Kaled S. Al Qdah [5] has investigated the design and performance of air conditioning system using photovoltaic cell. Rachid C. et.al [6] have been optimize the photovoltaic system and calculated the solar radiation falling on the photovoltaic system.

In this present study our main goal is to cool a given space of a building using photovoltaic system. The solar energy is used to power the D.C. motor that run the vapors compression system.

II. METHADODOLOGY

For the purpose of analysis we have chosen space that is a classroom inside JMI campus, New Delhi, having size 20.5 x 7.66 x 3 m. it is required to cool the specified space for 6 hour. The heat load calculation has been done on the basis of building structure, outside and inside temperature and relative humidity. The design maximum temperature is taken 43° C during summer and the comfort temperature inside the room is taken 25° C with relative humidity of 60%. The detail heat load calculation is given in Table 1.0 the selected specifications of air-conditioning unit are as following specification:

- Type of System - Packaged air-conditioning
- Unit capacity -10TR
- Input Power -14kW
- Input Voltage -220V

**2.1 Heat Load Calculation:
 Table 1.0**

	SOURCES	LOAD (Watts)
Sensible Heat	Heat gain from walls, roof, floor, door & window	6560.45
	Solar heat gain through glass	756
	Heat gain from 60 person	4500
	Heat gain due to ventilation	6608
	Heat gain due to lighting	1680
	Heat gain due to fans	800
	Heat gain due to fresh air	2280
	TOTAL SENSIBLE HEAT GAIN	1.065×23184.45 = 24.7 kW
	Latent Heat	Heat gain from 60 person
Heat gain due to ventilation		2700
Heat gain due to fresh air		1176
TOTAL LATENT HEAT GAIN		1.06x7176 = 7.6 kW
TOTAL HEAT GAIN		24.7+7.6 = 32.3 kW

Considering Factor of safety 15%, the Grand Total Heat load become 10 TR.

2.2 Sizing of Photovoltaic panel:

A Voltage regulator is designed to automatically maintain a constant voltage level

$$COP_{cooling} = \frac{\text{Desired output}}{\text{Input Power}}$$

$$W = \frac{35}{2.52} = 14 \text{ kW}$$

Where the acceptable COP system recommended should be 2.52.

So, we need 14000 W for 6 working hours per day
 Input Power x Working hours in day= Work hours per day
 14000×6 = 84000 W.hr/ day

Per day minimum hour sunlight is 6 hr/day

$$\text{Total load capacity} = \frac{\text{work per day}}{\text{min sunlight /hday}}$$

We need photovoltaic solar system with capacity 14kW. To fulfill the requirement of this load we need 12modules as given in Table 2.0.

Table 2.0

Total load (kW)	Energy lost	P.V panel energy needed	Panel generation factor	Total PV panel capacity	Powered (Wp)	No of PV panel
14	1.3	18200	4.32	4212.96	345	12

So, this system is powered by least 12 modules of 345 Wp PV modules.

Nominal battery Voltage = 24V and 48 V.

Battery loss 80% = 0.85
 Depth of Discharge = 0.6

Table 3.0

Total load (kW)	Nominal battery Voltage – I (V)	Nominal battery Voltage- II (V)	Day of Autonomy (day)	Battery Capacity-I (Ah)	Battery Capacity-II (Ah)
14	48	24	6	3431.373	6862.745

Table 4.0

No of PV panel	Starting Current (I) when battery Voltage=48	Starting Current (II) when battery Voltage=24	No of battery needed - I	No of battery needed -II
12	48	24	2	4

III. RESULT

For a cooling space (20.5 ×7.66×3) m we have calculated cooling effect 10 TR. This capacity of cooling effect can be

achieved by using Package type air-conditioning system. To fulfil the requirement of power we need 12 photovoltaic modules of 345 W_p. The arrangement of modules and cooling unit is given in Fig.1.0

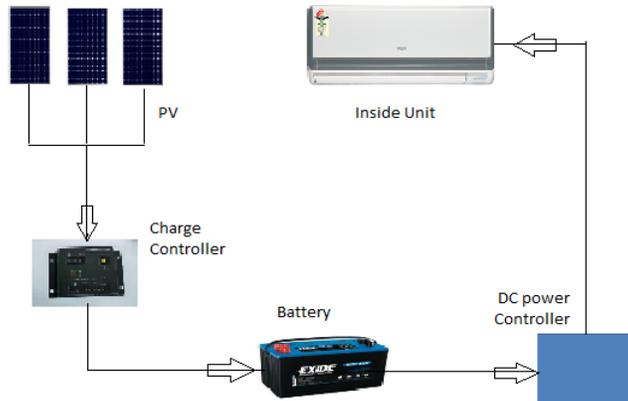


Figure 1.0 Final actual system cycle

IV. CONCLUSION

This work focuses on design, construction and testing to run a high capacity package type system air-conditioner using solar energy integrated with photovoltaic (PV) system and applying it under a classroom inside JMI campus, New Delhi climate conditions. The project comes as solution to reduce or save the losses of input energy by using D.C powered compression. For this purpose we need 12 PV modules of 345W_p. Two options have been adopted for selecting batteries. In one case we need 48 batteries of 24 Volts and 24 batteries of 48 volts to maintain the backup of the system.

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Emissions of Gasoline Combustion by Products in Automotive Exhausts

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Abstract- Increased gasoline consumption in automotive engines have triggered the emissions of greenhouse gases (GHG) especially carbon dioxide (CO₂) from automotive exhausts. These exhaust emissions depend on factors like the engine combustion design and operating conditions, fuel grade and lubricant, the state of maintenance and local road conditions and continue to affect the concentration of pollutants emitted by automobiles like CO₂ and unburnt hydrocarbons which are very toxic to humans, leading to environmental pollution. In pursuit of improved efficient engine and less toxic emissions, the use of gasoline blends and biofuels are not the panacea since the exhaust-gas concentration and its constituent are not indicative of the contribution of the constituent to the overall emission due to variations in exhaust-gas flow rate with different engine types and automotive sources. Moreover real-time monitoring, turbo-charging technologies, fuel injection strategies and catalytic exhaust aftertreatment may reduce emissions if compared to base engines but significant risk of CO₂ induced climate change continue to persist, while CO₂ capture technologies such as adsorption and absorption are limited in contrast to new developments in engine and exhaust technologies that are cheaper and locally sourced and could become the next trajectory.

Index Terms- carbon dioxide, combustion, emission, engine, gasoline

I. INTRODUCTION

Research and development has elucidated the relationships between vehicular operating conditions and vehicle emissions, but questions arise regarding the relationship between on-road vehicle emissions and stationary emissions as well as changes in vehicle speed and engine load that occur as driving conditions change relative to type of fuel and combustion engine^[1]. Studies have shown that transport is a major contributor to the emission of greenhouse gases (GHG) and perhaps carbon dioxide (CO₂) and its effects on health and environmental ecology are very severe^[2]. In 2006, transport accounted for 13% of global GHG emissions while 23% of global CO₂ emissions from fuel combustion are transport-related whereas transport related carbon monoxide (CO) emissions are expected to increase by 57% worldwide in the period 2005–2030^[2]. For e.g. in Lagos, Nigeria, CO from non fossil sources are relatively small compared to engines operating on fossil fuels especially trucks and generators^[3]. This increased gasoline consumption are triggered by population growth and increase in number of vehicles per capita. These promote more exhaust emissions from

combustion of gasoline consequently affected by fuel grade, vehicle age, vehicle model, engine size, fuel type and delivery system, catalytic converter, vehicle maintenance and road network and country of origin^[4]. For e.g. Japanese and German cars would be most likely to fail Jordanian and possibly Californian emission tests. In Cairo, Egypt, investigations of gasoline combustion emissions (pollutants) from vehicles confirmed CO₂, Hydrocarbon (HC), Nitrogen oxides (NO_x) and CO as major pollutants^[4].

Also in Nigeria, fuel emissions, open fires and restricted ventilation contribute to high ozone while non methane volatile organic compound (NMVOC) emissions are higher in India and China compared to most countries^[5].

The Nigerian GDP rebased economy recently surpassed South Africa,^[4] making it the largest economy on the continent. On the other hand, growing concerns of automotive exhaust emissions remain unchecked and worsened by bad roads, traffic congestion, malfunctioning vehicles, adulterated fuel and presence of sub-standard spare parts^[5]. Motorcycle exhaust emissions in Uyo, Akwa Ibom state Nigeria reveals that CO, Sulphur (IV) oxide (SO₂), Oxygen (O₂), Hydrogen sulphide (H₂S), Ammonium (NH₄) and Chlorine (Cl₂) are some of the major air pollutants^[6]. Moreover exhaust emissions from gasoline fuelled motorcycles are of higher concentrations in total hydrocarbon (THC) and CO than gasoline/methanol blend but lower in formaldehyde while the concentration of NO_x increased in the fuel blend whereas BTEX emissions: (Benzene, Toluene, Ethyl-benzene, p,m,o-Xylene) from gasoline combustion in motorcycles are higher in concentration than emissions from the fuel-blends^[7]. Emissions from traffic in developing nations contribute about 50-80% Nitrogen (IV) oxide (NO₂) and CO emissions, for e.g. assessment of air quality in Kano city, Nigeria along high traffic roads showed high levels of these pollutants indicating automobile exhaust emissions as mainstream air pollutants^[8]. Similarly, contributions from emissions of power generating equipments due to inadequate power supply and its implications in Port Harcourt, Nigeria showed CO to be 20,175.3 tons per year and CO₂ about 34,718.22 tons per year from gasoline generators and proposed inventory of emissions^[9]. Also Pollution is a major problem in the entire Niger delta region of Nigeria^[10], traffic emissions and other combustion processes releases toxic substances: VOCs, oxides of carbon, nitrogen, sulphur, particulate matter (PM) and heavy metals (HM) at levels exceeding national and international guidelines and will constitute a bigger challenge if it continues unabated and unchecked^[10].

Motor vehicle exhausts are also sources of trace metals, smaller amount of ions and carbonaceous aerosols^[10]. For e.g. heavy metals (HM) in Particulate Matter (P.M_{2.5}) are notorious

in Changsha, China and significant in spring with higher than normal concentrations with vehicular emissions, fuel combustion pollution as major contributors^[11]. However diesel and gasoline exhaust emissions differ in composition; diesel engines emit higher amount of PM, elemental carbon (EC), and ultrafine particles (UFPs) compared to gasoline vehicles which releases a higher fraction of Organic Carbon (OC). A number of polycyclic aromatic hydrocarbons (PAHs) have also been reported to be present in vehicle exhaust with inherent health risks^[12]. The effects of air pollutants on health are very complex; they affect the human health severely damaging the cardiovascular and respiratory system. Methane is a more potent GHG than CO₂^[13] whose atmospheric concentration can be affected by wind dispersion speed and other meteorological parameters like wind direction and temperature^[14]. But using remote sensing absorption spectroscopy techniques combined with Automatic Number Plate Recognition for vehicle identification showed that emissions of CO, HC, Nitrogen monoxide (NO) and smoke pollutant from petrol cars have being observed to decline with the introduction of each successive Euro emissions standard from Euro 1 onwards^[15]. This review introduces the problems of automotive exhaust emissions and the effects of exhaust emissions. It also evaluated the forms and sources of pollution with emphasis on gasoline combustion emission. Further discussions reviewed characterisation of exhaust emissions with focus on gasoline automotives, controls for exhaust emission especially CO₂, present challenges and practical solutions.

II. EFFECTS OF EXHAUST EMISSIONS

Gasoline is the fuel in liquid form used in internal combustion engine (ICE) of spark ignition type predominantly in automobiles and automotives made of complex hydrocarbon and blended components^[16]. In the USA, a study of its lifecycle and regulation to ensure performance and less environmental and health consequences confirmed that Companies seeking to register gasoline or gasoline additives into the U.S. commerce must submit to Environmental Protection Agency (EPA) a chemical description of their product. This information allows EPA to determine the likely combustion products and other emissions that may be released into the environment including toxicity tests; yet evaporative emissions and non evaporative emissions are only minimised^[16]. Moreover exhaust emissions depend on factors such as: the engine combustion design and operating conditions, the fuel grade and lubricant, the state of maintenance, and local road conditions^[17]. In Europe about 20% of all CO₂ emission comes from road transport^[18] and concerns over exhaust emissions have been part of the apprehension, especially CO₂ being a GHG in automotive markets globally. Although methane (CH₄) & N₂O emissions can have a global warming impact with as much as 1% - 3% emissions from a given vehicle, CH₄ is converted to CO₂ and H₂O generally increasing the emission levels of CO₂ emitted from automotive exhaust. However, ethanol blends if used as an alternative fuel has no significant difference in emission of CO₂ while Compressed Natural Gas (CNG) and Liquid Petroleum Gas (LPG) could reduce CO₂ exhaust emissions. Vehicle technologies, strict legislation, quotas and incentives may have emerged to reduce exhaust emissions but evidence still shows

that laboratory measured emissions are different from real time on road exhausts emission measurements.^[18] Analysis of 60 office workers and truck drivers exposed to traffic related PM_{2.5} and its correlation to lung infection in Beijing, China showed that Si, Ti, Al, and Ca of PM_{2.5} were common among truck drivers and negligible in office workers a pointer that occupational exposure could be indicators of toxicity levels of particulates. Pollutants emitted by motor vehicles such as CO, CO₂, NOx, HC, and SO₂, lead (Pb) and suspended particulate matter (SPM) are very toxic to humans and leads to environmental and economic losses.^[20] These exhaust gases are responsible for pollution. The ICE requires the chemically correct Air Fuel ratio. In petrol engines, the gases comprise a mixture of unburnt hydrocarbons (UBHC), CO and NOx, if in excess quantities, vehicular pollution is caused contributing to atmospheric pollution. The principal emissions from gasoline vehicles are crankcase blowby emissions making up of 40% in a four stroke engine and less than 1% in 2 stroke engines^[20]. Also evaporative emissions make up 20% in a four stroke engine and exhaust emissions up to 60% and as high as 97% in a two stroke engine with evaporative emission only 3%.

In pursuant of improved clean air act regulations for fuel and fuel additive registration^[21], the petroleum producing industry, additive producers, and makers of oxygenates conducted comparative toxicology testing on evaporative emissions of gasoline alone and gasoline containing fuel oxygenates were able to mimicking real world exposures which indicated levels of genotoxicity, subchronic toxicity, reproductive toxicity, neuro and immune toxicity, simultaneously. However atypical and typical gasoline blends, consist of fuels or fuel additives that contain elements such as antioxidants and metal deactivator other than carbon, hydrogen, oxygen, nitrogen, and sulphur^[22]. Also research on the extent of gasoline exposure to both workers and consumers has been for several decades. These hazard and exposure data provide useful data set for the purposes of gasoline risk assessment and a regulatory purpose which includes measures to minimise exhaust gas emissions of CO₂. In a study to evaluate health assessment of gasoline and fuel oxygenate vapours on subchronic inhalation toxicity, rats were exposed via inhalation to vapour condensates of either gasoline or gasoline combined with various fuel oxygenates to determine whether their use in gasoline affects the hazard level of evaporative emissions.^[23] The results showed evidence that the use of the studied oxygenates is unlikely to increase the hazard of evaporative emissions during refuelling, compared to those from gasoline alone indicating that regulated exhaust emissions are the major cause of air pollution^[23]. CO has been attributed to car exhaust suicide through poisoning in the USA and Great Britain in the 1960's, and in the 1990's it accounted for fourth leading method of committing suicide in Sweden^[24] but has been on the decline since the introduction of car emission control in USA and its removal in domestic gas in Britain.

Research in Isfahan, metropolis in Central Iran showed correlation with previous researches that vehicle exhausts, lubricants, weathered materials from road surfaces, tire particles, and atmospherically deposited materials are responsible for PAHs and heavy metal concentrations in the surface of road dust within urban areas^[25], therefore characterizing the anthropogenic

sources of heavy metals and PAHs in road dust is significant in quantifying levels of pollution. Similarly HMs in road dust samples which can cause siliceous disease of the lungs was been determined in Yola, Adamawa state, Nigeria. In addition automobile emission, metal welding and exhaust from generators have been identified as the major contributors in Nigeria [26]. Also, particle size and surface area can influence the negative effect of pollutants as demonstrated in the characterization study of combustion particles from vehicle exhaust and wood smoke [27] which showed that combustion particles from vehicle exhaust are characterised by a larger surface area to mass and a lower content of OC and PAHs, as compared to wood smoke particles.

Another Study also confirmed that particle toxicity increases with surface area while a high content of OC and PAHs have been associated with increased inflammatory responses. Additionally toxic effects of particulate matter from exhaust emissions affects populations of ecosystem due to their complex physicochemical characteristics [17]. In a country like Nigeria, gasoline exhaust emissions had become the major air pollutants in the atmosphere and not diesel exhaust emissions. The likelihood of more harmful toxicological effect will be significant due to smaller particle diameter [28]. The three major emission phases are gaseous phase, soot particles, and semivolatile organics. They have been shown to cause oxidative damage to lungs and brains in rats by increasing DNA single strand break, promoting lipid peroxidation and oxidative protein damage and decreasing activities of Superoxide dismutase in lungs and brains. In contrast, diesel fuelled vehicles have higher particulate emissions than gasoline fuelled vehicles due to PAH content in the fuel contributing significantly to emissions from traffic sources [29]. But its occurrence in the atmosphere is a major concern because of their mutation and carcinogenic potentials. Therefore there should be a need for controls either through air quality regulations or exhaust emission controls [30].

In regulation and control of toxic exhaust emissions, seasonal variation has continued to play an important role from roadside to tunnels [31] even to non road side emission and vehicular emission has been identified as a predominant contributor to high variation of PAH. Moreover vehicular transport is now recognized as urban air pollution source. Associated with urban pollution are the 5 ring coarse PAHs of PM_{2.5-10} and fine PM_{2.5} particulates at urban sites known to cause lung cancer. Thus to protect public health is to reduce exposure to vehicular traffic emissions [32].

Analyses of VOCs vehicular emission measurement of a tunnel in Hong Kong contributed to photochemical smog due to released photochemical oxidant precursors and formation of ground level O₃ in many urban areas of the world. The smog is a complex mixture of O₃, NO₂, nitric acid (HNO₃), aldehydes reacting with NOx and HC while ozone formation precursors like ethane, propane and toluene are associated with gasoline fuelled vehicles [33]. Benzene and other VOCs have also been noted to be of higher indoor concentration in southern Europe than the Northern Europe possibly due to volatilization. The guideline for benzene concentration in Flanders region Belgium is at 2µgm⁻³ and China to be 90µgm⁻³ showing a large difference in safety limit margins. But since natural dispersive forces produce exchange between indoor and outdoor environment, then it means that fuel and solvent related pollutants are more abundant

in countries with no strict implementation of exhaust emissions of pollutants [34].

Motorcycle is a major source of transportation in some countries and emissions from motorcycle exhaust is a source of PAH. Carcinogenic Benzo [a] pyrene [32, 34, 35, 36] has been found in motorcycle exhausts and vehicular exhausts and may be due to the highly toxic VOCs generated from incomplete combustion from motorcycle, its exhaust emission is significantly more toxic than BTEX [22]. Also powered two wheelers has been a popular transportation mode in Southern Europe like Italy. Incomplete combustion from powered two wheelers are known carcinogenic contributors of VOCs like 1,3 Butadiene however, their depleting ozone effect is negligible when compared with respect to CO₂ [37,38].

Research also confirms that the main pollutant in vehicle beside VOCs concentrations under static conditions, include HC, CO₂, SO₂, NOx, PM and various C₇-C₁₂ alkanes, however factors, such as [38,39] vehicle model, Vehicle age, temperature, air exchange rate, and environment airflow velocity affects them. A recent work investigating air quality in Multi-Storey Car Parks and exhaust emissions also proved that the main harmful exhaust emissions based on the motor vehicles are gases such as CO, HC, and NOx [40]. These pollutants increases in closed environments like poor ventilated car parks but below threshold limit value (TLV) in temporary car parks and thus do not pose any danger in health risk [40]. Studies in India verified that adulterated fuels still finds its way into the market causing emissions of significant higher levels of HC, CO and NOx and SPM. HC and CO have been observed to be higher in petrol adulterated with kerosene but with reduced BTEX emissions [41] while petrol ethanol blends had reduced CO, HC, NOx vehicular emissions compared to unleaded fuels. The exhaust gases from ICEs are complex mixtures consisting principally of the products of complete combustion or incomplete combustion and its major constituent are H₂O, CO₂, N₂, O₂, CO and H₂ and [42] minor constituents including oxides of SOx, NOx, aldehydes, organic acids, HC and smoke and small amounts of the oxidation products derived from the fuel and lubricant. Because the exhaust-gas concentration and its constituent is not indicative of the contribution of the constituent to the overall air-pollution problem due to wide variations in exhaust-gas flow rate with different engine types and automotive sources [42] under different operating conditions; the amount of the constituent exhaust gases discharged per unit time therefore plays an important role and driving conditions has remarkable effect on the emission rate of all constituents [42].

III. FORMS AND SOURCES OF EXHAUST EMISSIONS

The transport sector is a major source of air pollution and CO₂ emissions. These emissions will increase sharply as the global vehicle fleet is projected to grow between 2 to 3 billion vehicles by 2050 mainly in developing countries contributing over 50% of urban air pollution [1,2]. A comparative estimation into road vehicle exhaust emission in Genoa Italy from 1992-2010 and air quality showed a sharp 7% increase in vehicle number and 22% increase in mileage. Total emissions decreased for CO, HC, NOx, CO and PM due to improved technologies and rigid European legislation while NO₂ remained almost unchanged [43]. A study investigating source apportionment of

VOCs in an industrial area in Nanjing, China using their large differences in their atmospheric photochemical activities was used as a tracer for combustion sources indicated^[44] that the sources are mainly automobile emission sources, combustion sources, and industrial and volatilization sources with marked seasonal variations. Similarly, source apportionment study of gaseous and particulate PAHs from traffic emission in Shanghai, China using tunnel measurement identified the main sources of the gaseous PAHs to be combustion engine and combustion of fuel traffic related emissions based on PAH used as a chemical tracers of traffic exhaust^[45]. An early Preceding research on combustion engine running on gasoline when compared with engine running on methanol demonstrated that engine emissions are dependent on running conditions and different condition produces different results, however HC are found in both exhausts but lower in methanol engine also higher concentration of methanol and aldehydes are obtained in methanol engine exhaust^[46] agreeing with a more recent research that ethanol blends reduces CO and HC but with increases CO₂ and NOx emissions^[47].

In a similar study of motorcycle Exhaust and evaporative emissions from motorcycles fuelled with ethanol/gasoline blends, it was observed that regulated emissions of CO and THC decreased while NOx increased but regulated emissions of VOCs decreased with increases in carbonyls^[48]. Subsequently biofuel consisting of gasoline ethanol blends operated in a gasoline injector engine with installed alcohol injector produced different exhaust emissions at different engine loads and driving conditions^[49] while biodiesel in contrast is not suitable as fuel for ICES,^[50] though it serves as an alternative fuel for compression ignition engines (CIE) with attendant sulphur content and reduction of CO₂ emissions^[51, 52]. Moreover investigations carried out on the emissions and performance characteristics of a H₂/O₂-gasoline fuelled Spark Ignition engine (SIE) reduced THC and CO emissions but increased levels of NOx a precursor of photochemical smog,^[53] also the effect of air fuel stoichiometry ratio on emissions studied on oil fired furnace demonstrated that automotive exhaust emissions occur within a fairly narrow band of mixtures and can be reduced by changes in design for efficient combustion.^[54]

Gasoline grades are popular with ICEs and its composition affects combustion and exhaust emissions. A comparative analysis of gasoline showed that Nigerian gasoline due to its chemical composition is most likely to be below international standard among Holland and Kuwait gasoline samples although low in sulphur content^[55]. In reducing exhaust emissions on new gasoline blends in Mexico using physicochemical properties, a reduction of CO, THC and NOx was achieved at sulphur levels of 89ppm and 34ppm because if at such low concentration catalytic converter increases efficiency^[56] and in reducing emissions from automobile exhausts, Mexican government has directed the use of gasoline/ethanol as fuel improvement research showed decrease in CO, HC and NOx^[57]. Another study on the effects of octane number and fuel systems on the performance and emissions of a spark ignition engine indicated that lower octane gasoline grade emitted higher concentrations of THC and CO at higher engine loads^[58]. On the alternative, the effects of gasoline/diesel blended fuel on combustion and exhaust emissions when investigated, indicated that higher gasoline

fraction of up to 40% resulted to incomplete combustion while lower fractions had tendency for emission reductions^[59] furthermore profiling of emission of diesel and gasoline cars at city traffic junction using no load conditions demonstrated that a diesel exhausts emit higher particle peak number concentrations compared to gasoline exhaust emissions on volumetric basis. Also increasing engine speed increases CO and NOx emissions of both cars but fuel lean conditions of diesel engines leads to reduction in HC emissions^[60].

Also emissions studied on the flow of traffic at traffic junctions made remarkable impact on vehicular emissions confirming that CO, NO₂ and PM emissions at road intersections increases but unaffected at roundabouts with continuous traffic movement except at weekend days^[61] although the emissions come from light duty vehicles (LDV), however, in U.K with large fleet of light duty diesel engines have made a significant reduction in both NO and smoke emissions since the transition from Euro III to Euro IV vehicles^[15]. Moreover engine loads and vehicle speed are closely linked to fuel consumption and pollutant emission rates^[1] as well as driving conditions. An investigation of gasoline direct Injection engine (GDIE) particulate emissions rates in the real world driving conditions using standard driving cycles shows that the ratio of semi-volatile particles to total particle number is generally higher during acceleration followed by the idle operating mode. More particles per kilometre are produced during acceleration compared to cruise conditions^[62]. The use of Methylcyclopentadienyl Manganese Tricarbonyl (MMT) in GDIE as antiknock and to improve octane rating increases the total particulate mass (TPM) and number concentrations and increases CO and NOx emissions while HC decreases significantly with the increase of MMT content in the test fuels, although phased out in 2004^[63, 64]. Research on the effect of different alcohol fuel use on the performance, emission and combustion characteristics of a gasoline engine when compared with gasoline fuel showed that NOx, HC and CO emissions increased while CO₂ emissions increased^[64] although MMT has been phased out while that of gasoline/methanol blends in passenger cars at 15% methanol by volume showed that THC and CO decreased while NOx increased and formaldehyde almost doubled whereas unregulated carbonyls and VOCs increased at 19% and 23%^[65].

Dispersion also plays an important role in emission sources as statistics shows 20,000 tonnes of hydrocarbons released into waterways from boats on two stroke engines on studies of the mixing and dispersion of emissions from a vessel using organic dye as tracer showed that initial concentration of pollutants decreases with time due to dispersion^[66]. The Ocean going Vessels alone in Hong Kong have contributed 0.07% NOx, 0.05% SO₂, and 0.06% PM₁₀ out of the global total shipping emissions as at 2007^[67]. In the U.S alone, generator use has climbed in recent years, from an estimated 9.2 million units in 2002 to 10.6 million units in 2005, a study investigating the dispersion and indoor CO exposure associated with running a generator indoors in an enclosed shed found that for consistent weather conditions it would take about 2 hours for the emission to reach most rooms of the house at dangerous levels^[68]. Similarly vehicular emissions are also known sources of HMs. HMs such as Cu, Zn, Cd Pb in PM_{2.5} from Changsha, China in spring using peripheral component analysis (PCA) showed

sources are from fuel combustion, vehicular emissions and other pollutant sources^[69] likewise a study of road traffic emissions using simultaneous measurements of HMs at street and roof level, enabling calculations of emission factors using a tracer technique demonstrated that annual concentrations of Cd, Ni, As and Pb had decreased significantly while 80% of road emissions of Ni and 40% of Zn are from road traffic emissions^[70]

Review of vehicle related metals and PAHs in the UK environment as a continuing source of persistent pollutants in the environment confirmed that while other pollution sources are reducing, automobiles have remained a major source of Cu, Zn, and PAH^[71]. Study reveals that different fluorescence spectra will arise from the exhausts of different combustion systems when operated with the same fuel. This suggests that the routes of formation/oxidation of organic species depend on combustion conditions^[72] thus rain water samples analysed showed a strong absorption band below 250nm, with shape similar to those observations in condensed combustion-water samples indicating predominance of traffic emissions^[72] and a major source of urban pollution^[73]. Toronto, Southern Ontario Oxidants Study of 1992 was used to determine some of the factors leading to the production of high ozone levels in the Windsor to Quebec corridor. Results showed that HC distributions measured in the urban area had vehicle exhaust as the most contributing source [74] even previous research has identified the major PAH source from traffic emissions are from traffic mainly from diesel vehicles leading to recent shift to lighter diesel fuel vehicles^[12,27,29,75]

As traffic emissions continue to unsettle the world, nations continue to seek divers solutions. In Delhi, India under the proposed road map of emission standards and vehicular technology for on-road vehicle emissions from two wheelers, 4 stroke engines and CNG, PM_{2.5} emissions in 2030 will be halved, CO emissions will reach three times, and VOC and NOx emissions will at least stabilize compared to 2014 estimates^[76]. In Malaysia, the presence of high concentrations of Benzo perylene at all locations suggested a source indicator for traffic emission. Diagnostic ratio analysis and PCA also suggested substantial contributions from traffic emission with minimal influence from coal combustion and natural gas emissions^[77]. Additionally the use of catalytic converters in vehicles gives cleaner exhaust compositions and emissions with characteristics that are distinct from those obtained in the absence of catalytic converters^[78]. Furthermore, a laboratory and an on-road study of exhaust particles of modern gasoline vehicles indicated that under transient driving conditions gasoline vehicles can emit particles consisting of the lubricant oil originating compounds, also particles are emitted during acceleration and steady speed conditions but also during engine braking when the fuel is not injected into the combustion chamber^[79] and in two powered wheelers it has been noted that the modern technology used to lower regulated compounds would have a negative effect on unregulated compounds like carbonyls and organic aerosol producing more harmful pollutants^[80] while two stroke carburettor motorcycle exhaust emission is dominated by submicron particulates^[35]. Carbonyl emissions ranging from $2.3E^{-01}$ to $4.8E^{-01}$ gkg⁻¹ fuel dominated by formaldehyde have also been found in exhaust nozzle of aircraft while PM emission indices are found to increase from $1.1E^{-02}$ to $2.05E^{-01}$ gkg⁻¹ of

fuel with increase in power from idle to 85%^[81]. Thus sources and forms of automotive exhaust varies for e.g. vehicle surveillance program in Southern California noted that the contribution of emissions from malfunctioning vehicles to total fleet emissions increased from 16% to 32% for the 1995 fleet to the 2003 fleet even as percentage of malfunctioning vehicles in the fleet decreased from 10% to 5%. Malfunctioning vehicles are mostly vehicles that are at least 10 years old and generally have higher acetylene emission rate ratios. The successful identification and control of these malfunctioning vehicles will become increasingly important for improving mobile source emission estimates and reducing future tailpipe emissions^[82].

IV. CHARACTERISATION OF EXHAUST EMISSION

Characterisation of exhaust emissions requires extensive laboratory work. From the table 1 below the early laboratory work involved the use of IR spectrum and old analytical techniques^[83,84]. By 2001, GC coupled to Mass Spectrometer or Flame ionization Detector and other specialised equipments had become popular^[85,86,87,88] and researchers pursued specific objectives. Heavy metals were uncommon but became research areas due to toxicity levels and development of more specialised instruments^[81,87,88,89,90]. By the time awareness became a trajectory; several researches emerged to solve the emerging challenges presented by exhaust emissions^[91,92,93,94,95,96]. Also more advanced combustion engines needed to be tested and more advanced procedures became the norm been advancement and modification and improvement from already known techniques^[97,98,99,100,101]. With the advancement in emission measurement and introduction of Euro III and Euro IV cars, the levels of emission needed to be measured accurately and toxicological levels quantified^[102,103,104,105,106] moreover the use of fuel blends became acceptable and researches move to reduce emission and improve performances^[107,108,109,110,111,112] and today ICPMS and GCMS/FID have become advanced instruments for analyses of exhaust gas emissions: VOCs, PAH, PM, HMs from exhaust while gases of concern are CO, CO₂, NOx, THC and HC and usually analysed with exhaust gas analyzers. But a systematic characterisation of exhaust emissions will initially involve the determination of physicochemical properties of the fuel. Samples are taken and analysed using ASTM or approved methodologies^[20,113]. Further analyses may be carried out to determine the chemical composition of gasoline or fuel^[114,115,116,117] which usually contain HC fractions C₈-C₁₂ and BTEX. A Gas chromatography coupled to flame ionization detector (FID) or mass spectrometer may be then utilized to determine the VOCs concentrations of the exhaust emissions^{[[33,37,65,91,92,98,99,118,119,120]}. Determination of particulate matter in exhaust emissions are often carried out along with determination of polycyclic aromatic hydrocarbon^[17,31,89,101]. CO₂ and other gaseous pollutant have been identified as a major exhaust pollutant and continual measurement^[57,83,84,92,93,95,105,106] has remained ongoing and major focus on CO₂, CO and NOx exhaust emissions. Fuels contain elements, other elements in additives and antiknocks other than carbon which are transformed during combustion and the effluent gases contain metallic products in addition to CO₂ and H₂O. Therefore the determination of heavy metals from exhaust emissions^{[17,70,90,94,}

^{112]} formed a major focus for scientist due to heavy metal poisoning and toxicity levels in the atmosphere. However some bio-indicators like moss and lichen are being used to indicate the levels of bio-toxicity of HM in the environment. ^[94,118,119,121].

However from the table 1 below, it can be seen that the recent focus on exhaust emissions is the testing of engine performance relative to emission reduction.

Table 1: Analyses and characterisation of automotive exhaust emissions

AUTHOR	OBJECTIVE	SOURCE	FUEL	AREA	INSTRUMENT	GASES	METAL	STATISTICAL ANALYSIS	TOXCITY	REF S/N
Twiss S.B et al., 1955	Exhaust gas analysis of hydrocarbon	Engine manifold & Exhaust Analysis	Gasoline	Stationary dynamometer	IR spectroscopy Thermocouple Manometer	CO ₂ ,CO, HC, NOx, UHC	No	IR spectrum & Excel software	Non dispersive IR gas analyzer recommended. Both results agree.	83
Martin A. Elliot et al., 1955	Determination of exhaust composition	(Motor coaches) Gasoline exhaust. Diesel exhaust Propane exhaust.	Gasoline Diesel Propane	Stationary	Mass spectrometer Orsat analysis Phenylhydrazine ferricyanide , Phenol disulfonic acid method	CO, CO ₂ , N ₂ , O ₂ , H ₂ , SO ₂ , SO ₃ , HCHO, CH ₃ OH & smoke	No	Simple diagrams	Exhaust gas constituent alone not indicative of overall air pollution	84
Dennis Schuetzle et al., 1983	Vehicle emissions & biological testing correlation	Vehicle exhausts	Gasoline/diesel	Chassis dynamometer	HPLC, Dilution tube sampling of vehicle, fluorescence GC-MS	NO ₂ ,CO, CO ₂ , NOx, PAH, C ₈ -C ₁₈ , Nitro-PAH, OXY-PAH,	NO	Microsoft excel	No correlation of vehicle exhaust & mutagenicity	103
Alan Gertler et al., 1997	Characterisation of vehicle emissions ozone correlation	HDDV, LDV, HD SPARK IGNITION	Gasoline/diesel	Tunnel measurement (cassia tunnel)	Toddler bag samplers Gas Analyzers	CO, NMHC, NOx,	No	MOBILE 4.1C MOBILE 5C	MOBILE ratios of CO/NOx & NMHC/NOx in agreement	104
H. Wingfors et al., 2001	PAH Characterisation	Road Traffic (HDV & LDV)	Gasoline/diesel	Urban Traffic tunnel	Gravimetric method Sohxlett extraction HPLC GCFID	PAH, HCs, PM1, 2.5 & 10um, TSP	No	PCA, PLS Multivariate analysis	PAH mainly from Diesel Vehicles	85
Stephen Harris S.J et al., 2001	Characterisation of PM & distribution	Gasoline/diesel engines	Gasoline/diesel	Tunnel dilution & tailpipe sampling, exhaust	Scanning mobility particle sizer (SMPS)	PM	no	Coagulation model Excel software	Soot oxidation a major determinant	86

Cohen, D.D. et al., 2005	Investigation before, during and after trial of MMT introduction	Exhaust emissions	gasoline	Basin area and urban area	Particle induced X ray & y ray emission, Particle elastic scattering, Rutherford back scattering	PM _{2.5}	Mn, Al, Si, K, Pb	Paris-winsten regression & spearman correlations, Excel software	Continous monitoring where DDT is used	87
Hei-Hsien Yang et al., 2005	PAH particle size distribution characterisation	2 stroke carburetor Motorcycle exhaust	Gasoline/diesel	European driving cycles: Idle Cruising Acceleration deceleration	MOUDI impactor GC-MS	21 PAH	No	Excel software	Submicron particulates dominates motorcycle exhaust	35
Anette et al., 2006	Physicochemical characterisation	Vehicle exhaust /wood smoke	Gasoline/diesel	MOTR OWAY TUNNEL urban	TEM/HR/TEM, EELS & SAED/GC-MS/TOTA	16PAH/EC/OC/TC	NO	SPSS ANOVA	Undetermined/ Mutagenic/ Carcinogenic	88
Michael.D. Geller et al., 2006	Physicochemical & Redox Characteristics of PM	Renault Laguna, Peugeot 306, & Honda accord Passenger cars	Gasoline/diesel	Chassis dynamometer using New European Driving Cycle (NEDC)	CVS, fine articulate sampler, Condensation particulate counter, thermal optical transmittance, HPLC, scanning mobility particle counter	EC, OC, PAH, PM	Ni, Zn, Be, Li, Mg, Al, S, K, Ca, V, Cr, Na	Excel software	Toxicity level need to be reviewed upwards	89
Vassilakos Ch. Et al., 2007	Variations of HM in PM ₁₀	Ambient air	Unknown	Urban & sub-urban	Air quality monitoring stations Horiba APNA 360 ozone analyser, FAAS, EMS Andersen Instruments automatic sampler.	Aerosols, PM ₁₀ , NO, NO ₂ , O ₃	Cd, Pb, Ni, As, Hg	Excel software	Dispersive winds affect ambient gaseous pollutants	90
Harshit Agrawal et al.,	Chemical Characterisation of PM in	Aircraft Exhausts nozzles	Aviation fuel	4 different engine	HPLC-DAD, Thermal/optical Carbon	EC, OC, carbonyl emissions, PAH, n	Cr, Al, S, Si, Fe,	Excel software	Types of engine affects metal distribution	81

2008	Aircraft engines			power testing on wing at ground run up closure	aerosol analyzer, XRF, ICP-MS	alkanes, dioxins, CO ₂				
Ying Liu et al., 2008	Source profiling of VOCs	Exhaust Gasoline vapour burning & petrochemical industry etc	Gasoline, diesel coal & biomass & petrochemicals	Chassis dynamometer ECE driving cycles & urban driving cycles	GC-FID/MS CVS	92 VOCs	No	Excel software	1,3 butadiene as exhaust tracer while n butane, trans-butane & n-pentane as gasoline vapour tracer	91
Johansson .C. et al., 2009	Quantify road traffic emissions and HM	Road traffic emission	Unknown	Urban air in street canyons & road tunnel	MAD, ICPMS ICPOEMS	NOx tracer	Cd, Pb, Ni, As, Zn, Cr, Cu, Mn, Sb, Mo, W	COPERT III Gaussian air quality model	Exhaust emission a major Ni, Zn Pb a major ambient contributor	70
Vouitsis.E. et al., 2009	Physicochemical characterization of PM in LDV	Gasoline/diesel vehicle exhaust 3 types of LDV	Gasoline/diesel	Urban, road, motorway & Mild accelerations	Condensation particle counter, Scanning mobility particle sizer Constant volume sampling, ion chromatography, HPLC/FD EDXRF	CO ₂ as a trace gas PAH, PM, aerosol	Ba, Cd, Co, Cr, Cu, Fe, Mn, Ni, P, Pb, Sb, Se, Sn, Ti, Zn, Te,	Excel software	PM emissions are most often unrelated to ecotoxicity	17
Ho K.F et al., 2009	Determination of Vehicular emission of VOCs in a tunnel	Vehicle exhaust : LDT HDT LPG	Gasoline/diesel	Direct measurement in road Tunnel. Two Monitoring station	Hydrogen gas Methanizer, GCFID GCMSD	110 VOCs CO, CO ₂ , OCS, CH ₄ , NMHCs,CS ₂	No	Excel software	Ethane, toluene, n-butane, propane & i pentane most abundant	33
D.A Thornhill et al.,	Quantify gasoline/diesel vehicle	Vehicle emissions	Gasoline/diesel	On road (city roadways)	Non dispersive IR & Aerodyne	CO, CO ₂ , NO, NO ₂ , NH ₃ , HCHO,	no	Positive Matrix Factorization receptor	Gasoline produces more CO & NOx while diesel more	105

2010	emissions			Aerodyne mobile laboratory	IR, photometer, PTR-MS, QC-TILDAS	Benzene, PM, BC, Toluene, Acetone, aldehyde		model	VOCs. idling in measurements should be accounted for.	
N. Seshai ah, 2010	To achieve Performance & lower emissions in blends	Spark Ignition engine	Gasoline/kerosene Gasoline/ethanol	Laboratory experimental test rig	Orifice meter, burette, gas flow meter, orsat apparatus	CO ₂ , CO,	No	Microsoft excel	Kerosene blends gives more emissions	106
D.Balaji et al., 2010	To determine emissions & performance in Isobutanol Blend.	Spark ignition engine	Gasoline/isobutanol Gasoline/ethanol	Eddy current dynamometer	Sun glass Analyzer MGA 1200 (NDIR)	CO, CO ₂ , NOx, HC,	No	Microsoft excel	Blends reduced CO & CO ₂ but NOx increased	107
Dhanapal Balaji et al., 2010	Exhaust emission & combustion of unleaded gasoline & additives	Spark ignition engine	Gasoline/ethanol	Eddy current dynamometer	Sun glass IR Analyzer	CO, CO ₂ , NOx, HC,	No	Microsoft software	Ethanol in gasoline reduces emissions	108
Adam, T.W et al; 2011	Chemical composition, Emission factors & ozone formation potentials	LDV exhausts (dual fuel cars)	LPG/gasoline	Chassis Dynamometer	REMPI-TOFMS HPLC GC-FID	CO ₂ , CO, NOx, THC, carbonyls, Volatile hydrocarbons	No	LABVIEW Excel software	Chemical composition of emissions affects vehicle performance	92
G.A. Rhys-Tyle et al., 2011	Significance of emission standards in LDV	LDV	Gasoline/diesel	Instrumentation intercepted primarily light vehicle exhaust plumes. Total of 94328 matches. 54599 valid emissions matched to vehicle identification	Pre-existing Data collected using roadside remote sensing absorption spectroscopy techniques combined with Automatic number plate recognition (ANPR) (IR and UV)	CO, CO ₂ , HC, NO, smoke	No	Vehicle registration plate number software matched against Driver & vehicle registration database (DVLA)(UK)	Petrol cars had Successive downward emission trend with introduction of emission standards from EURO 1 onwards	93

Bajpai R. et al., 2012	Determine Road emission & HM level	Ambient air	Bioindicator (Lichen Thallus)	urban	UV scanning spectrophotometer, ICPMS	No	As, Al, Cd, Cr, Cu, Fe, Pb, Zn,,	LSD-test One way ANOVA,	Concentrations increases near roadside	94
Clairotte M. et al., 2012	EURO 2-Emission compliance of Powered two wheelers (mopeds)	Exhaust emission	Gasoline/diesel	Chassis dynamometer	FTIR spectrometer, REMPI-TOF-MS MAAP Condensation particle counter CO ₂ analyzer	CO ₂ , CH ₄ , N ₂ O, organic Aerosol, carbonyls PAH	No	PCA Multivariate analysis	After treatment may be potentially harmful	80
KIM J.Y et al., 2012	Determination of seasonal variation of roadside PAHs	Roadside & ambient air	Gasoline/diesel	Monitoring station	GC-MS	16 PAH particulate & Gaseous	No	Excel software	Toxicity level could be a concern	31
Janaka Gunawardana et al., 2012	City Traffic contributions of PAH & HM from exhaust	Diesel vehicles Petrol vehicles	Gasoline/diesel	City heavy traffic (street and city park area)	High volume polyurethane foam. Total sampling volume GCMS ICPMS	PAH, TSP	Zn, Pb Cd, Mn, Ni, Cu, Cr	MCDM e.g. PROMETHEE & GAIA Microsoft excel	Traffic sources are major PAH contributors	109
Yenny Gonzalez et al., 2013	Comparative study of UFP in vehicle exhaust, ship emissions & oil refinery	Vehicle exhaust Ship emissions, Oil refinery	Diesel engines Gasoline engines Ships refinery	Entries & exits at harbour, refinery area, City main roads	Gas analyzers, ultra fine condensation particle counter (UCPC) Multiple angle absorption photometer	PM _{2.5} , PM _{2.5-10} , BC, NO _x , SO ₂ , SO ₃ , CO, O ₂	No	Microsoft excel	UFPs background linked to vehicle, ship & refinery are major source	110
Sekimoto et al., 2013	Characterisation of nitromethane & time resolved Determination	Automotive Exhaust (gasoline passenger car + diesel trucks)	Gasoline/diesel	Stationary	Proton transfer reaction mass spectrometer/ chassis dynamometer PTR-MS	Nitromethane, CO ₂ , CO, NO _x	No	Excel software	Nitromethane suppressed in gasoline due catalytic converter	95
Drew R. Gentner et al.,	Chemical Quantification, emission	Gasoline/diesel exhaust, non	Gasoline/diesel	Tunnel measurement.	GC-MS, GC-FID, IR spectrometer	N butane to N pentadecane.	No	SAPRC-07 MIR MOIR Excel	Gasoline a major contributor of pollution & Organic	96

2013	factors & ozone formation potential	tailpipe gasoline exhaust			r	(C ₄ -C ₁₅), SOA, VOCs, branched alkanes, Cycloalkanes, Tri/Bicycloalkanes NO _x , PAH		software	compounds from motor vehicles has high ozone potential	
Sutthicha Nilrit et al., 2013	Emission factors of CH ₄ & CO ₂ in vehicles	HDDV, LDDV, LDGV	Gasoline/diesel	Chassis dynamometer	Bag sampling system Constant volume sampling NDIR, Methane analyzer & FID	CH ₂ & CO ₂	No	Microsoft software	Can be used to evaluate GHG emissions factors	111
Farouk Alkurd i et al., 2013	PAH exhaust emission characterization	Exhaust emissions (mini vans, Passenger cars, buses)	Gasoline/diesel 3 gasoline 3 diesel	In service vehicles	HPLC with UV Visible detectors Fluorescence detectors	15 PAH	No	Excel software	Catalytic converter gave cleaner emissions	78
Peipei Dai et al., 2013	Characterise exhaust & evaporative emissions	Exhaust & evaporative emission (passenger cars)	Gasoline/methanol blends	Stationary (dynamometer)	Motor exhaust gas analyser, HPLC GC-MS Thermal desorption	THC, VOCs, NO _x , carbonyls, methanol	No	Excel software	Evaporative emission a major source of HC emissions	65
Dallmann et al., 2014	Characterise chemical composition	Heavy duty diesel trucks & light duty gasoline vehicles	Gasoline/diesel	On Road urban (1 KM tunnel)	Soot Particle aerosol mass spectrometer (SPAMS) with Laser Vaporizer	PM _{2.5} /BC/OA Organic aerosol	Zn, Ca, Ph, Mg, K, Na, S	SQUIRREL PIKA	Unclassified Most OA in gasoline are lubricant derived	97
Moreno A.I et al., 2014	Chemical Characterisation	treatment plant	Solid waste	Municipal area: landfills, leachate pond & biogas leaks	Fluorimetric method Diffuse sampling Ogawa passive Samplers MX6 Ibrid portable detector. GC/MS	H ₂ S, C ₂ S, NH ₃ , VOCs Dimethyl sulphide, Methylmercaptan	No	Microsoft excel	Exhaust emissions are Main Contributors	98
Carmen R et	Determine VOCs and	Ambient air	unknown	Urban area	Tenax T.A cartridges	29 VOCs 24 VOCs	No	Excel software	Road Traffic source.	99

al., 2014	PM main sources	pollutants		low traffic Rural traffic	SCK Cartridges GC-MS Optical particle counter	PM2.5-10>10			VOCs in urban > VOCs in Rural	
Stephan Weinbruch, et al., 2014	Quantification of Exhaust emissions of Particulate traffic/resuspension component	Road vehicles	Gasoline/diesel	2 monitoring stations (Urban area)	Electro Microscopy (SEM/EDX /HRSEM))	PM ₁ , PM ₁₀ , PM _{2.5}	Silicates, Calcium sulphates, Carbonates, Fe oxide s/ hydr oxide	READY HYSPLIT 4 software,	Lower concentration of Exhaust particles compared to resuspension particles	100
Marcel Hernandez et al., 2014	Determination of emission & fuel economy in gasoline/ethanol blends	Exhaust emissions of 3 LDV	Gasoline Ethanol	Cold start Hot start Constant speed Real in city driving	Ignition calorimeter Gas analyzer ASTM method	CO, CO ₂ , NOx, UHC,	No	Excel software	Premium blend had lowest emission of CO, NOx, HC	57
Perrone et al., 2014	PAH, n alkanes & Phenols in different European classes of vehicles	5 Private cars 5 Light duty vehicles Chassis dynamometer, Warm start conditions Cold start conditions	Gasoline/diesel	In service vehicles using EU Standard urban driving traffic (UDC) EU standard extra urban driving cycle (EUDC)	GC-MS HPLC-UV	PM, PAH & n alkanes	No	Excel software	PAH changes with fuel use. Oldest vehicle had highest levels of unregulated emissions and still in circulation	101
Short .D. et al., 2015	Evaluate emissions of GDI & PFI in blends	GDI vehicles & PFI vehicles	Gasoline/isobutanol/methanol blends	Single Roll Emission dynamometer	A Pieburg AMA 4000 bench, Condensation particulate counter, MAAP, APM analyzer	PM, BC, WSOC, droplet surface tension	No	Online particle characterization Excel software	Operating conditions affect emission	102
Neghmeh Soltani	PAH & HMs in road dust	Traffic load & Land	Undefined traffic road dust	commercial Agricult	GCMS ICPMS	13 PAH	As, Cd, Cu,	SPSS	PAH linked to Traffic & high cancer risk.	112

et al., 2015	& cancer correlation	use		ural Industrial etc			Pb, Zn, Ni, Cr, Co, Sb			
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V. CONTROLS OF EXHAUST EMISSIONS

Automotive manufacturers and scientists have continued to improve combustion process and reduce exhaust emissions from automotive engines. Turbocharging technologies has become popular in reducing CO₂ and increase engine efficiency during combustion and continuous improvement of turbocharged gasoline engine sought through research and development^[122]. The size of particles formed during combustion is dependent on the time spent in the formation and oxidation zones and a research investigated how the location of air inlet affected particulate formation by changing the temperature of combustion inlet, it was observed that CO decreases with increasing temperature with higher CO₂ production^[123]. Also studies on vehicular pollutants emission and CO₂ emission reductions using Real-time monitoring and early warnings for vehicle exhaust emission factors showed that NO_x are usually emitted at high temperature and CO at low temperature and there is a correlation for early warning and monitoring data of the vehicle exhaust emissions^[124]. Therefore it is important to ensure that the temperature of the reactants is very close to the temperature of the products, since real combustion processes in ICEs occur in combustion chambers where both the volume and the internal energy are time-variant^[125]. Moreover exhaust gas recirculation (EGR) has become a popular exhaust emission control measure, because when this exhaust gas is re-circulated in the cylinder, the UBHC in exhaust gas burns because of sufficient O₂ available in combustion chamber and reasonably high intake temperatures^[126]. EGR has also been used to assist in achieving decreased PM formation and reduced gaseous emissions with pre-mixed hydrogen and carbon dioxide introduced into the EGR stream to generate a gas composition representative of reformat^[127]. Also an investigation of the exhaust emission characteristics of small amount of hydrogen added to gasoline air mixtures showed that HC emissions decreased significantly while an increase in the air-fuel ratio leads to a significant reduction in CO and HC emissions^[128] and improves engine performance^[129].

Furthermore fuel injection strategy on low temperature combustion with gasoline performed on independently adjustable intake/exhaust gas recirculation (EGR), and common-rail injection system while keeping other engine components intact showed that NO_x emission could be well controlled by either the single or double injection strategy with sufficient boost and EGR though double injection strategy emits more CO and THC emissions than the single injection strategy^[130]. In addition, in a dual injection bi-fuel spark ignition engine, the HC, NO_x and CO₂ emissions will reduce when using gasoline or ethanol fraction in direct injection. While the NO_x and CO₂ emissions increases and HC increases When using 2,5 dimethylfuran (DMF)^[131]. Emission reduction has also been investigated by

equipping gasoline/methanol fuel vehicles with dilution air refine system (DAR) performed on sealed Housing for evaporative determination (SHED) on chassis dynamometer, measured by a constant volume sampling (CVS) system and tested over the New European Driving Cycle (NEDC) showed that THC and CO decreased while NO_x, VOCs and Carbonyls also increased^[65] while gasoline/ethanol blended fuel spark ignition engine (SIE) illustrated that concentration of CO and HC in the exhaust pipe decreased by introducing ethanol blends, but CO₂ and NO_x emissions increased^[47, 132] and gives best emission control of HC and CO at 20%^[133] whereas the use of CNG in particular as an alternative fuel lowers CO₂ emissions, but ethanol blends generally show no change in CO₂ emissions but an increase in volumetric fuel consumption.^[134]

A combined application of gasoline and diesel blends using an ultra-low sulphur diesel with a cetane number of 51 and a high-quality gasoline with a octane number of 97 as the test fuel to prepare six blends with different volume fraction of gasoline using EGR was effective in reducing NO_x and smoke emissions simultaneously with minimal fuel consumption^[59]. Using fuels that were blended from standard gasoline refinery blending streams, but without any special chemicals, the impact of olefin content in gasoline on modern vehicles and its toxic emission when studied, showed that changing the olefin content had relatively low impact on exhaust emissions such as THCs, NO_x, and CO emissions and recorded slight increase in levels of 1,3 butadiene^[135]. Work on effects of gasoline properties on exhaust and evaporative emissions on LDV using seven fuels formulated with distillate fractions selected aromatic, paraffinic and olefinic refinery components to produce a test fuel matrix giving different effects showed that emissions of modern cars are usually reduced in warm engine conditions by catalysts, consequently emissions are significantly higher during the cold start^[136]. Accordingly, the concentrations of HMs in Lichen and Moss have been used as bio-indicators of roadside and exhaust emissions^[94,137,138].

Catalytic exhaust after-treatment has also been employed to control exhaust emissions in spark-ignition. The noble metals (Pt, Pd, Rh) used are impregnated into a highly porous alumina washcoat of about 20-40µm thick and applied to the passageway walls^[139]. Also alumina washcoat also contains other components, which function as catalytic promoters or stabilizers against ageing. Cerium is normally present in high quantities in the washcoat because ceria compounds have high oxygen storage capacity and lantanas have proper basicity and large ionic size^[139] moreover modern studies on the vehicle related air pollution suggest that improved air quality standards could be achieved by monitoring and controlling the current technology^[140]. This evident was observed in a research using series of low noble-metal content monolithic catalysts for exhaust purification of small gasoline engines, and it was found that the PtRh-

OSM/ Al_2O_3 , (OSM: oxygen storage material) catalyst with $\text{Ce}_{0.5}\text{Zr}_{0.5}\text{-MnO}_x$ (3% MnO_x) OSM held low light-off temperature for CO, HC, and NO while the three catalysts easily met the exhaust's temperature range of (300 – 700°C) of small gasoline engines and efficiently controlled exhaust emission of small gasoline engines e.g. water pump, power machine [141]. Experimental investigations have revealed that combustion chamber using ceramic material attaining an adiabatic condition with Optimum Cooling can reduce the emissions of CO, CO_2 , HC and smoke when compared to base engine [142].

The Intergovernmental Panel on Climate Change (IPCC) estimates that the terrestrial biosphere could mitigate between 10 and 20% of the world's fossil fuel emissions by 2050 as scientific evidence indicates significant risks around CO_2 induced climatic change [143]. The IPCC estimates further that average CO_2 concentration may rise to 570 ppm by the year 2100 causing a rise of about 1.9 °C in average temperature and 3.8m in the global mean sea level. Therefore CO_2 capture and sequestration (CCS) has emerged in reducing CO_2 emissions [144]. The use of activated carbon (AC) material evenly packed inside the adsorption column forming the reaction bed where CO_2 is adsorbed at low pressures has been reported [144] including CO_2 capture on primary amine groups entrapped in AC at low temperatures, demonstrated that the impregnation of amino clay ($\text{H}_2\text{N-CL}$) nanoparticles into AC can be a useful method for selective CO_2 adsorption at 273 and 298 K at 1 atm [145].

The use of amino acid salt solutions (AAS) and regeneration using hollow fibre membrane contactor showed that AAS have enhanced CO_2 absorption/stripping performances when compared to Monoethanol amine (MEA) [146] while CO_2 absorption with membrane contactors indicated that membrane contactors may provide significant improvements in offshore CO_2 capture, both from gas turbine, flue gas and in sweetening of natural gas [147] and simulation studies of MEA in a based packed column demonstrate CO_2 recovery increased with the flow rate of absorbent and absorption height but decreased as the lean CO_2 loading of the absorbent increases and very high recovery rate [148]. Although Chilled ammonia process and Corti process are two main processes that utilize ammonia as solvent but the composite membrane contactor in particular, can achieve promising performance for CO_2 post-combustion capture by ammonia [149] as confirmed by the use of novel hollow fibre membrane contactor that integrates absorption and stripping using a non volatile reactive absorbent polyamidoamine (PAMAM) dendrimer generation and an ionic liquid. This absorbent showed high CO_2 absorption capacity [150]. Furthermore comparison of amines and ammonia as aqueous solutions for post-combustion CO_2 capture showed that aqueous ammonia has much loading capacity, higher absorption and lower energy for regeneration, while NH_3 has better resistance to oxidative or thermal degradation relative to MEA [151].

Thus among various CO_2 capture technologies including adsorption, physical absorption [152] which is popular in industry and in post-combustion CO_2 capture pilot plant emission studies [153], plus chemical absorption e.g. chemical absorption using aqueous alkanolamine solutions for instance, MEA is proposed to be the most applicable technology for CO_2 capture before 2030 [152] and this primary, secondary, and tertiary amines for CO_2 capture can be designed for various mesoporous CO_2

adsorbents [154]. As a consequence, current research on physical adsorption focuses on how to improve the CO_2 adsorption capacity and selectivity via two ways: to improve surface area and pore structure of the carbonaceous adsorbents for e.g. the use of Zeolites is affected by size, charge density. Metal organic frameworks (MOFs) also have high surface area, controllable pore structures and tuneable pore surface properties which can be easily tuned by changing either the metallic clusters or the organic ligands chemical composition of cations in their porous structure [152].

A precipitating potassium carbonate (K_2CO_3)-based solvent absorption process has been developed for CO_2 from industrial sources. CO_2 removal rate was between 5 and 15% depending upon operating conditions and removal efficiency is limited by the height of the pilot plant packed column also removal rates are expected to improve with the addition of a rate promoter as well as higher concentrations of K_2CO_3 [155]. In contrast, there is CCU by biological system and converting it to complex molecules is becoming promising and the list of such microorganism are increasing e.g. algae, cyanobacteria, clostridia etc and there has been proposal that these biological CCU organisms can be incorporated into chemical or physical absorption [156]. Finally several opportunities exist for CO_2 combustion capture and utilisation. popular with post combustion process is chemical absorption, adsorption, membrane separation, and cryogenic distillation while the use of selexicol, rectisol, flour purisol is common in pre-combustion capture of CO_2 and finally oxy-combustion technology through the use air separation, combustion and CO_2 recycle and cleaning and CO_2 capture [157] but this review has emphasised post combustion process by exhaust pipes during combustion of gasoline.

VI. CONCLUSION

Transportation control measures through mobile source abatement can reduce CO_2 pollution through implementation of transportation control measures that can decrease motor vehicle trips, and vehicle mile travel congestion reduction by encouraging off-peak period travels under more optimal conditions and encouraging the use of transportation modes other than single occupant vehicle travel [158]. Although decrease in vehicular emissions has been notable in Cities especially Los Angeles, USA [159] data collected between 2001 and 2002 of Vehicular emissions of gasoline and diesel vehicles were the second major contributor to $\text{PM}_{2.5}$, following secondary aerosols, with about 20% contribution to total mass in both sites [159] it would also be notable that developing Motor Vehicle Exhaust Emission Standards in California has been on for several decades [160] as adopted by the California Board of Public Health on December 4, 1959 [160]. In the EU for e.g. the legal instrument for regulation of PM is through EU directive wherein member States are obligated to meet the emission limits and air quality standards but the legal means to achieve this at national level are left to their individual discretion [161], while in a country like Nigeria environmental policy needed to continually improve and implement sustainable transport development lack enforcement [162] and in nations like India the optimism of reducing future pollution should not be hinged primarily on emission standards, but also on an efficient and strictly enforced vehicle testing

program^[163]. In summary it is obvious that much of the reported analyses have been carried out in the USA or Europe, and there is lack of reliable information on traffic emissions in areas with high population density in Africa, Asia and South America and there is need to fill the gap^[164]. Finally, new developments in engine and catalyst technologies have engineered a tremendous progress in emission control from exhaust, fuel economy and performance of automotive engines, but the increasing complexity in modern engine designs may bring with it new challenges for more continual approach in research, development, policy and standards implementation^[165].

VII. RECOMMENDATIONS

- 1) There has been significant need to fit the exhaust emission measurements into the stoichiometry of gasoline combustion using stoichiometric equations.
- 2) There have been absences of simple colorimetric absorbents (indicators) that can indicate toxic levels of exhaust emissions for motor users.
- 3) There has been significant need for cheaper metals or dopants beside the noble metals to be used in catalytic exhaust after treatment.
- 4) There is need to source cheaper and biodegradable material or local materials that are useable as washcoat in catalytic exhaust after treatment.
- 5) There is also the need to significantly research in isotopic labelling to actually differentiate if CO₂, HC and other UBHC are carbon 12 or 14 isotope.
- 6) Research should also be expanded to source cheaper chemical exhaust emissions adsorbents/absorbents with local material precursors.
- 7) Development of a laboratory device that can trap and store CO₂ and reusable since most laboratory reactions evolve CO₂
- 8) There have been the absences of traffic emissions or vehicle emission computer programs to simulate and predict exhaust emissions in Africa region e.g. use of computer program on road transport emissions (COPERT III).
- 9) There is therefore need to apply advanced statistical tools like multivariate analysis or PCA to test the correlation and significant trends and patterns in exhaust emissions.

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LI-FI: Use of Visible Light Communication to Increase Performance of Data Transmission

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Abstract- The aim of this paper shows the prospective routine of Li-Fi technology and its features to increase the performance of data transmission and various applications where Li-Fi has been placed to use. The modern society is highly affected by modern communication technology. Almost all the level of peoples are using web to complete the chore through wireless network. As amount of users are increases in using wireless network, this has unfortunately led to an increase in network complexity, speed decreases, shortage of wireless radio bandwidth and an increased risk of interference of radio frequencies. Moreover efficiency and safety of the internet are dominating issues now. Though Wi-Fi gives us speed up to 150mbps, which is not sufficient to accommodate number of anticipated users. To Resolving this limitation of Wi-Fi, a new technology always is desirable and, there are enormous new technologies participating to make sophisticated environment for an end user. As a result, Li-Fi has been introduced that could provide a connection that's 100 times faster than traditional Wi-Fi, Li-Fi provides better effectiveness, handiness and safety than Wi-Fi. It has gained a huge popularity in short range of year. Such technology has brought not only speed but harmless and inexpensive future of communication. The immense usage of Li-Fi may solve some tailback of Wi-Fi technology. In the present; this paper made an exhaustive study on Li-Fi technology, working techniques, and related researches which used Li-Fi technology.

Key Words— Li- Fi, Wi-Fi, LED, Gi-Fi

I. INTRODUCTION

Modern society have gradually become hooked to the internet some way or the other in this 21st century. When there is no internet connection, it is difficult to think of a single day in human life. The internet that is using for a variety of purposes, topmost among them being sharing of data. In circumstances where people want to exchange data quickly and efficiently, low internet speeds can be quite maddening when numerous devices are connected.

In 2011, Scientist Harold Haas from UK showcased new technology and devised a best solution over these all problems called Li-Fi. It has been designed in such a way that it overcomes the disadvantages that occurs during the usage of Wi-Fi. Li-Fi stands for Light Fidelity. Li-Fi is a high speed and fully networked wireless communication.

Same as Wi-Fi and which uses light source called Light emitting diode for transmission and communication as well instead of

radio waves. Li-Fi is perfect for huge wireless data coverage in limited area and for releasing radio intrusion problems. The basic idea of Li-Fi technology is that the data can be transmitted through Light emitting diode (LED), which takes very less power when compared to other bulbs. Li-Fi is more proficient than Wi-Fi. Which means it can reach speeds of up to 1Gbps.

The Li-Fi light flicker at higher rates which is hazardous to the human eye. These challenges can be sorted out someday this paper is ordered as follows. The Background and Related Works are in section II. Our Approach and Solution has been discussed in section III. In Section IV and V Conclusion and Future Work of this technology have been discussed. Finally, references are given.

II. BACKGROUND AND RELATED WORKS

Li-Fi is a revolution of twenty first century data communication. Li-Fi is a technology which is very similar to the fiber optics communication where the data is transmitted through a LED at a higher intensity. Li-Fi technology can be applied to many different field navigation, undersea communication and etc. Li-Fi can also be used to improve security system in many different fields.

P.Tupe (2015) designed a Voice Activated Li-Fi Operated Surveillance System. This system controlled the movement of machine or robot through voice operator with the help of speech recognition algorithm and Li-Fi technology. In this system data received from microphone in the voice form used voice reorganization software, depends on the voice command the action performed. If input voice does not match with database voice, then voice is re-sent. This system provide simpler and safer communication without any harmful effect to environment. Nevertheless this system has some issues, such as need a lines of lights, cannot use normal lights and using robot is bit more expensive [1]. M.D.Reddy and S.Sonoli (2015) implemented a Li-Fi based Patient Monitoring System. This system monitored the patient health and if any emergency, it sent information to the receiver with the help of Li-Fi Technology. They used two parameter to monitor the patient health. Checked the patient saline bottle continuously and monitor the parent stress. If that goes to minimum level then sensor detected that and activated the encoder. These information transmitted to the receiver through Li-Fi transmitter. This system consumes low energy and increase the security [2]. A.Sewaiwar and Y.H.Chung (2013) has proposed a system called Color Clustered Bi-Directional Li-Fi Using QAM-DCO-OFDMA based on LI-FI technology. The

system uses Quadrature Amplitude Modulation (QAM). Users are allocated into separate color clusters created by Light Emitting Diodes and the user data is transmitted through allocated color beams achieved by a color sensor. The signal is modulated by QAM. This modulated signal is then transmitted through a RGB LED. As the transmitters at both ends are using different colors for data transmission, because of this Bi-directional link less interference is realized in this system. Since each user is allocated with different color clusters multi user access is very easy here. The drawback of the system is it only suits for indoor environments [3]. Christain B.D. et. al (2014) has proposed a system called Online Web Server Management based on Li-Fi technology. This system uses visible light communication to transfer data and used multiple hopping technologies as well. It uses two modules for data transmission user module and destination module here Li-Fi is connected to computer system connected to a sensor and a GPS/GSM device. The basic idea behind this technology is transfer data via illumination. Intensity of the LED light varies by changing the current passed through them at very high speeds. By using multi-hop technology the reliability and speed of the connection is increased [4]. López R.D has designed a Li-Fi system. The project has built a complete communication system, In order to enable wireless data communication visual light will be used instead of radio frequencies. Intention of the system is to achieve a steady system where we can send data in a controlled environment from 1 to 100 MHz System has implemented piece by piece starting from scratch. In carrying out this task Li-Fi technology is being used. It is a high speed and fully networked wireless communication mechanism, like Wi-Fi, but the system uses light. Li-Fi is a subset of Optical Wireless Communication and can be a correlative to Radio Frequency communication, or a replacement in contexts of data broadcasting. Using Li-Fi is a less costly and effective. But The Transmitter used in the system has a limited range because of the power intensity of its LEDs and also some weaknesses were there in giving directivity [5]. Waje S. has introduced a new system named Information Transmission System Indoor positioning and navigation which is mainly dealt with light sensors. System uses lighting sensors regarding information transmission. System for indoor positioning and navigation. In this system fluorescent light is used as the way to transmit information, which is cipher by using a pulse frequency modulation way. An efficient transmitter circuit has being designed here by adding a few components to a commercial electronic ballast circuit for fluorescent lamps with a low price. Communication will be able to go parallel with light freely as light reaches all around the area easily. This system can provide indoor tracking very less cost manner with an accuracy on the similar way as outdoor wearable GPS sensors and can be used in very wide indoor areas. It does not have any complex installations and is thus highly practical. The system can be mostly beneficial for mobile and wearable computers [6]. K.S.Kerps (2015) has designed a system called Road management and safety based on Li-Fi technology. one can make use of head lights and lights of vehicles. When the vehicle is passes though the mall, the code is send to the pc at mall. Complete on the personal computer. Police can make use of this information if needed. Person then pays the road service cab and move forward. Therefore, information about each and every

vehicle accessed, number of vehicles passed in one day and gathered all the information and stored in to main system. All the computers at all mall are networked together. Thus they can exchange the required information about each and every vehicle. The signal transmitted by the spare vehicle dominates this signal, the signal turns green and remains green till the vehicle is passed, and once the vehicle is passed the again switches to its normal mode of operation. Thus the emergency vehicle passes ahead, it will make the signal green generating green passageway for it are some of disadvantages in this system [7]. A.patani et.(2015) has implemented Project named as highway navigation is based on LI-FI. The basic gears of this project is its transmitter and receiver. The transmitter that have used here is a small one called, a smart pole. The components of smart pole are Light emitting diode, crystal oscillator. These components are mainly focused to maintain constant level of voltage. Both the receiver and transmitter have microcontroller. It has already programmed data. This system used normal machine or car as a receiver, which have photodetector in order to transmit data. This system more secure hence data cannot be interrupted without a clear line of sight [8]. Q.Huang et. al (2014) has posed a system called Integrating Li-Fi Wireless Communication and Energy Harvesting system based on Li-Fi technology. That focuses on Wireless sensors have been increasingly have to resources to in the design of descendants supercharged buildings. When deploying wireless sensors, energy supply and data transmission are the main view point. Even if power harvest wireless sensors could automatically feed themselves by collecting ambient power, the presence of reliable power sources to support dependable wireless transmission is a big challenged. The emerging Li-Fi technology is promising to fundamental reason this question Li-Fi technology provides harvested power to power wireless sensors with an uncommon convenience of power breeding from the lighting arrangement being composed challenged. The combination of Li-Fi and power collecting wireless sensor technologies could enable attractive appearance and bring in tremendous advantage in the design of next formation high achievement buildings because power harvest sensors do not face the expecting efficiency trouble. Li-Fi enables much higher transmission speed compared to the existing RF electromagnetic automation, that efficiency harvest sensors could quickly deliver environmental parameters quickly for control purposes [9]. M.D Renzo et. al Spatial Modulation for MIMO Wireless Systems in li-fi. That consider Li-Fi in the background of modernization looming problem in wireless connection. Transmit speeds of up to 10 Gbps have been demonstrated. That denote to a cellular Li-Fi system as an attocell system as the cell sizes are smaller than in a characteristic radio frequency femtocell network potentially unravel very high area spectral efficiencies. Geographical inflection is a new digital modulation and MIMO system which enables greater power-efficient transmute as it only requires a single transmitter chain. That explore dimensional modulation for Li-Fi transmitters and investigate how SM can be used to support dimming. [10].

III. OUR APPROACH AND SOLUTIONS

A. Working Processes

This technology based on the Visible Light Communication (VLC) which uses the visible light for data communication. Therefore, LED is the significant component of the Li-Fi technology. Li-Fi is designed using light-emitting diodes (LED) at downlink transmitter. Li-Fi principle is very simple. LED light set along with a microchip used to identify the changes in the light flickering, and help in converting light into data in its digital form. If the LED is turn on, it sent digital pulse 1. If the LED is turnoff, a digital pulse 0 is transmitted. The LED can be switched on and off very quickly which provides an opportunities for transmitting data through light. The multiple LED in the lamp, the more data to deal with it. There are certain opportunities to make improvements to alter the light's frequency using mixture of red, green and blue LEDs and for parallel data transmission, array of LEDs can be used. The figure 01 illustrate the working process of Li-Fi.

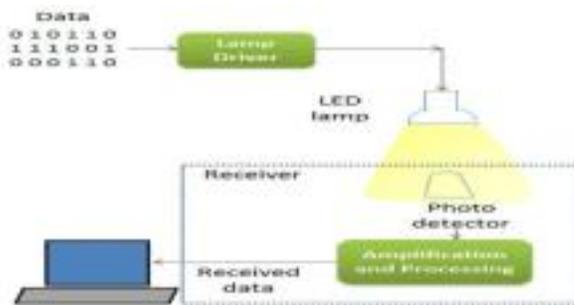


Figure 01: Li-Fi working Process

(Source: technichedu.in/journals/index.php/ijaecs/article)

B. Problem and the solutions

Now a day, Wi-Fi is the most commonly used technology in each and every field such as Hospitals, Security Services, Undersea Communication, Navigation, Petrochemical Industries and power plant and etc. For instance in Health technologies such as medical field operating rooms did not allow Wi-Fi over concern of radiation which used 2.4 GHz frequency Band, and if Wi-Fi implemented in hospitals, interference from phones and computers can block signals from nursing equipment. In power plant Wi-Fi and many other radiation or radio waves are bad for sensitive areas especially the atomic power plants and the range that Wi-Fi works between 20 to 100 meters. There is a serious necessity for a new technology hence the Wi-Fi has some major backdrops. In order to deal with these problems, several solutions have been proposed, Light Fidelity is a best solution in 21st

century. Li-Fi can be active well and used securely in airliners and healthcare field that are disposed to snooping from radio waves. This can be used in underwater where Wi-Fi fail to do, therefore throwing open limitless opportunities for military operations. Li-Fi technology cannot hack which lead to high security. LED can be used in vehicles head lights and back lights and traffic signals are also moving to LED. This can be developed an intelligent transport system and traffic management where vehicle-to-vehicle and vehicle-to-roadside communications. Li-Fi can be applied to highly accurate location-based information services such as advertising and navigation that permits the user to receive appropriate information in a timely manner and location. Li-Fi is an outline for all of these providing new competences to current and future services.

IV. CONCLUSION

Li-Fi is still in its developing stages and thus offers remarkable scope for future research and revolution. It has massive potential. A large number of research projects have focused on this new technology to support the higher data transmission. This paper presents a summarized overview of the recent research works being conducted in this technology. Li-Fi provides promising features to improve the data communication. As the amount of available bandwidth is limited, the airwaves are becoming gradually blocked, difficult to used wire-less technology with accurate. The LI-FI technology can give solution to this problem. Also it will shape the better future for next generation and can offer candid and very effective alterations to radio waves communications. This technology will be going to change the scenario of wireless communication in many harmless ways near in future.

V. FUTURE WORK

At the rate, currently adopt wireless data, It will ultimately run out of radio spectrum as ,cope with the long-term demand of wireless data communications and transmission the tons of bytes of data communicated each and every month. Therefore, Li-Fi will be the better choice. In future this technology will lead to produce every bulb to become a Li-Fi access point to transmit data. For the future researchers are developing very small size LED such as micro size LED. These LEDs collected and fix into large LED. Therefore, communicate and transfer data in a single LED. Therefore, the scientists believes it is possible to achieve more than 10Gbps, therefore people can download videos and audios very speed manner. Another future growth of Li-Fi is GI-FI. GI-Fi or gigabit wireless denotes to wireless communication at a data rate of more than one billion bits per second. In 2008 researchers at the University of Melbourne demonstrated a

transceiver integrated on a single chip that functioned at 60 GHz on the CMOS process. It will allow wireless transfer of audio and video data at up to less than 10 gigabits per second, ten times the current maximize the wireless transfer rate, at one-tenth the cost. Some reports called as GI-FI [11].

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Efficacy of Varying Levels and Brewing Durations of Vermitea Foliar Spray Applications on the Growth and Yield of Eggplant (*Solanum melongena* L.)

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Abstract- Vermitea is a water extract from vermicast brewed for beneficial organisms. This study was conducted at Campo, Kinoguitan, Misamis Oriental, Philippines from December 2012 to June 2013 to determine the efficacy of varying levels and brewing durations of vermitea foliar spray applications on the growth and yield of eggplant. A study was laid-out in a 4 x 4 factorial arrangement in Randomized Complete Block Design (RCBD) and replicated 3 times, with concentration levels as Factor A and brewing durations as Factor B. Results revealed that plants sprayed with 20% concentration level of vermitea had the tallest plants (29.69 cm), most resistant to pests and diseases (3.8), earliest to produce 50% flowers (50.33 days), produced the most number of flowers (144.92), highest percent fruit set (74.72%), longest fruit (20.79 cm), largest fruit (3.56 cm), obtained the highest total fruit yield (9.21 tons/ha) and the highest ROI (228.93%). Brewing vermitea for two days produced the tallest plants (25.21 cm), most resistant to pests and diseases (3.35), most number of flowers (133.67), highest percent fruit set (76.19%), longest fruit (21.75), largest fruit (3.50 cm), highest fruit yield (9.44 tons/ha) and highest ROI (232.49%). Plants with no foliar application consistently showed very poorly in all growth and yield parameters.

Index Terms- eggplant, vermitea, foliar sprays, brewing and fruit set

I. INTRODUCTION

The increasing cost of chemical fertilizers with the reduction of yield potential of soil and nutritional value of foods due to chemical fertilizing practices has led to an in-depth search for an economically viable alternative (<http://www.pinoybisnes.com/agri-business/starting-a-vermiculture-business/>).

Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony. The principal guidelines for organic production are to use materials and practices that enhance the ecological balance of natural systems and that integrate the parts of the farming system into an ecological whole (Sunny Ridge Microbial Solutions, 2011).

Organic agriculture practices cannot ensure that products are completely free of residues, however, methods are used to minimize pollution from air, soil and water. Organic food handlers, processors and retailers adhere to standards that maintain the integrity of organic agricultural products. The primary goal of organic agriculture is to optimize the health and productivity of interdependent communities of soil life, plants, animals and people.

Compost is an inexpensive alternative to chemical fertilizers, and it is less likely to harm sensitive roots. It can be extremely harsh on plants. Chemical fertilizers can also leave heavy metals like lead, arsenic and cadmium that can build up over time. A big shock of chemical fertilizers can also kill the very microbes that make soil fertile, dooming anybody to depend on using chemical fertilizers over and over again.

The presence of earthworms in soil ecosystems is an indicator of the well-being of a system. Earthworms have the unique ability to convert elements such as minerals, nutrients and microbes from the soil or composting systems into an excretion that contains the vastest amount of plant nutrients, microbes and growth elements that do exist. The excretion is called vermicast or vermicompost. The chemical and biological composition of vermicasts can be regarded as the closest resemblance of a balanced and healthy soil ecosystem. Elements and nutrients in vermicasts are also presented to plants in a more absorbable form compared to any other product in nature or industry. Earthworms also have the unique ability to convert toxic elements into complex organic compounds that are harmless to the environment. This is done by an organic conversion process inside the earthworm's gut called chelation (Joubert et al., 2008).

Earthworms helped cultivated, aerated, hydrated and fertilized the soil. Plants can more easily absorb nutrients from organic matter after the worm has broken it down. They burrow deep into the ground to search for moisture and to keep away from the light, as much as 12 feet below the surface (Sunny Ridge Microbial Solutions, 2011).

Vermicompost produced higher quality crops and better yields than chemical fertilizers. It has shown that worm castings contain 10–20 times as much microbial activity as the soil and organic matter that the worm ate. It added more beauty to flowerbeds since vermicompost is “green.” It does not harm nor pollute anything. It is 100% recycled. Castings were coated with mucus membranes from the worm that keep the nutrients from releasing all at once, making them available when the plants need

them. Humus makes possible for the plants to naturally feed on the nutrients in the soil. It also helps the soil hold nutrients, air, and moisture. It broke down bad intrusions such as pathogens and harmful bacteria (Sunny Ridge Microbial Solutions, 2011).

Brewing aside from extracting vermitea or vermicompost teas helps microbes wake-up and multiply exponentially double their count every 20 minutes while it takes 24 hours to make a batch of brew (Sunny Ridge Microbial Solutions, 2011). The longer the brewing time, the more soluble materials were extracted or the more food for the beneficial bacteria and fungi. Therefore, more nutrients were available to the plants. However, there should be optimal time for tea production to attain balance between extracted and growth of organisms. Short brewing may cause a tendency to produce anaerobic biofilm. Longer brewing time will make organisms to use up all their food and go to sleep and/or may colonize the surface of containers and begin to develop anaerobic layers on the container walls (Rex Compost Tea Brewer, 2009).

Vermicompost is a compost that has been digested by worms (vermi) and does not need to be turned, because worms "turn" the organic matter in their digestive tract, eliminating work for gardeners. Vermicompost tea (VCT) is a specific type of compost tea derived from soaking or brewing vermicompost in water (Balfanz et al., 2011).

Compost tea is a liquid derived from soaking and or brewing compost in water and is used as a foliar and soil application to plants (Balfanz et al., 2011). Vermicompost tea protected the leaves and stems of plants from the top down and not only from the soil. Direct application on the plant dramatically boosted its growth and vitality. The extract was rich in microbes, which helps restore plants after being exposed to pesticides and other environmental damage (Sunny Ridge Microbial Solutions, 2011). It can contain the three basic plant nutrients: nitrogen in the form of nitrate or ammonium (NO_3 and NH_4); phosphorus (P); and potassium (K). One analysis of VCT brewed at a 1:10 ratio showed on average: nitrate (NO_3) at 77 ppm; ammonium (NH_4) at 3.7 ppm; P at 18 ppm; and K at 186 ppm (Balfanz et al., 2011).

A 20% increase in plant growth and a 150% increase in root mass is possible by adding just 1 part of worm castings to 9 parts of soil, however if it is added to the soil at low rates may result in improved disease resistance. Worm castings provide beneficial microbes that compete with disease causing organisms; it enhances germination, plant growth, and crop yield; It improves root growth and structure. Worm castings fed to poultry stimulate their immune system (Organic Material Review Institute, 2010).

Eggplant is a good source of vitamins, fibers, and minerals. Eggplant is the leading vegetable crop in the Philippines in terms of area and volume of production. Small-scale farmers in many provinces grow eggplant and depend on it for their livelihood (JICA TCP, 2008).

Barangay Campo in Kinoguitan, Misamis Oriental, Philippines is known for eggplant production and is advocating or showcasing organic farming practices. It has a total land area of 415.2502 hectares which is 10.14 percent of the total land area of the municipality. Major land use of Barangay Campo is agricultural where 96% of its total land area is devoted to agricultural production. Generally, the topography of Barangay Campo is rolling (60%). However, 30% of its total land area is

plain. Only 10% is hilly. It has a Type II climate which has no distinct dry season with a very pronounced maximum rainfall from November to January. Maximum precipitation falls on the last quarter of the year which may even extend to mid-February. It is situated at an elevation ranging from 300 – 500 meters above sea level (MAO, 2011).

Conducting this study will serve as a learning site using an alternative organic foliar fertilizer and organic control of pests and diseases on eggplants. The barangay has an existing backyard gardening with eggplant as the common vegetable planted and on-going vermi-culture projects. The Campo Farmers Association (CFA) as well as the purok groups were engaging in vegetable production as their source of livelihood. Vermicasts were available in the barangay which were needed in making vermi-compost tea. Vermicompost tea showed the other uses of vermicast instead of using it as basal fertilizer in plants.

Thus, this study was conducted to determine the response of eggplant on varying levels and brewing durations of vermitea foliar spray applications under the condition of Campo, Kinoguitan, Misamis Oriental, Philippines.

II. MATERIALS AND METHODS

This study was conducted at Campo, Kinoguitan, Misamis Oriental, Philippines from December 2012 to June 2013.

The study used Casino F₁ eggplant seeds, vermicast, vermi tea, plow, harrow, sixteen (16) units of aerator/air pump, sixteen (16) pieces of bucket, eight (8) pieces of seedling trays and sixteen (16) units of hand pump sprayer, banana leaves, galloons, empty sacks and newspapers. This was laid-out following a 4 x 4 factorial arrangement in Randomized Complete Block Design (RCBD), replicated three times. The varying levels of vermitea served as Factor A and brewing durations as Factor B, as indicated: Factor A [A₁-Control (No foliar application), A₂-5% Concentration, A₃ - 10% Concentration, A₄ - 15% Concentration and A₅ - 20% Concentration] and Factor B [B₁- one day, B₂-two days, B₃-three days and B₄-four days].

A total land area of 297.5 sq. was used in the study. The area was divided into five double-hedge rows. Each row was measured 35 meters long and 2 meters wide between replications. Each treatment had 4 plants. Soil and vermicast samples were collected before land preparation for N, P, K, OM and pH analysis.

The field was plowed at 15-20 cm apart two to three times to help eliminate weeds, hibernating insect pests, and soil-borne diseases. Then, it was harrowed twice to break the clods and level the field.

Eggplant seedlings were raised in beds before they were transplanted. Raised seedlings in seedbeds were exposed to adverse conditions. Raising seedlings was noted because in trays required less seeds, promoted uniform growth of superior seedlings, minimized transplanting shock, and lessened seedling mortality.

The sowing media were prepared by mixing thoroughly 2 parts compost (vermicast) and 2 parts of garden soil. The holes of the tray were filled with the media and slightly compacted using the hand palm. A seedling tray with 100 holes was used.

One seed was sown per hole of the plastic tray at a depth of 0.5 cm. Seeds were covered with the media. Sprinkler with fine

droplets was used to water the seeds. The tray was covered with banana leaves, old newspaper or plastic sacks. To maintain soil moisture and temperature, the cover was removed when 1 or 2 seeds had sprouted.

The trays were placed on the platforms of a simple nursery made of bamboo slats and waved coco leaves with nursery nets. Eggplant seeds germinated in 5-6 days. Watering was done early in the morning and afternoon. Hand weeding was likewise employed.

Beds were raised at 20 cm height and 1 m wide. The beds were spaced 1 meter apart to serve as pathway for manual watering and other activities. The beds were watered a day before transplanting to cool down the soil. A 30 to 35-day-old seedlings were transplanted bearing 3-4 true leaves. Only one seedling was transplanted per hole in the afternoon. The transplants were watered immediately with a sprinkler. Vermicast application at rate of half kilogram (500 grams) per hill was done.

Preparation of Vermicompost Tea (VCT). A bucket was filled with 5 liters of tap water and let set for 24 hours for the chlorine to evaporate. The aerator tips were placed into the bucket of water and turned on the aerator for at least 2 hours before adding the compost to increase oxygen levels in the water and reduce chlorine levels that can be harmful to beneficial microbes. Vermicast measured (0.25, 0.5, 0.75 & 1.0 kg) to achieve the desired solid to water ratio. Vermicast was placed inside a bucket so that the vermicast submerged in water. Then the bucket was covered. The brewing Vermicompost Tea (VCT) was placed in a shaded area out of direct sunlight. The time and date were noted down when brewing started. After 24, 48, 72 & 96 hours of brewing, water turned to yellow-brown color. The freshly brewed vermicompost tea was harvested by straining it with the fine cloths. The freshly brewed vermicompost tea was transferred into a sprayer. The vermicompost tea was applied within 4 to 5 hours, otherwise the microbes will die and the tea will smell very foul.

Vermicompost tea was sprayed on 1st to 10th week after transplanting (WAT). One liter of vermicompost tea was diluted with 15 liters of water. Vermicompost tea was applied late afternoon, but not earlier than 4:00 PM.

Spot manual weeding was applied in the area. Uprooted weeds were thrown in a compost pit at the nearby area. Pests and diseases were managed through sanitation and proper disposal of infested plant parts to prevent pests build-up. Two border furrows of eggplants were established as buffer.

Data on plant height, pest resistance, number of days to 50% flowering, number of flowers produced, percent fruit set, length

and diameter of fruits and total yield were collected. The cost and return analysis was likewise computed.

The Analysis of Variance (ANOVA) using a 4 x 4 factorial in Randomized Complete Design (RCBD) was used to solve for the level of significance with Tukey's Test being used to compare significant differences among treatment means.

III. RESULTS AND DISCUSSION

Plant height. Table 1 shows the average height of eggplant as affected by the varying levels and brewing durations of vermitea. The height was significantly affected by the concentration levels of vermitea ($F_c = 4.5385^{**}$, $0.01 < p < .05$), but not with brewing durations ($F_c = 0.1795^{ns}$, $p >= .05$). No significant interaction effect ($F_c = 1.1145^{ns}$, $p >= .05$) was found between the two factors. The 20% concentration level of vermitea produced the tallest plants (29.69 cm). It is significantly different from the rest of the treatment means. Plants with no foliar application (control) showed the shortest with 18.42 cm. Based on the results of the laboratory analysis for vermicast, it showed 1.28%N, 0.29% P and 0.21% K. The vermicast used contained essential nutrients which are responsible for the growth and development of eggplant. Nitrogen is responsible for the increase and differentiation of cells and helps in the metabolism of foods for plant growth and development (Pava, 1995). The over-all shorter heights obtained by the plants was also due to the Verticillium wilt (*Verticillium albo-atrum*) being noticed at early growth stage of the plant that caused the plants to be stunted in their growth (Organic Material Review Institute, 2010).

Regardless of non-significant results among treatment means on the brewing duration of vermitea, however, plants applied with foliar spray of vermitea brewed for 2 days, obtained the tallest height with 29.69 cm, while the shortest by those sprayed with vermitea and brewed for 1 day with 25.21 cm. According to Rex Compost Tea Brewer (2009), that the longer the brewing time, the more soluble materials were extracted or the more foods for the beneficial bacteria and fungi. Therefore, more nutrients were available to the plants. However, there should be optimal time for tea production to attain balance between extracted and growth of organisms. Short brewing may cause a tendency to produce anaerobic biofilm. Longer brewing time will make organisms to use up all their food and go to sleep and/or may colonize the surface of containers and begin to develop anaerobic layers on the container walls.

Table 1. Average plant height (cm) of eggplant as affected by varying levels and brewing durations of vermitea foliar spray applications.

Factor A (Levels of Vermitea)	Factor B (Brewing Durations)				Mean (A)
	1 day	2 days	3 days	4 days	
Control (no foliar spray)	-	-	-	-	48.52 ^c
5% conc.	52.50	53.75	52.00	53.83	53.02 ^b
10% conc.	53.50	52.92	52.50	52.25	52.79 ^b
15% conc.	49.97	58.00	51.58	53.58	53.28 ^b
20% conc.	62.08	67.58	55.25	57.17	60.52 ^a
Mean (B)	54.51	58.06	55.58	54.21	
F-test:	A ^{**} , B ^{ns} , AxB ^{ns}				
CV:	11.11%				

Means within same column followed by a common letter is not significantly different at 5% using Tukey Test

Pest Resistance. Pest resistance of eggplant was not significantly affected by the concentration levels ($F_c = 1.6189^{ns}$, $p \geq .05$) and brewing durations ($F_c = 0.6777^{ns}$, $p \geq .05$) of vermitea. No significant interaction effect ($F_c = 0.8483^{ns}$, $p \geq .05$) was likewise observed between the two factors (Table 2).

However in Factor A, the Casino F₁ eggplant sprayed with 20% concentration levels of vermitea showed tolerance to pests and diseases with a resistance rating of 3.80, followed by those sprayed with 10% level with 3.21 rating (moderately tolerant), 5% level with 3.06 (moderately tolerant) and 15% level with 2.88 (moderately tolerant). The control treatment obtained the lowest rating with 2.67 (susceptible to moderately resistant). It was likewise observed that plants were attacked by shoot and fruit borer (*Leucinodes orbonalis*). Verticillium wilt was noticed at early growth stage of the plant. Plant height was greatly affected causing the plant looked stunted in growth. *Verticillium*

wilt, caused by two species of soil-borne fungi-*Verticillium dahliae* and *Verticillium albo-atrum*, infects more than 200 species of plants, including many vegetables. *V. albo-atrum* prefers cooler soils while *V. dahliae* can become a problem in greenhouse vegetable production. Sometimes, both species will occur in the same field. A yellowing of lower leaves followed by wilting is the first sign of disease. Brown, necrotic tissue within lesions is surrounded by a large, irregular area of yellowing due to a systemic leaf toxin produced by the fungi. Leaf necrosis is followed by wilting, stunting, and plant death. When the stems of infected plants are cut lengthwise, the vascular tissue exhibits a brown discoloration. Verticillium wilt affected 11.27% of the population which was 23 plants out of 204 but it was minimized due to foliar sprays with vermitea.

Table 2. Pest resistance of eggplant as affected by varying levels and brewing durations of vermitea foliar spray applications.

Factor A (Levels of Vermitea)	Factor B (Brewing Durations)				Mean (A)
	1 day	2 days	3 days	4 days	
Control (no foliar spray)	-	-	-	-	2.67
5% conc.	2.67	2.83	3.25	3.00	2.94
10% conc.	3.17	3.25	3.25	3.08	3.19
15% conc.	3.25	2.50	3.42	2.83	3.00
20% conc.	2.75	4.00	3.50	3.83	3.52
Mean (B)	2.96	3.14	3.35	3.18	
F-test:	A ^{ns} , B ^{ns} , AxB ^{ns}				
CV :	2.57%				

Rating scale: [1- very susceptible (80-100% damage), 2 - susceptible (60-79% damage), 3- moderately tolerant (40-59% damage), 4 - tolerant, (20-39% damage), 5 - very tolerant (0-19% damage)]

The low resistance of the plants to insect pests was due to the occurrence of shoot and fruit borers during the flowering and fruit setting stages which the plants were greatly affected. Shoot and fruit borers affected 14.70% of the total population which was 30 plants out of 204 plants. Shoots and fruit borer were manually controlled. No botanical or biological control measured was employed to the plants. However, the presence of leaf miners (*Tildenia inconspicuellla*), lady bugs (*Coccinellidae*) and flea beetles (*Epitrix hirtipennis*) were also noticed but their population and damages were minimized and controlled through

spraying of vermi tea. According to Rex Compost Tea Brewer (2009) that the greater the diversity of microbes in the tea, the greater the livelihood that the pathogenic organisms will be out complete on leaves, stems and roots surfaces and in the soil beneficial for the growth of the plant. The Vermicompost tea (VCT) contained beneficial microbes that also reduced or controlled diseases and improved soil health (Jack and Thies, 2006; Lowenfels et al, 2006). Studies indicated that VCT had a positive effect on suppressing tomato diseases (Zaller, 2006). Worm castings also provide beneficial microbes that compete

with disease causing organisms, thus giving more resistance to the plants (Organic Material Review Institute, 2010).

On the brewing duration, eggplant sprayed with vermitea brewed for 2 days obtained the highest resistance rating of 3.35 (moderately tolerant), while the lowest were those sprayed with vermitea and brewed for only one day. This finding also conformed to the findings of Rex Compost Tea Brewer (2009) such that the longer the brewing time, the more soluble materials were extracted or more foods for the beneficial bacteria and fungi. Therefore, more nutrients were available to the plants. However, there is an optimum time of brewing for tea production to attain balance between extract and growth of organisms.

There should be optimal time for tea production to attain balance between extracted and growth of organisms. Short brewing may cause a tendency to produce anaerobic biofilm. Longer brewing time will make organisms to use up all their food and go to sleep and/or may colonize the surface of containers and begin to develop anaerobic layers on the container walls.

Number of Days to 50% Flowering. The varying levels ($F_c = 2.8795^{ns}$, $p \geq .05$) and brewing durations ($F_c = 0.2455^{ns}$, $p \geq .05$) of vermitea foliar applications did not significantly affect the flowering of Casino F1 eggplants to produce 50% flowers among the plants under study (Table 3). No significant interaction effect ($F_c = 0.4538^{ns}$, $p \geq .05$) was likewise observed between the two factors.

Nevertheless in Factor A, plants sprayed with 20% concentration level of vermitea produced flowers at 50.33 days after transplanting as compared with those in the control treatment produced flowers the latest time only after 58.33 days. In Factor B, plants sprayed with vermitea and brewed for 3 days produced flowers first after 52.75 days, while the latest was those sprayed with vermitea being brewed at 2 days. However, differences were not that statistically far from each other.

Table 3. Average number of days to 50% flowering of eggplant as affected by varying levels and brewing durations of vermitea foliar spray applications.

Factor A (Levels of Vermitea)	Factor B (Brewing Durations)				Mean (A)
	1 day	2 days	3 days	4 days	
Control (no foliar spray)	-	-	-	-	58.33
5% conc.	56.50	57.67	53.83	53.67	55.42
10% conc.	55.17	52.83	52.67	52.33	53.25
15% conc.	56.30	54.17	54.33	55.67	55.12
20% conc.	52.67	47.17	50.17	51.33	50.33
Mean (B)	55.16	52.96	52.75	53.25	
F-test:	A ^{ns} , B ^{ns} , AxB ^{ns}				
CV :	8.91%				

Number of Flowers Produced. The production of flowers was highly affected by the applications of varying levels ($F_c = 127.1892^{**}$, $0.01 \leq p < .05$) and brewing durations ($F_c = 24.5542^{**}$, $0.01 \leq p < .05$) of vermitea. Interaction effects ($F_c = 24.5542^{**}$, $0.01 \leq p < .05$) were highly found between the 2 factors (Table 4).

Consistent with the results of the previous parameters, Casino F1 eggplant produced the most number of flowers (both primary and secondary flowers/male flowers as source of pollens for pollination) when sprayed with 20% concentration level of vermitea with 144.92 flowers and not significantly different from those sprayed with 10% and 15% levels which produced 125 and 118 flowers, respectively. The least was obtained by the control treatment with 68.33 flowers. As Hartman and Kester (1997) and Pava (1995) that nitrogen, phosphorus and potassium are essential elements needed by plants in macro level for the reproductive growth of the plants. Potassium is a nutrient element which helps in the translocation of photosynthates to the reproductive organ of the plant causing an early flowering and eventually, producing more number of flowers. As some investigations showed that fresh earthworm casts are several

times richer in available nitrogen, available phosphates and available potash than the surrounding topsoil. Worm castings also contain many beneficial bacteria and enzymes needed for the growth of plants (Organic Material Review Institute, 2010).

In Factor B, however, plants sprayed with vermitea and brewed for 2 days produced the most number of flowers with 133.67, while those sprayed with vermitea for 1 day produced the least with only 93.08 flowers. Nevertheless, no significant differences were observed among treatment means. Factor that supports this finding is the optimum time recommended for brewing of vermitea that shorter time may cause to produce anaerobic biofilm, while longer time make the organisms to use up all the foods and sleep and begin to develop anaerobic layers (Rex Compost Tea Brewer, 2010).

Table 4. Average number of flowers produced of eggplant as affected by varying levels and brewing durations of vermitea foliar spray applications.

Factor A (Levels of Vermitea)	Factor B (Brewing Durations)				Mean (A)
	1 day	2 days	3 days	4 days	
Control (no foliar spray)	-	-	-	-	78.33 ^d
5% conc.	104.67 ^{bc}	105.33 ^b	102.67 ^b	100.67 ^b	103.30 ^c
10% conc.	102.00 ^c	109.33 ^b	104.67 ^b	102.00 ^b	104.50 ^c
15% conc.	107.33 ^b	124.33 ^a	116.00 ^a	112.67 ^a	115.08 ^b
20% conc.	119.67 ^a	124.33 ^a	117.00 ^a	111.67 ^a	118.17 ^a
Mean (B)	108.42 ^b	115.83 ^a	110.08 ^b	106.75 ^c	
F-test:	A**, B**, AxB**				
CV:	2.08%				

Means within same column and row followed by common letters are not significantly different at 5% using Tukey Test

Percent Fruit Set. The percent fruit set was significantly affected by the concentration levels ($F_c = 432.5793^{**}$, $0.01 \leq p < .05$) of vermitea as well as the brewing duration ($F_c = 15.8437^{**}$, $0.01 \leq p < .05$). There were significant interaction effects ($F_c = 6.5747^{**}$, $0.01 \leq p < .05$) observed between the two factors (Table 5).

In Factor A, plants sprayed with 20% levels of vermitea produced 74.72% fruit set, followed by those sprayed with 15% level (67.07%) and 10% level (56.54%). The least was obtained by those in the control treatment which registered 34.72% fruit set. The low percentages of fruit set were primarily due to the more number of flowers which didn't develop into fruits. Contributory to the fruit setting of plants aside from genetic make-ups are the environmental factors that include nutrients, presence of pollinators and climatic conditions (Bautista, 1994). As Pava (1995) reiterated that essential nutrients such as nitrogen, phosphorus and potassium and other macronutrients are responsible for the growth and development of the plants. Nitrogen is essential for greening and growth of the plants, while potassium for the translocation of usable photosynthates for fruit bearing of the plants.

In Factor B, two days of brewing had made eggplant to develop flowers into more fruits with 75.19% and is not

significantly different from those brewed at 3 days with 65.69% , but statistically different from the rest of the brewing durations. The least was obtained by those plants sprayed with vermitea and brewed for one day with 45.25%. This implies that two days period of brewing of vermitea is more effective than one, three and four days of brewing. This shows further that one day period of brewing does not extract much beneficial organisms from compost, compared to two days. Three and four days period of brewing were long enough that no more soluble food resource and nutrients present in water as bacteria may increase by 100 to 500 times as a result of brewing process. That the longer the brewing time, the more soluble materials were extracted or the more food for the beneficial bacteria and fungi (Rex Compost Tea Brewer, 2010). Therefore, more nutrients will be available to the plants. However, there should be optimal time for tea production to attain balance between extraction and growth of organisms. Short brewing may cause a tendency to produce anaerobic biofilm. Longer brewing time will make organisms to use up all their food and go to sleep and/or may colonize the surface of containers and begin to develop anaerobic layers on the container walls.

Table 5. Average percent (%) fruit set of eggplant as affected by varying levels and brewing durations of vermitea foliar spray applications.

Factor A (Levels of Vermitea)	Factor B (Brewing Durations)				Mean (A)
	1 day	2 days	3 days	4 days	
Control (no foliar spray)	-	-	-	-	34.72 ^c
5% conc.	41.33 ^d	48.67 ^d	47.67 ^d	43.33 ^d	45.25 ^d
10% conc.	50.67 ^c	56.67 ^c	55.67 ^c	53.33 ^c	54.08 ^c
15% conc.	57.33 ^b	63.00 ^b	60.00 ^b	60.00 ^b	60.08 ^b
20% conc.	71.00 ^a	74.00 ^a	69.33 ^a	66.00 ^a	70.08 ^a
Mean (B)	55.08 ^b	60.58 ^a	58.17 ^a	55.67 ^b	
F-test:	A**, B**, AxB**				
CV:	3.03%				

Means within same column and row followed by a common letter is not significantly different at 5% using Tukey Test

Length and Diameter of Fruits. Both the length and diameter of fruits of eggplants were greatly influenced by the levels ($d.f. = 3$; $F_c = 40.9912^{**}$, $p = < .01$ for the length; $F_c = 33.5011^{**}$, $p = < .01$, for the diameter) and brewing durations

($d.f. = 3$; $F_c = 4.8133^{**}$, $p = < .01$ for length; $F_c = 4.2561^*$, $0.01 \leq p < .05$ for diameter) of vermitea. Significant interaction effects were significantly observed between the two factors on the length ($d.f. = 9$; $F_c = 2.6443^*$, $0.01 \leq p < .05$) of the fruits

(Table 6), but not on their diameter ($d.f. = 9$; $F_c = 1.4363^{ns}$, $p = < .05$) (Table 7).

Table 6. Average length of fruits (cm) of eggplant as affected by varying levels and brewing durations of vermitea foliar spray applications.

Factor A (Levels of Vermitea)	Factor B (Brewing Durations)				Mean (A)
	1 day	2 days	3 days	4 days	
Control (no foliar spray)	-	-	-	-	14.46 ^c
5% conc.	15.90 ^b	16.33 ^c	14.73 ^c	14.63 ^b	15.40 ^c
10% conc.	15.17 ^b	16.70 ^{bc}	15.90 ^{bc}	16.33 ^{ab}	16.02 ^c
15% conc.	17.03 ^b	19.00 ^{ab}	17.90 ^{ab}	17.27 ^a	17.80 ^b
20% conc.	20.63 ^a	22.33 ^a	18.63 ^a	18.43 ^a	20.01 ^a
Mean (B)	17.18 ^b	18.59 ^a	16.79 ^b	16.67 ^b	
F-test:	A**, B**, AxB*				
CV:	1.46%				

Means of same column and row followed by common letters are not significantly different at 5% using Tukey Test.

Eggplants sprayed with 20% concentration level of vermitea and brewed for two days produced the longest (22.33 cm) and the largest (3.63 cm) fruits. The shortest and the smallest fruits were obtained from those which were not sprayed with any vermitea at 14.46 cm and 2.46 cm, respectively. The higher the concentration

level of vermitea, the longer and the larger the fruits were produced; while brewing vermitea not shorter and beyond two days gave shorter and smaller fruits (Rex Compost Tea Brewer, 2010).

Table 7. Average diameter of fruits (cm) of eggplant as affected by varying levels and brewing durations of vermitea foliar spray applications.

Factor A (Levels of Vermitea)	Factor B (Brewing Durations)				Mean (A)
	1 day	2 days	3 days	4 days	
Control (no foliar spray)	-	-	-	-	2.46 ^d
5% conc.	2.60	2.70	2.63	2.47	2.60 ^c
10% conc.	2.73	2.77	2.77	2.70	2.74 ^c
15% conc.	2.97	3.00	3.00	2.80	2.94 ^b
20% conc.	3.30	3.63	3.20	3.00	3.28 ^a
Mean (B)	2.90 ^b	3.02 ^a	2.90 ^b	2.74 ^b	
F-test:	A**, B*, AxB ^{ns}				
CV:	6.13%				

Means within same column and row followed by a letter is not significantly different at 5% using Tukey Test.

Total Fruit Yield. Consistent with the results of the earlier growth and yield parameters, the total fruit yield of eggplant per hectare was likewise significantly influenced by the levels ($d.f. = 3$; $F_c = 231.7934^{**}$, $p = < .01$) and brewing durations ($d.f. = 3$; $F_c = 5.4648^{**}$, $p = < .01$) of vermitea (Table 8). Highly significant interaction effects were noted between the two factors ($d.f. = 9$; $F_c = 6.3224^{**}$, $p = < .01$).

The combination of 20% concentration level of vermitea and two days brewing duration gave the highest fruit yield of eggplant with 9.53 tons/ha. Among the levels of vermitea, it

showed 20% level obtaining the highest yield (9.11 tons/ha), and in the brewing durations, it revealed 2 days brewing with 8.49 tons/ha. The lowest yield was obtained from the treatment which was not applied with any foliar spray (5.86 tons/ha). The influential effects of vermitea as well as the optimum time duration of brewing were among the factors contributory to higher yields of eggplant (Rex Compost Tea Brewer, 2010). Besides, vermicast or worm casting enhances yield of crops (Organic Material Review Institute, 2010).

Table 8. Average fruit yield (tons/ha) of eggplant as affected by varying levels and brewing durations of vermitea foliar spray applications.

Factor A (Levels of Vermitea)	Factor B (Brewing Durations)				Mean (A)
	1 day	2 days	3 days	4 days	
Control (no foliar spray)	-	-	-	-	4.86 ^e
5% conc.	6.90 ^d	7.60 ^c	7.40 ^c	7.20 ^c	7.28 ^d
10% conc.	7.83 ^c	8.37 ^b	8.17 ^b	8.10 ^b	8.12 ^c
15% conc.	8.30 ^b	8.47 ^b	8.50 ^b	8.20 ^b	8.37 ^b
20% conc.	8.97 ^a	9.53 ^a	9.03 ^a	8.90 ^a	9.11 ^a
Mean (B)	8.00 ^b	8.49 ^a	8.28 ^{ab}	8.10 ^b	
F-test:	A**, B**, AxB**				
CV:	2.09%				

Means of same column and row followed by common letters are not significantly different at 5% using Tukey Test.

Cost and Return Analysis. The cost and return analysis is shown in Table 9. Based from the total fruit yield per hectare, the 20% concentration level of vermitea obtained the highest return on investment (ROI) with 225.36%, with brewing duration at two days (198.94%). The lowest ROI was obtained in the control treatment (no foliar application) with 143%, and those sprayed

with vermitea and brewed for one day at 185.71%. Even though treatments with increasing brewing durations had increasing expenses, however, higher net returns were likewise observed from those treatments with high gross sales.

Table 9. Cost and return analysis (US \$) of eggplant per hectare as influenced by varying levels and brewing durations of vermitea foliar spray applications.

FACTORS		GROSS SALES (US \$)	EXPENSES (US \$)	NET RETURNS (US \$)	ROI (%)
Levels of Vermitea (A)	Control (no foliar application)	2,641.30	1,086.96	1,554.35	143.00
	5% concentration	3,956.52	1,521.74	2,434.78	160.00
	10% concentration	4,413.04	1,521.74	2,891.30	190.00
	15% concentration	4,548.91	1,521.74	3,027.17	198.93
	20% concentration	4,951.09	1,521.74	3,429.35	225.36
Brewing Duration of Vermitea (B)	One day	4,347.83	1,521.74	2,826.09	185.71
	Two days	4,614.13	1,543.48	3,070.65	198.94
	Three days	4,500.00	1,565.22	2,934.78	187.50
	Four days	4,402.17	1,586.96	3,032.61	191.03

US \$ 0.5319/kg = farm gate price per kilogram (US \$ 1 = PhP 46.00)

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Increase Wireless Network Security Using W-LAN Algorithm and W-WAN Database

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Abstract- Wireless Local Area Network (W-LAN) security has signified incredible favorable advantages in numerous fields, with adaptable and straightforward access, W-LAN system administration has an extensive variety of requisition. This project involves the implementation of a network with more security by using measures which will disable access for unauthorized users to the network. The goal is to rise W-LAN security by introducing a W-LAN management system which can prevent the intruders who are try to access the system for steal the data. For this security process system going to detect the intruders and categorize them by using the algorithm and using data mining techniques, after categorizing system check activities of that devices and if the system feel that the activities are harm then it will block the device permanently from that network system. Although considerable debate exists regarding the risks and benefits of building a W-LAN it is possible to reduce unauthorized access to the system by making use of the existing technologies while building protocols to add more. Spoofing, Eavesdropping, phishing and other methods of accessing the network can be eliminated by this particular system.

Index Terms- Wireless local Area network, Wireless Wide Area Network, W-LAN Algorithm, Wireless LAN Security, W-LAN Database.

I. INTRODUCTION

W-LAN is becoming a common part of today's business organizations. The benefit of W-LAN connectivity for organizations includes elasticity, convenience, increased productivity, relatively low costs and ease of implementation. It can also serve to improve the effectiveness and excellently of the external audit for both the organization and the auditor and also most of computers sold to users today come pre-equipped with all necessary wireless Networks technology. As the technology continues to improve, the price of wireless services and hardware, such as laptop computer and other mobile devices, keeps trending down. Today, many mobile workers use mobile devices far beyond e-mail. Increased storage capacity and by using internet connectivity mobile workers can store huge amounts of private critical data and to access the corporation's back-end system remotely. Wireless communication nowadays becomes companies' intentional tool to gain competitive advantage. Companies gain profits to improve the connectedness of a workforce and to enhance decision making process by providing quicker access to more present information. Wireless

communication also improves workers' satisfactory and productivity by providing easier and flexible access option.

Still, along with these benefits, wireless communication also adds security risks to the integrity of the company's network. The more immediate concerns for wireless communications are device theft, denial of service, malicious intruders, harmful code, theft of service and industrial, access control risks. Theft is likely to occur with wireless devices because of their portability. Authorized and unauthorized users of the system may obligate fraud and theft; however, approved users are more likely to carry out such acts. Since users of a system may recognize what resources a system has and the system's security flaws, it is easier for them to commit fraud and theft. Harmful hackers, sometimes called crackers, are individuals who break into a system without authorization, usually for individual advantage or to do harm. Malicious hackers are generally individuals from outside of an agency or organization. Such intruders may gain access to the wireless network access point by eavesdropping on wireless device communications. Harmful code involves viruses, worms, Trojan horses, logic bombs, or other unwanted software that is designed to damage files or bring down a system.

This paper will cover the part of risk that are facing when accessing to the private Wi-Fi network Unlike the traditional network, wireless network use electromagnetic radiation as their means of transmitting data through space. Access control is a famous security mechanism to give right of entry permission or denial message to an access request according to the predefined access guidelines, in which the system monitors and controls who can access the precise data and also what they can do onto that data.

This paper proposes a way to secure the access of a particular user. Whether the user is an intruder or not. Our proposed method will first detect and analyze the particular user that is connected to the network and categorize the user to a harmful user or not, according to user's behavior in the network and from the previous stored recordings. According to the records if the particular user is harmful, system will automatically send the user to a public network and will block the access using the user's mac address. If the user is not a threat to the system will grant the access and both accesses will be stored in the log. To store details and retrieve data, system will use Syslog. Syslog is the way for network devises to send event messages to a logging sever. The Syslog protocol is supported by a wide range of devices and can be used to log different types of occasions. For example, a router might send messages about users logging on to support sessions, while a web-server might log access-denied events.

Using the syslog, system will analyze the pattern that how will the intruders will attack the network and will analyze the time period of the attacks and by analyzing those will prevent and secure the network.

I. Wireless Security risks, Detection and Prevention

Wireless security risks are inherent in any wireless technology. Some of these risks are similar to those of wired networks; some are exacerbated by wireless connectivity, some are new. The most significant source of risks in wireless networks is that technology's underlying communication medium, the airwave, is open to intruders, making it the logical equivalent of an Ethernet port in the parking lot. In order to detect and prevent these attacks any methods have been developed. The study of those researches will be as follows

a. Research Issues and Challenges of Wireless Networks

Wireless networking presents many advantages Productivity improves because of increased accessibility to information resources. Network configuration and reconfiguration is easier, faster, and less expensive. However, wireless technology also creates new threats and alters the existing information security risk profile. For example, because communications take place

"Through the air" using radio frequencies, the risk of interception is greater than with wired networks. If the message is not encrypted, or encrypted with a weak algorithm, the attacker can read it, thereby compromising confidentiality. Although wireless networking alters the risks associated with various threats to security, the overall security objectives remain the same as with wired networks: preserving confidentiality, ensuring integrity, and maintaining availability of the information and information systems. The objective of this paper is to assist managers in making such decisions by providing them with a basic understanding of the nature of the various threats associated with wireless networking and available countermeasures. [2][3]

a.a. Wireless Local Area Network

Wireless LANS provides details over view of 802.11 frequency range wireless technology. This has introduced the history of 802.11 technical information, network technologies and transmission range. It tests the security threats and vulnerabilities associated with wireless LANS and reducing risks of security WLANS environment.

Motorola developed one of the first commercial WLAN systems with its Altair product. However, early WLAN technologies had several problems that prohibited its pervasive use. Those were much LANs expensive, provided low data rates, were prone to radio interference, and were designed mostly to proprietary RF technologies. The IEEE initiated the 802.11 project in 1990 with a scope "to develop a Medium Access Control (MAC) and Physical Layer (PHY) specification for wireless connectivity for fixed, portable, and moving stations within an area." In 1997, IEEE first approved the 802.11 international interoperability standard. Then, in 1999, the IEEE ratified the 802.11a and the 802.11b wireless networking communication standards. The goal was to create a standards-

based technology that could span multiple physical encoding types, frequencies, and applications. The 802.11a standard uses orthogonal frequency division multiplexing (OFDM) to reduce interference. This technology uses the 5 GHz frequency spectrum and can process data at up to 54 Mbps.

a.b. Security Threats and Vulnerabilities in Mobile Ad Hoc Network (MANET)

Mobile Ad Hoc Network (MANET) is the kind of wireless networks which don't require any fixed Infrastructure or base stations or in or we can say it as Mobile Ad Hoc Network, these are collection of wireless mobile Communication devices or nodes communicating with other without any fixed infrastructure or federal administration. The nodes in MANET themselves are responsible for searching out other nodes to communicate with dynamism. In MANET, it may be necessary for one wireless mobile node to enlist other hosts in forwarding a packet to its destination due to the limited transmission range of wireless network interfaces. Each wireless mobile node operates not only as a host but also as a router forwarding packets for mobile nodes which has wireless network that may not be within the direct transmission range of each other. Every node take part in an ad hoc routing protocol that allows it to discover multi-hop paths through the network for other node. This wireless networking of Mobile ad hoc network type is also called infrastructure less networking, since the mobile nodes in the network establish routing to form their own network by themselves on the fly, dynamically [6]. Figure 1 illustrate the structure of mobile Ad Hoc Network.



Figure 1: Structure of Mobile Ad Hoc Network (MANET)
Source: A Survey on Routing Protocol and vulnerability in Mobile Ad-Hoc Network (MANET) Research Paper

a. Wireless Mesh networking security

Mesh networking is configuration of peer wireless access nodes that allow for continuous connections to a network infrastructure, including reconfiguration around blocked paths, by "hopping" from node to node. There are many different types of wireless mesh security architectures, where each type of architectures may use a different approach for wireless security. Many approaches for mesh security may be derived from ad-hoc security research, but any future commercial mesh products will standardize security through 802.11s

b.a. Ad-hoc Security and Research

Message integrity protection using public/private key security, including transitive trust architectures, between routing peers (SUCV), or message authentication using hash chains to

ensure detect tampering of routing information within the network (SEAD); Authentication of routing messages using digital certificates (SAODV); and, Protection by symmetric cryptography, using shared secrets or digital signatures (Ariadne).

b.b. Standardization

Standardization activities for security will focus on inter-AP security controls, where client access uses standard WPA2/802.11i authentication and encryption.

Standardization on security between mesh access points is still being finalized within the standard. However, link-by-link security mechanism will be based on 802.11i, with a security Architecture based on 802.1X authentication.

Mesh APs may have supplicant, authentication and authentication server roles. EAP 4-way handshakes must occur

between all mesh routing peers, where centralized 802.1X authentication is supported. However, means of communicating between authentication server and remote mesh AP is presently not within the scope of the standard the 802.11r standard for client mobility influences the security architecture by enabling a hierarchical key distribution scheme to improve mesh route maintenance.

Specifically, this means leveraging key hierarchies and co-ordination with a central/trusted key-holder for pair-wise master keys (e.g., an AP acting as an authenticator will need the pair-wise master keys of the supplicant AP to generate session/transient keys prior to the EAP 4way handshake). [1] Figure 2 illustrate the wireless mesh authentication and encryption.

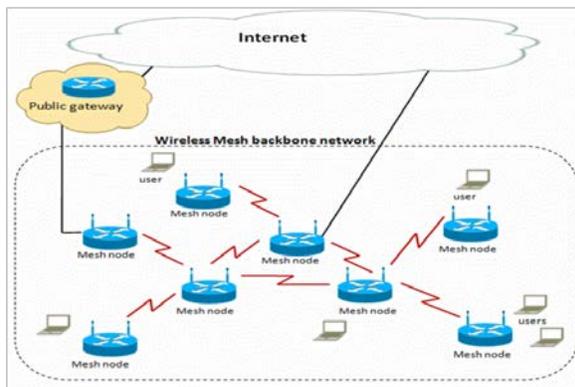


Figure 2: Wireless mesh authentication and encryption

Source:

<http://wiki.mikrotik.com/images/1/1b/image14002.gif>

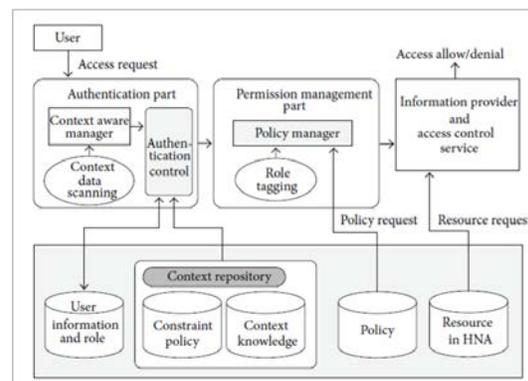


Figure 3: Overview of Dynamic access control Model.

Source: Dynamic Access Control Model for Security Client SeeVices in Smart Grid Research paper

c. Host base intruder detection and prevention systems

c.a. Dynamic Access Control Model for Security Client Services in Smart Grid

Dynamic Access Control Model for Security Client Services in Smart Grid, this research paper about dynamic access model for secure user services in the smart grid environment. Access control is a well-known security mechanism to give access or denial message to an access request and the system monitors and control who can access the specific data and also what they can do that data. Dynamic access control uses place, time and purpose according to context information as the conditions for access permission. This research is done by Sang-Soo Yeo, Si-Jung Kim and Do-Eun Cho. In the intelligent power grid, various objects can access system in several network environments so access control security becomes critical. In this research paper create new access control security model to provide users with secure services in the smart grid. This model analyzes the user's various access contexts and chooses an appropriate context type among the predefined context types. And then it applies the context-based user security policy to

allow the user's access to services dynamically. It provides stronger security services by permitting context information applied security services and flexible access control in various network environments. Using this system solve important access control issues when establishing the smart grid. [10] Figure 3 illustrate overview of Dynamic access control model.

c.b. Detecting and Eliminating Rogue Access Points in Ieee-802.11 Wlan -A Multi-Agent Sourcing Methodology.

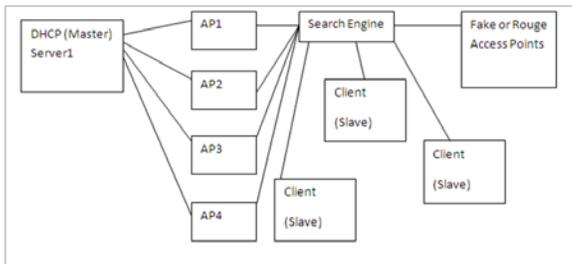


Figure 4: System architecture

Source: *Detection and Elimination of Fake Access Points in WLAN using Multi Agents and Clock Skew Methodology research paper.*

The master and slave agents are spontaneously look over the networks for any unauthorized access points using the skew intervals. Initially a master agent is generated on the DHCP-M server, which is responsible for regulating all the authorized processes of the Wireless Network.

This Master Agent generates slave agents depends upon the number of active Access Points Connected to the Server at that moment of time.

These slave agents are then transmitted on the respective APs connected.

Now these slave agents are duplicated on every Access Points are being dispatched to the every connect client system to the APs. When the duplicated salve agent at the client system detects any new Access Point, it automatically builds and sends an information packet INFO (SSID, MAC-Address, Vendors Name, Channel Used) of the Unauthorized AP to Duplicate Agent to the connected AP. The Slave Agent at AP transmits this Information to its Master Agent on the Server. At the server the details of the suspected AP are detected and matched with that of the information stored into the repository about all the access points.

If the information is matched and the AP is found ratified then a new slave agent is generated and send to that AP, rather if it's spotted as a client MAC address, a disassociation frame is send to all APs to inform them not to connect with it, else if the particulars doesn't match with the either of it then the MAC-Address of the AP is fetched from the INFO, the port at which the MAC-Address is coupled is examined and then be blocked for any LAN traffic Figure 4 will illustrate the system architecture of WLAN Multi-agent sourcing methodology.

This would then habitually deactivate the RAP from executing any network activity on the Wireless Network. And also prevent the clients (if any) connected to the AP by giving up the connection and get associated to the nearest AP which is certified. This is a very simple and most adequate method for completely routing out the Rogue Access Points from the network. [4][7]

This Methodology has the following owing stuffs:

It doesn't require any specialized hardware;

The proposed algorithm discovers and entirely eliminates the RAPs from network;

It provides a cost-effective result;

Due to multiple master agent's possibility of network congestion or delays is reduced.

The proposed technique can block RAPs as well as eradicate them from the networks both in form of Unauthorized APs or as a Rogue Clients Acting as APs.

Clear and easy to implement algorithm makes this architecture robust.

Proposed technique is very reliable and cost effective, as it deals with manifold level of detection and doesn't require any specialized hardware device

c.c. Rogue Access Point Detection and Prevention Techniques in W-LAN

"Study of Different Rogue Access Point Detection and Prevention Techniques in WLAN" about different RAP detection techniques with their pros and cons [7]. This paper contains techniques,

RAP Detection Scheme Using Statistical Techniques. Goal of this method is to detect evil twin attacks in real time under real wireless network environments. The method presents two algorithms to detect evil twin attacks: Trained Mean Matching (TMM) and Hop Differentiating Technique (HDT).

Detection of Rogue Access Point using Timing based Scheme. This method considers a scenario when a wireless station tries to join a WLAN to access the Internet.

Detection of RAP using Received Signal Strengths. This method proposes a novel fake AP detection method in the client-side.

A Novel Approach for RAP detection on Client Side. This method identifies existing rogue access point detection methods. This Study shows techniques that collect constructive or precise information from network to determine whether a device is rogue or not.

Talking about pros and cons of this system Pros will be, it can detect Man in the middle and evil twin attack efficiently, there is no need to modify network architecture if you are using this method, as it works on client side, Any Client side device can serve as detection mechanism, no special device needed for detection and cons this method only notify user about rogue access point.

Monitoring Systems

d.a. MAP: A Scalable Monitoring System for Dependable 802.11 Wireless network

The MAP project, which includes a scalable 802.11 measurement system that can provide continuous monitoring of wireless traffic to quickly identify threats and attacks. The MAP project, which includes

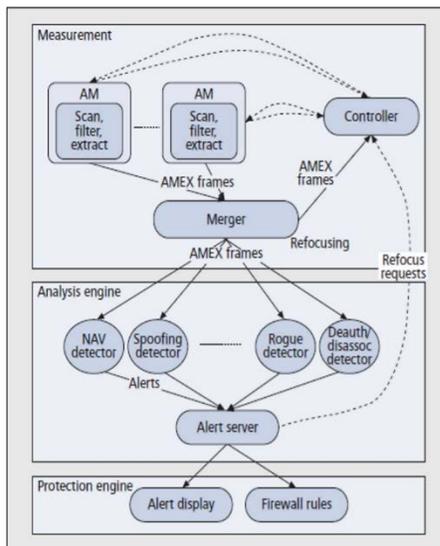


Figure 5: The Map architecture: dashed lines are controlled streams and bold lines represent Data.
Source: Map: a scalable monitoring system for Dependable 802.11 wireless Research Paper.

That can provide continuous monitoring of wireless traffic to quickly identify threats and attacks. The MAP system makes several contributions: novel channel-sampling strategies, a flexible mechanism for “refocusing” the attention of the measurement system to address changing needs of the analysis modules, a plug-in architecture for analysis components, and a range of attack detectors but coordinated sampling reduced frame-capture redundancy, refocusing was able to improve the effectiveness of our attack detectors, and performance was reasonable at the scale of a modest building. [8] Figure 5 illustrate the MAP Architecture.

b. Tracking

e.a. Tracking Mobile Users in Wireless Networks via Semi-Supervised Co-Localization

This research focuses on Tracking Mobile Users in Wireless Networks. Locating large quantities of users in a wireless network is an important task. To solve this problem this research developed a novel machine-learning-based approach that combines collaborative filtering with graph-based semi supervised learning to learn both mobile-users’ locations and the locations of access points. This framework exploits both labeled and unlabeled data from mobile devices and access points. Simultaneously recovering the locations of both mobile devices and access points, this is call colocalization, using labeled and unlabeled RSS (received-signal-strength) data from both mobile devices and access points. This research uses two-phase solution. First build a manifold-based model from a batch of labeled and unlabeled data in an offline training phase and then use a weighted nearest-neighbor method to localize a mobile client in an online localization phase. Then extend the two-phase co-localization to an online and incremental model that can deal with labeled and unlabeled data that come sequentially and adapt to environmental changes. Finally embed an action model to the framework such that additional kinds of sensor signals can be utilized to further boost the performance of mobile tracking.

II. SOLUTION

Most common problem of wireless network is the unauthorized access by the unauthorized intruders in current era. Different intruders trying to access to private networks using various methods. Therefore wireless network should have vast area of knowledge about the intruders, most of the Wireless Local Area Network (W-LAN) used the manual system for detect or prevent the intruders as an example when intruder trying to access a W-LAN, W-LAN security system detects intruders using their network policies and prevent them. Some other W-LAN security systems, they detect the unauthorized access and keep letting access the W-LAN. They do not take the actions to prevent the intruders.

This research trying to provide most securable environment for wireless networks. Research include mainly intruders detect, prevent and track them in most securable way. Firstly, identifying “who are the unauthorized accesses and are they really harmful to the wireless network”. Then check intruder’s violation history using particular technics include in system.

To check the intruder’s history, wireless network security system has special network called Wireless WAN, which is connected together all the wireless LAN around the world. All the wireless-LAN has connected to wireless-WAN, if any violation within the particular Wireless-LAN, it alerts to Wireless WAN. Wireless-WAN has special database which is included all the details about the intruders who had already done the violations before. With compare ring historic detail about the intruders, determine the intruder’s situation. If the intruder cannot find in the Wireless-WAN, that intruder automatically added to the database with all the information about the intruder.

To detect the intruders in this research used both traditional and newly introducing methods. Traditional way of detect the intruders is when anyone who trying to access the wireless network, determine whether if they are authorized or not using wireless network policies. Newly introducing method uses wireless network traffic and analyze traffic using particular algorithm to detect unauthorized access.

Wireless network security system uses an algorithm to analyze the users in the network background.

Algorithm analyze periodically traffic of the wireless network and keep the record of every periodic records. Algorithm continuously analyze wireless network periodically. If the algorithm detects any abnormal behavior within the network, wireless network security system keeps an eyes on about particular user. Anyhow particular time period record mismatch with previous records, Wireless-LAN suddenly identify there are something wrong with the Wireless-LAN and then check any violation occurs to the system using Wireless-LAN policies.

a. Analyze network traffic

As indicate above, using specific algorithm analyze the traffic of the W-LAN periodically to get the all the information about the W-LAN users. Mainly use the devices mac address to identify the users separately. Here monitor the both register uses of the W-LAN and unauthorized users. Register users monitored because, if they are trying to access the resources which are not

allocated to them and then analyze the which part of the W-LAN they are trying to access mostly then identify and give higher security to those part of the W-LAN. And also monitor the unauthorized access from outside the WLAN. This help system to detect and prevent the hackers before the attacking W-LAN.W-LAN algorithm also provide the proper knowledge about which time period hackers can attack the W-LAN and what part of the W-LAN mainly aim to attack.

b. W-WAN Database

Thousands of W-LAN spreads around the world and single W-LAN hard to protect from hackers, for that reason this research provide proper technics to combine them together for more secure. All the WLAN has common database which has connected to W-WAN. That database has most of the detail about the hackers who are trying to attack the W-LAN. When unauthorized access occurs to W-LAN, WLAN can check the device detail using W-WAN database and check violation history about device. If W-WAN database does not have the detail about that particular device-WAN database can update the new detail about device.

III. CONCLUSION

Wireless networking provides numerous opportunities to increase productivity and cost cutting it is also changing an organization's whole computer security risk profile. Although it is difficult to totally eliminate all risks related with wireless networking, it is possible to achieve a practical level of overall security by implementing a systematic approach to accessing and managing risks.

The research paper has stated new methodology for eliminating and detecting intruders. For the detecting it has used some traditional and new methods. The new method is to analyses the intruders by use of an algorithm and to analyses the pattern intruders that going to effect the network by using the algorithm. The algorithm will identify the time period of the intruder attacks. Using this network can be protected from the intruders automatically. Finally, the information about the intruder will automatically save with in the syslog and it'll block the intruder from the next attack.

IV. FUTURE WORK

In futre work there can be several things to develop with time. This research paper used the particular algorithm to detect and prevent the intruders.in future, that algorithm can be develop to be most intelligently using artificial intelligent. And also get all the hackers detail around the world using some richest technology. Since then can find out every hacker's violation history with his personal details. Using those details W-WAN can provide more accurate detail about the hackers.

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High Security Firewall: Prevent Unauthorized Access Using Firewall Technologies

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Abstract- This paper presents a detailed study of firewall technologies which are commonly used for network security. A firewall cannot handle all the destructive threats which are coming from unauthorized networks. Therefore, to develop a secured network different types of firewall technologies are used. Lot of researches have been done considering technologies of firewalls. The main purpose of this paper is to apply firewall capacity along with other firewall technologies such as packet filtering, network address translation, virtual private network and proxy services in order to prevent unauthorized accesses. Due to lack of many researches, related to firewall capacity and firewall technologies together. The research group focuses to build a more protected network by combining both firewall capacity and firewall technologies. The experiment results show the proposed idea good enough to build a secured network.

Index Terms- firewall technologies, firewall capacity, packet filtering, network address translation, virtual private network, proxy services

I. INTRODUCTION

Security is the most important aspect in a network. There are a lot of concepts for network security. Firewall is one of the most important concepts related to the network security. The term “firewall” was came to use in 1764, to describe walls which distinct the parts of a building most likely to have a fire from the rest of a structure. Firewall can be software or hardware. There is many installation software for network security; likewise, there are firewall devices for network security.

A firewall is designed in order to prevent or slow the spread of harmful events using firewall technologies to secure the network. Packet filtering, the firewall technologies that are currently existing can be named as Network addressing translation, Circuit-Level gateways, virtual private network, Proxy service, Application proxies and Application-Level gateway [1]. The firewall has a mechanism to allow some traffic to pass while blocking the other traffic (this is often called filtering). Most of the researches that have been done up to date focus on network security using firewall technologies. These researches focus on combination of few firewall technologies like packet filtering, Virtual Private Network and Network Address Translation. When consider about

Network security one of the most important points that should be taken in to attention is the firewall capacity. Firewall behavior basically depends on the capacity. Firewalls with higher capacities are expensive. The proposed system will acquire a more secured network combining low capacity firewall and firewall technologies. The Packet filtering is referred to as static packet filtering, this method Controls the access to a network by analyzing the incoming and outgoing packets and letting them pass or uncertain them considered on the IP addresses of the source and destination. Packet filtering is one of the techniques, among many for implementing protected firewalls. The Network address translation is a methodology of remapping one IP address space into another protocol datagram packet header while they are in transit across a traffic routing device. A Circuit-Level gateway is a type of firewall technique. Circuit-Level gateways perform at the session layer of the OSI model or “shim-layer” between the application layer of the TCP/IP stack. They monitor TCP handshaking between packets to determine whether a request session is legitimate. Create secure networks connection over a public network owned by a service provider is a virtual private network. Large corporations, educational institutions, and government agencies use virtual private network technology to enable remote users to securely connect to private network. A Proxy firewall is a network security system that prevent network resources by filtering messages at the application layer. An Application-Level gateway is firewall proxy which provide network security. It filters incoming node traffic to certain specifications which mean that only communicated network application data is filtered.

II. RELEVANT RESEARCH PAPERS

This research mainly defines about Network Address Translation (NAT) and Packet Filtering rules. Network Address Translation (NAT) is the process where a firewall assigns a public address to a computer or group of computers inside a private network. The main use of Network Address Translation (NAT) is to limit the number of public IP addresses an organization or company must use, for both economy and security purposes. A process of packet filtering is controlling access to a network by analyzing the incoming and outgoing packets and letting them pass or halting them based on the IP

addresses of the source and destination. Packet filtering is one technique among many for implementing security firewalls. But this paper is only focused about few firewall techniques, and it does not discuss about the firewall capacity. The firewall capacity exceeds large firewall should be replaced. So the cost will be high [2].

This research mentioned about how firewalls are used to protect resources from outside intruders and how Virtual Private Networks (VPN) enables to access the corporate network in a secure manner via non-secure public networks. A virtual private network (VPN) provides a secure connection between a sender and a receiver over a public non-secure network such as the Internet. It uses data encryption and other security mechanisms to prevent unauthorized users from accessing data, and to ensure that data cannot be modified without detection as it flows through the Internet. It then uses the tunneling process to transport the encrypted data across the Internet. Tunneling is a mechanism for encapsulating one protocol in another protocol. VPNs reduce remote access costs by using public network resources. Including private networks, a VPN is inexpensive. This paper is focuses on only VPN technique which is including in firewall. But there are more firewall technologies to make more secure network [3].

This research mainly focuses on the packet filtering rules, advantages, and disadvantages of it. In packet filtering, each packet passing through a firewall is compared to a set of rules before it is allowed to pass through. Depending on the packet and the rule, firewall can drop the packet, forward it, or send a message to the resource. This paper is disadvantageous as it focuses on only one packet firewall technique. Therefore, they are not considered to be secure on their own. And also they cannot make any content-based decisions on packets. Testing the grant and deny rules is also difficult, which may leave the network vulnerable or incorrectly configured [4].

The authors of this research focuses on packet filtering, network address translation and application proxies. Network address translations are placed in the borders of stub network domain. For all routed data grams, it translates the local address into unique address and vice versa. Using application proxies, for each application, separate forwarding service must be provided. This paper introduces a framework in the form of waterfall model. And also it describes about the generalized concept of authenticated signaling. But this paper is disadvantageous as it focuses about only few firewall techniques, and it does not discuss about the firewall capacity. If the firewall capacity exceeds, large firewall should be replaced. So the cost will be high [5].

This research focus on a Method and apparatus for configuring a client to redirect requests to a caching proxy server based on a category ID with the request. A computer network including a client, at least one caching proxy server, and a destination computer is described. In a

specific embodiment, a client computer may request particular types of information by including a category ID in request messages. In order to reduce network traffic, the destination computer may redirect the client's request messages to a caching proxy server, which is preferably located behind the same firewall or gateway as the client. The destination computer may initiate the redirection of client computer requests after receiving an HTTP proxy-GET request message from the client. The destination computer sends a message to the caching proxy server specifying the categories of request that the client computer will direct to the caching proxy server. The proxy server forwards this message to the client computer. The client computer uses the information contained in this message to direct requests messages to a specific caching proxy server based on a category ID. However, this research product is not covered in packet Filtering, Network Address Translation, Circuit-Level Gateways, Application Proxies, Application level Getaway areas [6]. D.Twum says that virtual Private Network technology allows remote network users to benefit from resources on a private network as if their host machines actually resided on the network. Each resource on a network may also have its own access control policies, which may be completely unrelated to network access. Thus users' access to a network does not guarantee their access to the sought resources. With the introduction of more complicated access privileges, such as delegated access, it is conceivable for a scenario to arise where a user can access a network remotely (because of direct permissions from the network administrator or by delegated permission) but cannot access any resources on the network. There is, therefore, a need for a network access control mechanism that understands the privileges of each remote network user on one hand, and the access control policies of various network resources on the other hand, and so can aid a remote user in accessing these resources based on the user's privileges. This research presents a software solution in the form of a centralized access control framework called an Access Control Service (ACS) that can grant remote users network presence and simultaneously aid them in accessing various network resources with varying access control policies. At the same time, the ACS provides a centralized framework for administrators to manage access to their resources. The ACS achieves these objectives using VPN technology, network address translation and by proxy various authentication protocols on behalf of remote users. However, this research product is not covered in packet Filtering, Network Address Translation, proxy Services, Application Proxies, Application level Getaway areas [7]. Wason T., Chandra A., focuses on network security according to a firewall policy. The advantage in this theory is Network Address Translation (NAT) which used to hide true addresses of protected hosts. The NAT function was developed to address IPv4 routing addresses that could be used or assigned to computers in order to

reduce the cost of obtaining public addresses for every computer. But this research does not concern about firewall capacity therefore in the high security firewall research it will concern about the firewall capacity which will help the people to choose the most suitable firewall to prevent network attacks [8].

This research mainly focuses on firewall techniques like packet filtering and circuit level gateways. Circuit level gateways monitor TCP handshaking between packets to determine whether a requested session is legitimate. In packet filtering only the authorized data packets are passed through the firewall. This research is disadvantageous as it only focuses about few firewall techniques. Therefore, high security firewall system will focus on having proxy services information packets would not pass through a proxy and proxy act as an intermediary computer. Therefore, this prevents direct connections and packet transfer between either sides of the firewall which makes harder for intruders to find the location of network where the packet is coming from [9].

Online examination system is used to provide exam online for remote candidates. The system is consisting of a web based server with a database facility. Database it contains User information and authentication for the Examination. Firewall technologies are used to make a secure system for online examination. Virtual Private Network (VPN) and NAT (Network Address Translation) these type of technologies is used to build this system. A Virtual Private Network (VPN) is a network technology that creates a secure network connection over a public network such as the Internet or a private network owned by a service provider. In order to gain access to the private network, a user must be authenticated using a unique identification and a password. An authentication token is often used to gain access to a private network through a personal identification number (PIN) that a user must enter [10].

Sharma, Bhisham, and Karan Bajaj state that packet filtering is the main technology that this research focuses on in order to prevent unauthorized traffic form network. The filtering decision is taken according to a set of ordered filtering rules written based on predefined security policy requirements. This research mostly considers about traffic of network and how to make secure network without any unauthorized access [11].

This report will provide readers with a resource for understanding firewall design Principles used in network security. Firewalls fall into four broad categories: packet filters, circuit level Gateways, application level gateways and state full multilayer inspection firewalls. In a packet filtering firewall, each packet is compared to a set of rules before it is forwarded. The advantages of Packet filtering firewalls are low cost, have only a small effect on the network performance, and do not require client computers to be configured in any particular way. Circuit level gateways examine each connection setup to ensure that it follows legitimate TCP handshaking. Application level

gateways Packets received or leaving cannot access services for which there is no proxy. The problem of this paper is that it does not focus on network capacity. So the performance will be decreased [12].

This research mainly focuses on the firewall capacity, advantages, and disadvantages of it. High firewall capacity helps the system to reduce the cost of replacing the low capacity. This paper is disadvantageous as it focuses on only one packet firewall technique. Therefore, they are not considered as a secured firewall. And also it may leave the network vulnerable or incorrectly configured. There are no any packet filtering techniques, which packet passing through a firewall is compared to a set of rules before it is allowed to pass through. So this a very big drawback for the system [13].

III. SOLUTION

Research team has discussed a conceptualized paper on high secure network combining firewall technologies and capacity together. In a network, security is most important factor. In organizations, network is used to share their confidential information and secret methodologies. The lack of innovative security standards, hackers can hack the system and steal their private and confidential details. Therefore, most of the organizations use firewall as a security system. There are few firewall technologies to provide security in the network. Those firewall technologies are packet filtering, network address translation, circuit level gateways, virtual private network, proxy services, application proxies and application level gateways. Firewall capacity is one of the factors that should give the priority in order to speed the performance of the firewall.

Firewall performances are sometimes depending on the firewall capacity. High capacity firewalls can perform better. Most of high capacity firewall is expensive. The Proposed research will be focusing on high secured network using firewall capacity and combination of firewall technologies such as packet filtering, network address translation, virtual private network and proxy services. When advanced secured network is built using these technologies, the firewall capacity can be increased in order to increase the performance of the firewall, otherwise low capacity firewalls can slow down the performance. Then this will affect the security of network. Therefore, Research team decided to combine few firewall technologies together in order to improve the security of a particular network.

3.1. Reason for consideration of these technologies

Packet filtering technique, Network will identify packet which is authorized and other unauthorized packet will be dropped. Therefore, this technology is more important. Network address translation consider about public IP Addresses which are allocated in specific network, then hacker cannot take information using

unauthorized IP addresses. Virtual private network associates with private network and it helps to keep secure connection between sender and receiver. Proxy services, Proxies are mostly used to control, or monitor, outbound traffic. Some application proxies supply the requested data. This lowers bandwidth requirements and decreases the access the same data for the following user. It also gives indisputable evidence of what was transferred. These technologies are more important to build a secure network. Therefore, proposed research is based on these technologies and capacity of firewall.

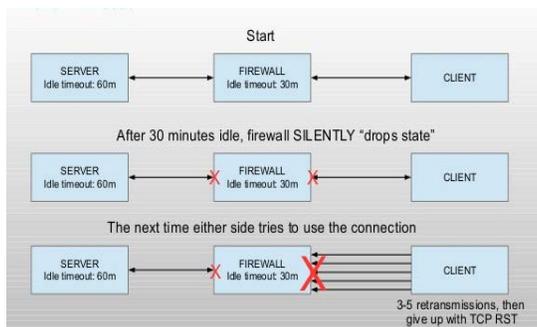


Figure 2: firewall time-out

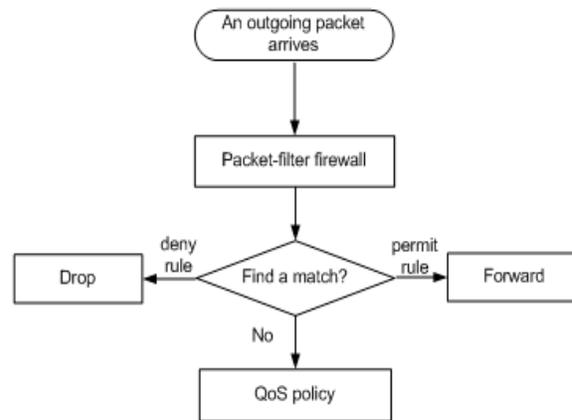


Figure 1: packet filtering mechanism

This figure 1 illustrates the mechanism of packet filtering technique.

3.2. Reason for consideration of the capacity of firewall

Firewall performance directly effects to network security and firewall performance depends on capacity of firewall. If firewall capacity high, it will give high performance. Therefore, research team selected firewall capacity for more secured network.

technique use encryption and other security mechanisms to make sure that only reliable users can access the network. The proxy server acts as a caching server to load the web page faster. The main technology focus in the research paper is the firewall capacity which helps to increase the performance of the firewall

Figure 2 represents the firewall time-out when firewall capacity is low.

IV. CONCLUSION

Firewall is a general technique which provide the authorize network access. There are many firewall techniques used to protect from unreliable accesses. Therefore, network should be configured in such a way that the network should not allow unauthorized users entering the network or accessing the information. The proposed research focuses on various technologies. packet filtering, Virtual Private Networks, Network Address Translation and firewall capacity. In packet filtering it focuses on passing or blocking packets at a network based on destination addresses, ports or protocols. Network Address Translation assigns a public address to a computer or group of computers inside a private network. It prevents from exceeding the number of public IP addresses an organization or a company must use for security purposes. Virtual Private Network is another technology that the research paper focuses, this

Figure 3: simple network topology

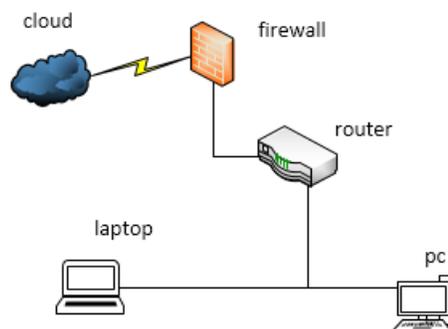


Figure 3 demonstrates a simple network topology which shows how the firewalls are connected in a network.

V. FUTURE WORK

The proposed research discusses about the advanced network security combining both firewall capacity and firewall technologies like packet filtering, Network Address Translation, Virtual Private Networks and Proxy Services. Due to Advancement of technology several cyber threats can occur in future. As a solution to overcome from these threats advanced security systems should be implemented. In future, researchers can focus on new aspects of firewall capacity in order to prevent cyber-attacks and including more firewall technologies. Thus, combining many technologies provides more effective access control and increases privacy.

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Study of Dissolved Oxygen (DO) Profile in Nalanda Lake, Sri Lanka

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Abstract- Nalanda Lake is (Long. 80° 37' 1.93" and Lat. 7° 40' 30.6") one of the ancient Lake in the Sri Lanka. It's fed by the Basin of Mahaweli River. This lake water is use for drinking, agriculture and human activities. Generally, in this lake observing the high amount of algae due to high nutrient content. Equally lake water had a less amount of Dissolved Oxygen (DO). The DO concentration is characterize of a lake healthiness. And also, the DO concentration responds to the Biological Oxygen Demand (BOD) load. Main Objective of this research was determined the DO concentration in selected Non-point source and developed the DO consumption model by using Mathematical Equation. Five different sample location points were selected. DO and BOD variation was studied during four weeks. Totally 20 samples were analyzed. DO was measured by DO meter (HACH Sension6), BOD was measured by the Winkler method. DO consumption was measured using Streeter-Phelps equation. According to investigated data DO vary (8.31±0.76 – 10.02±0.46 mg/l). Minimum DO value (7.62 mg/l) obtained point-3. BOD varied from 5.13±1.08 to 5.92±0.53. The position where the lowest DO appeared was around 14-18 km.

Index Terms- Oxygen Demand, Non-point source, Biological Oxygen Demand, Nalanda Lake, Nutrient

I. INTRODUCTION

Water is the largest natural resources in the world. But inappropriately low percentage of the total population be able to getting safe and clean water for their daily use. The amount of DO in water is one of the most commonly used indicators of a water body's health. A sufficient supply of DO is dynamic for all higher aquatic life. The problems associated with low concentrations of DO in water have been recognized for over a century (cox, 2003).

Water quality modeling in a Lake has developed from the pioneering work of Streeter and Phelps (1925) who developed a balance between the dissolved oxygen supply rate from reaeration and the dissolved oxygen consumption rate from stabilization of an organic waste in which the biochemical oxygen demand (BOD) deoxygenation rate was expressed as an empirical first order reaction, producing the classic dissolved oxygen sag (DO) model.

Matale District in Sri Lanka has a lot of Natural water resources. Those Natural water bodies has a high amount DO concentration due to the less temperature conditions compare to the other water bodies in Sri Lanka. But Nalanda Lake in Matale district is the one of the lake that highly varied in DO

concentration with the seasonal change. Hence, the aim of this work was to identify the DO profile (DO sag curve) in the Nalanda Lake by using Streeter and Phelps equation.

II. METHODOLOGY.

Location-Nalanada Lake is located in Matale district, central province and 28.4Km from Matale town. This is near to Dambulla and Galewella town. The estimated terrain elevation above mean sea level is 400m. Latitude is 7°40' 30.6" and Longitude is 80° 37' 1.93".

Sample collection-In this study five sample location points were selected according to morphological different. Samples were collected during four weeks. Totally 20 samples were analyzed.

Parameter Analyzed-Initial DO was measured by using DO meter and another sample was collected 300 ml BOD bottle.1 ml of Manganese sulfate and alkali-iodide-azide was added to the sample onsite. The sample was incubation at the 20°C temperature in 5 days. After five days final DO was measured by using Winkler method.

$$DO = \frac{8.0 \times C_b \times V_b}{(V_f - 2.0)V_f} \quad (1)$$

where DO - Dissolved O₂ Concentration in water (mg/l), C_b - Concentration of Sodium thiosulphate solution, V_b - Volume of Sodium thiosulphate solution, V_a - Volume of sample was taken from titration, V_f - Bottle volume with the stopper

$$BOD = DO \text{ (initial)} - DO \text{ (after incubation 5 days)} \quad (2)$$

Data processing-Finally, the model can be developed by using Streeter-phelps equation. When using collected data from the sample. Initial DO and BOD values were used. A Critical point was indented.

$$D = \frac{k_1 L_0}{k_2 - k_1} (e^{-k_1 t} - e^{-k_2 t}) + D_0 e^{-k_2 t} \quad (3)$$

Where D= Oxygen deficit in river after time t, L₀= Initial ultimate BOD at mix, D₀= Oxygen deficit in river after time Zero, K₁= De-oxygenation rate constant, K₂= Re- oxygenation rate constant, t= time

De-oxygenation rate constant

The BOD is the amount of oxygen required by microorganisms (to respire) as they consume organic matter. The amount of organic waste in a water body is measured by its demand on the water's oxygen resources. (B.A. Cox.2003)
 $K_d = K + u \eta / H$ (4)

Where K_d = Deoxygenation rate constant, K = BOD rate constant, u = Average stream velocity, m/s, η = Bed-activity coefficient, H = Average depth of stream, m

Reaeration rate constant

$$K_a = 3.9 u^{0.5} / H^{1.5} \quad (5)$$

Where K_a = Reaeration rate constant, u = Average stream velocity, m/s, H = Average depth, m

III. RESULTS AND DISCUSSION

DO concentration

Figure 1 illustrate the dissolved oxygen Variation with the sample point. According to the results are given in Figure 1, 2nd week gives highest DO concentration and 1st week gives lowest DO concentration. In 2nd week samples were collected during a heavy rain period. Therefore, it causes to decrease the temperature of water and also rain water can easily Dissolve Oxygen. Temperature is inversely proportional to the DO level in the water. Cold water holds more oxygen than warm water. And also DO level vary with altitude. At higher altitudes water has less DO concentration. Because of high altitude has a low atmospheric pressure it is the reason for observing low DO Concentration.

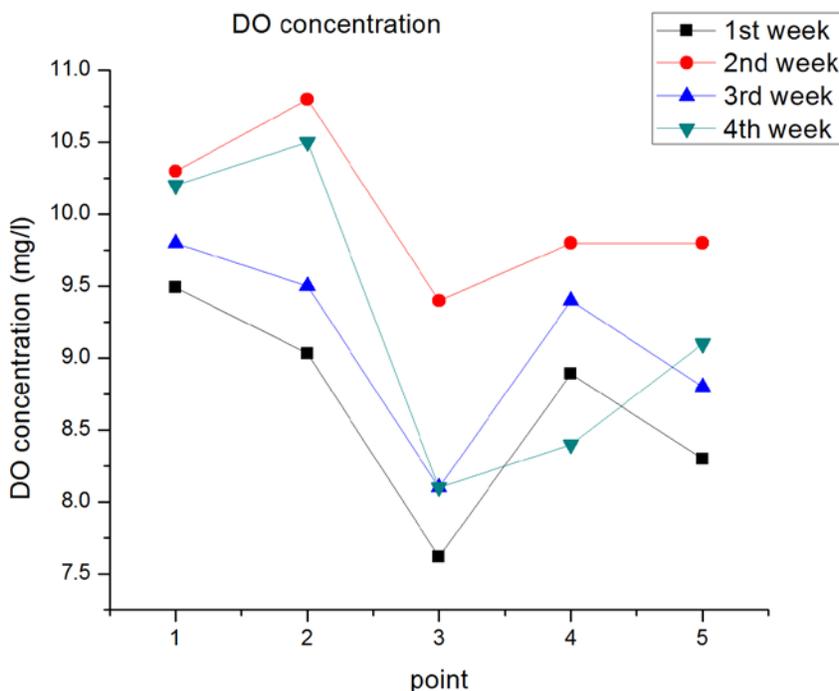


Figure 1: DO Concentration variety

Furthermore in every week, 2nd point samples showed highest DO level and 3rd point samples showed lowest DO levels. Highest DO is equal to 10.8 mg/l. Lowest DO concentration is 7.62 mg/l. This sample location point was highly contaminated with agricultural runoff. Therefore many organic matters are mixed with Lake Water. Aerobic Bacteria is consuming DO to break down these organic matters. As a result of that decrease the DO level in the water.

DO Sag Curve

Oxygen sag curves the curve obtained when the concentration of dissolved oxygen in a river into which sewage or some other pollutant has been discharged is plotted against the distance downstream from the sewage outlet. Samples of water are taken at areas upstream and downstream from the sewage

outlet. The presence of sewage reduces the oxygen content of the water and increases the biochemical oxygen demand. This is due to the action of saprotrophic organisms that decompose the organic matter in the sewage and in the process use up the available oxygen. (A dictionary of Biology, 2004).

According to the Oxygen sag curve, initially, DO Concentration is reduced with the distance. This zone name as a zone of degradation. In this zone is a high amount of CO2 content. After that again DO concentration is increasing, call as a zone of recovery. Due to this, most of the stabilized organic matter are settled as sludge. Between, Zone of degradation and Zone of recovery, is a zone of active decomposition. A minimum concentration occur at one point, call critical point. Dissolved Oxygen Drift and Critical Drift were calculated using Streeter-Phelps equation.

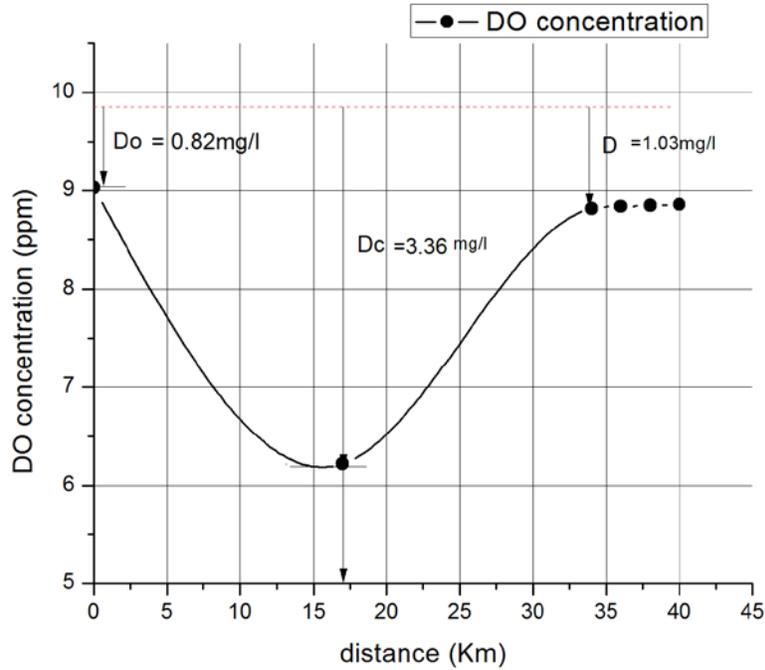


Figure 02: Oxygen Sag Curve 1st week point 02

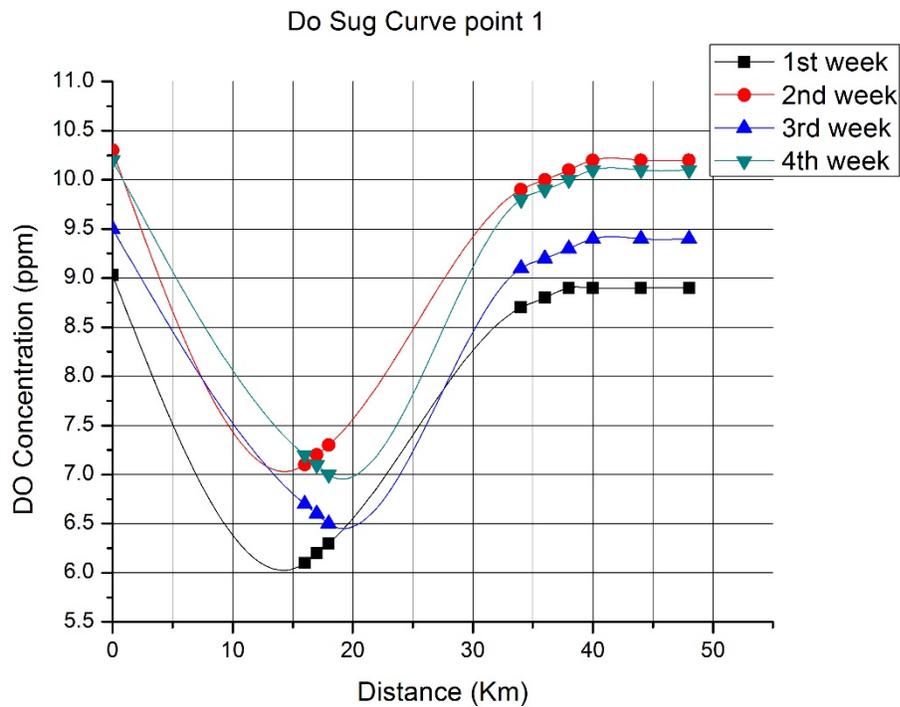


Figure 3: DO Sag Curves in Sample collected Point 01

According to the Figure 3: Initial DO concentration in polluted point 01 nearly $9.88 \pm 0.46 \text{ mg/l}$ and critical DO concentration is nearly $6.78 \pm 0.38 \text{ mg/l}$. That critical point was arising nearly $18 \pm 1.27 \text{ km}$ from the polluted point.

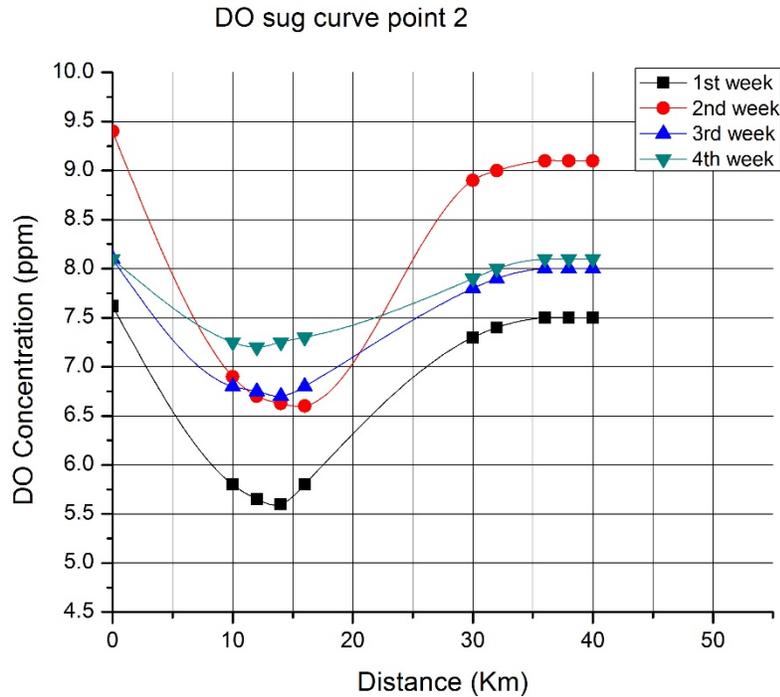


Figure 4: DO Sag Curves in Sample collected Point 02

The figure 4: Initial DO concentration in polluted point 02 nearly 8.31 ± 0.78 mg/l and critical DO concentration is nearly 6.93 ± 0.23 mg/l. That critical point was arising nearly 17 ± 0.69 km from the polluted point.

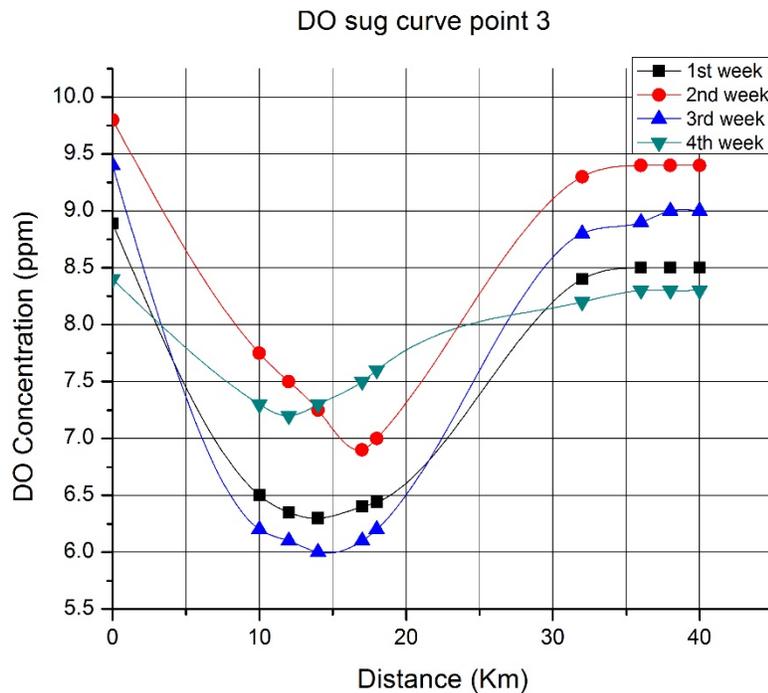


Figure 5: DO sag curves in Sample collected Point 03

According to the Figure 5, initial DO concentration in polluted point 03 nearly 9.12 ± 0.61 mg/l and critical DO concentration is nearly 6.41 ± 0.81 mg/l. That critical point was arising nearly 17 ± 1.94 km from the polluted point.

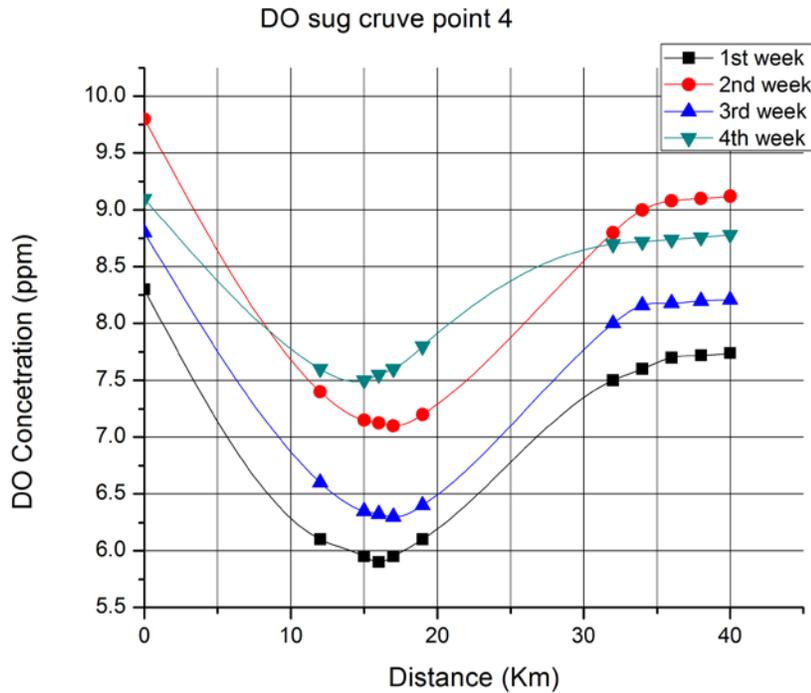


Figure 6: DO sag curves in Sample collected Point 04

According to the graph 4.8 initial DO concentration in polluted point 04 nearly $9 \pm 0.63 \text{mg/l}$ and critical DO concentration is nearly $7.29 \pm 0.22 \text{mg/l}$. That critical point was arising nearly $14 \pm 3.10 \text{km}$ from the polluted point.

Table 1: Distance where the low DO concentration was occurring.

point	week	Initial DO/ppm	Critical DO/ppm	Distance (Km)
1	1	9.03	6.2	17
	2	10.3	7.2	18
	3	9.5	6.5	18
	4	10.2	7	18
2	1	7.62	5.6	14
	2	9.4	6.6	16
	3	8.1	6.7	14
	4	8.1	7.2	12
3	1	8.89	6.4	17
	2	9.8	6.9	17
	3	9.4	6.2	18
	4	8.4	7.4	12
4	1	8.3	5.9	16
	2	9.8	7.1	17
	3	8.8	6.3	17
	4	9.1	7.5	15

IV. CONCLUSION

The following conclusion can be made as find outcomes based on the results of the current study. Every point has been effect nearby 16km into the polluted point. Because has a low velocity. Therefore, water flowing very slowly. As a result, of that setting time and the distance is increasing. In the rainy

season has a high amount of DO concentration in the water. But in dry season less amount of DO concentration has a in the water. Because dissolved Oxygen depends on the temperature.

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Strengthening vegetable marketing policy through indexing of rising constraints

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Abstract- The present study was designed to assess the constraints affecting market performance of selected vegetables: namely potato, egg plant, pointed gourd, okra, aroid and red amaranth. Total 100 respondents were randomly selected from two upazilas- Bogra sadar and shibgonj of Bogra district. Both tabular and quantitative analyses were conducted to achieve the objectives of the study. Spread values of vegetables grower to consumer were almost doubled. The average spread value change of vegetable at town market was 19.67 % higher than village market. The major findings of the study revealed that production of all the selected vegetables were profitable but respondents faced constraints due to improper marketing systems. Growers, wholesalers, retailers and consumers of vegetable put first priority accordingly on low market price, irregular supply by growers, high wholesale market price and high retail market price. All the respondents were put emphasis on to stretch out constraints early and proper steps should ensure by government to minimize all the risk.

Index Terms- horticultural crop, constraint, vegetable marketing policy, Bangladesh, agriculture

I. INTRODUCTION

Bangladesh is one of the pioneer country in term of vegetable production among the South Asian countries (Ali, 2000). Vegetables compare very favorably to other crops in profitability terms and the future performance of the sector will largely determine how successful the country is in diversifying its agricultural production base and achieving higher agricultural growth rates (Ateng, 1998; Mahmud et al., 2000).

Crop production has increased by two to three times in the last few economic years. But it is evident that without an efficient agricultural marketing system, high crop production can not be sustained for a long time. When the farmers do not get the fair price for their products they must be lost their interest to continue farming as for financial crisis. Agricultural marketing is an essential tool as uninterrupted, adequate and timely supply of agricultural products, inputs and services to target groups, including producers, consumers and intermediaries and agricultural marketing is not just a means of distributing agricultural product but also a way of stimulating new forms of production (Mahmud *et al.*, 2000). There are a number of factors that obstruct the farmers from getting fair price for their

products. Farmers are compelled to sell their products at the harvest time when the prices are minimal resulting in a very low return for their produced products. Ultimately, the farmers who produce and bear the risks associated with the crop production are deprived of the major benefits of their products (Faruquee, 2005). For Bangladesh, identifying the constraints on the expansion of vegetables production and marketing are important, since the supply of vegetables is quite irregular in most Asian countries, including Bangladesh (Ali, 2000). Farmers who are engaged in the production of vegetables often earn higher incomes than those engaged in the production of cereal crops alone (Weinberger and Lumpkin, 2005). Vegetables like egg plant, radish, cabbage, bitter gourd, cauliflower, and okra gave returns at least three times higher than rice (Ateng, 1998).

So far, there have been several studies of the possibility of horticultural sector improvement in Bangladesh. Most of them have highlighted the potential of horticultural crops like vegetables (Weinberger and Genova II, 2005; Ali, 2000). Keeping these points in mind, the study was undertaken for Potato, Egg plant, pointed gourd, Okra, Aroids/Taro and Red Amaranth in terms of investigating profitability point of view.

The specific objectives of this study was as follows-

- i) To examine the present marketing situation of vegetables.
- ii) To assess the constraints affecting market performance and to propose policy recommendations to provide the growers fair price and a lower price to the consumers for enhancing market performance.

II. METHODOLOGY

Seven crops, such as Potato, Egg plant, Pointed gourd, Okra, Bitter gourd, Aroids/Taro and Red Amaranth were selected for this study. The study was conducted in Shibgonj and Sadar Upazila of Bogra district was selected purposively due to the high production regions of selected crops. On the other hand, the most prominent wholesale market is here in Mohasthanor, Shibgonj. We selected five village market and five town markets from these two Upazila. Five village markets were Bilhamla hat, Mohasthanor hat, Pirob hat, Bihar hat and Shibgonj hat. Five town markets were Raza bazar, Banani bazar, Namazgor bazar, Mathidali bazar and Godarpara bazar. From the population, 25 growers, 25 wholesalers, 25 retailers and 25 consumers of vegetables were selected randomly for the year of 2014. Data for

the present study were collected through pre-designed and pre-tested interview schedules. Data were collected between August and September 2014. After necessary adjustments, collected data were analyzed to achieve the stipulated objectives of the study. Tabular methods of analysis using averages, percentages, ratios etc. were done for the study.

The following formula was used to calculate the different parameters and the cost of production of selected vegetables:

- i. Net Return = GR –GC
Where, GR = Gross Return = P×Q
Q= Yield per acre (kg)
P= Sale price of the product (To.)
GC= Gross Cost = TFC+ TVC
Where, TFC= Total fixed cost per acre (To.)
TVC= Total variable cost per acre (To.)
- ii. Gross Margin (GM) = GR- TVC
Where, GR= Gross Return
TVC= Total variable cost per acre (To.)
- iii. Benefit Cost Ratio (BCR) = Gross Return (GR)/Gross Cost (GC)

Gross Return per acre represented the average price of the main product and its by-products. Gross Margin (GM) analysis has been estimated as the difference between gross return (GR) and Variable Cost (VC). That is GM= GR-VC (Yang, 1965). The Net Return (NR) analysis considered fixed cost which includes costs for land use, interest on capital, etc. So net return per acre was calculated by deducting all costs (variable costs and fixed costs) from total (i.e. NR=GR-GC). Thus, per acre GM and NR of the relevant vegetables were estimated to compare among the alternative vegetables to identify the most profitable vegetable. Benefit Cost Ratio (BCR) is a relative measure which is used to compare benefits per unit of costs. It helps to analyze the financial efficiency of the vegetable farms and market.

Constraint/Challenge Facing Index (CFI) for any one of the identified dimensions could range from 0 to 300 where constraints were ranked according to Constraints Facing Index of vegetable marketing. For this purpose, a Constraint/Challenge Facing Index (CFI) was computed by using the following formula as used by Mansur (1989) and Raha (1989).

- iv. Constraint Facing Index (CFI) = $P_1 \times 1 + P_m \times 2 + P_h \times 3$
Where, P_1 = Constraint facing score of respondents having less severe

P_m = Constraint facing score of respondents having moderately severe

P_h = Constraint facing score of respondents having highly severe

III. RESULTS AND DISCUSSION

3.1. Costs and returns of vegetable production

Production cost plays a vital role in the decisions of the growers. The costs refer to the total amount of funds used in production. In this study, the total costs per acre were worked out. Hence, total variable and fixed costs were calculated separately (Table 1). In the present study it was observed that total costs of potato production by the sample growers was Tk. 43,000/acre, of which variable cost was Tk. 22,500/acre and fixed cost was Tk. 20,500/acre (Table 1). A total return from the production of potato was Tk.129,000/acre, while gross margin was Tk. 106,500/acre and net return was Tk. 46,000/acre. In case of egg plant production, a total cost was Tk. 47,150/acre, of which variable cost was Tk. 26,150/acre and fixed cost was Tk. 21,000/acre (Table 1). A total return from the production of potato was Tk. 291,200/acre, while gross margin was Tk. 265,050/acre and net return was Tk. 244,050/acre. Whereas it was the highest return of any other vegetables. In case of pointed gourd production, a total cost was Tk. 35,200/acre, of which variable cost was Tk. 19200/acre and fixed cost was Tk. 16000/acre (Table 1).

A total return from the production of potato was Tk. 158,400/acre, while gross margin was Tk. 139,200/acre and net return was Tk. 123,200/acre. A total cost of okra cultivation was Tk. 28,700/acre, of which variable cost was Tk. 13,400/acre and fixed cost was Tk. 15,300/acre (Table 1) and net return was Tk. 83,300/acre. Here fixed costs were more than total variables cost. On the other hand, a total cost of bitter gourd cultivation was Tk. 45,200/acre, of which variable cost was Tk. 25,100/acre and fixed cost was Tk. 20,100/acre (Table 1) while net return was Tk. 64,000/acre. The total cost of aroids/taro cultivation was Tk. 33,900/acre and net return was Tk. 56,100/acre. Again, the total cost of red amaranth cultivation was Tk. 23,600/acre and net return was Tk. 12,400/acre which was almost half of the total cost of red amaranth cultivation. The study was found that net return of egg plant production was the highest among the selected vegetables against the total production cost while in case of red amaranth was the lowest.

Table 1. Per acre production cost (Tk/acre) and returns at grower's level:

Parameter	Potato (pakri)	Egg plant	Pointed gourd	Okra	Aroids	Bitter gourd	Red Amaranth
A. Total variable costs	22500	26150	19200	13400	18000	25100	9000
i) Human labor cost	7200	8400	6000	4800	6300	8100	3600
ii) Land preparation cost	2100	2100	2100	2100	2100	2100	2100
iii) Seed cost	2000	1800	1200	400	2000	1500	200
iv) Fertilizer cost	4000	4200	3400	2500	3200	4000	1000
v) Irrigation cost	2000	2400	1800	1600	1200	2000	800
vi) Pesticide cost	3200	5250	3200	1000	1200	5400	800
vii) Others cost	2000	2000	1500	1000	2000	2000	500
B. Total fixed costs	20500	21000	16000	15300	15900	20100	14600
i) Land rent cost	12000	12000	12000	12000	12000	12000	12000
ii) Family labor	6500	6500	3200	2800	2400	6600	2100
iii) Interest on borrowed money (%)	2000	2500	800	500	1500	1500	500
C. Total costs (A+B)	43000	47150	35200	28700	33900	45200	23600
D. Total returns	129000	291200	158400	112000	90000	109200	36000
E. Gross margin (D-A)	106500	265050	139200	98600	72000	84100	27000
F. Net return (D-C)	46000	244050	123200	83300	56100	64000	12400

Data showed (Table 2) that the average total cost of potato production was Tk. 12.35/kg while the net profit was Tk. 5.65/kg, whereas benefit costs ratios for the cultivation of potato by the sample farmers were 1.46 over profit, respectively (Table 2).

The productivity or yield of potato in study areas was 7.2 ton/acre which is higher than the national average yield of 6.4 ton/acre (BBS, 2008). The estimated BCR of the present study was lower but close to the result presented by Azimuddin *et al.* (2009) for potato production in Comilla and Munshigonj.

3.2. Profitability of vegetables at grower's level

Significant variations in production, varieties, and quality also increase the marketing cost (Harris-White, 1995). The net profit margin of a specific agency is the net earnings, after

paying all marketing costs (Khushk, 2001). On the data (Table 2) showed that Egg plant was the most profitable vegetable in the study area during cultivation season 2014 according to BCR (3.38), where net profit per kg was 15.72 Tk. against average total cost 8.28 Tk/kg. On the other hand, Red Amaranth was the least profitable vegetable in the study area during cultivation season 2014 according to BCR (1.29), where net profit was 2.67 Tk./kg against average total cost 9.33 Tk./kg that was ranked 7th of profitability out of seven selected vegetables. The benefit cost ratios of egg plant, okra, aroids, pointed gourd, bitter gourd, potato and red amaranth over profit were 3.38, 2.20, 2.00, 1.88, 1.74, 1.46 and 1.29 respectively which were ranked similarly 1st to 7th. The present finding consisted with the findings of Mohammed (2007).

Table 2. Profitability of vegetables at grower's level

Parameters	Potato (pakri)	Egg plant	Pointed gourd	Okra	Aroids/ Taro	Bitter gourd	Red Amaranth
A. Average production cost (Tk/Kg)	6	4.43	7.33	7.18	9.41	10.76	7.87
B. Average marketing cost (Tk/Kg)	6.35	3.85	4.37	3.27	3.09	4.14	1.46
i) Grading (Tk/Kg)	0.34	0.32	0.37	0.42	0.44	0.54	0.24
ii) Transport (Tk/Kg)	0.58	0.52	0.60	0.60	0.60	0.60	0.60
iii) Cold storage rent (Tk/Kg)	3.53	-	-	-	-	-	-
iv) Market toll (Tk/Kg)	0.50	0.50	0.50	0.50	0.50	0.50	0.25
v) Loading – unloading cost (Tk/Kg)	0.25	0.30	0.30	0.25	0.25	0.25	0.25
vi) Personal expense (Tk/Kg)	0.25	0.82	0.85	0.75	0.55	0.75	-
vii) Wastage (Tk/Kg)	0.90	1.39	1.75	0.75	0.75	1.50	0.12
C. Average total cost per kg (Tk) (A+B)	12.35	8.28	11.70	10.45	12.50	14.9	9.33
D. Average wholesale price per kg (Tk/ kg)	18	24	22	23	25	26	12
E. Net profit (Tk/ kg) (D-C)	5.65	15.72	10.30	12.55	12.25	11.10	2.67
F.i) Average yield per acre (kg)	7200	10400	4800	4000	3600	4200	3000
ii) Total return per acre (Tk)	129600	291200	105600	92000	90000	109200	36000
iii) Net profit per acre (Tk)	40680	163488	49440	50200	44100	46620	8010
iv) Gross cost per acre (Tk)	889200	86112	56160	41800	45000	62580	27990
G.i) BCR on profit	1.46	3.38	1.88	2.20	2.00	1.74	1.29
ii) Profitability Rank	06	01	04	02	03	05	07

3.3. Marketing average cost of vegetables incurred by growers, wholesalers, retailers and consumers.

The marketing costs of some selected vegetables for the study areas are shown in Table 3. The estimated average marketing costs per ton vegetables incurred by the growers were

Tk. 3920. The estimated average marketing costs per ton vegetables incurred by the wholesalers were Tk. 3635 and by the retailers were Tk. 3380. More costs occurred by transportation cost by wholesalers and retailers.

Table 3. Marketing average cost of vegetables incurred by growers, wholesalers and retailers.

Cost Item	Growers		Wholesalers		Retailers	
	Tk/ton	%	Tk/ton	%	Tk/ton	%
Grading cost	380	9.70	250	6.88	150	4.44
Transportation	590	15.05	1940	53.37	1930	57.10
Loading unloading cost	270	6.90	375	10.32	375	11.08
Market toll	500	12.75	300	8.25	200	5.92
Spot /shop rent	-	-	100	2.75	100	2.96
Personal expense	660	16.83	200	5.50	200	5.92
Wastage	1020	26.02	250	6.88	300	8.88
Donation	-	-	220	6.05	50	1.48
Others	500	12.75	-	-	75	2.22
Total	3920	100	3635	100	3380	100

3.4. Comparative study about the most gainer in the vegetable marketing channel.

On the data (Table 4) shows that the growers (43.17 %) were the most gainer in the vegetable marketing channel in the study area during cultivation season 2014 according to an average gaining percentage of selected seven vegetables rather than wholesalers (37.08 %). The least gainer was the retailers according to the average percentage (19.74%) of gaining.

Although the growers the most gainer in the vegetable marketing channel but they could not win the race of profitability because they had loan of larger share of invested capital. Potato growers who were solvent, they stored their potatoes in cold storage and were maximum beneficiary by growing potato. But most of potato growers did not get proper price for their potatoes due to improper marketing system early marketing.

Table 4. Comparative study about the most gainer (Tk/Kg) in the vegetable marketing channel.

Item	Growers			Wholesalers			Retailers		
	Production cost	Sale cost	Gain	Buy cost	Sale cost	Gain	Buy cost	Sale cost	Gain
Potato (pakri)	12.35	18	5.65 (38.56)	18	24	6 (40.96)	24	27	3 (20.8)
Egg plant	8.28	24	15.72 (42.81)	24	35	11 (29.96)	35	45	10 (27.23)
Pointed gourd	11.70	22	10.30 (42.38)	22	33	11 (45.27)	33	38	3 (12.35)
Okra	10.45	23	12.55 (45.55)	23	34	11 (39.93)	34	38	4 (14.52)
Aroids/ Taro	12.50	25	12.25 (63.64)	25	29	4 (20.74)	29	32	3 (15.58)
Bitter gourd	14.9	26	11.10 (44.22)	26	35	9 (35.86)	35	40	5 (19.92)
Red Amaranth	9.33	12	2.67 (25.02)	12	17	5 (46.86)	17	20	3 (28.12)
Average gaining %	-	-	43.17	-	-	37.08	-	-	19.74

3.5. Comparative scenario of vegetable marketing price village and town

The main thing was that the average spread value change of vegetable at town market was 19.67 % higher than village market. Data revealed that the spread values of potato, egg plant, pointed gourd, okra, aroids, bitter gourd, and red amaranth were 8-9, 17-23, 14-17, 14-16, 6-8, 11-15 and 9-11 Tk/kg respectively at village market on an average of 12.71(Tk/kg). On the other hand, the spread values of potato, egg plant, pointed gourd, okra,

aroids, bitter gourd, and red amaranth were 10-11, 21-23, 16-17, 22-24, 8, 15-21 and 13-15 Tk/kg respectively at town market on an average of 15.21(Tk/kg). The highest spread value was for okra and the highest spread value was for aroids both in village and town market, but the lowest change was 10 % higher than village market for egg plant at town market. Again the highest spread value was 53.33 % for egg plant at town market than village market (Table 5).

Table 5. Comparative scenario of vegetable marketing price village and town

Name of the vegetables	Village market				Town market			
	Sold by growers (Tk/kg)	Sold by whole sellers (Tk/kg)	Sold by retailers (Tk/kg)	Spread value (Tk/kg)	Sold by growers (Tk/kg)	Sold by whole sellers (Tk/kg)	Sold by retailers (Tk/kg)	Spread value (Tk/kg)
Potato (pakri)	18-19	24-25	26-28	8-9	18-19	24	28-30	10-11 (+23.53)
Egg plant	23-25	32-36	40-48	17-23	23-25	32-36	44-48	21-23 (+10.00)
Pointed gourd	22-23	33-34	36-40	14-17	22-23	33-36	38-40	16-17 (+6.45)
Okra	22-24	32-36	36-40	14-16	22-24	36-40	44-48	22-24 (+53.33)
Aroids	22-26	28-30	30-32	6-8	22-26	26-27	30-35	8 (+14.29)
Bitter gourd	25-27	30-35	36-42	11-15	25-27	28-36	40-48	15-21 (+38.46)
Red amaranth	11-13	16-18	20-24	9-11	11-13	18-20	24-28	13-15 (+40.00)
Average (change%)	-	-	-	12.71	-	-	-	15.21 (+19.67)

3.6. Identified Constraints and their nature faced by growers, wholesalers, retailers and consumers of vegetable marketing:

Comparative Constraints facing index of growers, wholesalers, retailers and consumers and their nature faced by potato farmers according to their opinion on vegetable marketing were investigated in this study. Constraint/Challenge Facing Index (CFI) for any one of the identified dimensions could range from 0 to 300 where constraints were ranked according to Constraints Facing Index of vegetable marketing.

3.6.1. Constraints and their nature faced by growers according to their opinion

Among the constraints in case of vegetable production and marketing ranked 1st was low market price of vegetable, rank 2nd was lack of marketing facilities, 3rd was the effect of middle men, 4th was Lack of capital and equipments, 5th was Rot in storage condition, 6th was Lack of preservation facilities, 7th of Low yield of vegetables, 8th was Lack of processing facilities, 9th Poor transportation and 10th was Lack of good seed during vegetable growing season 2013-14 (Table 6). Hence therefore, most of the vegetable growers put emphasis on low market price of vegetable (highly severe 63%) rather than lack of marketing facilities (highly severe 63%).

Table 6. Constraints and their nature faced by growers according to their opinion

Constraints	Severity of constraints (%)					CFI	Ranked
	Highly severe	Moderately severe	Less severe	Not at all	Total		
Low market price	63	28	9	0	100	254	01
Lack of marketing facilities	46	32	22	0	100	224	02
The effect of middle men	27	37	8	28	100	163	03
Lack of capital and equipments	12	25	57	6	100	143	04
Rot in storage condition	15	26	34	25	100	131	05
Lack of preservation facilities	6	21	44	29	100	104	06
Low yield of vegetables	0	17	44	39	100	98	07
Lack of processing facilities	7	18	39	36	100	96	08
Poor transportation	0	13	59	28	100	85	09
Lack of good seed	2	12	31	55	100	61	10

3.6.2. Constraints and their nature faced by the wholesalers according to their opinion.

Among the constraints of vegetable marketing ranked 1st was irregular supply by growers, rank 2nd was loss or rot during transportation, 3rd lack of marketing facilities, 4th was lack of preservation facilities, 5th was lack of processing facilities, 6th was lack of capital and loan, 7th was rot in storage condition, 8th was unexpected toll during transportation, 9th poor transportation

and 10th was high rate of transportation during vegetable growing season 2013-14 (Table 7). Therefore, most of the vegetable wholesalers put emphasis on irregular supply by growers (highly severe 43% and 1st ranked according to CFI) and loss or rot during transportation (highly severe 45% and 2nd ranked according to CFI) rather than lack of marketing facilities (highly severe 12%, moderately severe 59 % and 3rd ranked according to CFI).

Table 7. constraints and their nature faced by the wholesalers according to their opinion

Constraints	Severity of constraints (%)					CFI	Ranked
	Highly severe	Moderately severe	Less severe	Not at all	Total		
Irregular supply by growers	43	35	15	7	100	214	01
Loss or rot during transportation	45	22	33	0	100	212	02
Lack of marketing facilities	12	59	28	1	100	182	03
Lack of preservation facilities	17	32	49	2	100	164	04
Lack of processing facilities	8	39	31	22	100	133	05
Lack of capital and loan	13	42	4	41	100	125	06
Rot in storage condition	5	27	35	33	100	104	07
Unexpected toll during transportation	11	20	13	56	100	86	08
Poor transportation	0	31	17	52	100	79	09
High rate of transportation	3	27	12	58	100	75	10

3.6.3. Constraints and their nature faced by retailers according to their opinion

Among the constraints of vegetable marketing ranked 1st was high market price, rank 2nd was lack of marketing facilities, 3rd the effect of middle men, 4th was lack of preservation facilities, 5th was weight loss or rot at shop, 6th was lack of capital and easy loan, 7th was competitive marketing, 8th was

suddenly fall of market value, 9th Poor transportation and 10th was unsold vegetables during vegetable growing season 2013-14 (Table 8). Hence therefore, we can see that most of the vegetable retailers put emphasis on High market price (highly severe 24% %, moderately severe 56 % and 1st ranked according to CFI) rather than lack of marketing facilities (highly severe 11%, moderately severe 69 % and 2nd ranked according to CFI).

Table 8. constraints and their nature faced by retailers according to their opinion

Constraints	Severity of constraints (%)					CFI	Ranked
	Highly severe	Moderately severe	Less severe	Not at all	Total		
High market price	24	56	20	0	100	204	01
Lack of marketing facilities	11	69	20	0	100	191	02
The effect of middle men	12	38	32	18	100	144	03
Lack of preservation facilities	9	39	27	25	100	132	04
Weight loss or rot at shop	6	48	16	28	100	130	05
Lack of capital and easy loan	0	37	32	31	100	105	06
Competitive marketing	0	26	47	27	100	99	07
Suddenly fall of market value	30	2	0	68	100	94	08
Poor transportation	0	12	45	43	100	69	09
Unsold vegetables	0	6	53	41	100	65	10

3.6.4. Constraints and their nature faced by customers according to their opinion

Among the constraints of vegetable marketing ranked 1st was high market price, rank 2nd was lack of quality vegetables, 3rd lack of marketing facilities, 4th was the effect of middle men, 5th was chemical polluted vegetables, 6th was monopoly marketing, 7th was rot in home storage condition, 8th was excess

price wants by retailer, 9th dishonest retailers and 10th was crowd market of vegetables during vegetable growing season 2013-14 (Table 9). Hence, most of the vegetable retailers put emphasis on high market price (highly severe 72% %, moderately severe 20 % and 1st ranked according to CFI) rather than Lack of quality vegetables (highly severe 31%, moderately severe 35 % and 2nd ranked according to CFI).

Table 9. constraints and their nature faced by customers according to their opinion

Constraints	Severity of constraints (%)					CFI	Ranked
	Highly severe	Moderately severe	Less severe	Not at all	Total		
High market price	72	20	8	0	100	264	01
Lack of quality vegetables	31	35	27	7	100	190	02
Lack of marketing facilities	33	12	27	28	100	150	03
The effect of middle men	17	39	19	25	100	148	04
Chemical polluted vegetables	9	48	23	20	100	146	05
Monopoly marketing	0	27	62	11	100	116	06
Rot in home storage condition	0	15	67	18	100	97	07
Excess price wants by retailer	0	12	55	33	100	79	08
Dishonest retailers	0	32	10	48	100	74	09
Crowd market of vegetables	0	7	52	41	100	66	10

3.7. Suggestions to overcome the constraints faced by growers, wholesalers, retailers and consumers according to their opinion on vegetable marketing.

Data were collected by giving the suggestions to overcome the existing constraints faced by growers, wholesalers, retailers and consumers according to their opinion on vegetable marketing. For calculation of score, one (1) score was assigned for one suggestion of the respondents. Every respondent gave opinions according to importance of their constraints vegetable marketing.

Data (Table 10) indicates that the most important suggestion of the respondents had “to fix minimum price rate for sale this is

more than production cost” (ranked 1st by growers), “improve marketing facilities” (ranked 1st by wholesalers) and easy termed loan facilities (ranked 1st by retailers). Second ranked suggestion of the respondents had “introduction of govt. vegetable marketing policy” (by growers), Easy termed loan facilities (by wholesalers) and Improve transport facilities (by retailers). Third most important suggestion of the respondents had “easy conditioned equipments supply for vegetable cultivation and marketing” (by growers), “Increasing storage facilities for vegetables at local market” (by wholesalers) and “Improve infrastructure facilities of local vegetable market” (by retailers).

Table 10: Suggestions to overcome the constraints faced by growers, wholesalers, retailers and consumers according to their opinion on vegetable marketing

Suggestions and their ranking	Growers		Wholesalers		Retailers		CR
	score	ranked	score	ranked	score	ranked	
To fix minimum price of vegetables which is more than production cost	26	1	-	-	-	-	
Improve marketing facilities	10	4	23	1	8	5	01
Increasing storage facilities for vegetables at local market	-	-	12	3	4	9	
Quality and HYV seed for vegetable cultivation	6	7	-	-	-	-	
Easy conditioned equipments supply for vegetable cultivation and marketing	11	3	5	7	9	4	03
Controlled price of fertilizer and pesticide	6	7	-	-	-	-	
Introduction of govt. vegetable marketing policy	2	9	4	8	7	6	04
Easy termed loan facilities	8	6	15	2	12	1	02
Vegetable marketing co-operation summit is needed	-	-	9	4	5	8	
Improve transport facilities	-	-	4	8	11	2	
Improve infra-structure facilities of local vegetable market	-	-	7	5	10	3	
To control the effect of middle men	17	2	-	-	7	6	
Search for new export market of vegetable	-		6	6	-	-	
Increasing cold storage facilities	5	8	3	9	3	10	05
Smooth supply chain of vegetable	-	-	4	8	6	7	
Consumer's capacity of buying should be maximized	-	-	-	-	4	9	
Every body of the supply chain could be able to do their duties	-	-	3	9	2	11	
Problem should be identified through discussion with them and then taking early steps	9	5	2	10	3	10	
Govt. should ensure to minimize all the risk	6		3		9	4	
Total	100		100		100		

* CR= Commonly Ranked

Common suggestions of all categories of the respondents were improve marketing facilities, increasing storage facilities for vegetables at local market, easy conditioned equipments supply for vegetable cultivation and marketing, introduction of govt. vegetable marketing policy, easy termed loan facilities, increasing cold storage facilities, problem should be identified through discussion with them and then taking early steps and govt. should ensure to minimize all the risk.

IV. CONCLUSION

The benefit cost ratios of egg plant, pointed gourd, okra, aroids/taro, potato and red amaranth were found over profit were 3.38, 2.20, 2.00, 1.88, 1.74, 1.46 and 1.29 respectively which were ranked similarly 1st to 7th respectively. It is, therefore, evident from the findings of the study that the cultivation of all the selected vegetables is profitable to the growers. Cultivation of egg plant requires highest costs (To. 47150/acre) and receives highest net returns (To. 244050/acre) as well as highest benefit cost ratios (3.38 over total profit) among all the vegetables, egg plant cultivation is also a labor intensive vegetable. It was also found from the study that the total costs of vegetables i.e., Potato, egg plant, pointed gourd, okra, aroids, bitter gourd and red amaranth cultivation were 43000, 47150, 35200, 28700, 33900, 45200 and 23600 to/acre respectively, as well as received the net returns of these vegetables were 46000, 244050, 123200, 83300, 56100, 64000 and 12400 to/acre respectively. The estimated average marketing costs per ton vegetables incurred by the growers were Tk.3920, which was higher than the wholesalers and the retailers. More costs occurred by transportation cost by wholesalers and retailers. The average spread value change of vegetable at town market was 19.67 % higher than village market. Among the constraints in case of vegetable production and marketing faced by the growers, ranked 1st was low market price of vegetable (highly severe 63%) rank 2nd was lack of marketing facilities and 3rd was the effect of middle men during vegetable growing season 2013-14. Most of the vegetable growers put emphasis on low market price of vegetable (highly severe 63%) rather than lack of marketing facilities. Most of the vegetable wholesalers put emphasis on Irregular supply by growers (highly severe 43% and 1st ranked according to CFI) and Loss or rot during transportation (highly severe 45% and 2nd ranked according to CFI). Among the constraints in case of vegetable marketing, ranked 1st was High market price and rank 2nd was Lack of marketing facilities during vegetable growing season 2013-14. Retailers put emphasis on High market price (highly severe 24% %, moderately severe 56 % and 1st ranked according to CFI) rather than lack of marketing facilities (highly severe 11%, moderately severe 69 % and 2nd ranked according to CFI). The consumer ranked 1st was High market price (highly severe 72%) and rank 2nd was Lack of quality vegetables (highly severe 31% and moderately severe 35 %). Common suggestions of all categories of the respondents were improve marketing facilities, increasing storage facilities for vegetables at local market, easy conditioned equipments supply loan facilities, introduction of govt. vegetable marketing policy, increasing cold storage facilities. Most of them put emphasis that problem should

be identified through discussion with them and then taking early steps and govt. should ensure to minimize all the risk.

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Hospital Discharge Patients and Health Relationship Management Services (HRMS):

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Abstract- Unplanned readmission of hospital discharge patients is driving up healthcare costs, and the statistics are staggering. In 2010, U.S. hospital discharges numbered over 35 million and nearly 20 percent of Medicare patients were readmitted back into the hospital within the first month. The Affordable Care Act's Hospital Readmissions Reduction Program (HRRP) Centers for Medicare & Medicaid Services (CMS) began a penalty on hospitals having high readmission rates. As a result, hospitals are financially motivated to reduce hospital discharge patient readmissions. At-home patients with undetected deteriorating physical conditions can result in adverse secondary conditions (i.e., developing infections) that send them back into the Emergency Room. The most common post-discharge complications are: (i) an adverse drug event (ADE), (ii) infections acquired in the hospital, (iii) secondary acquired

complications, as well as, (iv) pneumonia, and (v) depression and loneliness. Reducing adverse events post-discharge is essential for the U.S. health care system. Health Relationship Management Services (HRMS), a new healthcare paradigm, monitors the patient's health from home after discharge to help minimize hospital readmissions. At the same time, it alleviates loneliness and isolation by providing a connection to a caring health community, empowering patients to control health outcomes in collaboration with their care providers and care experts.

Keywords: *Health Relationship Management Services (HRMS), hospital discharge, hospital readmissions, remote health monitoring system*

I. INTRODUCTION

Patient hospital discharge readmissions has become a major problem for the healthcare industry. Studies show that that almost 20% of patients have adverse events within 3 weeks of being discharged, of which close to three-quarters could have been improved or prevented [1]. In 2010, U.S. hospital discharges numbered over 35 million, and nearly 20 percent of Medicare patients were readmitted within the first month [2] [3]. Research shows that, in the U.S., nearly 25 percent of discharged patients are readmitted to the hospital within 90 days. Many such readmissions originate from errors due to discontinuous, fragmented care after discharge [4]. Unplanned readmissions costs billions; thus, they have to be avoided for the financial well-being of healthcare systems and patient quality-of-life [3]. Hospitals are financially motivated to reduce readmissions, since the Affordable Care Act's Hospital Readmissions Reduction Program (HRRP) Centers for Medicare & Medicaid Services (CMS) poses a penalty on hospitals having high readmission rates that can amount to a considerable expense [5] [6] [7]. Thus, reducing adverse events post-discharge is essential for the U.S. health care system [8].

Patients may be especially vulnerable during the transition period from discharge and home care because they may be still functionally impaired during the transition from critical care to ambulatory care [9]. This stems from patients leaving the hospital "quicker and sicker" [10] [11]. Discharge patients who receive home-care are vulnerable because they

generally do not receive the same around-the-clock professional monitoring they did in the hospital [12] [13]. Research shows that one in five patients had an adverse event transitioning from hospital to the home; some were preventable, while others were correctable, but could have been lowered by timely corrective actions [11]. Other studies have shown that at-home patients with undetected deteriorating physical conditions can result in adverse secondary conditions, such as developing infections that bring a person into the Emergency Room.

Due to pressure from Medicare and other payers, patients are being discharged as soon as possible, where they often return home with little or no professional assistance, and where difficult and complex care often falls under the responsibility of family members who have no training [14]. Hospitalized patients' conditions are assessed routinely, but once they go home, they are monitored only by a caregiver who is a family member or someone other than a hospital care provider [11]. For the caregiver, problems arise, such as time management, competing demands, physical and mental stress, and financial concerns [15]. Some problems also may arise due to incompetent or fraudulent caregivers.

The most common post-discharge complications are: (i) an adverse drug event (ADE), (ii) infections acquired in the hospital, (iii) procedural complications, as well as, (iv) pneumonia, (v) depression and loneliness [16]. The somewhat higher rate of ADEs after discharge may be due to patients not

being monitored as closely following discharge as they were in the hospital [11]. Another condition of a discharged patient that often develops is the feeling of isolation, depression, or lack of awareness of a supporting community of care friends. Although social isolation is more prevalent in the elderly, young adults, such as those who are disabled and confined to their homes due to a disease such as multiple sclerosis, or a young single mother who may experience loneliness and social isolation as well.

Possible Solutions

There are a number of interventions that can be used to reduce readmissions, to include prompt identification and response to symptoms signaling a worsening condition and avoidance of adverse events that result in readmission [17]. Some current suggestions for readmission prevention have included post-discharge activities, such as home visits, follow-up phone calls, and connections to the physician between inpatient and outpatient surroundings [2]. Some effective approaches include preemptive monitoring, visits to the patient's home, consultations by phone, and telemonitoring [17].

Remote monitoring technology that combines all of these elements may significantly impact a decrease in hospital readmissions by using sensors to detect key wellness indicators, such as quality of sleep, adherence to medications, and physiological information [17]. Sensors used in a patient's own home can continuously monitor daily living activities and detect subtle clues to potential health problems, notifying caregivers to potential developing health conditions [17]. Research shows that, due to monitoring, for example, patients having heart failure reduced emergency department visits and exhibited a tendency toward reducing readmissions and overall costs [18].

Patients who receive social support from family or friends have healthy beneficial impacts on the "cardiovascular, endocrine, and immune systems" which serve as protective barriers against disease [19]. At-home caregivers can help prevent readmissions by understanding prescribed dosage and adherence to medication schedules [20]. Caregivers should be aware of and be able to recognize risk factors, such as COPD or heart failure. Also, potentially adverse events can be avoided by tracking small changes in the patient's day-to-day behavior, such as sleep patterns, eating, clinical vital signs and mental state [20]. Real-time monitoring with alerts can lead to intervention and prevent unnecessary trips to the hospital [20].

Real Solutions: Health Relationship Management Services HRMS

A comprehensive solution to these problems is a new paradigm in patient healthcare called Health Relationship Management Services (HRMS), which is a daily system of patient remote health monitoring, patient health data analytics, follow-up and response. HRMS helps decrease hospital readmissions, healthcare costs, increase access, and provide "anywhere, anytime monitoring diagnosis and treatment" [21]. HRMS reads patient health data and immediately sends this raw data to the cloud for restructuring into information that can be accessed and interpreted by a caregiver over time. If there is a change in the patient's health data that requires immediate action, the patient is contacted to see what might be causing the change. When repeated, the continuous use of the monitor adds more personalized patient health data into the system.

Constant remote health monitoring of a patient can also detect patient disconnect or inactivity, indicating conditions such as a fever, pneumonia, or medication misuse that may need to be followed-up on. HRMS may also be an effective strategy for disease management in high-risk heart failure discharge patients because it monitors physiological conditions [18] [23]. HRMS may detect symptoms of "hypertension or hypotension, malaise, or requests for comfort or simple communication needs that can be relayed in real time" [24].

Since patients are provided access to real-time personal health information in an understandable format, they now have the ability to contribute, correct or amend information in their own Electronic Health Records (EHR), which can accept patient generated data. By actively capturing and centralizing personal health data, hospital discharge patients are encouraged to become involved in their health with user-friendly access via friendly portals [25]. Patients will also be provided with outbound motivational messages, reminders, and opportunities to further engage in their own health care.

For the isolated patient, the interactive app will provide an outlet to the outside world which may limit a sense of loneliness and isolation by discussing health issues with others through Patient Health Narratives (PHN) [26]. Care management platforms incorporate community resources to support patients giving patients access to organization supported social media, games, etc., that encourage engagement and positive behavior change [25]. By connecting to a caring, supportive, health care community through an online patient portal app, the patient can share stories to better understand health conditions, prescription medications, and alleviate psychological health problems.

HRMS has other benefits, such as providing quality end-of-life care by honoring patient wishes regarding life-sustaining treatment. HRMS can incorporate patients' advanced directives wishes and links to Medical Orders for Life-Sustaining Treatment (MOLST) information and forms accessible by health care practitioners and facilities [27]. Also, since the needs of foreign-born patients may be considerably different from American-born patients, HRMS assessment and care planning now includes culturally sensitive care that meets the patients' needs, irrespective of their background [28].

Case Study

This case study is about Carolyn, a baby-boomer aged mother, who is discharged from the hospital after abdominal surgery. She has been hospitalized for several days, and is still in constant pain, requiring regular doses of pain medication. Carolyn is facing at least two weeks of recovery and recuperation at home, after which time, she will be able to return to her job. At the time of discharge from a hospital, a discharge nurse prints out several pages of instructions for Carolyn delineating what type of procedure was done, what to expect at home, and how and when to take prescribed medication. This procedure is often lengthy and confusing to many patients when instructions are given to them, and research indicates that, not only do many discharge patients misunderstand discharge instructions, some even appear to be unaware that they don't understand them [29]. Now it is okay for Carolyn not to remember everything the nurse tells her

at this point of discharge because HRMS has shown that she can access this information through an HRMS remote patient portal later in the comfort of her own home.

Caregivers are called upon to perform certain routine caregiving tasks once a patient goes home. Carolyn's daughter, Megan, will help her bathe, prepare meals, administer medication, and change wound dressings. However, since Megan has received very little advice or training from the nurse to care for her mother, these are activities that Megan is not trained to do. Although she is loving and supportive, she also works full-time, so her free time is limited. Hospital staff often does not provide education for these tasks until the day of discharge, which may or may not be the best time for the caregiver to learn their responsibilities. As a result, Megan feels overwhelmed and stressed over this responsibility of caring for her mother, and because of her job commitment, she cannot be readily available, even in an emergency [30].

After Carolyn's formal discharge at the hospital, Megan escorts her to the hospital pharmacy where she is given her prescribed medications, is educated about their use, and has her questions satisfactorily answered. Carolyn is also set-up with a unique account with HRMS, a prescribed at-home health monitoring system. Carolyn is provided with the HRMS remote monitoring unit that comes with case that automatically will connect her to the internet and the patient portal through a customized android system with access to all instructions for medications and other healthcare instructions. It is crucial for Carolyn's recovery and health safety that she clearly understand her medication instructions, as well as how to use the remote health monitoring system that will provide her and Megan with health related information at a later date. HRMS will allow Megan to access current information about her mother's health, medication, and at-home instructions even while she is at work. Automatic reminders are sent for important instructions that must be done at certain times, such as drinking water to avoid dehydration and taking medication at the proper time. Since the HRMS system can also capture all of Carolyn's vital health metrics to assess physiological changes, Carolyn's physician can get feedback about her state of mind and physiological and psychological conditions.

Upon arriving at home, Megan places the monitoring system alongside Carolyn's medication on her nightstand, so she can use it every morning when she rises and every night before she goes to bed. She can view video instruction on her screen how to use the system, which, when used according to directions, captures Carolyn's personal health data that is immediately sent to the cloud for analytics. Typically, twice a day at the time Carolyn brushes her teeth, she can see a screen on her cradle that will show her health metrics with every use, so she knows her health progress every day.

While Carolyn is recovering, she is left alone quite frequently. Research shows that loneliness is a widespread social problem with severe physiological and health implications, and appears to be a risk factor for raised Systolic Blood Pressure (SBP) and escalations in SBP over time [32]. So, in-between Megan's visits, Carolyn engages with the patient app that is part of the monitoring platform to pass the time by reading an interactive online magazine with patient health stories and health newsfeeds, and playing games that reward her with points that

can be cashed in for prizes. This will help her understand how to recover faster, which at the time of discharge may not have been understood. Now, Carolyn has an HRMS remote caregiver that is part of the community who supports her and will avoid a sense of loneliness when Megan is not around. HRMS, as a contact to the outside world, will help alleviate that sense of isolation that is important for recovery [32].

HRMS tries to capture as much information about Carolyn as possible, so if she has not understood her discharge instructions, she may receive reminders followed by calls from the Communication Center later on. If Carolyn does not respond to the patient portal, calls or messages, this may be an indication that something is wrong. HRMS can track when Carolyn takes her medications and can tell if there is a change in her pattern. Lack of attentiveness may indicate that she is not taking her medication properly or may not be exercising per her physician's orders, and the HRMS system will want to know why. Physiological parameters can be tracked for normalcy, and if they appear abnormal (for example, if Carolyn seems to be developing a fever which indicates a post-surgery sign of inflammation), action can be taken. Although incidences of post-op surgery infections are low, individuals who have undergone surgery are the most vulnerable to infections caused by bacteria that resists some antibiotics [33]. Also, if Carolyn should experience swelling of her legs, feet, ankles, calves or thighs, it may be the result of fluid buildup (fluid retention) or from inflammation in tissues or joints [34]. Swelling of the legs may be a sign of a serious disorder, such as a blood clot or heart disease [34].

If any of these conditions are present indicating a deteriorating condition, a patient advocate in the Communication Center, who has been alerted by the analytic engine of HRMS, will place a call to Carolyn to find out if there is an underlying cause that needs action and determine whether further escalation is necessary. This information is recorded in her secured personal data file for later review by her physician. The next level of escalation is to contact her personal care friend, whom, in this case, is her daughter, Megan. There is a constant update in Carolyn's status, and last level of the escalation path would be an emergency call to her physician or to the ER.

Because of HRMS, Carolyn has become an integral part of a new health care delivery model of point-of-care analysis and self-testing system. Carolyn is encouraged to be more engaged in her own healthcare by having access to her own health information and caregivers. Through connected monitoring systems, Carolyn's daughter now can track her post discharge condition to reduce chances of readmission. Carolyn can stay in touch with others within a caring, interactive, health community through her HRMS patient portal app, a platform that allows her to become personally involved by viewing and contributing to her own health record, providing her with a sense of ownership over her own health outcome. By having a "doctor in a box," any health alerts will be immediately followed-up on, so Carolyn can avoid readmission to the hospital.

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Sensor Based E-Bike for College Campus

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Abstract- Present day skateboards and bikes are truly engineering marvels; nevertheless they have already been so refined that they are quite simplistic by today's high technology standards. Rapidly advancing technologies in many sectors including potential E-bikes are classed according to the power that their electric motor can deliver and the control system, i.e, when and how the power from the motor is applied. As such, the classification of these e-bikes varies greatly across countries. The classification of e-bikes is mainly decided by whether the e-bike's motor assists the rider using a pedal –assist system or by a power-on-demand one. The existing systems are the electric powered manually balanced wheeled vehicles via the means of the electric motors. But for most of the users balancing the vehicle at lower speed is a difficult task and with limited technology mounted on the vehicle. To overcome this drawback we are introducing the self balanced smart E-bike with a smart phone or a tablet integrated on its dashboard for monitoring college campus or hospitals etc. We have proposed a concept called sensor based E-bike for college campus for monitoring which consist of two wheels connected two dc motors arranged side-by-side, with a small platform between the wheels, on which the rider stands. The directions of E-bike are controlled by the rider's hand positions which are detected by IR sensors connected to the arduino controller which gives commands to the E-bike to move accordingly as well as there is an integrated manual operation .The main intention of this project is to build a smart E-bike for higher authorities to move freely around the campus and monitor the classrooms through the smartphone or the tablet integrated on the dashboard of the E-bike. This E-bike can be operated using hand movements or with manual joystick operations and also come with an dashboard on which control switches for bike movements, horn, light, smartphone/tablet can be mounted.

Index Terms- IR sensors, E-bike, Smartphone/tablet, Arduino controller, Dc motors.

I. INTRODUCTION

Sensor based E-bike for college campus for monitoring which consists of two wheels connected two dc motors arranged side-by-side, with a small platform between the wheels, on which the rider stands .The direction of e-bike are controlled by the rider's hands movements which are detected by is sensor connected to the arduino controller which gives command to the e-bike to move accordingly as well as there is an integrated manual operation. The main intention of this project is to build a

smart e-bike for higher authorities to move freely around the campus and monitor the classroom through the smartphone or the tablet integrated on the dash board of the e-bike .This e-bike can be operated using hand movements or with manual joystick operations and alsocome with an dashboard on which control switches for bike movements, horn, light, smartphone /tablet can be mounted.

II. PROPOSED SYSTEM

A. Block Diagram–

We have proposed a concept called sensor based E-bike for college campus for monitoring which consist of two wheels connected two dc motors arranged side-by-side, with a small platform between the wheels, on which the rider stands. The directions of E-bike are controlled by the rider's foot positions which are detected by IR sensors connected to the arduino controller which gives commands to the E-bike to move accordingly as well as there is an integrated manual operation. The main intention of this project is to build a smart E-bike for higher authorities to move freely around the campus and monitor the classrooms through the smartphone or the tablet integrated on the dashboard of the E-bike. This E-bike can be operated using leg movements or with manual joystick operations and also come with an dashboard on which control switches for bike movements, horn, light, smartphone/tablet can be mounted.

B. Algorithm steps–

The working of the project can be explained in the following steps:

Step 1: Initially 5v power supply is given to the IR sensors, Arduino microcontroller and motor drivers.

Step 2: IR sensor is ready to receive the commands.

Step 3: If the IR sensor1 is off and IR sensor2 on then the E-bike moves left side.

Step 4: If the IR sensor1 is on and IR sensor2 off command is RIGHT the E-bike moves right side.

Step 5: If the IR sensor1 is on and IR sensor2 on command is FORWARD the E-bike moves forward.

Step 6: If the IR sensor1 is off and IR sensor2 off command is STOP the E-bike stops moving.

Step7: If the switch1 is pressed the E-bike moves forward.

Step8: If the switch2 is pressed the E-bike moves backward.

Step9: If the switch3 is pressed the E-bike moves right.

Step10: If the switch4 is pressed the E-bike moves left.

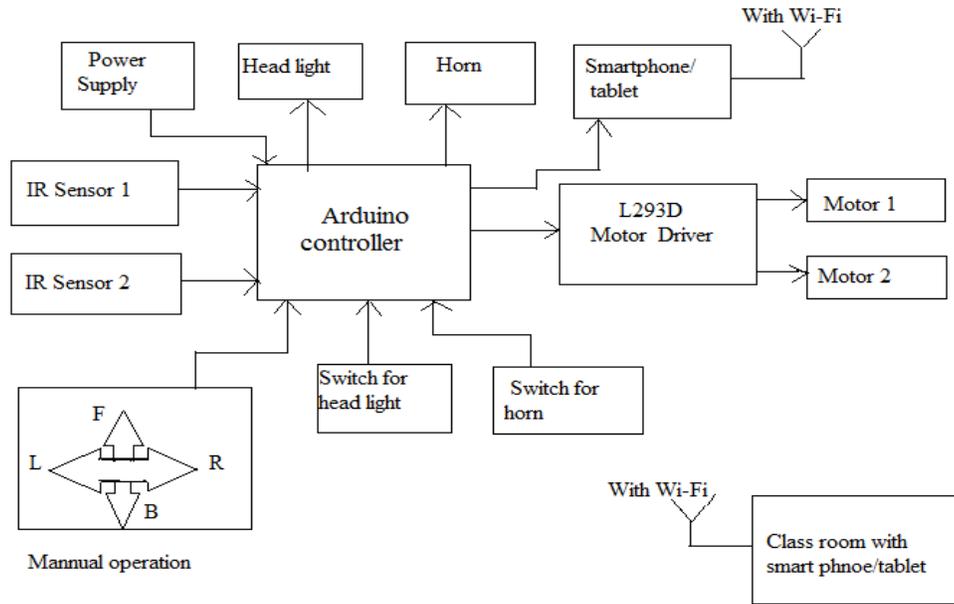


Figure1: Sensor based e-bike block diagram
C. Flow chart:

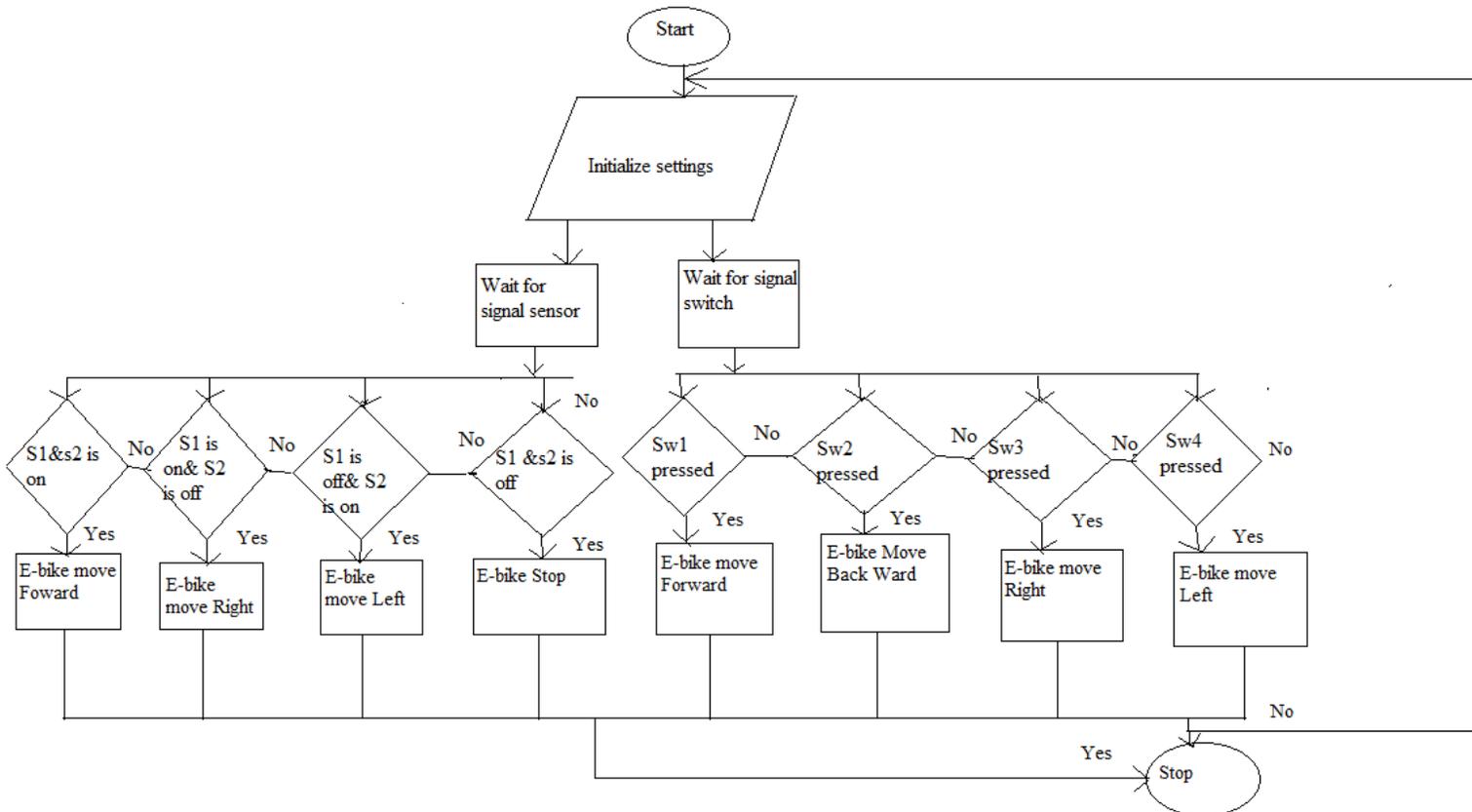


Figure:2 Flow chart

D. Hardware Implementation –

Power supply:

9v or 12v battery is used for giving power supply for ir sensor, arduino microcontroller and motor driver. 7805 regulator

IC is used to give constant dc 5v output which is given as operating voltage for the ir sensor, Arduino micro controller as well as motor driver.

IR sensor:

We are using two ir sensors and these have three pins, output pin is connected to the arduino micro controller and input pin is connected to the power supply board and ground pin is connected to the ground in power supply. These sensors are used to detect the hand movements of the person who is standing on it. These commands are trained.

Command	IR Sensor Module Output
Forward	sen1=1, sen2=1
Left	sen1=0, sen2=1
Right	sen1=1, sen2=0
Stop	sen1=0, sen2=0

Micro controller:

12v rechargeable battery is connected to the microcontroller so that microcontroller get 5v constant dc output supply to the arduino board. The two IR sensors are connected to the pin 12 and 13 pin of microcontroller where it senses the hand movements. Pins (4-7) of micro controller are given to the motor driver as an inputs. Push buttons are connected to the pins (8, 9, 10, 11) of arduino microcontroller.

Motor Driver and Motor:

Pins (4, 5, 6, 7) of arduino micro controller is given to the motor driver input pins(2,7,15,10).The motor pins is given to the motor driver as an output .5v battery is given to the vcc pins of

motor driver. From the vcc it is connected to the 8 pin of motor driver.

Switch operations:

In addition to the ir sensor we also have manual operation that is switch operation. In switch we have two pins one pin is connected to the 5v pin of arduino controller and another pin is connected ground pin of arduino controller. These operations are done according to the given commands below.

Command	Switch module outputs
Forward	s1=0, s2=1, s3=1, s4=1
Backward	s1=1, s2=0, s3=1, s4=1
Left	s1=1, s2=1, s3=0, s4=1
Right	s1=1, s2=1, s3=1, s4=0
Stop	s1=0, s2=0, s3=0, s4=0

Web of cam

This application is used for monitoring the classes while moving in corridor. By placing the mobile in the class room and also on the e-bike with web of cam app along with Wi-Fi. So that they can watch the classes while moving on e-bike.

III. EXPERIMENT AND RESULT

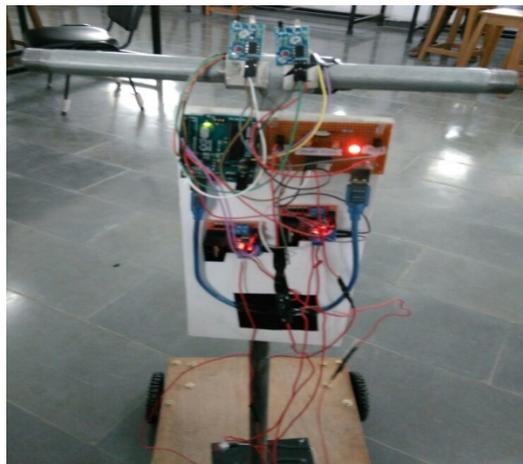
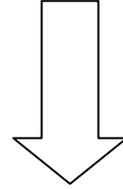
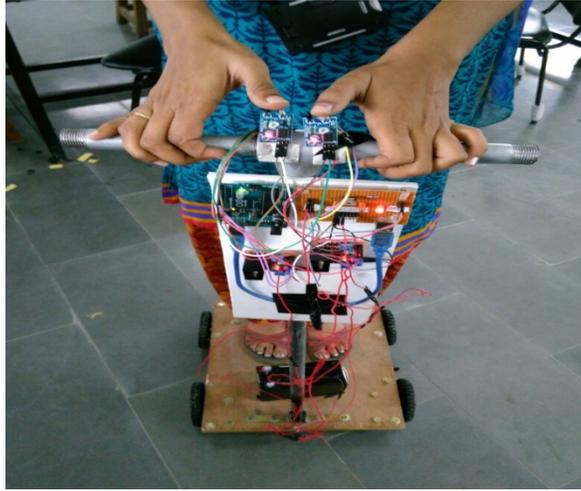
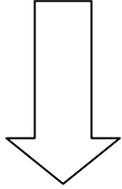
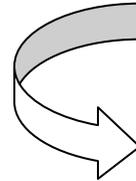
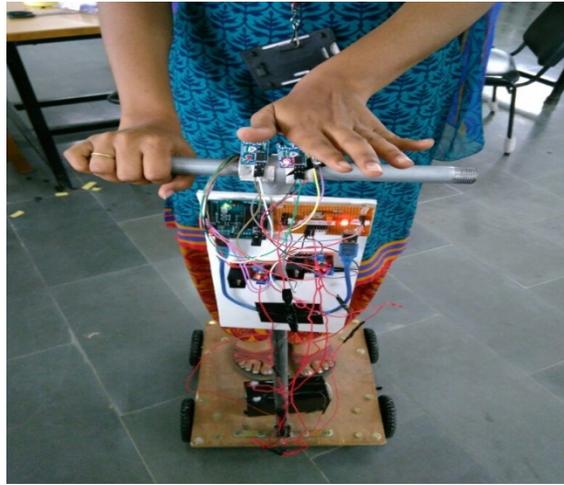


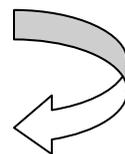
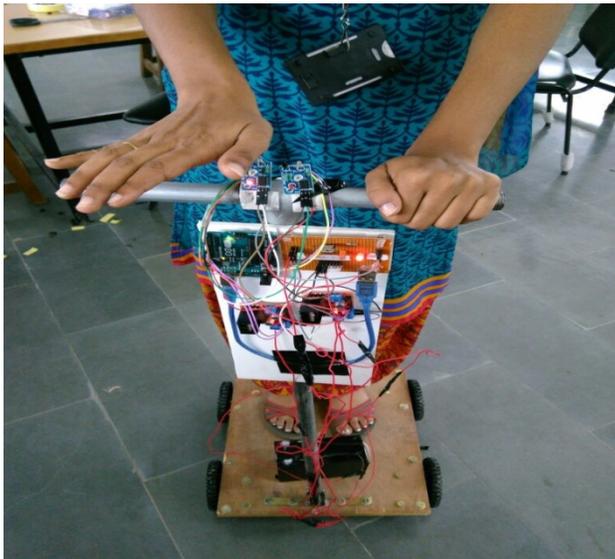
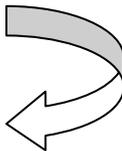
Fig: 3 sensor based e-bike for college campus



(a)



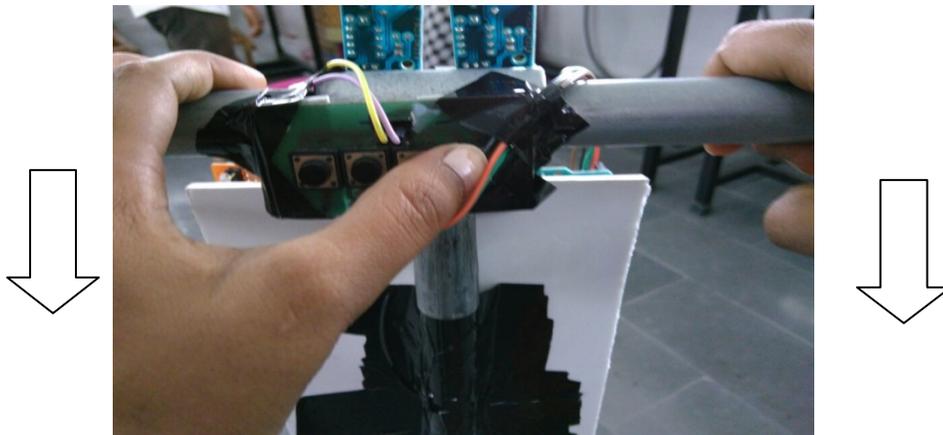
(b)



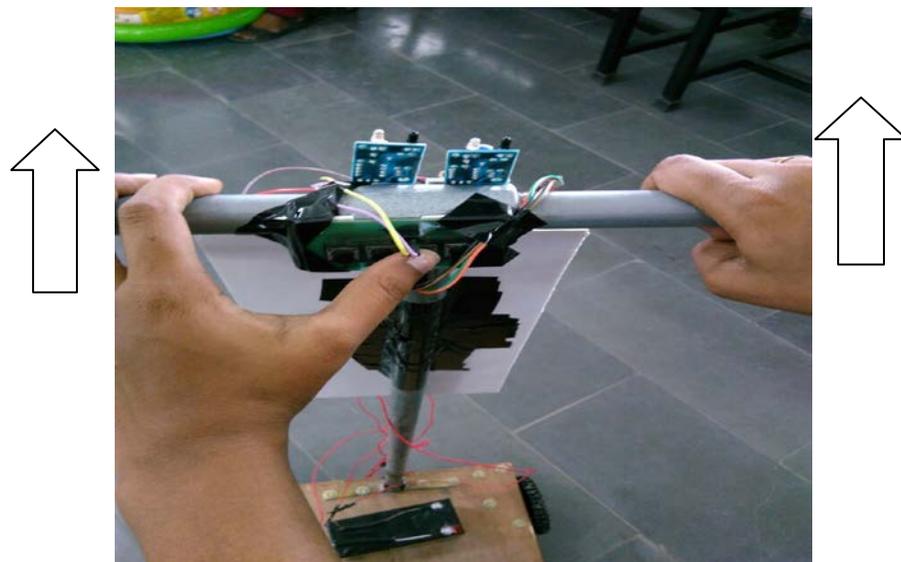
(c)



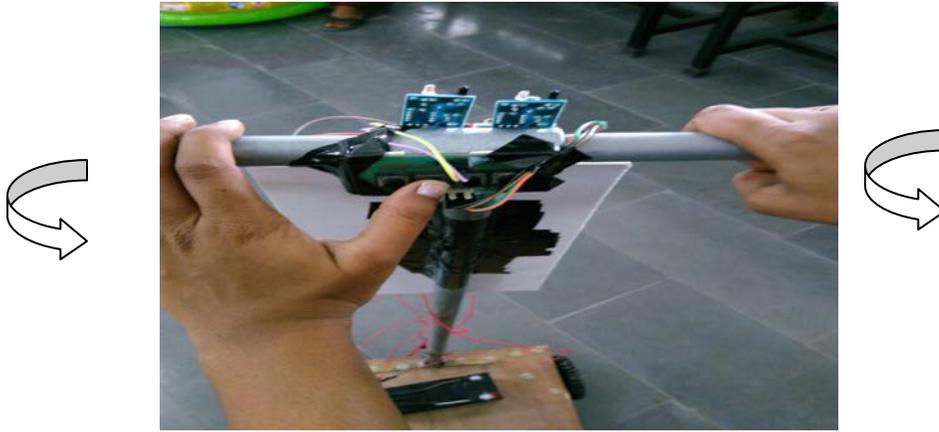
(d)



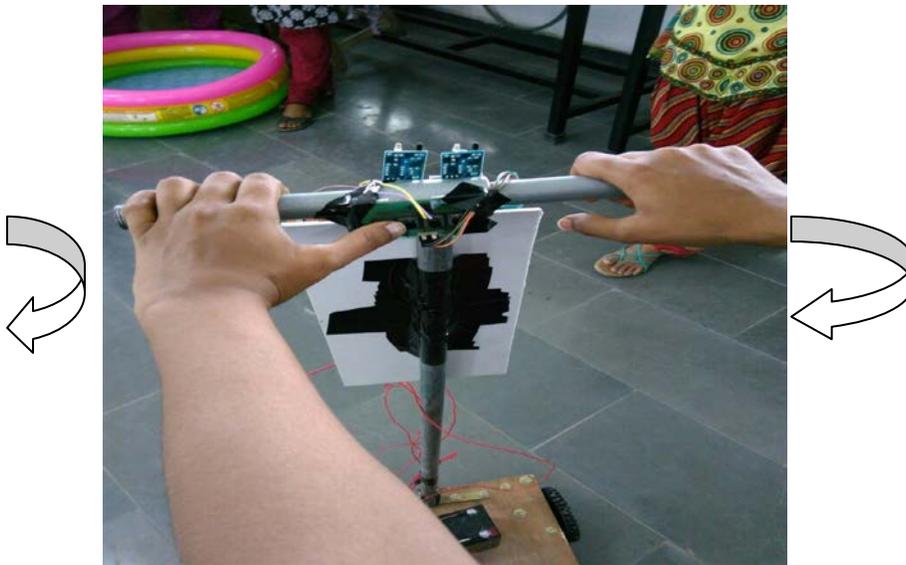
(e)



(f)

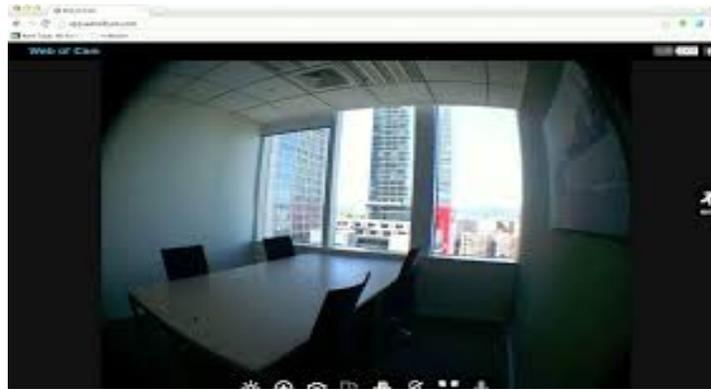


(g)



(h)





(i) Web of cam

Sensor operations

- (a) When the sensor1 and sensor 2 is on then the E-bike moves forward.
- (b) When the sensor1 and sensor 2 is off then the E-bike get stops.
- (c) When the sensor1 is off and sensor 2 is on then the E-bike moves left side.
- (d) When the sensor1 is on and sensor 2 is off then the E-bike moves right side.

Switch operations

- (e) When switch 1 is pressed the e-bike moves forward.
- (f) When switch 2 is pressed the e-bike moves backward.
- (g) When switch 3 is pressed the e-bike moves right.
- (h) When switch 4 is pressed the e-bike moves left.

IV. CONCLUSION

The paper has been successfully designed and tested. It has been mainly designed in order to reduce human effort. Many existing systems have discussed about the E-bikes and have proposed many methods for reducing their efforts. But still there is a difficulty in moving manually. So, in order to avoid that difficulty, instead of walking in campus electrically or by gestures, our project succeeded in moving the wheel chair using hand movements. When the hand movements are given by the person standing on the e-bike, using IR sensors or manual switch operations the commands are received, and according to those movements the motors will move which in turn moves the E-bike.

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How to Develop Proper Communication in Company Combination with Topologies?

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Abstract- Many companies are using computer networks in modern days because to make easy their works. Not like earlier, it is actually easy to work with computer networks. People use different topologies to communicate with networks. There are different kind of topologies in the world. For an examples Ring, bus, Mess, Star, etc. Not only that wireless technology has vastly developed within 5 years. Although there are some difficulties when communicating in networks. It is hard to categorize different access levels in network. Many companies are using networks to communicate. Many of them used different topologies to communicate. Therefore those researches face so many difficulties while communication. For an example in ring topology if one cable broken down there is no way to fulfill the communication. Modern days lot of companies do not involve with Network topologies because it is not efficient. Consider both topologies and wireless together, these fields are different fields in network. Although combination of both together it can made efficient network topology with wireless technology. From this concept it helps to made proper network topology. This conceptual schema helps to do communication most secure and efficiently.

Index Terms- Topologies, Networks, Security, Wireless network, Protocol

I. INTRODUCTION

In earlier, communication is not easy like now a days. People used different kind of methods to communicate with others. The communication methods are birds, arrows, horses, etc. These methods are not faster and sometimes messages not reached to the correct place or person. These causes too many problems. After 1st world war human found so many concepts to communicate faster and efficiently. German used special kind of a script machine to do their communication. The machine known as "Enigma". After this machine data communication ways are expanding year by year.

The communication has always been the crucial part of mankind's social life. The means of communication has changed according to the changes in human life style and all other circumstances such as technological developments.

Throughout history, the technology has a huge impact on the means of communication. In the past, smoke was used as a means of communication from one mountain to another. Needless to say that only a few simple messages could be sent and received with this primitive method of smoke signals. People needed to send their messages further away and faster as the

world population increased and started to be globalized. This period has influenced the methods of communication.

Today, People use telephones, mobiles, text messages, e-mail, and internet chat programs as oral and literal ways of communication. The inventers and producers are aiming to develop faster, cheaper, smaller-sized, multi-tasking gadgets for communication. The communication technology has been changing to fulfill customer needs. However, the means of communication also shapes human life styles. Mobiles have been the most important things to carry after the identity card, the keys and the wallet.

Future of communication is not difficult to predict. The trend of mobile, multi-tasking, wireless technology seems to continue to improve. ... (HDTV's), hologram simulators are the clues for possibility of image transferring or the matter transferring at the speed of light in the future. People will be transferred to communicate our own messages to the other places in an instant one day. Who knows?

The proposed research is mainly focus on improve the accuracy of the network and congestions in an internal network of a company or an association. Today there are many modern technologies which are using to implement networks. Some of them are design an artificial topologies, Network topologies (Refer appendix), wireless networks, frameworks, using packet transfer methods, using mobile network, use database connections, Dynamic networks, provide analytical tools, Queue management systems, GPSR technologies, new network security systems, combine topologies with wireless networks and etc. We have discussed about these modern technologies with more details in the literature review. In this research there is different access levels to different levels of users. For an example head manger has all privileges in access in network. Sub managers don't have privileges than head manager, but they have privilege to handle their employee's computers. Likewise security levels divided according to authority levels.

The proposing system is also use some of these technologies. They are design an artificial topologies, using protocols, using topologies, wireless networks, queue management system, proper network security & combine topologies with wireless networks. All these concepts are not in one network at the present. Hence using all these concepts together there can be a fast & accurate system which can send all data packets to the correct destination. The proposed system can communicate with the inter company without data traffic and it has some access levels to the network which are using to stop unauthorized access.

Chapter two (II) explains about the referred research papers (Literature review). Chapter three (III) explains about example of an As Is System. Chapter four (IV) contains about Implementation of Wireless Network Topology that the research team proposing. Chapter five (V) explains about advantages of proposed concept. Chapter six (VI) contains Conclusions that research team had after development of the concept. Chapter seven (VII) research team propose some concepts that can be develop in future researches and finally in chapter eight (VIII) an acknowledgement for those who help in research. This research paper contains a reference list and an appendix.

II. LITERATURE REVIEWS

Simulations can be consider as an important factor in network research. As the selected topology often influences the outcome of the simulation, realistic topologies are needed to produce realistic simulation results. The research first discuss the different types of topologies and present their collection of real-world topologies that can be used for simulation. The research define several similarity metrics to compare artificially generated topologies with real world topologies. The research use them to find out what the input parameter range of the topology generators of BRITE, TIERS and GTITM are to create realistic topologies.

These parameters generate artificial topologies that researchers can work as a valuable starting point. Artificially generated topologies are practical or judge by the pure visual inspection. Equality is a common objective and measurable metrics that define tomorrow as two network topologies objective criteria to measure the similarity. The topology graph to capture the basic connection properties. The research focus is the shortest way, the distance between nodes and the network for the connection to the degree simulation [1]

Network congestions lead to lost packets while the packet is travelling resource to the destination. The research paper covers Proactive queue-management (PQM) algorithm called GREEN which is applying knowledge of steady behavior of TCP connections to intelligently and proactively drop packets. GREEN (Generalized Random Early Evasion Network) keeps packet queue lengths relatively low and reduces bandwidth & latency jitter. GREEN achieves maintaining high link utilization and low packet loss. GREEN router classifies and ensures fairness between flows, [2] compare GREEN with two flow-based AQM (Active Queue-Management) schemes that are derivatives of RED [11] and BLUE [12]. The research does not focus on Design an artificial topologies, using protocols, using topologies and wireless network. The proposed system will be built with capability of high speed network usage, protection & queue management [2].

Research Cloud Research Simulation Toolkit (CREST), the new cloud computing and simulation research to enable cloud providers before continuing to test your system design tool introduction. The research compared to other known cloud crest with device simulation and a variety of delivery protocols and middleware for robustness and reliability related subscription network topologies evaluate crest shows the utility. The results expand on previous work and included in the published literature shows inaccuracies. With the intention crest, Source Forge in the

Creative Commons license has been issued under the open source as it can be used and expanded by cloud computing research community [3].

The research paper covered the area about the wireless network virtualization. This paper discuss framework based on architectures. Thus this research can be enables to reduce the significant of wireless network operations and deployment. Therefore there have some technologies like radio access technologies and remain some research challenges such as control signaling, resource discovery, security, etc. The proposed system will be built a secured system using artificial topologies and without using these technologies [4].

Wireless sensor networks (WSNs) is a dangerous component in the formation of modern computing applications; His size, process and communicate information, and the ability to feel the stimuli, they are part of what the Internet is a promising. However, they are plagued with problems of reliability and node failure. There is research to find the gene regulatory network (GRNs) by using the organism *Escherichia coli*-believe these problems are randomly generated and broadcast WSNs structure derived from the genetic study of broadcast-quality signal failure such as gene networks to strengthen against obstacles. Select the middle of the network nodes is crucial to the performance; Select four middle-node technology research here Introduction: Two high opinion-based based an attractor and a high degree of performance based approach and to assess their extensive simulation performance. Especially, we under varying channel loss model specific random deployed sensor network topologies, such as against the structure of the packet transmission communication Grn- derived robustness properties to evaluate use NS-2 simulation. Receipt Rate WSNs packets rather than randomly generated, communications structure which is shown to be higher for the GRNs use these networks, are compared between. The proposed project also offers strong communication communications structure to assess their applicability derived from existing organic network performance evaluation model generation. This gene regulatory network topologies based on the inherent properties of signal transmission robustness and fault-tolerant routing algorithms in the future use and development of strong WSN paves the way for [5].

The research present a framework to unify different notions of sign consistency and propose a refined method for data discretization that considers uncertainties in experimental profiles. The research furthermore introduce a new constraint to filter undesired model behaviors induced by positive feedback loops. Finally, they generalize the way predictions can be made by the sign consistency approach. In particular, they distinguish strong predictions (e.g. increase of a node level) and weak predictions (e.g., node level increases or remains unchanged) enlarging the overall predictive power of the approach. The research then demonstrate the applicability of our framework by confronting a large scale gene regulatory network model of *Escherichia coli* with high-throughput transcriptomic measurements [6].

The research it mainly discusses about a network of dynamic agents with fixed and switching topologies. Main contribution of this paper is to define and address consensus problems under network topologies. Hence in the research analyze some time delay and switching topology cases and

introduce linear and nonlinear protocols for each case. And provide some analytical tool like matrix theory, control theory etc. The proposed system will be built a wireless network with queue management [7].

The research [8] focuses Greedy Perimeter Stateless Routing (GPSR) protocol. It is a novel routing protocol for wireless datagram networks that uses the positions of routers and a packet's destination to make packet forwarding decisions. When mobility's frequent topology changes, GPSR can use local topology information to find correct new routes quickly. The research [8] describes about extensive simulation of mobile wireless networks to compare its performance with that of Dynamic Source routing. This research [8] is used protocols, topologies, mobile wireless technology, and GPSR technology as the components. The proposed system is not discussing about the mobile networks. The proposed research designs an artificial topologies and queue management methodology to handle wireless network congestions and makes a fast network communication in inter network of company [8].

Wireless network, an attacker tune a receiver and between two nodes can communicate. Get some meaningful information by touching a wireless connection depends on whether or not to use the security protocol. Cryptographic techniques can be used to secure a communication to. Article safe alternative way between the two points we discussed. Based on the research network topology to provide wiretapping attacks against the simple security protocol. Although a theoretical point of view to study the problem can, their protocol is easily implementable. At least these attacks as any other protocol is secure. Only the sender and receiver and an attacker research links between that wiretapping is essential for any meaningful information shows that you can get. Network encoding techniques used in the research. Including cycle network protocol, any network topology works for [9].

Sensor Networks usually consists of several kinds of nodes, The Gateway node is used for applications of transmitting data from the WSN to long distance data server region) measured from sensor nodes is send to the gateway nodes, and then the gateway transmits the data over a long Recently, there are 3 kinds of gateway used in WSN: Ethernet WSN gateway, WLAN WSN gateway, and the Ethernet WSN gateway. Kind of those gateway node is to connect the sensors in WLAN WSN gateway WLAN WSN gateway node is an improving to the wired Solutions about GPRS/CDMA WSN gateway node can node and surveillance center in this design of WSN gateway [10].

III. EXAMPLE FOR AS IS SYSTEM

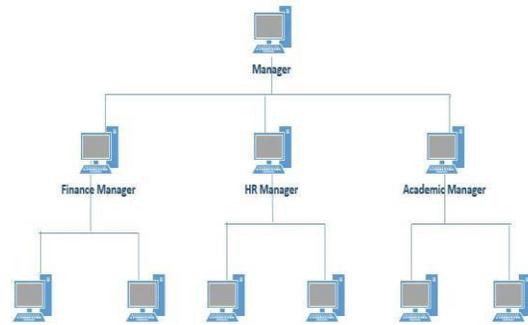


Figure 1: As Is System

ABC Company currently using above (figure 1) network topology. Hence the company faces lots of difficulties because this network has main drawbacks. Such as:

- Communication failures (Failure of one computer can impact the rest of the network);
- Low security;
- Difficult to troubleshoot;
- Limited cable length and number of stations;
- Network is highly dependent on the wire which connects different components.

IV. IMPLEMENTATION OF WIRELESS NETWORK TOPOLOGY

In most companies mostly use single topology to communicate with company members. Such as Star, Bus, Mess, Ring, etc. Therefore it cannot increase the efficiency in network.

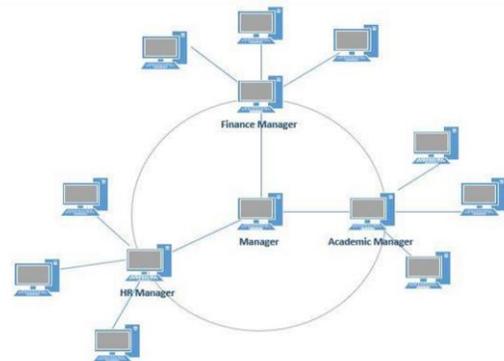


Figure 2: Conceptual Design

Consider the network above (figure 2). It is the example that implement as solution. This is the concept of efficient communication between users in company. Manager is the main person in this company and he can contact other members easily with this topology. Basically Manger PC uses Star topology to connect with this system. HR, Finance, Academic Managers connect with manager via Star topology and they connect with each managers with ring topology. Sub Managers can connect with their employees via Star topology. In some topologies there are some issues in connecting with other users. For an example in

ring topology if it is token ring topology when ring break down in one place, communication will disconnect in ring. To avoid this kind of problems it is better to implement wireless network among users. This is the conceptual idea in our research.

Basically wireless routers connect with star topology. If device makers can implement wireless router to other topologies and router can maintain access levels of internal users according to their positions also can increase efficiency and security in the network. In this system different users have different access levels. It can improve security in this system.

V. ADVANTAGES OF PROPOSED CONCEPT

- Rather than calling meetings with company members, as network like this can save cost and time in company.
- Top management can easily communicate with their group members with this system because every user connect with the system categorize clearly.

If implement this system with real topologies it takes more cost to switches, cables, bridges, etc. In wireless technology it can save the cost of those equipment.

VI. CONCLUSION

The term topology, or more specially, network topology, refers to the arrangement or physical layout of computers, cables and other components on the network. Topology can also determine how computers communicate on the network. Different topologies require different communication methods, and these methods have a great influence on the network.

The research team consider about the ring topology, it connects, computers on a single circle of cable. Unlike the bus topology, there are no terminated ends. The signals travel around the loop in one direction and pass through each computer, which can act as a repeater to boost the signal and send it on to the next computer. We can mention lots of advantages having a ring topology as network topology.

Advantages:

- System provides equal access speed for all computers.
- Performance is even despite many users.

A ring network is usually very reliable, but it may occur some problems such as,

- If one of the cables in the ring breaks, causing the network stop functioning temporarily.
- If one of the cables in the ring becomes disconnected, causing the network to temporarily stop functioning.

So failure of one computer can impact the rest of the network. It may affect the network performance. So the best solution to overcome of those problems is to use an efficient network topology with wireless technology. The research paper bring out a conceptual network design to communicate efficiently, using the wireless technology.

VII. FUTURE

The main drawback to implement this network is lack of devices suites for the implementation. Future developments research team propose to develop wireless devices consist with network topologies for implement efficiency and security of internal office network. The team also propose to develop an artificial intelligent device which can make decision when a section of the wired network failed, make a new connection path or wireless connection with other computers automatically, without human interference, like as in electricity failure diesel generators starts automatically.

Implement system like this can do big different in Network communication in future. There is no device to allocate ring topology with wireless network now a days. In present most of routers works on star topology. As a result of this there are limitations in implementing network as purposed. From this research, developers can change their view from traditional method. Developing wireless system can do evolution in networking in future.

Appendix

A. Star topology

In figure 3, Star topology, cable segments from each computer are connected to a centralized component called a hub. Signals are transmitted from the sending computer through the hub to all computers on the network. This topology originated in the early days of computing when computers were connected to a centralized mainframe computer.

The star network offers the advantage of centralized resources and management. However, because each computer is connected to a central point, this topology requires a great deal of cable in a large network installation, also if the central point fails, the entire network goes down.

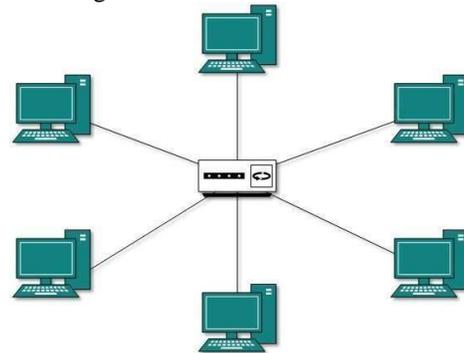


Figure 3: Star Topology

B. Ring topology

In figure 4, Ring topology is a Local Area Network (LAN) in which all the devices are connected two other devices forming a ring shape. Packets will be sent around the network until it reaches its destination. Other devices will drop the unnecessary packets. However Ring topology is rarely used nowadays. Because of the disadvantages like the packet having to travel through all the devices, network being highly dependent on the media it is connected with.

The major disadvantage of the ring topology is if in case of a failure in one node the whole network will be terminated. However there are advantages of ring topology as well, such as

all data flows in one direction, reducing the chance of packet collisions. Hence a network server is not needed to control network connectivity between each workstation.

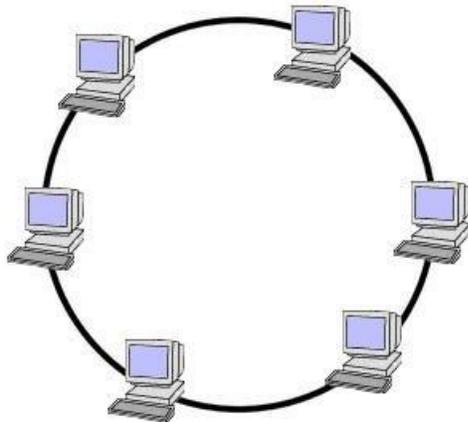


Figure 4: Ring Topology

C. Wireless network

Wireless technology is rapidly evolving, and is playing an increasing role in the lives of people throughout the world.

For mobility, **Wireless LAN** technology is a key enabling technology that allows institutions to extend their existing network into areas where hardwiring would be expensive or difficult. It allows users to achieve total PC portability and location independence. The technology can now go to the class rather than the reverse, allowing for rapid deployment anywhere—even outdoors – without the inconvenience of taking students out of their normal learning environment because they need network access.

Wireless LAN or local area networks -- provide flexibility and reliability for business computer users.

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Need of Tokenization and Dynamic Data Masking for Financial Sector of Sri Lanka

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Abstract- This paper presents a detailed study about how tokenization and dynamic data masking assist for security of banks. Financial sector is one of the most important sectors in any developing country. In financial sector banks are playing a vital role. All over the world, there are lot of transactions happening in banks per day. Most of the people have choose banks as a safe place to keep their money and valuables safely. To secure those money and valuables are difficult for banks because of frauds and vulnerabilities. As a developing country, Sri Lankan financial sector should have proper security mechanisms to secure information, different encryption methods can be used. When it comes to Tokenization and dynamic data masking together it's a new face of encryption methods. It does both encryption and Tokenization which provide more security. Technology is developing day by day. To face the future, new technology should be applied. Therefore the need of implementing research of tokenization and dynamic data masking for Sri Lankan banking sector is the purpose of this study. How tokenization and dynamic data masking assist for security of banks in Sri Lanka has been discussed as in results.

Index Terms- Banks, Tokenization, Dynamic data masking, Encryption, Sri Lanka, Security

I. INTRODUCTION

In the digital world, Security of the financial sector has become an essential factor. Financial sector includes banks which has an important role in it. Banking information is the most precious, therefore banks are increasingly discovering tokenization as a way to keep away cybercriminals. Tokenization can be used to keep the sensitive customer data within the bank's control at all times as external systems have no access to the real data.

Credit cards have become a popular payment instrument in the 21st century. Increasing popularity of business through Internet has make it essential for every business to maintain credit card information of its clients in some form. Credit card data theft is considered to be the most serious threat to any business. Not only amounts to a serious financial loss to the business but also a critical damage to the image of the company. Credit card data are a very sensitive information, and theft of sensitive data is a serious threat to any company. Any organization that stores credit card data such as cardholders name, credit card number, expiry date, card verification value, etc. needs to achieve Payment Card Industry (PCI) compliance. Which is a process where the organization needs to demonstrate that the data it

stores are safe. PCI sets a standard called PCI Data Security Standards (PCIDSS) which provides a framework for developing a robust payment card data security process.

However, it is quite expensive for each merchant to maintain a PCI DSS compliance server. There is also a risk if the server has security faults. Therefore there has been a shift in treatment of the problem of storage of payment card information. In this new concept instead of the real credit card data a token is stored, this process is called "Tokenization". The token signifies a look alike of the credit/debit card number, but ideally has no relation with the credit card number that it represents. Solution features the Token Server, which is a virtual appliance for managing access to tokens and tokenizing records and clear-text data.

Tokenization makes it more challenging for hackers to gain access to sensitive data, as compared with older systems in which credit card numbers were stored in databases and exchanged freely over networks. Tokenization technology can, be used with sensitive data of all kinds including bank transactions, criminal records, medical records, loan applications, vehicle driver information, stock trading etc. Solution as Tokenization does not eliminate the need to maintain and validate PCI DSS compliance, but it may simplify a merchant's authentication efforts by reducing the number of system components for which PCI DSS requirements apply.

Reducing the risk of tokenization can be achieved by representing it more difficult for attackers to gain access to sensitive data external to the tokenization system or service. Execution of tokenization may simplify the requirements of the PCI DSS, as systems that no longer collect or process sensitive data. It may have a reduction of applicable controls required through the PCI DSS guidelines.

In addition, Dynamic data masking can be substitute to applications to protect the actual data while having a functional supplement for occasions when the real data is not required. The format of data remains alike and only the values are changed. The figures may be altered in a number of ways, including character shuffling, encryption, and character or word substitution. In any kind of method is chosen, the values are changed in some way makes detection or reverse engineering impossible. Policies regarding security can be created using data masking by creating privileged logins, masking rules, and masking functions. Those logins which are privileged logins get unmasked data. Dynamic data masking certifies that non-

privileged users see only the data they are permitted to see while other data is masked.

Through this paper authors has concentrated on how important is to use tokenization and dynamic data masking in financial sector Sri Lanka as in banks must give priority to the security of confidential information. Similarly banks are supposed to provide all measures necessary to make customers believe that information is transmitted safely and securely. Authors explain about the security vulnerabilities and limitations of banks and how to overcome them. Therefore, the authors suggests tokenization and dynamic data masking to implement in financial sector of Sri Lanka.

II. AIM

The aim of this research paper is to introduce a secure system to encrypt sensitive data in banking sectors. Along with tokenization and dynamic data masking, the system would assist to protect confidential information between the client and the bank when credit transaction process happened. It would create a secure location to store those data with no access to the general database.

Research Questions

A. Main Research Question

How tokenization and data masking can be used to secure the confidential information of a banking sector in Sri Lanka?

B. Sub Research Questions

- a) What are the security issues and attacks related to the Sri Lankan banking sector?
- b) What is the procedure of tokenization and data masking?
- c) What are the advantages for Sri Lankan banking sector with the proposed solution?

Deliverables

The output of this project will be a report in how tokenization can be used to improve banking and credit card security in case of an intrusion. The main purpose of this report is to cover the scope of the project aim as shown below.

- Identify the main issues and attacks that could be commonly seen in a banks.
- Investigate available security systems to avoid those issues.
- Build a more reliable system to eliminate those security issues and attacks through tokenization and data masking.

III. LITERATURE REVIEW

Usage of data tokenization and other technologies in existing researches:

RSA technology has developed by Xin zhou and Xiaofei Tang, In this encryption method works using two keys called private key and public key. Private Key keeps the server and public key can be given away for any party. These keys are generated with two prime numbers and put it into a particular algorithm as a result it produce private and public keys. This technology lacks secured encryption management, secure application integration and dynamic data masking. Research team will try to develop them in the upcoming project [1].

End to end encryption technology is an encryption method which uses to transfer data, from source to the destination securely. This method uses public and private pre-shared keys to encrypt and decrypt processes. End to end encryption also uses known algorithms in order to generate private key and public key. In the proposed project secured encryption key management and secure application integration will be improved as they are not included in this research [2].

Payment Card Industry Security Standard Council (PCI SSC) has also formulated its guidelines regarding Tokenization. Since this research lacks on demand scalability, secure application integration and dynamic data masking, it will be developed in the proposed project [3].

Euro pay, MasterCard, and Visa (EMV) Tokenization Specification is concerned with a new kind of tokenization that prevents cross-channel fraud by replacing card data (PAN and PAN expiration date) with token data (token and token expiration date). In the proposed project secured data encryption, secured application integration and scalability will be developed as those functionalities are not included in this project [4].

JIET Group of Institutions found a data encryption algorithm that can be used to encrypt data by using ASCII values. It is an algorithm for data encryption and decryption. The secret key used will be modifying to another string and that modified string is used to encrypt or decrypt the data. This algorithm operates only when the length of input and length of key are same. Since this research lacks in dynamic masking and scalability, Research team will try to improve them [5].

SMS security algorithm is used for the interchange of confidential data. The encryption algorithm is characterized by a secret key. The application is develop using programming language Java and the J2ME

environment. Sort-time password method is in software-based security systems, the coding and decoding of information is done using specialized security software [6].

Encrypting in the data center applications, servers, databases, and storage, which help us to determine to pick the best encryption option for the projects. It is covers different high-level options and technologies. Proposed project will improve on demand scalability which is lacking from this research [7].

Point to point encryption to validate a secure element in a mobile device when scanned by a terminal. This project lacks on demand scalability and it will be included in the proposed project [8].

Secured application integration technique is before a device starts accessing sensitive data, the device request for a token from the server. After the device receives the token it can access the data that is associated with the token information. The functionalities that are missing such as dynamic data masking and on demand scalability will be included in the proposed project [9].

Dynamic data masking by replacing sensitive data by fake information in technical terms of hiding the sensitive data in the result set of a query over designated database fields. Non-disruptive implementation and on demand scalability will be improved in the proposed project as they are lack from this research [10].

IV. PROBLEMS IN SECURITY SYSTEM OF CURRENT SL BANKING SECTOR

Security of Sri Lankan banking sector is not in safe side. Day by day financial frauds happening in Sri Lanka. As a developing country these problems will affect in the future in critical ways. And also these problems will lead to reliability issues in customers. In sub section A and B will be discussed some of the security issues and attacks as well as potential problems and limitations in Sri Lankan banking security.

A. Security issues and attacks

In worldwide people are used to do transactions through credit cards and debit cards. Electronic card payment transaction security has become an important issue in Sri Lanka rather than the other foreign countries.

Millions of credit card numbers are stored and sent in to insecure networks. Malicious ones might break into a merchant's server and obtain thousands of credit card numbers as well as consistent information.

There are a various types of credit card fraud but two which are the most common types experienced are such as 'skimming' and application fraud. Skimming is the theft of credit card information in legitimate transaction. This is often done by

placing a small device on an ATM which will read and store card details. Which allows the thief to capture a customer's debit or credit card information, including their PIN with each swipe. Basically in foreign countries Systems are implemented using the latest technologies such as tokenization and data masking [11].

Recently Sri Lanka has been ranked amongst the top 10 countries in the world for credit card fraud. Therefore, a number of high profile cases have been recorded recently.

- Four suspects involved with credit card fraud worth Rs. 32.8 million were arrested by the Criminal Investigations Department (CID). The money was all withdrawn on a single day last May out of a well-known bank's ATM network. ATMs in Colombo, Kilinochchi and Jaffna were all targeted [12].
- Involved in the Rs. 263 million frauds by withdrawing money from foreign credit card holders through an e-commerce application service provided by a State bank in Sri Lanka.
- Information on frauds committed using mobile phones [11].

Recently group of two Turkish nationals and one Ukrainian national after surveillance have arrested a by the Police on a tip received. Investigations have revealed that the group has made a number of withdrawals using 33 such fraudulent cards from ATMs (Automated Teller Machines) around Colombo and had visited Sri Lanka three times in the recent past [12].

B. Limitations and potential problems

As defined in section A, there is genuine need to protect confidential information. Limitations of banking due to unavailability of confidential information security. As in security is not perceived as an obstacle or a major concern in mobile banking transactions. It can be understood that people are ready to settle with less secure environment in courtesy of ease of use and convenience. Trust between the bank and the customers will affect due to such circumstances.

Potential problems such as hackers accessing Bank databases and removed withdrawal limits on prepaid debit cards and created access codes. Awareness of potential loss due to fraud or a hacker compromising the security. Therefore, a lot of security vulnerabilities may occur due to lack of security in banks.

V. SOLUTION AND IMPLEMENTATION

According to sub section A and B in section IV, current status of the Sri Lankan banking security and related issues and attacks cannot be satisfied as a developing country. As a solution to eliminate these issues banking security systems must be upgraded. Tokenization is an easy way to maintain sensitive data in banking databases, with data masking can be assign policies and privileges for different users. Figure 01 in Appendix shows

how tokenization procedure work and how systems are integrated.

As shows in Appendix Figure 01, Customer credit details will directly go to the Application server in the banking system. Then App server forward customer credit details to token server for tokenization through REST API (REpresentational State Transfer Application Program Interface) which helps to integrate systems securely and to create faster management process. Once the token is created token key related to token will be send to Data security manager to store it securely. Then the original data will be stored in token vault and tokenized data will be send back to app server through REST API. Then app server will store tokenized data in database.

When it needs to DE tokenize stored data it will go back to the reverse order. App server will get related tokenized data from the database and send it to the token server for DE tokenize then data security manager will arrange the token key related to received token value. Once it DE tokenize using token key, token server will get the original information from token vault and set it back to the app server then it will distribute the data for the relevant parties.

As shown Appendix Figure 02, illustrates the task of the dynamic data masking feature. It assigns policies and privileges to control data flow among different users. Which means as an example, User needs to take customer support from bank then customer support person needs to verify the customer first. In this stage customer support person can ask the last four digits of the card because data masking make sure customer support person will only see last four digits of the card number, nothing more shared of credit details. Rest of the details can be verified in other ways such as birthday, address and etc. If customer needs to go for advance change of his or her account then customer service supervisor needs to assist because data masking service can arrange privilege to access his or her credit details. In this case customer support person got half privilege and customer service supervisor got full privilege.

So tokenization and data masking together will give a successful solution for above mentioned problems in sub sections A and B in section IV.

VI. CONCLUSION

Based on the findings done through related research papers and other available online materials, it has become clearer that security for organizations and banking sector is becoming a priority day by day. In order to avoid intrusion to online database systems and other confidential information in banks, the project team has implemented a security system based on data tokenization and dynamic data masking.

APPENDIX

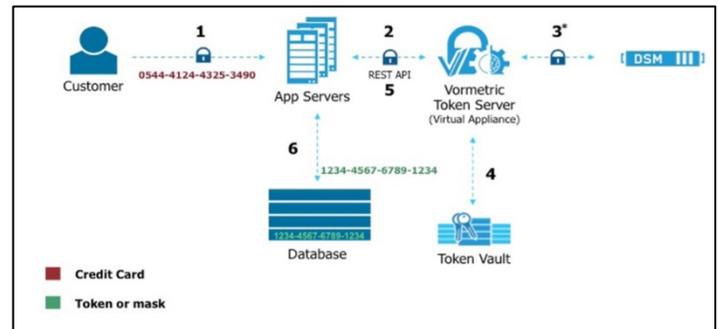


Figure 01: Tokenization procedure

(Source: <http://enterprise-encryption.vormetric.com/Tokenization-With-Dynamic-Data-Masking.html>)

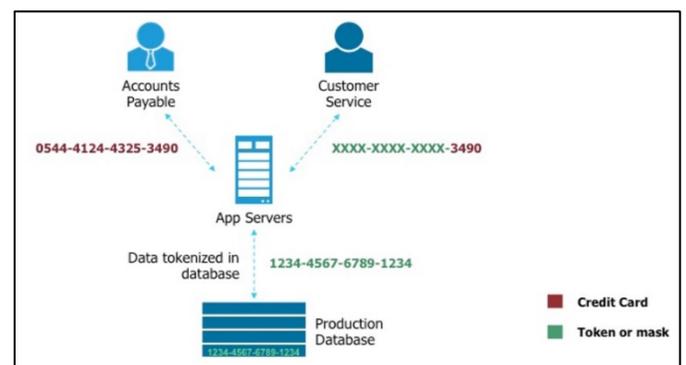


Figure 02: Task of data masking

(Source: <http://enterprise-encryption.vormetric.com/Tokenization-With-Dynamic-Data-Masking.html>)

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Effect of linearized expressions of Langmuir equations on the prediction of the adsorption of methylene blue on rice husk

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Abstract- In order to investigate the effect of linearized process on the adsorption equilibrium isotherms of methylene blue from solutions onto rice husk, the experimental data were fitted to the Langmuir isotherm equations by using five different types of linear expression. The adsorption equilibrium constant related to the affinity of the binding sites and energy of adsorption (K_L) and maximum adsorption capacity (q_{max}) for each linear expression had been calculated. Also, values of the amount of MB adsorbed on adsorbent at equilibrium time using the constants calculated from these five linear types of Langmuir isotherm equations were compared with the experimental data. The results indicated that the type 1 linear expressions were able to calculate the adsorption equilibrium constant and q_e for the studied system (methylene blue/rice husk) well. The results also showed that it was inappropriate to use the other four proposed alternate linear expressions (type 2 to type 5) to calculate the adsorption equilibrium constant and q_e for the studied system.

Index Terms- Langmuir; Adsorption; Isotherm

I. INTRODUCTION

Increasing concern for public health and water quality has result in the establishment of severe limits on the acceptable discharge standards of dyes. Thus, removal of dye from process or waste streams becomes a major environmental problem (Hamdaoui and Naffrechoux 2007). Liquid phase adsorption, referred to the passive uptake and physicochemical binding of dye to the adsorbate surface, is now generally known as an effective and economically feasible technique for the removal of dye pollutants from waste streams (Chowdhury and Das Saha 2011). One of the important task in the study of adsorption is to discover the adsorption mechanism, in particular the interactions which are implicated at the adsorbate / adsorbent interface. In fact, the effective description of the dynamic adsorptive separation of dye from solution onto an adsorbent depends upon an proper illustration of the equilibrium separation between these two phases. Adsorption properties and equilibrium data, normally recognized as adsorption isotherms, is established when the amount of dye being desorbed from the adsorbent is equal to the amount being adsorbed and the equilibrium solution concentration remains constant at this point (Kundu and Gupta 2006, Gimbert, Morin-Crini, et al. 2008). In order to optimize the design of an adsorption system, it is important to establish an accurate mathematical description of the equilibrium isotherms. The commonly used isotherm were the Langmuir expressions. The Langmuir isotherm equation has been successfully applied to many dye adsorption procedures. Because the Langmuir isotherm equation as expressed in literatures is nonlinear, the non-linear regression method was applied to calculate the parameters of Langmuir isotherm equation. The calculation of Langmuir equation by using the non-linear regression technique offers a more complex calculated process for determining isotherm parameters and the researchers need to use some particular softwares or write down some computer programs to solve these non-linear regression equations. Due to these reasons, the researchers try to find a easy method to replace the non-linear regression technique to solve the Langmuir isotherm equation. A common alternative method is to use linearized forms of the Langmuir isotherm equation to replace non-linear form of the Langmuir equation to calculate the isotherm parameters. This linear regression method is often applied to estimate the Langmuir isotherm equation parameters, since this method only requires little understanding of the data fitting process, and is easily done by using Excel or similar spreadsheet softwares. However, depending on the approach of the Langmuir isotherm equation linearized, the error distribution may changes worse. Thus it will become an unsuitable substitute method to use the linearization procedure to estimate the Langmuir isotherm equation parameters.

In this study, 5 different types of linear expressions of the Langmuir equations has been used to estimate the Langmuir isotherm equation parameters and also to find the best linear type on the basis of the experiment of methylene blue adsorption from its aqueous solution onto rice husk.

II. MATERIALS AND METHODS

The experimental data used in this research was got from the literature (Shih 2012). The adsorbent used in the literature was RH (rice husk) and the dye used in the literature was methylene blue (MB). The amount of dye adsorbed at equilibrium time (q_e) (Djeribi and Hamdaoui 2008, Huang and Shih 2014):

$$\text{Amount adsorbed at equilibrium time } (q_e) = \frac{(C_i - C_e)V}{M} \quad (1)$$

where M is the weight of adsorbent used (g). C_i and C_e (mg/L) are the liquid phase concentrations of dyes initially and at equilibrium time, respectively. V is the volume of dye solution (L).

The Langmuir isotherm equation

The Langmuir isotherm equation derived on the basis of assumption of uniform energies of adsorption onto the surface and no transmigration of adsorbate in the plane of the surface is expressed as (Ho 2006, Hamdaoui and Naffrechoux 2007):

$$q_e = \frac{q_{\max} K_L C_e}{1 + K_L C_e} \quad (2)$$

where q_e is the amount of MB adsorbed on adsorbent at equilibrium (mg/g); C_e is the equilibrium concentration in the solution (mg/L); q_{\max} is the q_e for a complete monolayer (mg/g), a constant related to sorption capacity; and K_L is the adsorption equilibrium constant related to the affinity of the binding sites and energy of adsorption (L/mg).

The linearized forms of Langmuir equation derived on the basis of Eq. [2] is expressed as :

$$\frac{C_e}{q_e} = \frac{1}{K_L q_{\max}} + \frac{C_e}{q_{\max}} \quad \text{type1} \quad (3)$$

Eq.[3] can be rearranged to obtain another 4 different linearized types of Langmuir expressions (Hamdaoui and Naffrechoux 2007):

$$\frac{1}{q_e} = \frac{1}{K_L q_{\max} C_e} + \frac{1}{q_{\max}} \quad \text{type2} \quad (4)$$

$$q_e = \frac{-q_e}{K_L C_e} + q_{\max} \quad \text{type3} \quad (5)$$

$$\frac{q_e}{C_e} = -K_L q_e + K_L q_{\max} \quad \text{type4} \quad (6)$$

$$\frac{1}{C_e} = K_L q_{\max} \frac{1}{q_e} - K_L \quad \text{type5} \quad (7)$$

III. RESULTS AND DISCUSSION

For the current study, the experimental data for methylene blue adsorbed onto the rice husk were fitted to the 5 different linearized forms of Langmuir equations. Values of the the maximum adsorption capacity, q_{\max} ; the adsorption equilibrium constant, K_L by the type 1 linearized forms of Langmuir equation can be calculated from the plots of C_e/q_e versus C_e as presented in Fig. 1. In fact, the rate constant K_L and the q_{\max} also can be obtained from the plot of $1/q_e$ vs. $1/C_e$ (fig.2), q_e vs. $-q_e / C_e$ (fig.3), q_e / C_e vs. q_e (fig.4) and $1/C_e$ vs. $1/q_e$ (fig.5) for the linearized expressions of type 2, type 3, type 4 and type 5 of Langmuir equations, respectively (Kumar 2006, Hamdaoui, Saoudi, et al. 2008). The predicted results of the maximum adsorption capacity, q_{\max} ; the adsorption equilibrium constant, K_L , and the correlation coefficient, R^2 for these 5 different linearized types of Langmuir equations were given in table 1. From Table 1, it was able to be found that the equilibrium sorption capacity of rice husk for methylene blue predicted by these five different linearized types of Langmuir isotherm equations were highly varying from 8.73 mg/g to 11.70 mg/g. Also, the K_L values and R^2 values obtained from the five linear expressions of langmuir equations were different. From table 1, It was observed that expression of type 2 and type 5 had the R^2 value higher than 0.999 for the MB adsorption on RH, the R^2 values of type 3 and type 4 expressions are higher than 0.95, and the R^2 values of type 1 expression are higher than 0.98. The comparison of R^2 values of these five different types of linearized Langmuir isotherm equations indicated that expression of type 2 and type 5 had the highest R^2 values and the type 2 and type 5 linear expressions of Langmuir equatuion may be used to represent the MB adsorption on RH. Beside the comparison of R^2 values for these five different types of linearized Langmuir isotherm equations, the expression of type 1 Langmuir isotherm was the most frequently used linear type to study the relation between the concentration of solute in the solid

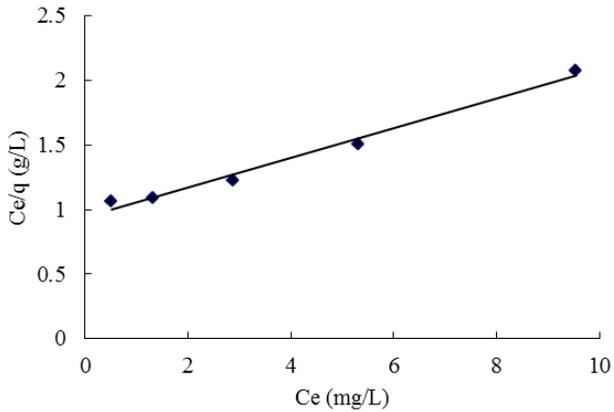


Figure 1. Type 1 Langmuir isotherm equation obtained using linear method for the sorption of methylene blue onto rice husk

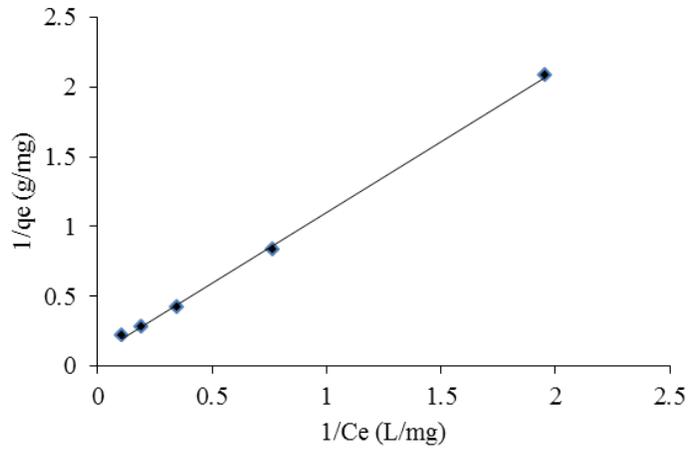


Figure 2. Type 2 Langmuir isotherm equation obtained using linear method for the sorption of methylene blue onto rice husk

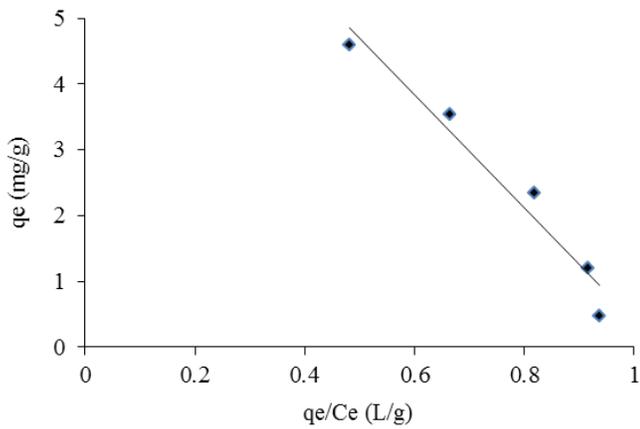


Figure 3. Type 3 Langmuir isotherm equation obtained using linear method for the sorption of methylene blue onto rice husk

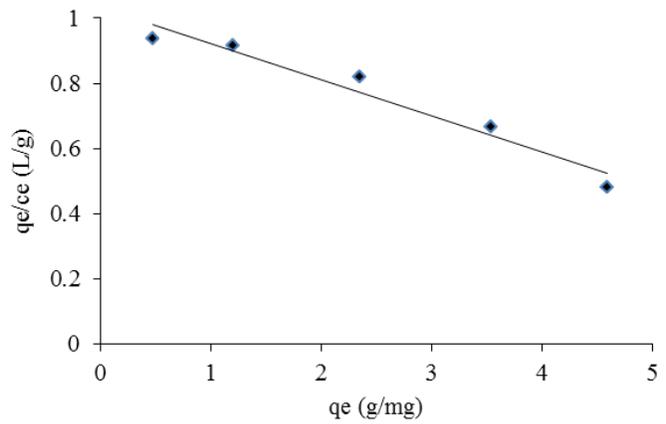


Figure 4. Type 4 Langmuir isotherm equation obtained using linear method for the sorption of methylene blue onto rice husk

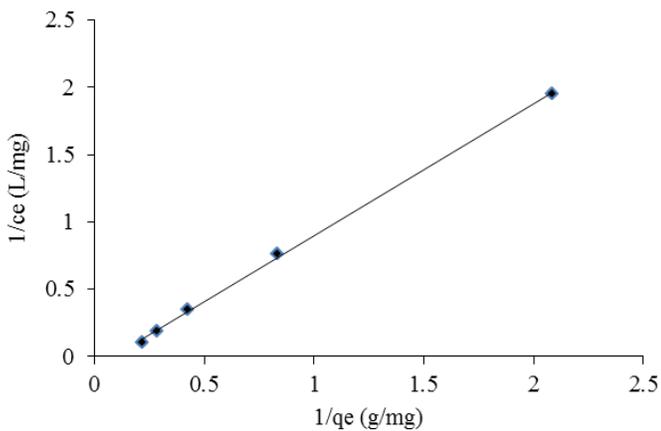


Figure 5. Type 5 Langmuir isotherm equation obtained using linear method for the sorption of methylene blue onto rice husk

Linear Type	q_{max} (mgg ⁻¹)	K_L (Lmg ⁻¹)	R^2
Type1	8.73	0.12	0.985
Type2	11.63	0.08	0.999
Type3	8.99	0.12	0.955
Type4	9.29	0.11	0.955
Type5	11.7	0.084	0.999

Table 1. Isotherm parameters obtained by using linear methods for the adsorption of methylene blue onto rice husk

phase and in liquid phase at equilibrium conditions (Hamdaoui and Naffrechoux 2007, Kumar and Sivanesan 2006). In order to find the suitable linear expressions of Langmuir equation, the K_L values and q_{max} values obtained from these five linear expressions of Langmuir isotherm equations were brought into the nonlinear form of Langmuir isotherm equation to calculate the q_e values and C_e values separately.

Comparison between the experimental points and predicted values for the adsorption of MB onto RH by these 5 linear type of Langmuir isotherm equations were presented in figures 6-10. From fig. 6-10, it was observed that the type 1 linear expressions of Langmuir isotherm equation can predict the experimental data very well.

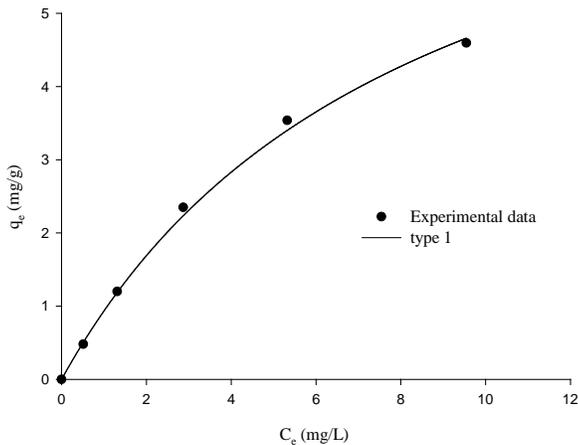


Fig. 6. Comparison between the experimental points and predicted adsorption isotherm of MB onto RH by linear type 1.

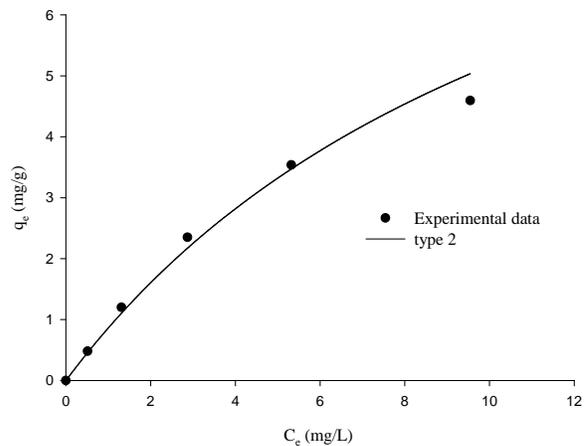


Fig. 7. Comparison between the experimental points and predicted adsorption isotherm of MB onto RH by linear type 2.

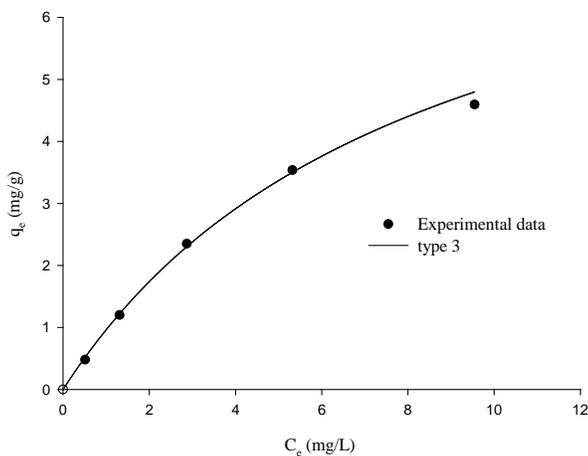


Fig. 8. Comparison between the experimental points and predicted adsorption isotherm of MB onto RH by linear type 3.

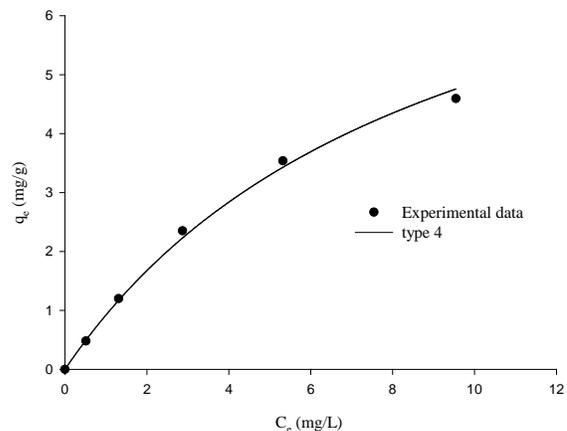


Fig. 9. Comparison between the experimental points and predicted adsorption isotherm of MB onto RH by linear type 4.

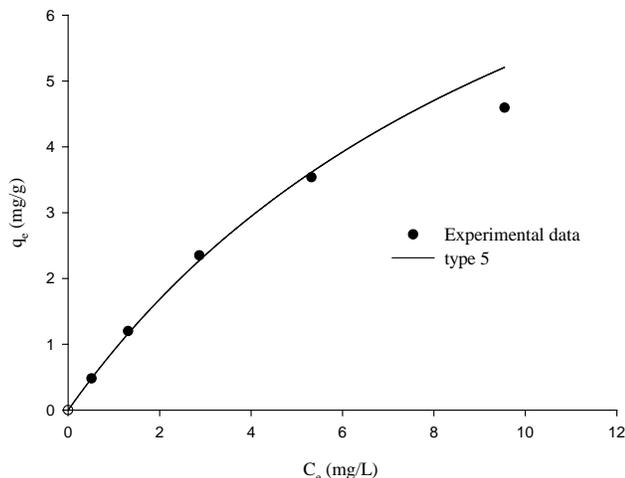


Fig. 10. Comparison between the experimental points and predicted adsorption isotherm of MB onto RH by linear type 5.

The figures 7 and 10 indicated that the type 2 and type 5 linear expressions of Langmuir isotherm equation failed to predict the q_e values and C_e values for the adsorption of MB onto RH. All these results indicated that the theory behind the Langmuir isotherm equation was getting valid for the adsorption of methylene blue onto rice husk based on the type 1 linear expression and the theory behind the Langmuir isotherm equation was violated by the type 2 and type 5 linear expression. These results also indicated that different linear forms of the same Langmuir isotherm equations significantly affect calculations of the parameters. These divergent outcomes show the real complexities and problems in estimating the isotherm parameters by the linearized method. The different outcomes for different linearization form of Langmuir isotherm equations were produced by the variation in the error structure that would get varied upon linearizing technique of the nonlinear equation (Khambhaty, Mody, et al. 2008).

IV. CONCLUSION

The purpose of this research is to find the linear type of Langmuir isotherm equations that can describe with precision the experimental results of equilibrium isotherms, specify the parameters that can be calculated, compare the dye adsorption behavior, and determine the theoretical adsorption isotherms. The calculated results obtained from the five linear forms of Langmuir equations indicate that the q_e values and k_L values were different. Further, from the calculated results obtained from the five linear expressions of Langmuir isotherm equations, it was observed that, if the R^2 values were used to select the best-fit linear types of the same Langmuir isotherm equation, it can be seen that the values of R^2 of type 2 and type 5 are close to unity, which means the isotherms are approaching the type 2 and type 5 linear expressions of Langmuir isotherm equations but not the type 1, type 3 and type 4 linear expressions of Langmuir isotherm equations. The predicted q_e values and C_e values for the adsorption of MB onto RH by these 5 different linear expressions of Langmuir isotherm equations were used to verify the applicability of each linear type. It was observed that type 1 expressions provide reliable evaluates. However, the predicted q_e values and C_e values of type 2 and type 5 expression of Langmuir isotherm equations were found to be the worse fit expression of Langmuir isotherm equations. The present findings suggest that it is not appropriate to use the type 2 and type 5 expression in determining the parameters of the Langmuir isotherm equation. This inadequacy of type 2 and type 5 are primarily because transforming a nonlinear equation to a wrong linearized expression tends to alter the error distribution, and thus distort the calculated results and obtain unsuitable parameters.

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Bio-metric Social Media Network Secure.

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Abstract- The aim of this research paper is to make a security in social media network. Social media networking sites offer a straight forward way for people to have a simple social presence through web. They provide a virtual environment for people to share each and every activity, their interests, and their circle of acquaintance with their family, friends, or even the unknown. Usage of social media network is very high in nowadays, hackers have found very easy ways to steal personal information through these networking sites. The use of social media for communication is becoming more prevalent worldwide, with people from countries of varying economic development increasingly accessing the Internet to participate in networking sites. In present the social media has security risks. It is used to damage the reputation of popular person, criminals for fraudulent activity, gathering business intelligence, stealing sensitive information etc. This paper will demonstrate the security level increment & the methods that make the popular person's social media network profile more secure.

Index Terms: Social media network, social media network security, Social media networking sites, BioMetric Security, Popular personality

I. INTRODUCTION

Today internet is becoming part of our lives. Unlike in the past, today people have less relationship with each other. In the years we have witnessed a rapid development in information technology. It's commonly known as social media. There are popular social media sites such as Facebook, Twitter, My space, Google+ and instagram etc. It has been shown in figure 01.

Today Social media networks have over 2.13 billion active users It has been shown in figure 02, table 01 and figure 05 in Appendix A[18].And who spent more than 9.7 billion minutes per day on the social media network sites [16]. Half of all Social media network users have more than 200 friends [17]. Anyone can create profiles easily. Two kinds of people create profiles, normal people and special personalities like Cricketers, actors, politicians whom belong to special personality category.



Figure 01: Social media networks

(Source:<http://www.cyberneticsltd.com/services/webservices/Social-media-marketing/>)

Special personalities create profiles and the possibility to hack these profiles is vast. There are instances of complaining about hacking special personalities profiles. Some hackers have logged in such profiles and uploaded photos and private information into the internet. It's a tragic circumstance. So many special personalities hate to create profiles. They have no trust in security either. A solution for this research paper tries to introduce a new technology to protect profiles.

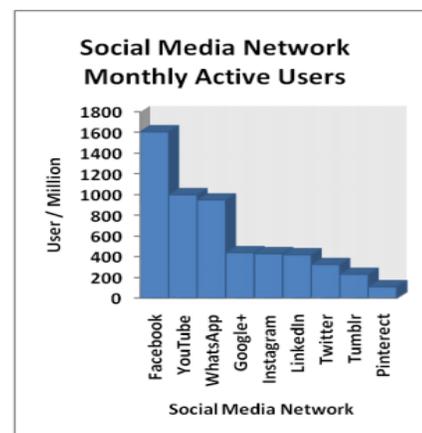


Figure 02: Social media network monthly active users

(Source:<http://www.socialnomics.net/2016/02/09/social-media-user-statistics-2016/>)

II. BACKGROUND AND RELATED WORKS

The human factor in the social media security combining education and technology to reduce social engineering risks and damages, is demonstrating the cyber security risks and mitigations, focusing on the human factor and social media. Formal policy to guide how employees can use social media sites is not enough, and complementary layers are needed: education starting at elementary school, interactive and adaptable training and innovative technology means. To strengthen the human factor, should put effort in education, starting as early as the first grade, at the age that the children are exposed to the internet. Unusual approaches to cyber security training should be considered. Also put more effort on technological means of helping humans make fewer errors and avoid falling into cyber traps. Privacy settings can limit access to the user's information. Social media site monitoring tools can help organizations keep track of malicious activities and threats against them. Technology can help to check the reliability of the person suggesting friendship. Social networks can also be used to identify an organization's insider threat, by analyzing the social media content. Combining education and training with best-of-breed technology may reduce social engineering risks and damages. Disadvantage of this is give education and training to peoples are get long time period, to overcome this problem Biometric Social Network Secure is develop by using new networking technologies [1].

User awareness of social media security the public sector framework is to examine factors affecting user security concerns among social media users in the educational sector. The researchers employed a quantitative research approach because the subject matter needs further definition. This aids researchers in determining a suitable research design and data collection method, as well as to examine the hypotheses and proposition developed in the current Problem. Disadvantage of this is hypotheses and proposition develop are get long time period and want many statistical data, to overcome this problem Biometric Social Network Secure is develop by using new technologies to secure social media [2].

A new social media security model, is increases in functionality and popularity, it has become more vulnerable. It is no secret that social media vendors exclude security during development, hence leaving it to users' discretion which raises a serious cause for concern. The aim of this is to study existing vulnerabilities of online social media and propose practical solutions. The importance of studying social media vulnerabilities provides a clear understanding in developing a new security model to prevent social engineering attacks. Investigate key security vulnerabilities eroding the trust placed on social media such as profile cloning, single factor authentication, weak password creation, weak account activation systems, privacy vulnerabilities, unethical posts and multiple login sessions. Disadvantage of this is key security is not a most suitable secure method it might be hack by in social media, to overcome this problem Biometric Social Network Secure is develop by using biometric fingerprint key to secure social media[3].

Social media security policies: guidelines for organizations, is introduction of Social Media into the workplace has created the need for a new way of thinking for people. Social Media's growth into corporations has opened opportunities and benefits that many corporations did not foresee in the past. However, the use of these services has also created many risks for the company's reputation and has developed vulnerabilities in corporate culture and security policies. Some risks are so great that businesses are putting an all-out ban on the use of the Social Media services. This examines the impact of social networks on corporate culture as well as on corporate information security policies. Guidelines are offered for an organization to enhance their presence with social networks as well as employee participation. Disadvantage of this is its only depends on the security policies, to overcome this problem Biometric Social Network Secure is developing by using combination of security policies and new networking technologies for advance Social media security [4].

Countering Social Engineering through Social Media: An Enterprise Security Perspective is increasing threat of social engineers targeting social media channels to advance their attack effectiveness on company data has seen many organizations introducing initiatives to better understand these vulnerabilities. This examines concerns of social engineering through social media within the enterprise and explores countermeasures undertaken to stem ensuing risk. Also included is an analysis of existing social media security policies and guidelines within the public and private sectors. Disadvantage of this is its depends on the security policies, to overcome this problem Biometric Social Network Secure is develop by using biometric fingerprint key to secure social media [5].

Security model to control on social media using visualization and forensic approach is providing cyber security controls on social media is becoming critical particularly for the enforcer in community. Controlling on social media contents are much more demanding than the conversational media. Moreover, the enforcer has identified the real and virtual information should be protected from any devastating physical, logical or cyber impact. In this long term project, this research has focused on cyber impact to society and also identified cyber problems area like illegitimate rumors, fake non textual content, wrong perception, unfeasible to trace the irresponsible writers and detecting any malicious data on social media contents. At the end of this project, it's expected to produce controlling rumors propagation model, network forensic analyzer prediction model and intelligent image to identify factors on shaping appropriate perception on social media readers activities. Disadvantage of this is forensic analyzer prediction model and intelligent image are might be sometimes give error figures, to overcome this problem Biometric Social Network Secure is develop by bio-metric fingerprint key using new networking technologies [6].

Security Management real versus perceived risk of commercial exploitation of social media personal data, is covers one of the issues in security management, which is that people react

more on their perceived risk rather than on their real risk. This work is designed to be the first one to consider that user's behavior is a mix between perceived risk and accepted risk. This research defines two dimensions of risk analysis and it has designed a real and perceived risk test measuring prudent vs. risky behavior and feeling safe vs. At risk, then this work introduces the idea that there are four types of personality depending on the perceived degree of risk and the real and accepted degree of risk are conscious, paranoid, unconcerned, and paradoxes. Disadvantage of these two dimensions of risk analysis is not enough to secure social media networks, to overcome this problem Biometric Social Network Secure is developing by using combination of risk analysis and new networking technologies for advance Social media security [7].

A robust finger print based two-server authentication and key exchange system, is based user authentication systems are highly secured and efficient to use and place total trust on the authentication server where biometric verification data are stored in a central database. Such systems are, prone to dictionary attacks initiated at the server side. Compromise of the authentication server by either outsiders or insiders do all user private data to exposure and may have serious repercussions to an organization. In this present a practical fingerprint based user authentication and key exchange system employing novel two-server architecture. Here, make use of Image processing techniques to extract a biometric measurement from fingerprint image. In this system, only a front-end service server engages directly with users while a control server stays behind the scene. Also the system is secure against offline dictionary attacks mounted by either of the two servers. Disadvantage of this is use a simple sever to store fingerprints are not a most suitable secure method it might be hack, to overcome this problem Biometric Social Network Secure is develop by using bio-metric fingerprint keys are store in social media network central database [8].

Biometrics verification techniques combing with digital signature for multimodal biometrics payment system which consists of functions like finger print authentication, using a digital signature, hand/face authentication. This lacks functions like using a smart card to store biometric data, Finger print authentication for automatic teller machine, Using Short Message Service for user authentication, Utilizes a minutiae matcher for fingerprint, using finger print verification for online transactions, Using on card comparison for finger print verification. Disadvantage of this is only for payment systems, to overcome this problem Biometric Social Network Secure is developing for this Social media security by using new technologies to secure social media [9].

Symmetric key encryption technique, cellular automata based approach and cellular automaton is one of the most engrossing fields of studies. At the present digital world where almost every communication is being done via the internet, requirement of security and privacy of information is a must. For securing big or small data over internet, cryptographic techniques are essential. Usage of cellular automata characteristics in the field

of cryptography is still not much explored. Here, the presents a symmetric key cryptographic technique of block cipher using cellular automata rules. Disadvantage of this is only for cellular automata systems, to overcome this problem Biometric Social Network Secure is develop by secure browser to social media central sever communication using new encrypt and decrypt method, using new networking technologies [10].

Social Networking Sites and Their Security Issues is Social networking sites offer a straightforward way for people to have a simple social presence through web. They provide a virtual environment for people to share each and every activity, their interests, and their circle of acquaintance with their family, friends, or even the unknown. With so much sharing, Found hackers and thieves in social networks, very easy ways to steal personal information through networking sites. This calls for advances in security protocols to safeguard against hackers. This discusses some of the privacy and security concerns, attacks and their respective prevention techniques. Disadvantage of this is only use of security protocols to safeguard social network is not enough, to overcome this problem Biometric Social Network Secure is develop by using biometric fingerprint keys to secure social media networks [11].

Estimating the sentiment of social media content for security informatics applications is Inferring the sentiment of social media content, for instance blog posts and forum threads, is both of great interest to security analysts and technically challenging to accomplish. This presents two computational methods for estimating social media sentiment which address the challenges associated with Web based analysis. Each method formulates the task as one of text classification, models the data as a bipartite graph of documents and words, and assumes that only limited prior information is available regarding the sentiment orientation of any of the documents or words of interest. The first algorithm is a semi supervised sentiment classifier which combines knowledge of the sentiment labels for a few documents and words with information present in unlabeled data which is abundant online. The second algorithm assumes existence of a set of labeled documents in a domain related to the domain of interest, and leverages these data to estimate sentiment in the target domain. Disadvantage of this is only use of algorithms to safeguard social network is not enough, to overcome this problem Biometric Social Network Secure is develop by using biometric fingerprint keys to secure social media networks [12].

Online social media networking and assessing its security risks are presents the security risks of online social media networking and then attempts to develop the model for assessing its security risks. This can help security professionals for assessing security risks in the existing information systems and designing new security systems of enterprise. Disadvantage of this is only use of algorithms complex multi layered informational system is not enough, to overcome this problem Biometric Social Network Secure is develop by using bio-metric fingerprint keys to secure social media networks [13].

Security policy and social media use is intended to demonstrate that the existing information security policies already in place at many organizations can easily be extended to cover social media. Therefore, organizations do not need to issue security policies and guidelines specifically for social media. This attempts to demonstrate that the main security threats posed by social media and would be addressed by a good overall security awareness program, along with technical and administrative safeguards. Disadvantage of this is only use of security policies to safeguard social network is not enough, to overcome this problem Biometric Social Network Secure is develop by using biometric fingerprint keys to more secure social media networks [14].

Security and privacy in an online world is describe the amazing advances in information and communications technologies,

III. PROPOSED SOLUTION

This research paper introduces a smart solution to protect the profiles of the special personalities. It is a technology to protect their profile from unauthorized users in very safety way. Up to date social media network profiles have two security methods. One is password and other one is security code method. But these methods have less security. When the users miss the password or if someone can guess the password and if they get it, then he or she can use the social media network profile as his own one.

So this research paper introduces a new advanced technology. These profiles are considered as special profiles. Their appearance is same as the normal profiles but they are totally different in creating profiles, login the profiles and their security. Here in this paper finger print is used as the password. This is a very safe method as one's finger print shows user own identity.

Monthly Active Users	
Facebook	1.609 Billion
YouTube	1 Billion
WhatsApp	950 Million
Google+	440 Million
Instagram	430 Million
LinkedIn	420 Million
Twitter	325 Million
Tumblr	230 Million
Pinterest	110 Million

Table 01: Monthly Active Users in social media networks.

A. Creating a profile.

Creating a profile is totally different from the normal one. First, the user must send his finger print to the social media network headquarters. Social media network users are worldwide. So getting connections with the social media network headquarters is not an easy task. To solve this problem centers have been established in every country. Then the user can visit these centers

peoples are heading for an online world in which convenience goods have unprecedented computing power and are permanently connected to the internet or stored in the cloud. The internet is everywhere, and now people are talking about the Internet and its things. Look at your own belongings; it's likely that you carry around at least one or possibly several handheld devices such as smart phones that are permanently connected to the internet. Now people use internet to download and play songs and movies, access social media, run e-mail or messenger software, or access any of the other myriad apps people have created recently. This is mainly described usage of the internet [15].

Background and related works Comparison has been shown in table 02 in Appendix B.

and give their finger print, email and phone number. These centers send this data to the social media network headquarters. Social media network headquarters will create pre generate user profile and send to the user by email fellows. It enriches the information pool of your paper with expert comments or up gradations. And the researcher feels confident about their work and takes a jump to start the paper writing.

B. Login to profile.

Then user can go to the link and start login. First user must enter the email id and the password as usually. Then the user has to buy a finger print device and connect it to the USB port. Then only he can insert the finger print. Mostly modern phones have this function. After inserting the correct finger print, security code comes to the phone. As the third step he must enter the security code. After satisfying these three requirements the user can log to the social media network profile.

As we know finger prints are also transferring as binary codes. Another 19 finger prints are created in this technique. Thus 20 binary codes are encrypted. These encrypted 20 binary codes are transferred to social media network headquarters. Hackers will get a less possibility to hack these profiles in this method. Social media network headquarters know the correct finger print but hackers are not be able to select the correct finger print among the 20 finger prints. This system allows putting a finger print once only. It is very difficult to hack the profile because of these reasons. The user is Notified that the hacker enter the profile by getting a phone alert. Then the user can take action immediately.

Not only that, user can see all the login time, place, ipaddress, all the records, phone message when necessary. In this research paper it introduces a most secure and smart method to protect the profiles of the special personalities.

C. Secure data communication.

Data communication between web browser and social media network sever to create better secure data communication, this can develop a new encrypt – decrypt method, using encrypt key for user input biometric fingerprint key and use decrypt key for stored biometric fingerprint key in the social media network sever side biometric fingerprint database. It has been clearly shown in figure 03.

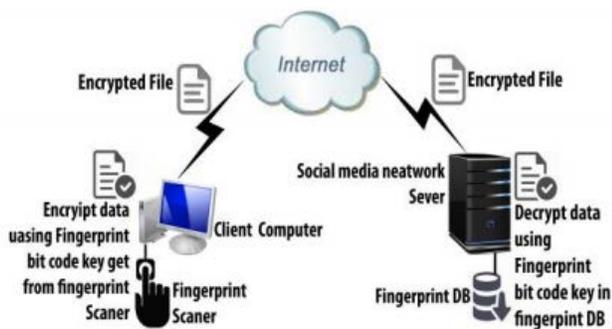


Figure 03: Social media network secure data Communication

IV. FUTURE WORKS

Future Works has been at the forefront of social media network login security and online data transfer between web browser and social media network server, and through experience and dedication. We continue to learn what works and what does not. This paper believes in social media with a biometric fingerprint to secure social media login and also online data transfer between web browser and social media network server using new encrypt and decrypt method develop using biometric fingerprint as a key. Our social media activity is not focused over roll social media network society, this develop only for just selected special persons like actors and actress, politicians. Also this biometric fingerprint key login system will help to identify our username & the password once we place our fingerprint in the device. Now this will help taking social media network security to the next level, this can help develop login security and secure data transfer to social media security to meet future needs.

V. CONCLUSION

Today in this World widely risen problem is hacking popular person's profiles or pages such as singers, actors, actress etc., social media network Profiles and creating fake profiles by editing their personal details such as images, videos etc. Such a kind of issues and damage the popular person's reputation. To avoid this problem this research has implemented and demonstrated the smart user friendly biometric finger print key by using encrypt-decrypt method to secure the special social media network profiles.

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Appendix A:

Biometric Social media secure User Authentication

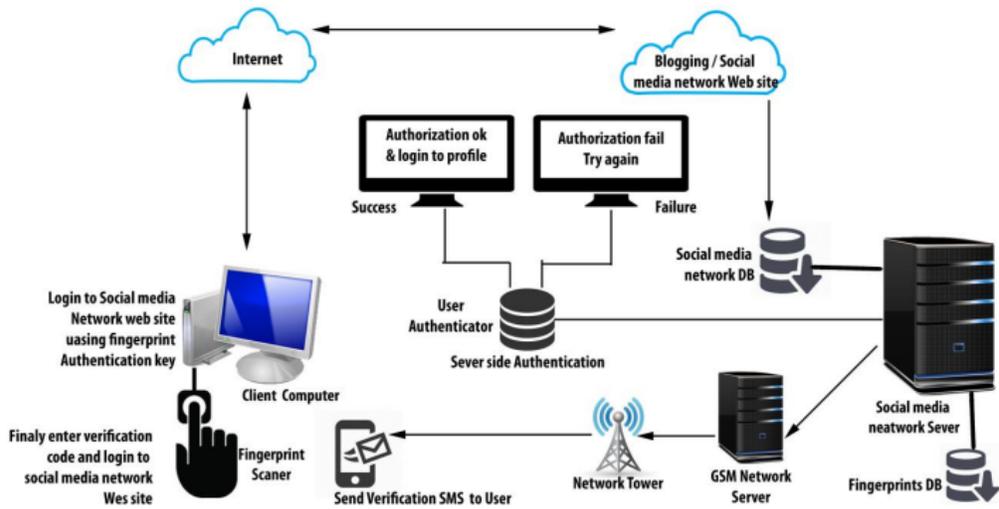


Figure 04: Bio-metric social media user authentication

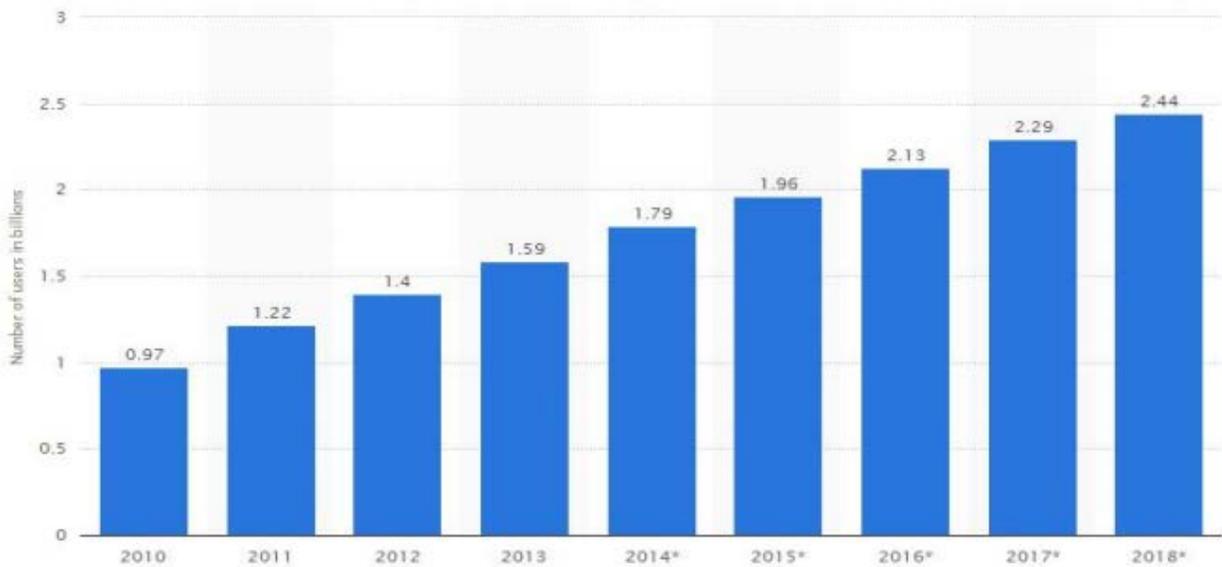


Figure 05: Number of worldwide social network users 2010-2018

(Source: <http://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/>)

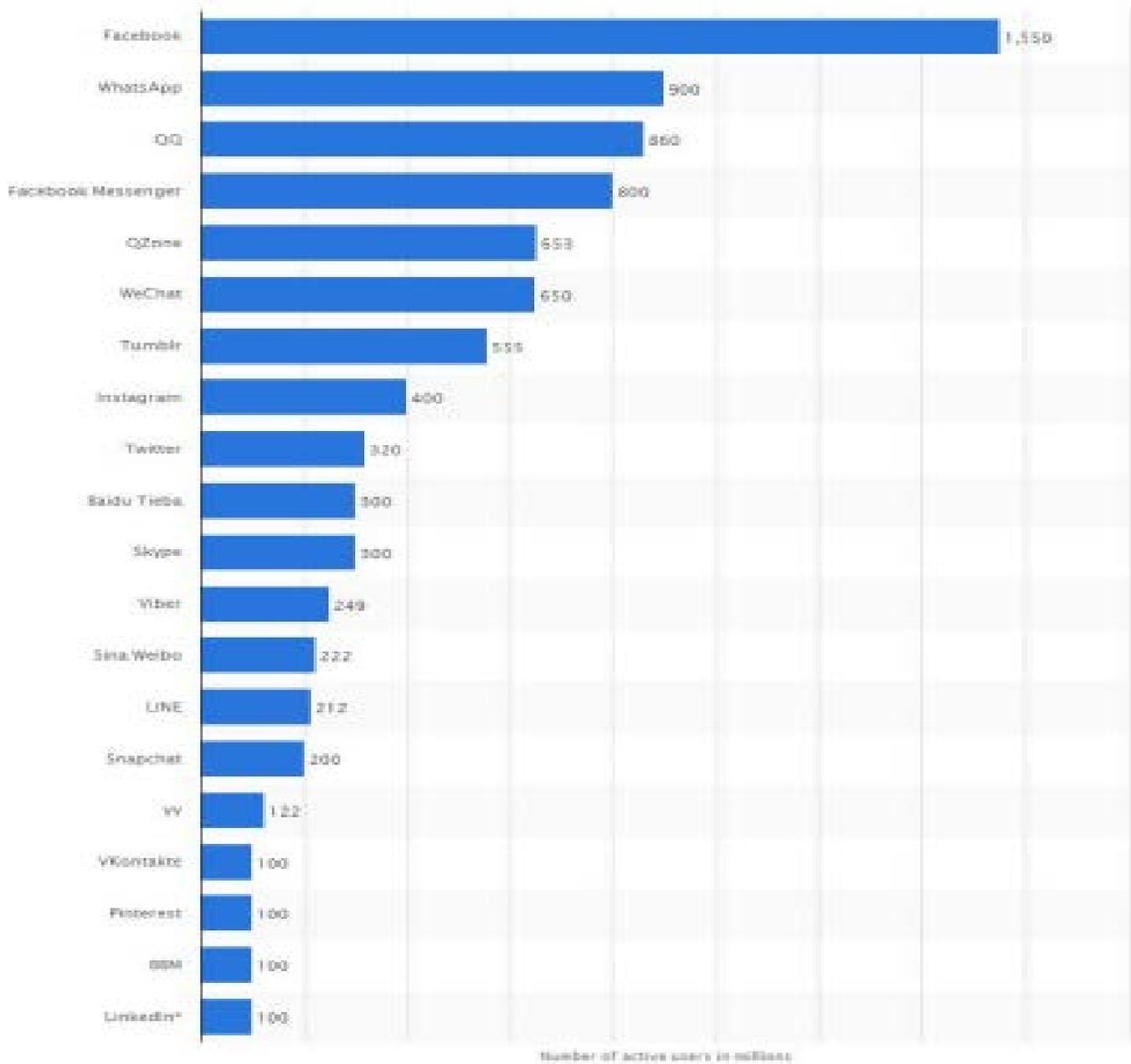


Figure 06: Leading global social networks 2016

(Source: <http://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/>)

Table 02: Literature Review comparison

Functions	Analyzing the social media content	Examine the hypotheses and proposition developed	Investigate key security vulnerabilities eroding	Security policies guidelines	Explores countermeasures Undertaken to stem ensuing risk	Produce controlling rumors propagation model	Biometrics Verification Techniques	Symmetric Key Encryption	Use of security protocols	Use algorithms to create social network security
Research										
The Human Factor in the Social Media Security – Combining Education and Technology to Reduce Social Engineering Risks and Damages. [1]	√	X	X	X	X	X	X	X	X	X
User awareness of social media security: The public sector framework. [2]	X	√	X	X	X	X	X	X	X	X
A New Social Media Security Model (SMSM). [3]	X	X	√	X	X	X	X	X	√	X
Social media security policies: guidelines for organizations. [4]	X	X	X	√	X	X	X	X	X	X
Countering Social Engineering through Social Media: An Enterprise Security Perspective. [5]	X	X	X	√	√	X	X	X	X	X
Security Model to Control on Social Media using Visualization and Forensic Approach. [6]	√	X	X	X	X	√	X	X	X	X
Security Management: Real versus Perceived Risk of Commercial Exploitation of Social Media Personal Data [7]	X	X	X	X	√	X	X	X	X	X
A robust finger print based two-server authentication and key exchange system[8]	X	X	X	X	X	X	√	X	X	X
Biometrics Verification Techniques Combing with Digital Signature for Multimodal Biometrics Payment System [9]	X	X	X	X	X	X	√	X	X	X
Symmetric Key Encryption Technique: A Cellular Automata based Approach. [10]	X	X	X	X	X	X	X	√	X	√
Social Networking Sites and Their Security Issues. [11]	X	X	X	X	X	X	X	X	√	X
Estimating the sentiment of social media content for security informatics applications [12]	X	X	X	X	X	X	X	X	X	√
Online Social Media Networking and Assessing Its Security Risks [13]	X	X	X	X	X	X	X	X	X	√
Security Policy and Social Media Use. [14]	X	X	X	√	X	X	X	X	X	X
Security and Privacy in an Online World [15]	X	X	X	√	X	X	X	X	X	X
Biometric Social Secure	√	X	X	√	√	√	√	√	√	√

Reasons for Interruption, Knowledge, Attitude and Practices of Patients Treated for Tuberculosis in Nandi County, Kenya

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Abstract-

Introduction

Kenya is ranked 15th on the list of 22 high-TB burden countries as determined by the World Health Organization, with a case notification rate of 440 cases per 100 000 persons. National TB treatment success rate is 85.5%, Nandi County lags behind at 77%. The country has adopted WHO recommended short course since 2007 and direct observation of treatment (DOT) since 1993 to mitigate against interruption of treatment. We conducted this study to determine the reasons for TB treatment interruption and the factors relating to patient attitude and practices that influence interruption in Nandi County.

Methods

We randomly selected and interviewed 252 subjects using a pretested semi structured questionnaire. Data on social and demographic factors, lifestyle, clinical information, family support, nutritional status, medication history was collected. Analysis was conducted with Epi- Info Version 7. Outcome variable was treatment interruption. Analysis was by logistic regression at 95% CI and P<0.05 significance level.

Results

We interviewed 252 respondents of whom 149 (59.1%) were males. The most common age 69 (27.4%) was 30-39 years. The most frequently given reason 50 (64.1%) for treatment interruption was "Too many pills". Not knowing the risk of interrupting TB treatment AOR 2.8 (1.43 – 5.62), ever ashamed because one had TB AOR 2.6 (1.33 – 4.93) and ever used herbal medicine during treatment AOR 2.1 (1.04 – 4.22) were independently associated with treatment interruption.

Conclusion

Treatment interruption was associated with lack of knowledge on the risk of interrupting TB treatment, ever ashamed because one had TB and ever used herbal medicine during treatment. These can be addressed by intensive pre-treatment counselling of patients and care givers that focuses on the importance of adhering to treatment and reduction of stigma as well as sensitizing herbalists and traditional medicine men on TB and engaging them in TB patient referral.

Index Terms- Interruption, Kenya, Knowledge, Practices, Tuberculosis, Nandi

I. INTRODUCTION

Tuberculosis is a chronic infectious disease caused by *Mycobacterium tuberculosis*, a fastidious intracellular alcohol-acid fast bacterium. Currently two billion people in the world live with TB (1). Nine million people a year contract the airborne bug while 1.4 million die from it (2). This translates to a person being infected with TB every second (3). It is the most common cause of mortality among HIV positive patients, with 25% of HIV/AIDS fatalities actually die from TB (4),(5). In 2012, 8.6 million people fell ill with TB and 1.3 million died from TB (5). Over 95% of TB deaths occur in low- and middle-income countries, and it is among the top three causes of death for women aged 15 to 44 (5). In 2012, an estimated 530 000 children became ill with TB and 74 000 HIV-negative children died of TB (6).

Africa holds approximately 30% of world TB burden (3) (7), with 363 persons per 100,000 population being newly infected with TB. TB mortality in Africa is at 74 deaths per 100,000 of population (8). Of the twenty-two countries designated as high TB burden by the World Health Organization, nine are in Africa (Democratic Republic of Congo, Ethiopia, Kenya, Mozambique, Nigeria, South Africa, Tanzania, Uganda, and Zimbabwe) (7).

In Kenya, national TB treatment success rate is 85.5% (9), Nandi county lags behind at 77% (10). The case detection rate is 85% (11). WHO estimate show that the country currently has 3024 multi drug resistant (MDR) TB patients; this has justified the need of a surveillance system to monitor MDR TB (1). In 2010, Nyanza, Rift valley province and Nairobi all contribute 56% of the total TB burden in Kenya (12).

Successful treatment of TB involves taking treatment for at least 6 months. Kenya has adopted WHO recommended short course since 2007. This involves 2 months of intensive phase and 4 months of continuation phase. Treatment interruption is one of the major obstacles to TB control. Poor adherence means patients remain infectious for longer and are more likely to relapse or succumb to TB. To improve compliance to treatment, emphasis is placed on direct observation of treatment (DOT) by a health worker or a close family member. Despite use of this WHO recommended strategy since 1993, Kenya is still among the 22 high TB burden countries in the world.

Treatment interruption appears to be significantly linked to transportation time, the sex of the patient, patient information and the quality of communication between patients and health workers (13). In a study in 2011 in Nigeria, Ibrahim *et al* showed that interruption of treatment was associated with living more than 5km from the patients' treatment Centre (13). This study established distance, cigarette smoking and lack of knowledge of treatment duration of TB as independent predictors. This is also supported by O'Boyle *et al* (14) in Malaysia and Kandel *et al* (15) in South Africa. They reported long distance, costs of travel and travel time as predictors of interruption of treatment among TB patients. Association of TB and smoking is also documented in a study in Hong Kong (16).

Patient knowledge, attitude and practice are also important determinants of interruption. The disappearance of symptoms is an indication of clinical improvement from diseases and a measure of the effectiveness of therapy. Because of the high quality drugs used in the DOTS strategy it is common place for TB symptoms to disappear within a few weeks of treatment (17). Patients with inadequate knowledge of the duration of the treatment may feel that they are cured and thus stop the treatment. Kaona *et al* (2004) in his study on assessment of factors contributing to TB treatment adherence in Ndola, Zambia found that feeling well was the major reason for patient stopping treatment.

The attitude of the health care worker towards the patient remains an important factor that can keep the patients on treatment or make them interrupt. Unfriendly attitude might make patients feel threatened and unwelcomed leading to treatment interruption. Negative effect of poor attitude of health care workers on TB treatment was reported by Jaiswal *et al*. They noted that patient who defaulted from treatment blamed the health workers for their unpleasant behavior and attitude towards them, whom they described as rude and unhelpful (18).

Cultural and religious practices also influence on patient health seeking behavior including adherence to TB treatment in many developing countries. Studies from Africa, Bangladesh and Syria showed that most married women must seek permission from their husband to attend health care services including TB treatment (19) (20). Despite this barrier women tend to adhere to anti-TB treatment leading to better treatment outcome than men indicating that there could be hidden factor among the female. However, Ibrahim *et al.*, (2014) found no significant relationship between age and gender and interruption of TB treatment.

Tuberculosis, like HIV/AIDS, is often associated with stigmatization and thus may create resistance among patients to treatment. A study carried out in Nigeria (21), raised an important point of delays in care seeking behavior due to stigma experienced by TB patients. Studies have shown that stigmatization creates self-denial among those with diseases like TB and Sexually Transmitted Infections (STIs); hence most of them fail to comply with the treatment (22).

Despite these multiplicity of determinants of treatment interruption, we believe the easily modifiable factors are the ones we should focus on. This is why we chose to determine the reasons for TB treatment interruption and the factors relating to patient attitude and practices that influence treatment interruption. Since Nandi County has a treatment success rate below the national target, we choose to conduct the study in this county in order to use the findings to improve the TB indicators.

II. METHODS

Study Site

The study was conducted in Nandi County, Kenya. The county borders Uasin-Gishu county, Kericho county, Vihiga county, Kisumu county and Kakamega county. It comprises 5 administrative sub-counties; Nandi central, Nandi North, Nandi South, Nandi East and Tinderet (23). It covers a total area of 2884.2 square kilometers with temperatures ranging from 120 to 260 c and rainfall between 1200mm and 2000mm per annum (24). The county population is 752965 people, with density of 261 persons/Km². The population is distributed across age groups as follows; 0-14 (45%), 15-64(51.4%) and above 65(3.6%). Of the population, 47.4% live below the poverty line. Agriculture is the main economic activity. Nandi County has a total of 138 health facilities, infant mortality ratio of 66 per 1000 newborns and an under five year's mortality rate of 111 per 1000 live births. The main diseases affecting residents in the county are Malaria, respiratory tract infections, diarrhea diseases and skin diseases.

Study design

We conducted a cross sectional study between April and June 2015.

Study population

Our study population was patients who had been initiated on treatment for TB between January 1st, 2013 and June 30th, 2014.

Sample size determination

We determined minimum subjects to be sampled with a consideration of 95 % confidence interval, a power of 80 %, Z_{α} of 1.96 and a precision of 0.05. In 2009, E.J Carter estimated prevalence of treatment interruption at 19%. Patients initiated on treatment in Nandi

county between 1st January, 2013 and 30th June 2014 was 843. Using Cochran formula (1977) we obtained a minimum sample of 236 which we adjusted to 260 after a 10% adjustment for non-response.

Sampling Procedure

We used simple random sampling. A list of all the patients initiated on treatment for TB from January 1st, 2013 to June 30th, 2014 in Nandi County was obtained from the county TB register. Using a computer, we generated 260 random numbers between 1 and 843. The patients alongside these numbers were selected and enrolled in the study for interview. Refusals were replaced with the next consecutive numbers up to three consecutive replacements for each refusal. Beyond three consecutive refusals for a single slot, then a new computer generated number was generated.

Eligibility and exclusion criteria

We included patients in the county TB register aged 14 years and above, who had been initiated on treatment between January 1st 2013 and 30th June 2014 and gave assent and consent. The participants in the study included new TB cases, re-treatments, smear positive, smear negative, defaulters and non-defaulters, those with known or unknown HIV status. At the time the study was conducted, the patients were expected to have completed treatment if they had observed their prescription without missing their pills.

We excluded those aged 13 years and below since they would not give objective opinions. Those patients who did not give consent were also excluded as were those transferred out of the county after initiation of treatment. We also excluded those who died after initiation of treatment to avoid interviewing proxies since this would introduce bias.

Case definitions

We used the following case definitions:

- A TB patient was defined as a person who had been diagnosed with TB based on clinical, microscopic or X-ray examination within Nandi County and initiated on treatment between January 1, 2013 and June 30, 2014.
- Treatment interruption was defined as failure to adhere to prescribed TB medication for a period of two consecutive weeks or more by persons who were already on TB treatment, regardless of their return to therapy or DOTs afterwards.

Data collection

The sampling frame was obtained from the county TB register for the year 2013/2014. This was downloaded into Microsoft Excel sheet. The randomly selected subjects were interviewed by directly administered pretested questionnaires by trained data collectors. The data collectors comprised mainly the TB ambassadors who are employed by partners implementing TB activities in the county. They are provided with motorbikes and bicycles which they use to do home visits. They used these means to trace subjects and conduct interviews at their homes. Those patients not found were still traced with their telephone contacts available in the TB registers. The questionnaires were both in English and the local languages (Nandi, Luhya and Luo).

This method enables the interviewers to clarify and elaborate the purpose of the research and effectively convince the respondents about the importance of the study. We collected information on socio-demographics, clinical presentation, side effects, reasons for interruption if any, patient knowledge on TB, attitudes and practices. We used the clinic registration number as the unique identifier during data collection. The questionnaires were reviewed daily and stored in lockable cabinets.

Data analysis

Data from questionnaires were then transferred into Epi- Info Version 7 (CDC, USA Atlanta) make view by two sets of data clerks to minimize errors. The resulting two sets of database were cleaned and validated using check codes and queries, comparisons being made between the sets. In case of discrepancies, reference was made to the original copy of questionnaire.

Univariate analysis using frequency and proportions. Variables that are continuous were summarized using means and standard deviation while discrete variables were summarized using median, range and inter-quartile ranges. Bivariate analysis was done to establish determinants of treatment interruption using prevalence odds ratio as a measure of association, where 95% confidence intervals were used with Yates corrected chi-square test of significance where factors with p-values of ≤ 0.05 were considered as significant. The outcome variable was treatment interruption. The independent contribution of each significant factor was assessed using unconditional logistic regression where factors with a p-value of ≤ 0.15 were considered. This also controlled for multiple confounding. Stepwise forward elimination method was used to select the variables in the final model.

Ethical approval and considerations

A consent form explaining the rationale and benefits of the study was used to seek informed consent from potential participants. Participants between 14 years and 17 years of age assented to the study and consent was obtained from their guardians. Participation in the study was voluntary and participants were at liberty to withdraw from the study at any stage without being penalized. No study participant was identified by names in any report from the study. The study had minimal risks. Permission was obtained from Nandi county health department. Clearance was also obtained from Jaramogi Odinga Oginga Teaching and referral hospital (JOOTRH) ethical review board prior to data collection (ERC.2/VOL.1 (103)).

III. RESULTS

Socio-demographic of TB patients

We interviewed 252 respondents of whom 149 (59.1%) were males. The most common age 69 (27.4%) was 30-39 years. The mean age was $40.0 \pm (15.3)$ years, median age was 37.5 years (IQR 28.5 – 48.0) while mode was 30.0 years. One hundred and forty-three

(56.8%) were married while the rest were in other types of relationships. Monogamy was reported among 206 (81.8%). Most 152 (60.3%) had attained primary education while the rest had post-primary education (Table 1).

Symptoms, Side effect profile and reasons for interruption of TB treatment

A total of 220 (87.3%) presented with cough at diagnosis while the rest did not. Night sweat 173 (68.7%) was the second commonest symptom followed by chest pains 172 (68.3%). The most frequently given reason 50 (64.1%) for treatment interruption was "Too many pills". Other reason given included side effects 41 (52.6%), Inadequate food 40 (51.3%) and Unpleasant medication 37 (47.4%). None of those interviewed indicated having interrupted treatment due to drug stock outs. The most 119 (47.2%) reported side effect was change in urine colour. One hundred and eighty-two (72.2%) reported that TB is caused by an infectious agent, the rest either gave a wrong response or did not know the cause of TB (Table 2).

Predictors of treatment interruption based on knowledge and practice of patient

Sharing utensils with others in the community during treatment OR 0.5 (0.31 – 0.86), Ever ashamed because of having TB 3.3 (1.87 – 5.74), Ever experiencing being neglected because of TB OR 1.9 (1.08 – 3.19), Use of herbs during treatment OR 2.6 (1.36 – 5.01), Lack of knowledge on TB transmission OR 2.0 (1.13 – 3.47) and Lack of knowledge on risk of treatment interruption OR 4.1 (2.15 – 7.76) were found to be statistically significant on bivariate analysis. Sex and age were not statistically significant (Table 3).

On Logistic regression, not knowing the risk of interrupting TB treatment AOR 2.8 (1.43 – 5.62), ever ashamed because one had TB AOR 2.6 (1.33 – 4.93) and ever used herbal medicine during treatment AOR 2.1 (1.04 – 4.22) were independently associated with treatment interruption (Table 4).

IV. DISCUSSION

We determined the reasons for TB treatment interruption and the factors relating to patient attitude and practices that influence treatment interruption in Nandi County. We found that one in every three patients initiated on treatment for TB would interrupt. The major factors associated with treatment interruption were not knowing the risk of interrupting TB treatment, ever ashamed because one had TB and ever used herbal medicine during treatment.

Similar findings on interruption rates are also documented by Ibrahim et al., 2011 (13) who found one in every five patient in Plateau state in Nigeria to have interrupted. In South Africa, Kandel et al., 2008 (15) found interruption rates of 47% in a similar setting. This high rate could be attributed to the increasing TB burden due to HIV/AIDS pandemic (25) (26) against a low health workforce. This has made pre-treatment counseling to be insufficient and of poor quality since health workers are overburdened. Insufficiency of counseling as a contributor to high interruption rates has also been advanced by Muture et al., (2011) (17). Inadequate pre-counseling would subsequently lead to poor patient practices that make patients vulnerable to failing to take their pills.

Use of herbal medicine during treatment increased the risk of interrupting treatment twofold. Similar findings have been documented by Muture et al., 2011 (17) who found that use of herbal medication was associated with a six fold increase in risk of interruption (AOR 5.70). Boateng et al., 2010 also found that defaulters were more likely to receive other health care (Spiritualists and traditional healers) more than non-defaulters (OR 2.96) in a study in Ghana. Like most rural settings in Africa, traditional medicine men and herbalists exist in Nandi County. They are in constant competition with conventional medical practitioners, in some areas, especially so where the level of education is low. In such areas, it is easy for the herbalist to convince patients since they believe in witchcraft. Use of herbal medicine as an alternative showed lack of confidence in the use of prescribed anti-TB drugs as well as inadequate information. This meant they could easily abandon treatment in favour of the herbal medicine. Since the efficacy of the herbal medication is not assured, this leads to continued infectivity and thus increased TB burden. Use of herbal medicines is also associated with liver and kidney damage. Since anti-TB drugs are also associated with liver damage, their concurrent use with herbal medicines would make increase the damage, leading to exacerbation of the unpleasant side effect. Side effects discourage patients from taking their pills.

Apart from use of herbal medication, stigma was found to significantly influence interruption. Being ashamed because one had TB was associated with three times risk of interrupting treatment. Similar findings were reported in a study in Madagascar (27) about patients who "felt that TB was a shameful disease" who had three times the risk of defaulting treatment compared to those who did not (OR 2.97). Stigma associated with TB and HIV/AIDS acts as a barrier to adherence since patients are not free to disclose their condition. They hide from family members and thus end up not getting the desired support. This ultimately ends up in non-adherence. A study in South Africa assessing effect of attitude and knowledge on TB treatment initiation and adherence concluded that stigma influenced TB patients' decisions in health seeking behavior and adherence (28).

We also found that knowledge on TB was an important predictor of interruption. Patients who did not have knowledge on the dangers of interruption were three times (AOR 2.8) more likely to interrupt as compared to those who did. Several studies have documented the role of knowledge on TB in determining interruption (29) (30) (31). Boateng et al., (2010) established that knowledge on how people get TB, whether TB is curable and knowledge on symptoms of TB were important determinants of TB interruption. The drugs used in the first two months of treatment are highly effective and thus kill most of the bacteria on initiation of treatment (32) (33) (34). The reduction of the bacteria load leads to resolution of symptoms making the patients feel better. This explains why most patients would default early in the course of therapy. This is due to inadequate knowledge on TB leading to interruption of treatment. Kaona et al in their study on assessment of factors contributing to TB treatment adherence in Ndola, Zambia showed that feeling well was the major reason for patient stopping treatment (35). Their finding is similar with our results which revealed that lack of knowledge of duration of treatment was significantly associated with interruption of treatment.

Our study findings should be interpreted in consideration of some limitations. The study excluded patients treated for TB aged 13 years and below. This accounts for 11% of all TB patients (36). This may affect generalization of the study on the entire population. The study was also prone to interviewer bias since the TB ambassadors (interviewers) are also involved in patient care. We reduced this bias by intensive training of data collectors.

V. CONCLUSION

This study has shown that treatment interruption in Nandi County is high. This was attributed to poor pre-treatment counselling leading to inadequate knowledge of TB and poor patient practices. It was also deduced that the most important factors associated with treatment interruption were lack of knowledge on the risk of interrupting TB treatment, ever ashamed because one had TB and ever used herbal medicine during treatment. We suggest that these factors be addressed to reduce treatment interruption by intensive pre-treatment counselling of patients and care givers that focuses on the importance of adhering to treatment and reduction of stigma. Herbalists and traditional medicine men should be sensitized on TB and engaged in TB patient referral.

APPENDIX

Appendices, if needed, appear before the acknowledgment.

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COMPETING INTEREST

We wish to state that there was no conflict of interest in this study.

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Table 1; Socio-demographics of patients on treatment for TB, Nandi County, 2014

Description	Total (%)	Interrupters (%)	Non-interrupters (%)
Total subjects	252(100)	78(31.0)	174(69.0)
Sex			
Female	103(40.9)	33(42.3)	70(40.2)
Male	149(59.1)	45(57.7)	104(59.8)
Age			
14-19	10(4.0)	1(1.3)	9(5.2)
20-29	59(23.4)	13(16.7)	46(26.4)
30-39	69(27.4)	26(33.3)	43(24.7)
40-49	55(21.8)	18(23.1)	37(21.4)
50-59	29(11.5)	6(7.7)	23(13.2)
Over 60	30(11.9)	14(18.0)	16(9.2)
Marital status			
Cohabiting	3(1.2)	1(1.3)	2(1.2)
Married	143(56.8)	46(59.0)	97(55.8)
Other	3(1.2)	1(1.3)	2(1.2)
Single	86(34.1)	23(29.5)	63(36.2)
Widow/ Widower	17(6.7)	7(9.0)	10(5.8)
Type of family			
Monogamous	206(81.8)	61(78.2)	145(83.3)
Polygamous	46(18.2)	17(21.8)	29(16.7)
Education level			
Primary and below	152(60.3)	53(68.0)	99(56.9)
Secondary	72(28.6)	19(24.4)	53(30.5)
College/Tertiary	23(9.1)	6(7.7)	17(9.8)
University	5(2.0)	00	5(2.9)
Religion			
Atheist	7(2.8)	2(2.6)	5(2.9)
Catholic	113(44.8)	39(50.0)	74(42.5)
Muslim	1(0.4)	0	1(0.6)
Protestant	131(52.0)	37(47.4)	94(54.0)
Occupation			
Casual laborer	53(21.0)	19(24.36)	34(19.54)
Employed(Formal)	27(10.7)	8(10.26)	19(10.92)
Farmer	118(46.8)	34(43.59)	84(48.28)
Other	11(4.4)	2(2.56)	9(5.17)
Small scale business	43(17.1)	15(19.23)	28(16.09)
Nuclear family type			
Dual parent	148(58.7)	33(42.3)	115(66.1)
Single parent	104(41.3)	45(57.7)	59(33.9)

Table 2; Symptoms at diagnosis, Side effect profile and reasons for interruption among patients on Treatment for TB, Nandi County, 2014

Variable	Total (%)	Interrupters (%)	Non-interrupters (%)
Symptoms at diagnosis			
Cough	220(87.3)	69(88.5)	151(86.8)
Chest pains	172(68.3)	55(70.5)	117(67.2)
Hemoptysis	49(19.4)	15(19.2)	34(19.5)
Weight loss	156(61.9)	61(60.4)	95(62.9)
Loss of appetite	85(33.7)	23(29.5)	62(35.6)
Night sweats	173(68.7)	50(64.1)	123(70.7)
Other symptoms	7(2.9)	1(1.3)	6(3.5)
Reasons for interruption			
Too ill		10(12.82)	
Stock-outs		0	
Migration to new home		2(2.6)	
Afraid of Injections		2(2.6)	
Inadequate food		40(51.3)	
Medication tasted unpleasantly		37(47.4)	
Drugs not working		12(15.4)	
Too many Pills		50(64.1)	
Relief from symptoms		13(16.7)	
Stigma		12(15.4)	
Side effects		41(52.6)	
Side effects of anti-TBs			
Altered vision	26(10.3)	10(12.8)	16(9.2)
Headaches	46(18.3)	14(18.0)	32(18.4)
Vomiting	74(29.4)	30(38.5)	44(25.3)
Itching	57(22.6)	21(26.9)	36(20.7)
Jaundice	25(9.9)	11(14.1)	14(8.1)
Abdominal pains	54(21.4)	22(28.2)	32(18.4)
Change in urine colour	119(47.2)	45(57.7)	74(42.5)
Causes of TB			
Act of God	11(4.4)	3(3.9)	8(4.6)
Don't Know	29(11.5)	12(15.4)	17(9.8)
Infectious agent	182(72.2)	49(62.8)	133(76.4)
Other causes	11(4.4)	8(10.3)	3(1.7)
Smoking	15(6.0)	5(6.4)	10(5.8)
Witchcraft	4(1.6)	1(1.3)	3(1.7)

Table 3; Predictors of interruption of Treatment for TB, Nandi County, 2014

Variable	Interrupters (%)	Non-interrupters (%)	OR CI (P Value)
Sex			
Female	33(42.31)	70(40.23)	1.1(0.63-1.87)
Male	45(57.69)	104(59.77)	P=0.86
Age			
Below 40 years	40(41.28)	98(56.32)	0.82(0.48-1.40)
Above 40 years	38(48.72)	76(43.68)	P=0.54
Card available during interview			
Yes	45(57.69)	113(64.94)	0.74(0.43-1.27)
No	33(42.31)	61(35.06)	P=0.34
Patients shared utensils with others during treatment.			
Yes	43(42.6)	89(58.9)	0.52(0.31-0.86)
No	58(57.4)	62(41.1)	P=0.02
Ever ashamed because of having TB			
Yes	52(66.7)	66(37.9)	3.27(1.87-5.74)
No	26(33.3)	108(62.1)	P<0.001
Ever experienced being neglected because of TB			
Yes	46(58.9)	76(43.7)	1.85(1.08-3.19)
No	32(41.1)	98(56.3)	P=0.04
Used herbs during treatment			
Yes	23(29.5)	24(13.8)	2.61(1.36-5.01)
No	55(70.5)	150(86.2)	P=0.01
Know transmission of TB			
No	33(42.3)	47(27.0)	1.98(1.13-3.47)
Yes	45(57.7)	127(73.0)	0.02
Lack knowledge on risk of interruption.			
Yes	29(37.2)	21(12.1)	4.09(2.15-7.76)
No	49(62.8)	152(87.9)	P<0.001
Patients Know the cause of TB			
No	16(24.6)	28(17.4)	1.55(0.77-3.11)
Yes	49(75.4)	133(82.6)	P= 0.29

Table 4; Multi-Variate analysis of factor associated with TB Treatment interruption, Nandi County 2013-2014.

Term	Odds Ratio	95% C.I	P-Value
Having knowledge on TB transmission	0.6	0.35-1.20	0.170
Not knowing risks of interrupting treatment	2.8	1.43-5.62	0.003
Did share utensils with others during treatment	0.9	0.47-1.55	0.598
Ever ashamed because one had TB	2.6	1.33-4.93	0.005
Ever neglected because one had TB.	1.1	0.58-2.12	0.760
Ever used herbal medicine during treatment.	2.1	1.04-4.22	0.040

Consider the Cell; Forget Not the Host Component, While Promoting Health Care, to Safeguard Life

Sample Project proposal for the globe.

3.5 years program, by tripod scheme

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MBBS MD [General Medicine]

I. INTRODUCTION

Past few decades have witnessed, increased incidence of diseases for e.g. Diabetes mellitus, systemic hypertension, acute coronary syndrome, as part of metabolic syndrome; i.e. “cell metabolism is deranged due to unknown factors”. This project is planned to prevent, revert the elucidated “unknown factors” as highlighted in the published e book-“Destroyer of life on earth...” [reference: <http://www.ijsrp.org/monograph/destroyer-of-Life-on-Earth-Ecology-Economy-read.html>] by *grass root level infrastructure*.

Purpose

Cell metabolism is deranged, hence the factors involved in normal cell metabolism, which have defaulted due to acquired pathology need to be reconciled with, to prevent increasing incidence of whole host of “degenerative diseases, auto immune diseases, neoplastic diseases, infectious diseases” in the era of unaware, wantonly embraced contraception, abortion, without therapeutic indication, not implemented as therapeutic protocol but as guillotine protocol?!

Literature Review

Germ cells union resulting in one cell embryo goes through a process of differentiation, controlled multiplication, to become 3 kg baby under the surveillance of 4200pg estrogen, [secreted by fetal placenta, from cholesterol, synthesized from essential fatty acids consumed by the mother in her diet] otherwise fetus will undergo spontaneous abortion by 3rd month-called as placental switch over insufficiency.

Every cell within 48 hours, goes through differentiation, controlled multiplication, degeneration, programmed cell death (apoptosis) and new cell formation, which is called cell metabolism, cell cycle, cells life, under the surveillance of androgen, estrogen, derived from chole-sterol, hence they are called steroid hormones; *so it means every 48 hours new kidney, new bone, new brain tissue...[every cell, tissue made a new every 48 hours] is rejuvenated by cell metabolism, cell's life cycle which is God ordained in the physiology.*

Endogenous estrogen, androgen surveillance
Cell cycle/metabolism

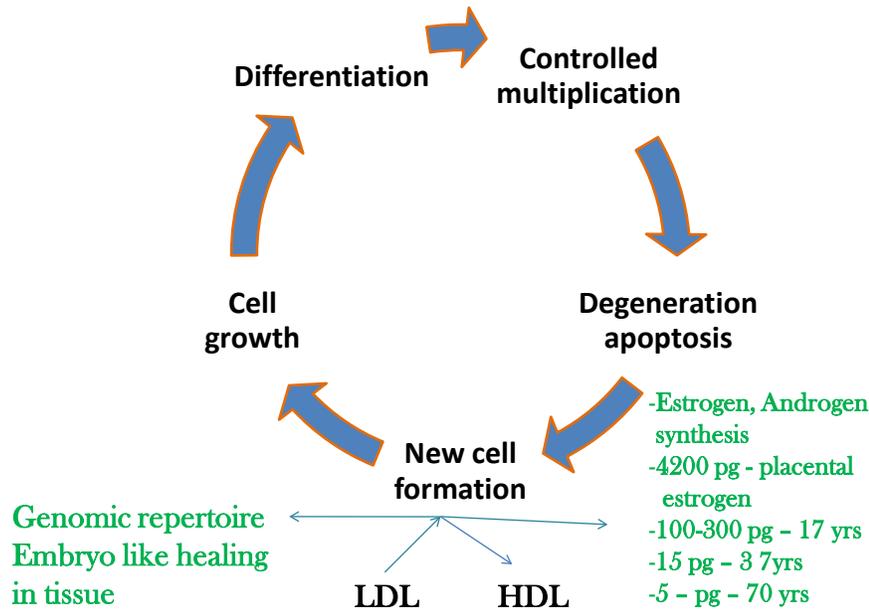


Figure - 1

Reduced Endogenous estrogen, androgen
Contraception, Abortion - Deranged Cell cycle/metabolism

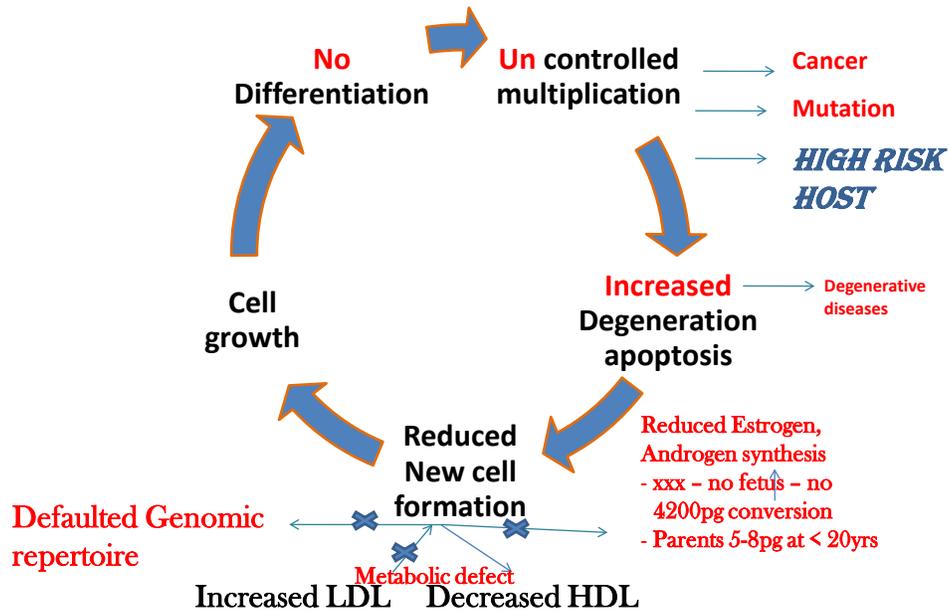


Figure - 2

When the androgen estrogen cannot be synthesized due to *essential fatty acids deprived diet*, decreased synthesis of cholesterol in the body, thereby decreased, cholesterol derived steroid hormone synthesis, the cells apoptosis [God ordained programmed cell death, to prevent cells no differentiation, followed by uncontrolled multiplication leading to neoplasm formation] will continue but new cell formation will lag behind, proportionate to the reduced cholesterol, androgen, estrogen

synthesis, cell membrane synthesis, *resulting in 60% increase in degenerative diseases of every cell, tissue, for e.g. behavioral disorders, divorces, diabetes mellitus, systemic hypertension, acute coronary syndrome neoplasm,...*

Every cell membrane, functioning remarkably, is synthesized from cholesterol and cell cycle governing androgen, estrogen is also synthesized from cholesterol; so cholesterol is basic cell's life moiety.

Cholesterol is synthesized by the body from consumed essential fatty acids and is transported by Low density lipo proteins-LDL, Intermediate density lipo proteins-IDL; LDL donates cholesteryl esters for new cell membrane synthesis, steroid hormone synthesis, bile acid synthesis and becomes HDL-high density lipo protein; when the cell membrane dies, cholesterol gets adsorbed on to HDL by LCAT-lecithin cholesteryl acyl transferase and becomes LDL again; this is a constant ongoing normal metabolic process

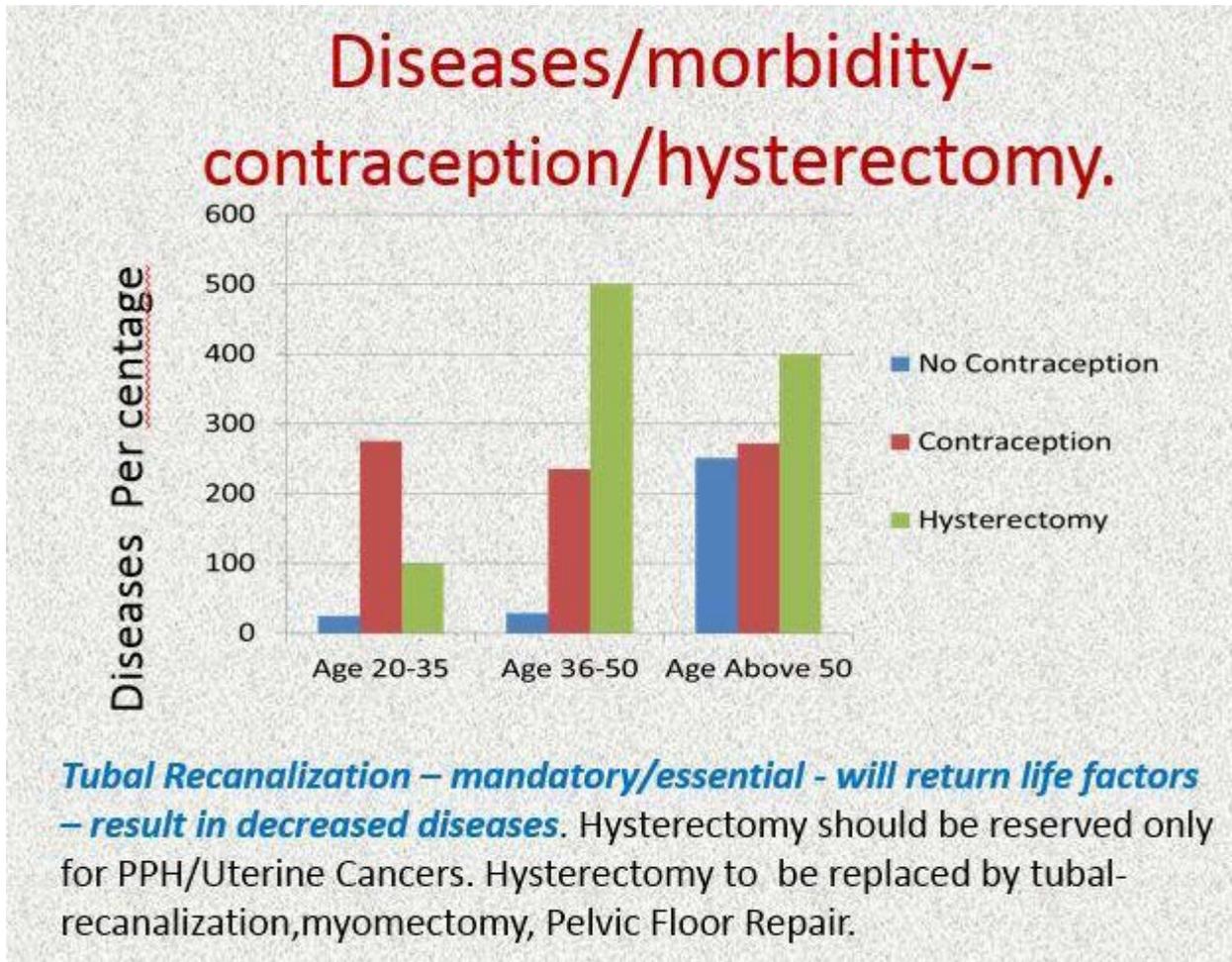
Essential fatty acids comprise mainly virgin oil with its fat content, since oil is derived from nuts and seeds containing seedling and life factors to support the growth of the baby plant; hence oil fat contains life, growth associated fatty acids; nuts and seeds containing preparations like vadai, Bengal gram, green gram gravies, ground nut, cashew nut cookies....; one egg per day fried preparation which has life factors to support the growth of the chicken.

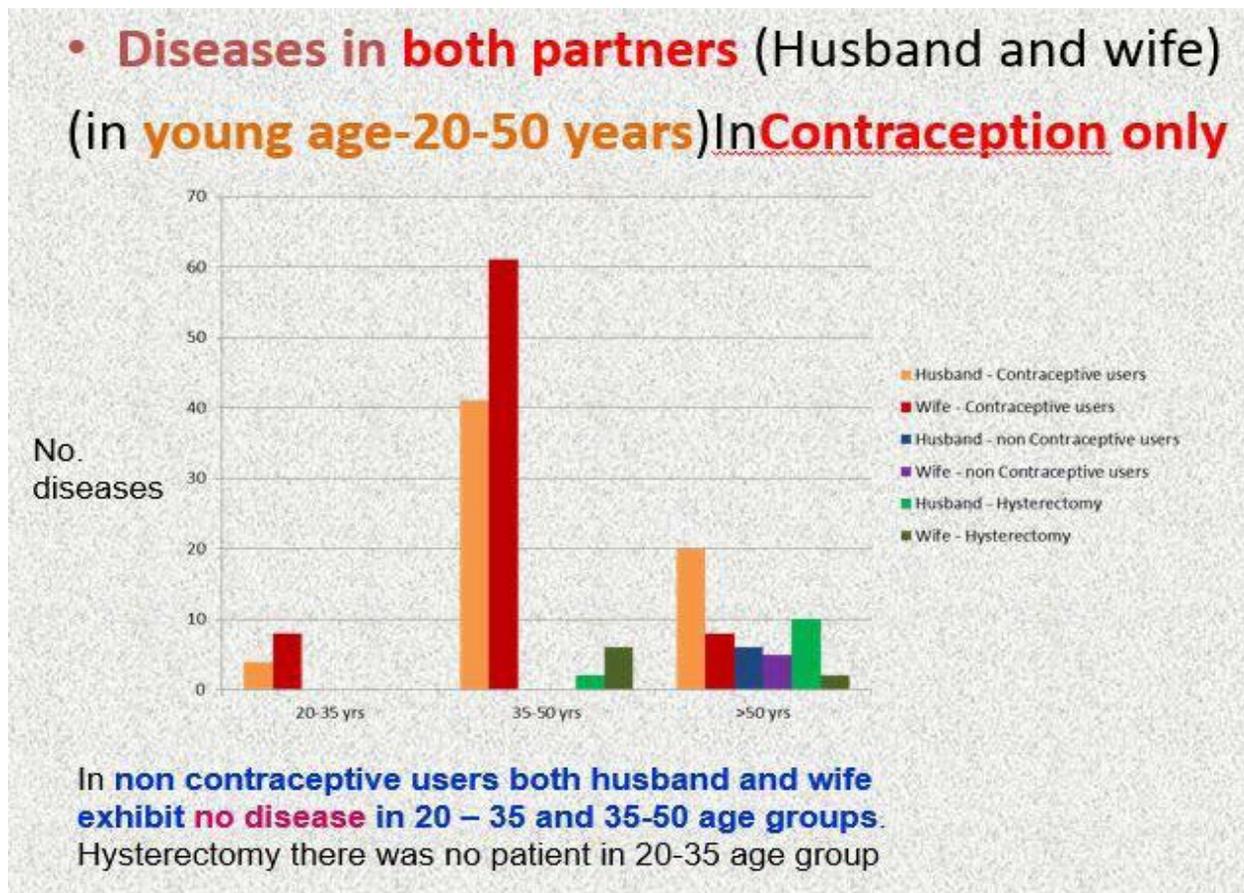
Triglycerides derived from animal fat is harmful, leading to - **6 fold increase in coronary artery disease, stroke;** hence meat without fat, blood needs to be consumed; **whereas water living without scales, gills e.g. crabs, sword fish, jelly fish should not to be consumed,** because they have toxin [akin to snakes, scorpions] in the flesh, which **by molecular mimicry mediated auto immunity, results in destruction of nephrons, neurons, blood vessels, blood cells i.e. colitis, nephritis, cerebro vasculitis-micro angiopathic, macro arteritis, venulitis, angioneurotic edema, Crohns disease, ulcerative colitis, liver, pancreatic, gastro intestinal tract malignancies, [as its ingested-entry by mouth], pancytopenia, auto immune thrombocytopenia, hemolysis, thyroiditis, transverse myelitis, acute poly radiculopathy.....**similarly some legumes meant to be consumed by horses, mushrooms meant for cattle, yams with

urticarial instigation, can produce, similar auto immune diseases by consumption, contact.

Cholesterol is the basic moiety of cell and cell cycle governing steroid hormone; **hence virgin oil, nuts and seeds preparations result in robust health of cells, life, metabolism;** whereas **obnoxious triglycerides consumption is detrimental to the tissue leading to molecular mimicry mediated auto immune destruction;** auto immune diseases naturally are combated by steroids prepared from cholesterol, but present era of sun flower[has 6 fold decreased HDL, LDL than ground nut seed], refined oil, fatty acids deprived diet, natural synthesis of cholesterol from fatty acids and thereby steroid hormone synthesis being at stake, the obnoxious triglycerides ingestion associated auto immune diseases are seen in a pronounced manner.

Hence essential fatty acids deprived diet i.e. refined oil, sunflower oil [with 6 times less HDL, LDL than ground nut seed] can lead to **60% increase in degenerative diseases** like diabetes mellitus, systemic hypertension, behavioral disorders, dementia, psychosis, increased divorces [brain tissue degenerates including frontal lobe,(the difference between animals and humans) so animal like behavior i.e. I'll damage someone but not realize its wrong, just as lion will kill but called as King of Forest neoplasm like fibro adenoma breast, myoma uterus, ovarian cysts, a small percentage of uterine cancers, poly cystic ovarian disease...[because the cell goes for uncontrolled multiplication, preceded by no differentiation, to form tumors due to decreased surveillance of androgen, estrogen; when the estrogen is reduced by fatty acids deprived diet, reduced mid cycle estrogen surge-leading to reduced ovulation, poly cystic ovarian disease]





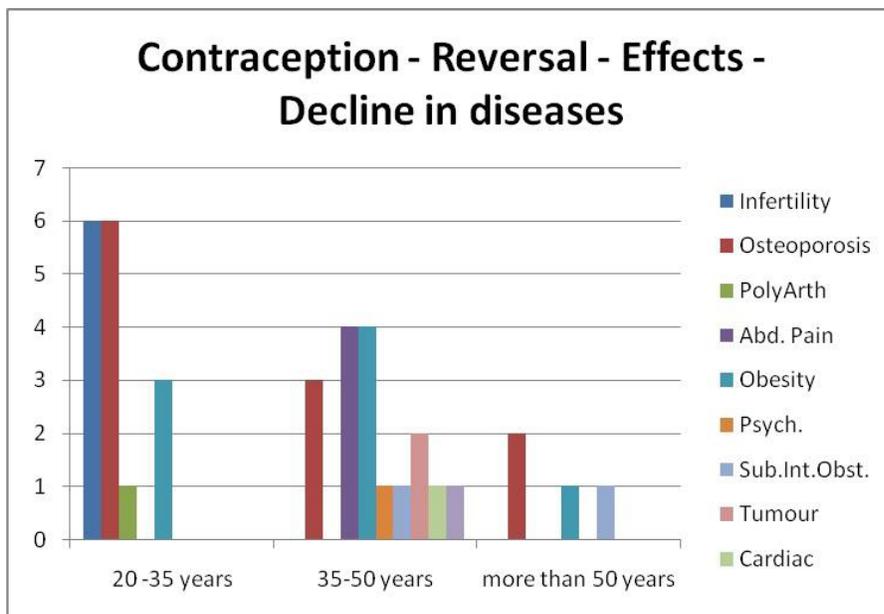
Contraception, abortion on the other hand- {an acquired measure aimed to control the birth of people [population], [to achieve eradication of human race which it has achieved successfully]} which got implemented without therapeutic indication, therapeutic protocol, results in **275% increase in diseases, 5 fold increase in mortality among 20-50 years age group, secondary to contraception as follows:**

- smashed fragmentation of 20 million germ cells, on the barricades of contraception within fraction of seconds [which otherwise would have liquefied in minutes normally] resulting in ring chromosomes, a centric fragments, chromatid breaks, with associated reduced androgen, estrogen to 1.4ng, 5pg respectively resulting in **degenerative diseases**
- fragmented chromatids are recognized as foreign and **autoimmunity** develops to the loci of chromosomes present in the fragmented chromatids resulting in multisystem destruction
- agonizingly reduced estrogen, androgen surveillance results in cells transforming unchecked **to neoplasm** by

uncontrolled multiplication, preceded by no differentiation

- cells genomic repertoire[embryo like healing capacity]reflecting cells robust healthy metabolism is reduced in the cells, secondary to reduced estrogen androgen status, associated with acquired contraception, abortion, with **resultant increase in infectious diseases.[withered tree concept host]** and **alarmingly high emergence, virulence, drug resistance of microbes favored by aborted environmental blood pollution, contraceptive menstrual blood pollution.**

Contraception reversal including tubal recanalization, results in halt of germ cells destruction, restoring androgen, estrogen back to 79.9% of age normal, leading to restoration of normal cell cycle, metabolism, decline in diseases in both parents



Hysterectomy, orchidectomy are associated *with 500% increase in degenerative diseases and neoplastic diseases, since the hormones drop to < 0.4pg*, cell metabolism, cell cycle, cell's genomic repertoire gets deranged, default, because cell metabolism, cycle, genomic repertoire are dependent upon estrogen, androgen surveillance, whose synthesis, has drastically reduced, secondary to hysterectomy, orchidectomy.

Hence hysterectomy, be reserved only for cancer uteri, post partum hemorrhage. Myoma come secondary to decreased estrogen surveillance either secondary to essential fatty acids deprived diet, resulting in decreased synthesis of endogenous estrogen, or secondary to contraception, abortion, the endogenous estrogen is agonizingly reduced, <5pg/ml, being associated with smashed fragmentation of germ cells; myoma will never become malignant.

Hence Myomectomy coupled with counseling for essential fatty acids rich diet to prevent recurrence, can be planned instead of hysterectomy, as in nulliparous uterus, by increased synthesis of estrogen, by enhancing cholesterol synthesis from essential fatty acids containing diet.

By reversal of contraception, [tubal recanalization] coupled with Myomectomy, menorrhagia can be treated instead of hysterectomy i.e. the reduced estrogen status, rejuvenates secondary to halt of germ cells destruction by reversing contraception, and the estrogen, synthesis increases to 80% of age normal [withered tree blooms again] and further recurrence of myoma, or occurrence of cancer uteri are prevented, by restoring cell cycle governing estrogen, androgen.

Similarly *tubal recanalization, coupled with pelvic floor repair/ sling procedure as in nulliparous prolapse, can replace vaginal hysterectomy*, with restoration of estrogen, cell's genomic repertoire, the pelvic floor muscles are restored with full fiber tensile strength

Reversal of contraception, halt of abortions will restore deranged cell metabolism, by restoration of hormones, halt of germ cells destruction and not Yoga- which will only further increase wear and tear and not the answer for the increase in metabolic syndrome similarly orchidectomy be reserved for cancer testes only; its physiological decrease, in androgen leads to in equal peri-urethral growth of prostate growth in a non contracepted person leading to benign prostate pathology; in acquired contraception, abortion, endogenous androgen gets agonizingly reduced to <1.3ng with resultant 275% increased diseases, including Benign prostate pathology, with increased malignant transformation and *pathologically acquired orchidectomy to treat prostate neoplasm, in contracepted person, will result in 500% increase in degenerative diseases, neoplastic diseases.*

Two subsets of people are obvious-the one group without contraception, abortion, with intact, normally functioning cell metabolism, cell cycle, genomic repertoire [embryo like healing capacity] with normal endogenous estrogen, androgen.

The other subset of people with acquired contraception, abortion, disrupting normal cell metabolism, cell cycle, genomic repertoire, secondary to acquired germ cell destruction, agonizingly reduced endogenous estrogen, androgen-akin to withered tree host component experiencing 275% increased degenerative, neoplastic, auto immune, infectious diseases.

Tight pelvic attires lead to thermogenic destruction of germ cells with loss of viability, further the germ cells in an attempt to withstand the heat go through metaplasia, dysplasia, anaplasia, and malignancies.

Maximum cells healing capacity is 1mm/ day; hence starting from the day of **menstruation**, though the flow by endometrial shedding will be for 3 days it will take another 3 days for the raw endometrial surface to heal, demanding **7 days**

abstinence, otherwise the germ cells being exposed to raw endometrial surface can lead on to autoimmune diseases, during contact the patchy endometrial tissue can be sucked in producing endometriosis, adenomyosis. Similarly **girl child [xx] birth**, with bigger placenta, increases the life of parents by >20 years by the placental estrogen produced->4200pg/ml, [circulating in mother's blood, goodness passed on to the father by endorphins, the parental kidneys enlarge during pregnancy, bones become strengthened during pregnancy, by circulating endogenous placental estrogen levels, protects from increased thrombogenicity i.e. myocardial infarction, stroke, deep venous thrombosis, pulmonary embolism, increases robust health in cell cycle, metabolism...]. So when the placenta detaches during delivery, the flow/lochia will be for ~45 days another 45 days for the detached raw placental surface to heal, hence **abstinence needs to be observed for 90 days**; whereas **male child [x y] birth** is associated with smaller placenta, 22 days lochia will be there, another 22 days will take for the raw detached placental surface to heal, hence **abstinence is required for 45 days** only, otherwise autoimmune diseases, adenomyosis uteri can occur.

In **couples observing contraception**, the 20 million germ cells are smashed to fragments, and if abstinence is not observed, the **millions of fragmented germ cells will be exposed to the raw endometrial surface**, enormous injured cells getting exposed to the raw endometrial surface can result in **disseminated intravascular coagulation and sudden demise** is also possible.

Contraception abortion has resulted in disruption of self sustaining ecology, self sustaining economy, as follows:

In 1994 Dr. Susan Joplin of Brunel University in an attempt to explain the reason for disappearance of fish, wanting to identify the pollutant let out in the rivers, with a postulate of industrial waste, planned a study of 4 major rivers of Australia, U.K., USA; to their surprise the **pollutant identified by the study was not industrial waste, but estrogen**.

Similarly in 1997 Professor Paul Devroy of Germany, in an attempt to find out the pollutant of the air, which could explain the increase in infertility, again postulating it has to be industrial emissions, detected to their surprise, it was not industrial emissions, but **particles like estrogen are in the rise in the air**; but how and why estrogen are on the rise was not clear; in the following calculation an attempt is made to explain the same

When a mother is blessed with for e.g.10 children, she will not menstruate for 200 months minimum; now with one child policy, small family norms, a woman of reproductive age group is made to menstruate for 20 years more ~1989 million women of reproductive age group are made to menstruate each for 200 months more.

So **1989 million women×200 months× 300pg/ml menstrual blood×350ml of blood loss/ menstrual cycle= estrogen pollutant to the environment**

863 million reported surgical abortions from 1922-2010, 37.5 million reported surgical abortions/year, 498 abortions /minute on the globe; hence

498 abortions/minute×60 minutes×24hours×365days×80years×350ml.blood /abortion×4200pg/ml of estrogen in the aborted blood=estrogen pollutant to the air, water

Aborted blood polluted, contraceptive menstrual blood polluted air inhalation, water ingestion, results in

a) Increase in chronic obstructive lung diseases, lung cancers in never smokers;

b) Emergence, virulence, drug resistance of microbes e.g. SARS virus, H1N1 virus, HIV, since blood is a good media for growth of microbes

c) in this God ordained Universe, live humans with their mandatory emissions, being food for plants, replace molecule by molecule oxygen, hence any number of lives can this earth support, without oxygen getting depleted; acquired contraception, abortion, **aborted blood, contraceptive menstrual blood pollution, depleted oxygen cannot be replaced by plants**, unlike live humans with their emissions, because **Author of Life, Universe's calculations exist to support Life on earth and not destruction of lives** sequel.

d)hence ozone-oxygen envelope is depleted by aborted blood pollution, contraceptive menstrual blood pollution, leading to global warming, hot air currents setting up resulting in **increasing tornadoes, cyclones, earthquakes, tsunamis, disappearance of islands[earth quakes coupled with tsunami,]. When the blood pollution depletes oxygen of waters the fish are washed ashore dead**; by global warming, irreparable repair of DNA occurs in all lives, **disappearance of birds** follow.

The blood fond **animals like tigers are visiting foot hill townships** more frequently along the river coasts, attracted by the **aborted blood pollution of the waters**.

Elephants, bears due to blood pollution depleting oxygen of the air, pronounced **hypoxia of altitudes**, for want of oxygen, **reach the plains**, wherein from the houses, **emanating obnoxious odors of aborted blood**, contraceptive menstrual blood makes them irritated, **crazy and they drive humans**, break their homes.

e) live humans annual excreta of 5 people can drive a bus for 350 KM., can supply electricity to township; its bio-methane, eco friendly, it's not toxic to the environment; its reacted at different stratospheres, becomes manure for plants.

Whereas **innumerable dead fetuses putrefaction**, result in **toxic, inflammable, explosive gases** emanation, for e.g. ammonia, hydrogen disulphide, which collect in the coastal, river beds, septic tanks, soil, resulting in **rupture, explosion of earth** as it happened during tsunami of Japan; these **gases** add to convection currents to increase **tornadoes, hail storms**.

Due to these toxic fumes recently septic tank cleaners, well diggers, miners are facing lethal effects. These **toxic fumes mixing in waters will result in more and more of water living, washed ashore dead**.

When lightning passes through these toxic fumes, it leads on to **spontaneous combustion of skies**, lighting up **spontaneous forest fire, oil tanker vessel fire**.

The soil **with putrefaction of innumerable dead fetuses leads to production of bees, wasps, and stinging insects**.

Self sustaining ecology meant to support and supported by life is disrupted by abortion, contraception, wherein life goes down the drain

f)Everything on earth is designed to meet the need of a human being, baby, child; without live humans, all the technologies, developments, have become futile, without utilizers, customers, buyers, passengers- recession; we invest on

people to see returns, but the people we have eradicated, hence invested money returns we are not able to see and every business –big or small is in ruins, **hard hit recession, achieved by acquired contraception, abortion, disrupting the existing self sustaining economy designed by the Author of the Universe to meet the needs of people.**

Baby boom is the answer to recession, climate change, to prevent young parents from embracing early death, disappearance of islands, fish, birds, tsunamis, frequent visit of tigers, elephants to human habitat

Plan of action:

1] Forming the **infra structure** comprising of Grass root level workers

2] Providing **information** of the

- a) **increasing degenerative, neoplastic, auto immune, infectious diseases, mortality, climate change, recession, disappearance of islands, fish, birds, global warming, global hypoxia, caused by contraception, abortion**
- b) **Contraception reversal, halt of abortions, reverts destruction of germ cells, with restoration of androgen, estrogen to 80% of age normal, resulting in 80% decline in diseases, mortality, by restored cell metabolism, cell cycle, genomic repertoire**
- c) the robust health of cells metabolism, cell cycle provided **by essential fatty acids** containing diet, **[converted to cholesterol]** namely **consumption of virgin oil**-coconut oil, palmolein oil, gingili oil ground nut oil, olive oil [highest fertility index is olive oil]with their **life supporting factors** contained, **nuts and seeds preparations, with life supporting factors** meant to support the growth of a baby plant, **one egg / day as fried preparation with its life factors** to support the life of a chick
- d) **milk, dairy products**, including butter, ghee are required for cells of brain, other tissues,- **good fatty acids, fish identified by scales, gills contain omega 3, 6 fatty acids is also essential fatty acids** good for skin, joints, vision, heart. esse
- e) To differentiate from **animal fat consumption [triglyceride]** which is harmful to produce 6 fold myocardial infarction, stroke; **hence meat without fat, blood washed away to be consumed**
- f) **Not to consume the water living without scales, gills e.g. crabs, prawns, sword fish, jelly fish..-[obnoxious triglycerides] since they contain toxin in their flesh[akin to snakes, scorpions] which by molecular mimicry, mediate auto immune destruction leading to vasculitis, carditis, thyroiditis, gastro enteritis, appendicitis, cholecystitis, pancreatitis, cerebro vasculitis, microangiopathic hemolysis, thrombocytopenia, pancytopenia, nephritis, angio neurotic edema, transverse myelopathy, alopecia, polyradiculopathy, gastro intestinal tract, pancreatic, liver malignancies**

- g) **Tight pelvic attires produce thermogenic destruction of germ cells resulting in germ cell neoplasm**, loss of viability of germ cells, hence to wear formal dresses with loose fitting around pelvis, since the cells are extremely fragile
- h) To **observe abstinence for 7 days** after last menstrual onset, **for 45 days abstinence in male child birth, for 90 days abstinence in girl child birth, to avoid auto immune diseases, adenomyosis, sudden demise, disseminated intravascular coagulation**
- i) **More the number of children the parents are blessed with after holy matrimony[the marriage bed is undefiled]the longer their lives** with robust health because the fetal placental estrogen-4200pg/ml enhances cell metabolism
- j) To discourage all forms of adultery, pornography, homosexuals, extramarital, premarital affairs, which result in self destruction
- k) **To promote child birth at all costs, this is the basis for self sustaining ecology, economy, longevity of life, preventing metabolic syndrome...**
- l) **Hysterectomy, orchidectomy are associated with 500% increased degenerative, infectious, neoplastic diseases since the hormones drop to 0.4pg;** let the hysterectomy, be reserved for post partum hemorrhage, and cancer uterus; orchidectomy be reserved for testicular cancer only;
- m) **let Myomectomy coupled with tubal recanalization [contraception reversal]replace hysterectomy for uterine bleeding by myoma in a contracepted host;** Myomectomy will stop uterine bleeding, contraception reversal, essential fatty acids intake, will prevent recurrence of myoma
- n) **tubal recanalization coupled with pelvic floor repair, sling procedure or ring pessary, Kiegel's exercise [contraception reversal] replace vaginal hysterectomy,** for uterine descent **in a contracepted host;** pelvic floor muscles will restrengthen by restored cell metabolism, cell repair, rejuvenation of pelvic floor muscles, secondary to contraception reversal, restoring germ cells from destruction, restoration of androgen, estrogen to 80% of age normal.
- o) **Child birth-2months maternity leave sufficient-it's a physiological status, not pathology**

3] **Implementation** of the following by Grass root level workers system

- a) **Contraception reversal in countries with permanent sterilization namely fallopian tubal recanalization, vasectomy reversal, contraceptive implants removal, by tripod scheme of donor agency, service agency and the beneficiary**
- b) **Promote child birth at all costs**
- c) Provide maternity services for safe deliveries
- d) Provide antenatal surveillance to **pregnancy after caesarian sections, to follow up patients weekly, after 7 months of gestation**

Strategy:

Form the grass root level workers infrastructure comprising of village health volunteer for every 5000 people, village health nurse, rural community organizers, social worker, for every 25000 people, mobile team comprising of nurses, medical officer, helpers for every 1.25 lakh population, tertiary care including a surgeon, gynecologist, theatre for every 5-6 lakh people. This frame work comprises **one life sector cell**, to restore life among 6 lakh people by targets achievement. Implementation assessor will be coordinating 5 life sector cells.

Village health volunteer can be a dhai, an elderly lady who'll be chosen by the community, who can be given training on information on our targets, the prime being promote child birth, care at all costs, to coordinate with the rural community organizers, village health nurse and the mobile team.

Rural community organizers will be youth coordinating for 5 village health workers areas, [25,000people] along with the village health nurse, towards achieving the targets.

Mobile team will be giving antenatal surveillance for 5 areas served by rural community organizers, [125,000 people] to cover pregnancy after LSCS from 7th month weekly follow up, maternity child care services to eradicate abortion, contraception, to promote child birth, child care the future generation, to eradicate pornography, adultery, to give awareness about blessed child birth after Holy matrimony to prevent early demise of young parents, increasing natural disasters, recession.

Surgeons, gynecologists will be coordinating 5 mobile teams, [5-6 lakh people] concentrating on contraception reversal including tubal recanalization, removal of contraceptive implants, removal of loop, copper t, to replace hysterectomy by Myomectomy coupled with tubal recanalization; pelvic floor repair/sling procedure, coupled with tubal recanalization instead of vaginal hysterectomy, because hysterectomy is associated with 500% increase in diseases because the estrogen, decreases to 0.4pg and associated decline in cell metabolism, leading to degenerative diseases and neoplasm. Tertiary care units will be diligently performing their other services also.

Implementation assessor, a senior officer, will be supervising implementation, tracking the cost allotment, distribution, utilization of funds, their reports, achievement assessment, base line survey, assessment annual survey of promoted child birth, contraception reversal, decline in diseases, mortality, disasters, divorces, economy recession, disappearance of fish, birds, abolition of pornography, adultery, pre marital, extra marital affairs, increase in holy matrimony, strengthened families, Myomectomy, pelvic floor repair surgeries, instead of hysterectomy; assessment annual survey, of thwarted orchidectomy, hysterectomy and the prevented, declined diseases

Any governmental, non governmental agencies, people interested in society's welfare, can appraise themselves of this need and can take initiative to form one life sector cell, frame projects for submission, approval, implementation and follow up by meticulous assessment surveys.

Ultimately global life sectors, organizations, assemblies, [WHO/UNO] will have to feel the need of the targets, purpose portrayed in this proposal and take global initiative to reverse contraception, abortion, promote child birth at all costs the basis for life, to achieve reversal of recession, climate change, decline

in diseases, mortality, therapy failures in couples practicing contraception, abortion, disappearance of fish, birds, islands, global warming, hypoxia.

Global sectors like USAID, WHO, UNO, Bill gates foundation can appropriate this scheme with urgency for nations, global benefit, and enable tripod scheme of donor agency, service agency, beneficiary[who gets it free of cost] to be adopted.

Provide the information of targets

- by training to village health worker, village health nurse, rural community organizers, medical, paramedical personnel, mobile team;
- Surgeons, gynecologists, medical officers will be conducting the training program, who'll be briefed about targets, altered health-life care approach with awareness of the forgotten cell, the implementation protocol.
- Information is imparted to the people by **1] grass root level workers, by visual aids, media,2] training of different sectors** e.g. health sectors, police officers, pharmaceuticals, engineers, executives, students, self employed, youth, local ladies assemblies, good will organizations, governmental agencies, nongovernmental agencies.**3] Change in curriculum of school, college, medical, paramedical** reflecting on the basics to include the facts presented in the publications backing the project, highlighting the targets of this project to eradicate, reverse contraception, abolish abortions

Implementation of the program by surveillance:

- Promote child birth at all costs achieving growth of people in billions- by safe delivery, meticulous antenatal surveillance specially for pregnancy after lower segment caesarian sections, every week after 7 months of pregnancy [11 LSCS was performed on a mother safely in 1989, no therapeutic indication for sterilization, antenatal surveillance programmed to provide follow up every week, after 7 months of pregnancy following lower caesarian segment sections].
- Promote child care anticipating, targeting in billions.
- Eradicate one child policy, small family norms, contraception, abortions from the face of this earth**
- Reverse contraception-temporary and permanent specially by tubal recanalization, implemented by tripod scheme of beneficiary, donor agency, service agency, with global funding, planning implementation in countries wherein permanent surgical sterilization techniques have been adopted
- Prohibit pornography, adultery,[websites] pre marital, extra marital affairs, homosexuals**
- Encourage holy matrimony based family norms, strengthened by uncurbed, God ordained child birth-the basis of life-the privilege, birth right of parents
- Promote the awareness of **More the children, longer the life of parents, the goodness provided to parent's cell metabolism, by fetal placental estrogen**, male child birth increases parents` life by ~10 years, [x y] (smaller placenta, smaller raw surface, requiring 45 days abstinence), girl

child birth[xx] (larger placenta, larger placental detached raw surface, 90 days abstinence)

- h) Save womanhood from napkin status of use and throw [use and abort] and raise womanhood to the royal, blessed motherhood of bringing forth many children as God ordained, for her beloved husband, after holy matrimony; to covet precious virginity**

Procedures: Let the *tubal recanalization* be by *open mini laparotomy* -supra pubic incision-than by laparoscopy, *because after tubectomy*, secondary to germ cells destruction, reduced endogenous estrogen, deranged cell metabolism, degenerative changes in every tissue enhances, including peritoneum; *there will be dense adhesions incorporating tubes, sigmoid colon, omentum, caecum, urinary bladder prolonging laparoscopic recanalization to hours, whereas open laparotomy, tubal recanalization can be finished as follows in 10 minutes-each side*

Let both the severed ends of fallopian tube be cut open, to check the lumen, patency, prolene thread be passed through the fimbrial end, through the severed ends, corneal end to check patency; approximate the severed ends, over the prolene thread and 2 bites of suture taken between the approximated severed ends with 6-7 0` catgut, then remove the prolene thread; repeat the same on the other side also. As the germ cells destruction stops by tubal recanalization, androgen, and endogenous estrogen are restored to 80% of age normal, resulting in restored cell metabolism, leading to spontaneous adhesionolysis.

Adhesion release, grilling the lumen is not required, to minimize tissue injury, bowel perforation, to reduce complications, prolonged anesthesia. We have seen the cell cycle recovering including new nail bed, hair follicles, every tissue is restored its robust health-80% by the restored hormones. Myoma have increased in incidence, after contraception, due to estrogen decrease, secondary to contraception, Myoma will never become malignant, when its associated with menorrhagia, **Myomectomy, with tubal recanalization can replace hysterectomy to treat myoma associated menorrhagia.**

Similarly **pelvic floor repair, sling procedure**, with tubal recanalization, **replace vaginal hysterectomy**, because due to contraception, deranged cell metabolism, enhanced degenerative phenomenon in the tissues, the pelvic floor muscle degenerates, leading to uterine descent; tubal recanalization will restore hormones, because germ cells destruction stops, thereby pelvic floor muscles will be renewed, strengthened, added by sling procedure, or Kiegel's exercise or a ring pessary to keep back the uterus; hysterectomy can be reserved for cancer uteri, post partum hemorrhage alone. Hysterectomy is associated with 500% degenerative diseases, neoplasm secondary to reduced synthesis of endogenous estrogen to 0.4pg/ml

Similarly reserve orchidectomy for testicular cancers only; prostate pathology stems from slow physiological decline in androgen, with periurethral growth preferentially going for benign prostatic hyperplasia; contraception, abortion with reduced agonizingly androgen, to very low levels, leads to more of malignant changes in prostate, orchidectomy will increase prostate neoplasm, since androgen will reduce drastically, leading to 500% increased diseases

Surveys: *Base line survey, annual survey, end of program survey* of all the people, families, to include the number practicing contraception, abortion, status of hysterectomy, orchidectomy, children per family, diseases prevalent matching against their contraception status; as the project is implemented then, the reverted figures of contraception, abortion, promoted child birth specially more than small family norms, the luxurious achievement of child birth, antenatal surveillance achieved specially for pregnancy after LSCS, thwarted hysterectomy, orchidectomy, and performed Myomectomy with tubal recanalization, pelvic floor repair, with tubal recanalization, instead of hysterectomy; *recession level assessment, natural disasters decline assessment.*

Questionnaire, Visual Aids, posters- see annexure

Life sector cell:

Budget:

Capital Budget for co coordinators who are interested in the program but do not have adequate infrastructure

Theatre Table Rs. 25,000 or as per local quotation

Focus lamp Rs.10, 000 or as per local quotation

Instruments to perform tubal recanalization, Myomectomy, pelvic floor repair Rs. 10,000 or as per local quotation

Recurring budget

Village Health volunteer- (VHV) Rs. 1000/month

Rural community organizer (RCO)/village health nurse (VHN)/social worker (SW)/village health worker (VHW)- Rs.10, 000/month

Helper mobile team Rs. 3000/month

Staff nurse –mobile team Rs. 12500/month

Medical Officer Rs. 33,000/month

Survey analyst Rs. 25,000/month

Physiotherapist Rs. 15,000/month

Coordinator Rs. 28,000/month

Surgeon/ gynecologist/Physician/anesthetist coordinating Rs. 50,000/month

Implementation assessor Rs. 60, 000/month + transport cost

Recanalization procedure Rs.17000/procedure to the service team, Rs. 3000[-to the patient [as food, health fortifier-horlicks-5 bottles, virgin coconut oil-5l can, transport-500]

Every child birth delivery-Rs. 6500-to the service team, Rs. 1000 worth horlicks, coconut oil can to the mother], child birth promoted >2 7500/ delivery to the service team

Child birth by LSCS-Rs.6500/to the service team, [Rs.1000 to the mother as horlicks, protinex, food fortifier, virgin coconut oil, transport]

Antenatal surveillance services per mother Rs. 300/ month to the service team; towards medicine Rs. 200/ month /mother to the service team, food fortifier- horlicks, virgin groundnut oil, coconut oil, palmolein oil-200/month to the mother

Every copper t removed, every parent motivated to avoid contraception, abortion-Rs.1000/couple

Every child birth promoted –incentives to VHV/helper-Rs.200/child, RCO/VHN/SW-Rs.400/child, Nurse-Rs.300/child, medical officer-Rs.500/child, gynecologist/, surgeon/-Rs.1000/child

Child birth-2months maternity leave sufficient-it's a physiological status, not pathology

Child care Rs. 300/ month/ baby as food products till 5 years, Rs. 100/ month for medicines/baby to the service team

Save the uterus:

Myomectomy-Rs.13, 000/procedure

Sling procedureRs.13000/procedure

Ring pessary, Kiegel's exercise-Rs. 1000/ mother to physiotherapist, medical team, supervision-Rs. 1000/ mother for food products

Every hysterectomy thwarted, replaced by Myomectomy, pelvic floor repair Rs. 5000/ person to the surgeon, gynecologist

Funds sources: USAID, WHO, UNO, UNICEF, UNDP, world bank, world vision, CASA, Bill gates foundation,

Sample questionnaire

Individual,

Name, Age, Sex, Married, Children, Contraception status, Diseases, Death, Disaster, Economy

For family

No. of members, Age group, children, diseases, death, disasters, economy,

Base line survey analysis -4 age groups- 20-35years, 35-50 years, 50-70years, >70years

Children, contraception status, diseases, death, disasters, economy, employment

Annual, End of program analysis for families-4 age groups-20-35 years, 35-50years, 50-70years, >70 years

Children, child birth promoted, Contraception status-reversed/not reversed, diseases, death, disasters, economy, employment

Goodwill global organizations,...implementing the tripod scheme of donor agency, service sector, beneficiary for whom everything gets free of cost.

Program planned for 3.5 years to revert life in the cells, to prevent further disappearance of fish, islands, birds; to prevent increasing trends of storms, cyclones, tornadoes, hail storms, tsunamis, earth quakes, climate change; to revert recession; to prevent early demise of young parents, to minimize hysterectomy, orchidectomy; restore robust health in the cells to revert metabolic syndrome.

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Determination of Maximum Reduction of the Hexavalent Chromium Using Indigenous Bacterial Isolates

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Abstract- Tanneries generate wastewater in the range of 30 to 35L kg⁻¹ skin/hide processed with high salinity, high oxygen demand, high organic loading and a high salt content one of which is chromium which spoils the agricultural land and pollute the ground water. In the present investigation, the bacterial strains were isolated from the contaminated soil which was collected from in and around the tannery waste contaminated site. Previously grown indigenous bacterial culture was transferred into 100 ml nutrient broth containing different concentrations of hexavalent chromium (100ppm, 200ppm, 300ppm, 400ppm, 500ppm, 600ppm and 700ppm). These were incubated for 72 hours in facultative conditions. The blanks were also maintained in same conditions without bacterial inoculation. Samples were collected from this experiment to evaluate hexavalent chromium at different time intervals (0hr, 12hrs, 24hrs, 36hrs, 48hrs, 60hrs and 72hrs). From the results it was inferred that the higher bacterial growth was observed at 48 hrs and the maximum chromium reduction was observed upto 500ppm, it was reduced at percentage of 90.40. The isolated microorganisms were identified as *Pseudomonas fluorescens* and *Bacillus subtilis*.

Index Terms- Tannery waste, Hexavalent chromium, Indigenous bacteria, Chromium reduction.

I. INTRODUCTION

Indian leather industry occupies an important position in foreign exchange earning. This phenomenal growth obviously calls for the processing of enormous amounts of hides and skins. The tanning process involves pre-tanning, tanning and post tanning operations. During the processing of leather, substantial amount of solid and liquid wastes are generated (Chakraborty, 2003), especially toxic metal chromium passing to wastewater and are not easily eliminated by ordinary treatment process (Franco *et al.*, 2005).

Chromium used by the leather industry to tan hides is not taken up completely by leather and relatively large amount escapes into the effluent. Due to chrome leather tanning process, large quantities of chromium compounds are discharged through liquid, solid and gaseous wastes into the environment and can have significant adverse biological and ecological effects. Several reports have shown that the values for Chromium in tannery effluent are considerably higher than the safe limits prescribed by National and International standards.

The Environmental Protection Agency (EPA) has reported that Chromium levels in tannery effluents are considerably higher than the safe limits required by the National Environment Conservation Strategy (EPA, 1990).

Tannery wastewaters are mainly characterized by high salinity, high oxygen demand, high organic loading and specific pollutants such as chromium (Bajza and Vrcek, 2001; Colak *et al.*, 2005). Among the oxidation states of chromium, the hexavalent Chromium (Cr (VI)) and trivalent Chromium (Cr (III)) forms are of significance in aqueous systems. The hexavalent form is water soluble, toxic, mutagenic and carcinogenic to humans and mammals whereas the trivalent form is less soluble and less mobile and 100 times less toxic than Cr (VI) (DeFlora *et al.*, 1990; Ramakrishna and Philip, 2005).

The damage to the environment by the hazardous tannery effluent has become an acute problem in the country. The main objectives of the present study focused the isolation, enrichment and chromium reduction of the indigenous bacteria from the tannery contaminated soil.

II. MATERIALS AND METHODS

PREPARATION OF NUTRIENT MEDIA

The general growth nutrient medium for bacterial growth consisted of peptone 10g, beef extract 2g, yeast extract 1g and sodium chloride (NaCl) 5g in 1 L of distilled water. All media were autoclaved at 120°C and 15 psi for 15 minutes and stored in room temperature for further use. The pH was maintained at 7±0.2 by using HCl or NaOH.

ISOLATION OF MICROORGANISMS

Bacterial strains were isolated from the contaminated soil. About 1g of soil sample was added into 100 ml of nutrient medium and incubated for 24 hrs in facultative condition. A loopful from the above culture was streaked on agar plate, incubated for 24 hrs and stored in the refrigerator at 4°C for further use.

DETERMINATION OF MAXIMUM REDUCTION OF THE HEXAVALENT CHROMIUM USING INDIGENOUS BACTERIAL ISOLATES

About 1 ml of previously grown bacterial culture was transferred into 100 ml nutrient broth containing different concentrations of hexavalent chromium (100ppm, 200ppm, 300ppm, 400ppm, 500ppm, 600ppm and 700ppm). These were incubated for 72 hrs in facultative conditions. The blanks were also maintained in same conditions without bacterial inoculation. From these cultures, 5 ml of sample was taken to evaluate hexavalent chromium at different time intervals (0hr, 12hrs, 24hrs, 36hrs, 48hrs, 60hrs and 72hrs).

A loopful from the media containing mixtures were streaked on agar slants, incubated for 24 hours and stored in the refrigerator at 4°C for screening of the enriched cultures.

MEASUREMENT OF OPTICAL DENSITY (OD)

All the samples drawn at different time intervals (0hr, 12hrs, 24hrs, 36hrs, 48hrs, 60hrs and 72hrs) from the above mentioned experiments Optical Density (OD) was measured through UV-Visible Spectrophotometer, at 540 nm wavelength.

IDENTIFICATION OF MICROORGANISMS

The isolated microorganisms were identified by colony morphology, staining and biochemical tests. The tests that employed were Gram's stain, motility, Indole, methyl red, Voges-Proskauer, citrate utilization tests, starch hydrolases, gelatin hydrolases, nitrate reduction test, oxidase, catalase and TSI (0.1% Glucose, 1% Sucrose, 1% Lactose and Iron) (Dubey and Maheshwari, 2002).

III. RESULTS AND DISCUSSION

MEASUREMENT OF OPTICAL DENSITY AND MAXIMUM REDUCTION OF HEXAVALENT CHROMIUM

Bacteria were grown on nutrient media which contained different concentrations of hexavalent chromium (100, 200, 300, 400, 500, 600 and 700ppm) (Plate 1A). At definite time intervals (0, 12, 24, 36, 48, 60 and 72 hrs) OD was measured in these samples.

Among all the hexavalent chromium concentrations, a higher bacterial growth was observed from 100ppm to 500ppm. However, in 600ppm and 700ppm hexavalent chromium concentrations, bacterial growth showed a declining trend. Among all the time intervals a higher bacterial growth was observed at 48 hrs (Table 1).

The present study focused on the reduction of toxic hexavalent chromium into trivalent chromium by the native bacterial strain which showed very high-level of reduction up to 500ppm of potassium dichromate on nutrient broth, it was reduced at 90.40% (Table 2). The similar results were reported by several authors. Camargo *et al.* (2003) have reported that most of the dichromate contaminated isolates tolerated and reduced hexavalent chromium at lower than 1500mgL⁻¹. Faisal and Hasnain (2004) studied very high-level resistance against potassium dichromate both in nutrient broth (up to 25mg ml⁻¹) and on nutrient agar (40mg ml⁻¹) and also reported that when increases the initial hexavalent chromium concentration from

100 to 500µg ml⁻¹ the chromium content in the cell become almost doubled.

Jeyasingh and Philip (2005) also reported that the hexavalent chromium reduction rate increased with the initial Cr (VI) concentration even at high initial Cr (VI) concentration of 400mg/l. The isolated microbes are able to reduce or remediate Cr (VI) even at higher concentrations though it takes a long time. Anaerobic microbes are usually more sensitive to toxic compounds like heavy metals. Chromium resistant bacteria isolated from effluent of tanneries could resist up to 250µg ml⁻¹ of Cr (VI) in the medium (Basu *et al.*, 1997).

Garbisu *et al.* (1998) and Megharaj *et al.* (2003) isolated the bacterial isolates *Anthrobacter* sp. and a *Bacillus* sp., from the tannery waste contaminated soil that showed similar resistance to Cr (VI) and had the ability to reduce Cr (VI) to Cr (III).

Several authors used an initial hexavalent chromium concentration of 10, 20, 50 and 100µg/ml for the bioremediation experiment. Amongst these concentrations the indigenous strains resist up to 50ppm of chromate (Ganguli and Tripathi (2002); Megharaj *et al.* (2003) and Faisal and Hasnain (2004)).

Microorganisms with the ability to reduce Cr (VI) can be used for detoxification of tannery contaminated soil. In this study, the isolation and screening of Cr (VI) reducing bacterial isolates and characterization of Cr (VI) reduction by the selected isolates have been attempted. From the isolated colony (Plate 1B), morphology, staining and biochemical tests, the results inferred that the isolated microorganisms were *Pseudomonas fluorescens* and *Bacillus subtilis* (Table 3; Plate 2 and 3).

The results suggested that 90.40% reduction of hexavalent chromium into trivalent forms was due to the enzymatic chromium reductions by *Pseudomonas fluorescens* and *Bacillus subtilis* appear to be a form of respiration in intact cells and may have beneficial environmental effects. The similar results were observed by Rehman *et al.* (2007) and Parameswari *et al.* (2009). The biosystem developed in the present investigation is a viable alternate for chromium contaminated soil treatment. The system is environmental friendly, as it is utilizing only naturally available waste materials, cost effective and sustainable.

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FIG. 1
GROWTH OF CHROMATE RESISTANT BACTERIAL STRAIN BIOMASS IN DIFFERENT CONCENTRATIONS OF HEXAVALENT CHROMIUM (50, 100, 200, 300, 400, 500, 600 AND 700ppm) AT DIFFERENT TIME INTERVALS (0, 12, 24, 36, 48, 60 and 72 hours)

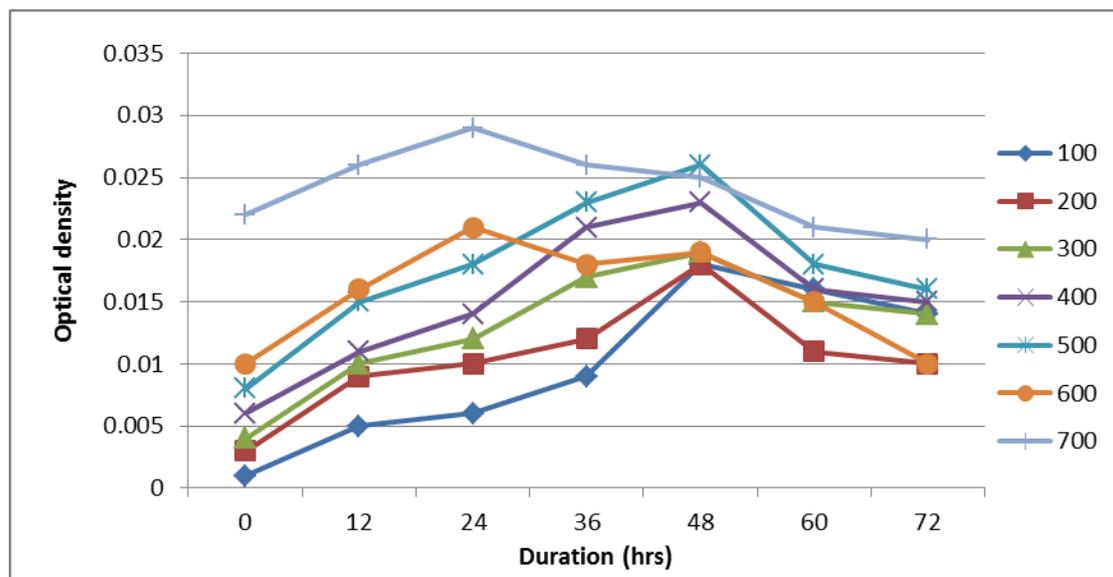


FIG. 2
Cr (VI) CONTENT (ppm) IN NUTRIENT BROTH CONTAINING DIFFERENT CONCENTRATIONS OF HEXAVALENT CHROMIUM (100, 200, 300, 400, 500, 600 and 700ppm) AT DIFFERENT TIME INTERVALS (0, 12, 24, 36, 48, 60 and 72 hours) AND % REDUCTION OF Cr (VI)

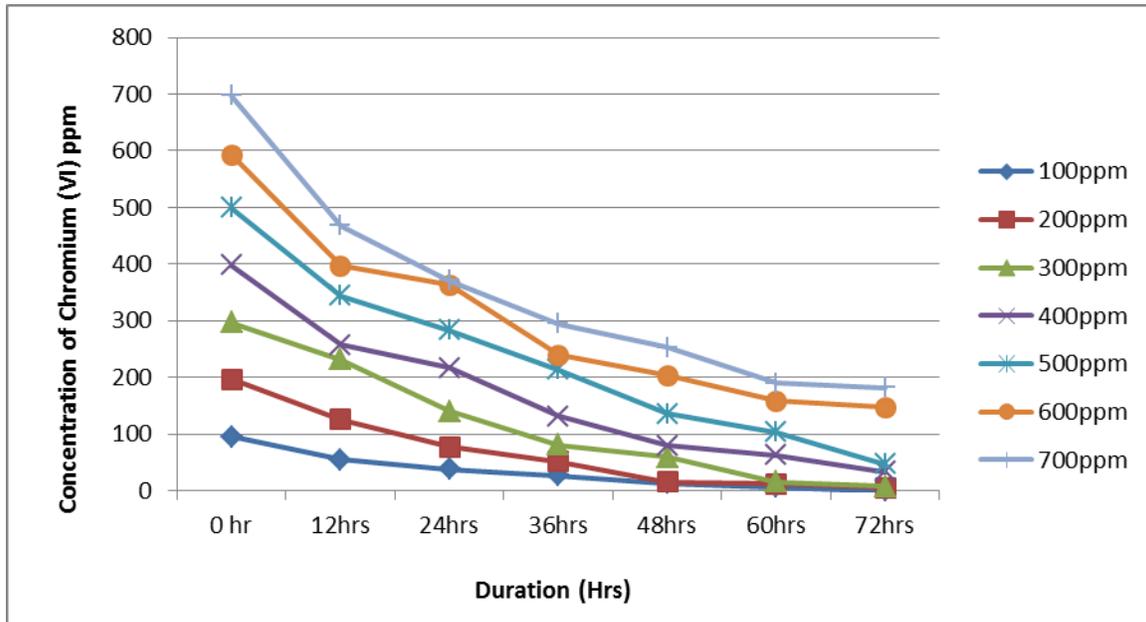


PLATE 1

A. BACTERIAL GROWTH IN DIFFERENT CONCENTRATIONS OF HEXAVALENT CHROMIUM AND BLANK (WITHOUT MICROBIAL INOCULATION) IN LAMINAR AIRFLOW



B. ISOLATION OF BACTERIA FROM 500ppm CONCENTRATION OF HEXAVALENT CHROMIUM

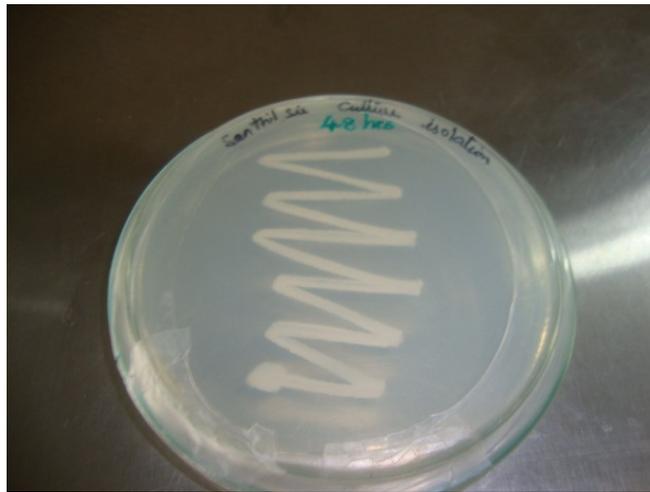
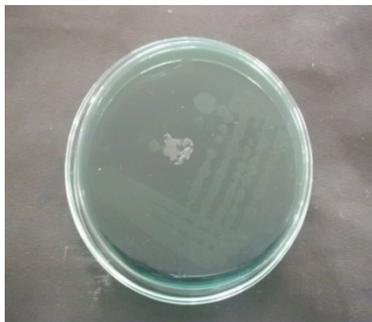


PLATE 2
Pseudomonas fluorescens

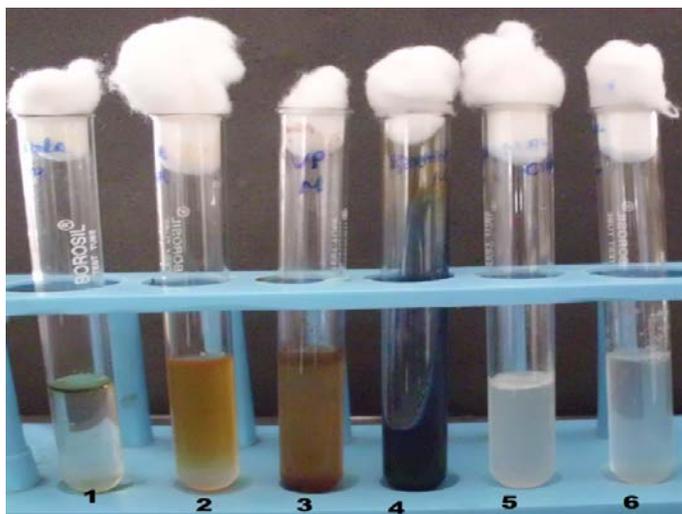
Pure culture of the isolated colony



Gram's Staining (-)



Biochemical characterization



1. Indole (-), 2. Methyl red (-), 3. VP (+), 4. Citrate utilization (+),
5. Nitrate reduction (-) and 6. Catalase (+)

Gelatin hydrolases (+)



Starch hydrolases (-)



Oxidase test (+)



PLATE 3

Bacillus subtilis

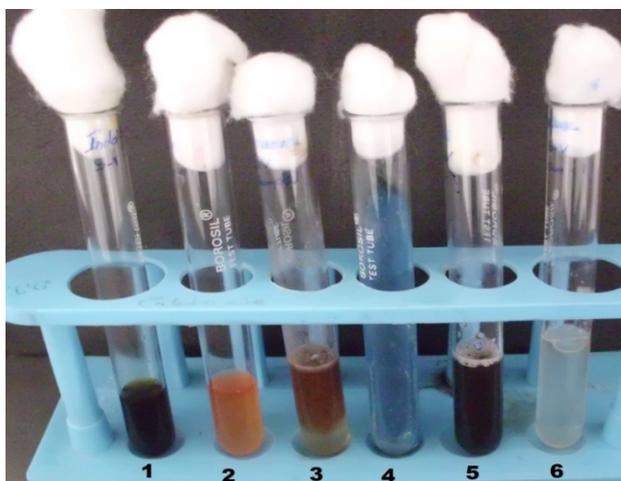
Pure culture of the isolated colony



Gram's Staining (+)



Biochemical characterization



1. Indole (-), 2. Methyl red (-), 3. VP (-), 4. Citrate utilization (+), 5. Nitrate reduction (+) and 6. Catalase (+)

Gelatin hydrolases (+)



Starch hydrolases (+)



Oxidase test (-)



TABLE 1
OPTICAL DENSITY OF BIOMASS IN DIFFERENT CONCENTRATIONS OF HEXAVALENT CHROMIUM
DURING DIFFERENT TIME INTERVALS

Duration	CONCENTRATION OF HEXAVALENT CHROMIUM						
	100ppm	200ppm	300ppm	400ppm	500ppm	600ppm	700ppm
0 hr	0.001	0.003	0.004	0.006	0.008	0.01	0.022
12 hrs	0.005	0.009	0.01	0.011	0.015	0.016	0.026
24 hrs	0.006	0.01	0.012	0.014	0.018	0.021	0.029
36 hrs	0.009	0.012	0.017	0.021	0.023	0.018	0.026
48 hrs	0.018	0.018	0.019	0.023	0.026	0.019	0.025
60 hrs	0.016	0.011	0.015	0.016	0.018	0.015	0.021
72 hrs	0.014	0.01	0.014	0.015	0.016	0.01	0.02

TABLE 2
Cr (VI) CONTENT IN NUTRIENT BROTH CONTAINING DIFFERENT CONCENTRATIONS OF HEXAVALENT
CHROMIUM (100, 200, 300, 400, 500, 600 and 700ppm) AT DIFFERENT TIME INTERVALS
AND % REDUCTION OF Cr (VI)

Duration	CONCENTRATION OF HEXAVALENT CHROMIUM						
	100ppm	200ppm	300ppm	400ppm	500ppm	600ppm	700ppm
0 hr	95.77	197.1	297.03	398.36	498.97	591.98	696.78
12hrs	54.83	125.61	231.79	257.47	344.22	396.97	467.76
24hrs	38.17	77.73	140.19	217.22	283.15	362.96	370.6
36hrs	27.02	51.36	80.5	131.17	213.75	239.43	294.95
48hrs	13.19	15.96	59	79.12	135.33	203.34	253.31
60hrs	6.94	11.79	15.96	62.46	103.41	158.23	189.46
72hrs	0	5.55	7.63	33.31	46.97	147.13	182.52
% Reduction	100%	95.77%	96.46%	91.26%	90.40%	74.14%	73.47%

TABLE 3

THE IDENTIFICATION OF MICROORGANISMS USING COLONY MORPHOLOGICAL AND BIOCHEMICAL TEST

S.No.	Biochemical tests	<i>Pseudomonas fluorescens</i>	<i>Bacillus subtilis</i>
1	Gram's Staining	-	+
2	Motility test	+	+
3	Indole Test	-	-
4	Methyl red Test	-	-
5	VP Test	+	-
6	Citrate Test	+	+
7	Starch hydrolases	-	+
8	Gelatin Hydrolases	+	+
9	Nitrate reduction Test	-	+
10	Oxidase Test	+	-
11	Catalase Test	+	+
12	Glucose Test	A	A
13	Lactose Test	NG	A
14	Sucrose Test	A	A

(+ Positive, - Negative, A-Acid Production, NG-No Gas production.)

Effects of Succession Planning on the Performance of Non-Governmental Organizations in Kenya

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Abstract- Successional planning is an essential issue within organizations, particularly within non-governmental organizations. The empirical literature depicts that albeit numerous of the non-governmental organizations (NGOs) are run and managed by their initiators or by a small management team, very little is observed as pertains adequate and tactical succession planning as a strategy for long-run survivability. The inadequate succession planning practices could have adverse effects on the organization such as internal inefficiencies, derailed performance or even the collapse, especially when the main players exit the establishment upon old age, retirement or seek greener pastures elsewhere. Such exit predisposes the organization to vulnerability, hindered growth, as well as diminishing its worth for its stakeholders, particularly the donors and target beneficiaries. Intrinsically, the study set to assess the effects of successional planning practices on the performance of (NGOs) in Kenya. Objectively, it examined the relationship between successional planning practices and their influence on turn-over rate, organizational conflict, and shareholder expectations. Ideally, this was achieved through a descriptive approach aimed at registered non-governmental organizations in Nairobi. The study engaged both qualitative and quantitative data obtained from 15 NGOs, then presented the analysed data through illustrative frequency distributions. Conclusively, the study identified successional planning as the persistent concern for (NGOs) pursuing performance sustainability. There was an existing gap between conventional management of (NGOs) in Nairobi and the adoption of successional planning practices. Also, it noted that maintaining relevance, and enhancing other effective managerial capabilities were a core contributor to the sustained performance of the NGOs.

Index Terms- succession planning practices turn-over rate, organizational conflict, and shareholder expectations, performance sustainability

I. INTRODUCTION

Kenya as a developing country is undergoing a tough economic period (Onyango, Njanja and Charles, 2014). However, some spheres in the economy are shedding hope to the compelling situation. Notably, the Non-Governmental Organization Coordination Board (NGO-CB) has described the NGO sector as being such a sphere (NGO-CB, 2009; 2013). The Government of Kenya through the Non-Governmental Organization Coordination Board reported that Nairobi region has observed a growth in the rise of NGOs (GoK, 2012). The

Board also reported a rate of approximately 400 NGOs in the region every year in the last seven years. The sector's progress has been observed to draw from efficient resource utilization, feasible strategies, planning practices, proficient products, and niche identification (Onyango, Njanja and Charles, 2014). Keenly, Couch (2003) outlined an organization as a framework entailing authority, duties, and responsibility through which the earlier mentioned resources are aggregated and coordinated for the attainment of specific proposes. The NGOs draw from this definition; only that they are organizations that are neither part of the government nor are they conventionally purposed for profit business (DeCenzo, 2005). NGOs are established by ordinary entities (individual or organized) and are funded by businesses, foundations, governments, and /or private entities (individual or organized) (DeCenzo, 2005). NGOs are characterized based on their orientation (charitable, empowering, participatory, and service) or degree of cooperation (city-wide, community-based-CBO, national, international NGOs) (GoK, 2012). Such organizations according to Taylor and McGraw (2004) need to operate, perform and sustainably survive in the long-run and still uphold relevance in the market and environment they operate in. NGOs will need survival that will be anchored on their ability to realize and sustain their effective practices over a period. For instance, the growing pressures on the human capital, coupled with organizational restructuring, glowing uncertainties, and up surging program complexities have adversely influenced how NGOs respond to staff retention and career development (Rothwell, 2010). Expectedly, on one hand, NGOs strive for survival and continuity of their operations and activities - this is paramount, on another, resource planning will be indispensable to performance. It does not, however, mean that the significance of other management practices has decreased (OED, 2002). But, contemporarily, the dire requirement for succession planning practices has grown, and organizations are in pursuit of such practices (Caudron, 1999). Recently, (Bendell, 2006) posited that numerous entities are operationalizing successional planning because they have over the years found challenge in retaining particular positive and effective abilities and capacities in their organizations for competitive edging both in the short and long run. He further notes that the emergence of effective practices and the need for sustained performance is because of the compelling modern business environment that has been characterized with ever changing, dynamic and embedding complexities.

1.2 Statement of the Problem

Every organization need to continually recognize the critical role of successional planning prior to departure of their top level

management. Nonetheless, in place of such recognition, it is worrisome that in spite of the programs, incentives, policies and support availed at establishing new and revamping existent NGOs, NGOs have continually failed to adopt successional planning practices and performed below the expectation in Kenya (Onyango, Njanja and Charles, 2014). For these organizations to thrive they must have a people (Human Resource) that is a source of immense support of development of the NGOs' objectives and achievements. Organizations are increasingly recognizing the significant asset that comes with this resource and one that could enhance sustainable competitive advantage. Nonetheless, local NGOs have failed to adopt effective human resource management (HRM) practices. Often, the local NGOs fail to realize the prominence of effective management of human resources in enhancing the organizational well-being. Kleinsorge (2010) notes that from this failure, they are not able to invest sufficient resources to enhance their capacity in needed human resource competencies. The inadequate focus on the management of human resource is observed as contributing to organizational conflicts and failing shareholder expectations (Kleinsorge, 2010). It also stands between performance and failure in numerous NGOs in Kenya and other developing countries. Thus, impeding sustainable performance of NGOs (Onyango, Njanja and Charles, 2014).

Fundamentally, local NGOs operate within a project orientation focus. It implies that they have inadequate priority for investing in promoting human resource capacities. Particularly, staff retention and organizational conflicts measures, which suffer most from short term nature of NGOs' projects. Majority of the organizations according to Onyango, Njanja and Charles (2014) lack the capacity to have the right employees at the right time and place. Such organizations face the challenge when hiring and recruiting staff and that of eventually retaining them at the end of the project phases where most staff leave prior to the termination of the projects. Per se, the dynamism encountered in project-oriented NGOs is quite challenging because staff turnovers are frequently high and unpredictable and this subverts programming and ultimately the organization performance and sustainability. NGOs' performance anchors upon effective strategic management. Wangomb'e and Kagiri (2013) noted that ineffective strategic management endeavours such as successive planning by the organizations have constrained performance, much less from unproductive goals formulation, high, turnover rates, growing organizational conflicts and misaligning decisions with meeting shareholder expectations. Even so, these elements y are in their state not an end in themselves, but, merely a channel towards achieving performance. Greer and Virick (2008) described succession planning practices as amongst those activities that organizations will adopt and utilize to maintain the already achieved performance.

Additionally, NGOs rely on the capitalization and investment of donors, who will include private, corporate, and government sourcing (Mwega, 2010; Samuel, 2013).). The mere fact of NGO financing has elicited immense criticism across the board, considering that reliance on foreign donation to achieve growth and performance is also dependant on an ambient policy setting coupled with sound internal governance, and accountability (OED, 2002). Additionally, beneficiaries of NGOs' anticipate sound support, training, observance of

fundamental rights, just treatment and care. Samuel (2013) observed several NGOs not to address societal issues of their beneficiaries. He noted a low adherence to service provision and poor continuity of engagement and consultation with direct beneficiaries and adjacent community-beneficiaries about planning, service provision, development, and monitoring aspects. Based on the above presentation, there is then a ground that succession planning as a specific strategic management concept is gaining its fair share in organizational performance sustainability. For that reason, successional planning practices may be used by NGOs to align their staff turnover rate, to appropriately address organizational conflict, as well as, meeting their donors' and beneficiaries' expectations. Considerably, Kleinsorge (2010) suggest that such alignment offers NGOs an opportunity to enhance a systematic progression aimed at recognizing, establishing, and stimulating the growth of positive elements in the entity's resource (capital, human, financial, marketing). Thus, a continued organizational succession chain.

1.3 Objectives of the Study

1.3.1 General Objective

The study endeavoured to evaluate the effect of succession planning practices on the performance of NGOs in Nairobi.

1.3.2 Specific Objectives

The specific objectives of the study were:

- i. To explore the effects of succession planning on staff retention and its influence of sustained performance
- ii. To examine how succession planning influences organizational conflicts and the eventual effect on performance sustainability
- iii. To evaluate the level to which meeting stakeholder's expectation as a succession planning practice influences the realization of NGO's performance sustainability

1.4 Study Hypotheses

The study set to test the following null and alternate hypothesis:

H₀ Succession planning on staff retention has no influence on the sustained performance

H₁ Succession planning on staff retention has an influence on the sustained performance

H₀ Succession planning on organizational conflicts has no influence on the sustained performance

H₁ Succession planning on organizational conflicts has an influence on the sustained performance

H₀ Succession planning practices have no contribution to meeting stakeholders' expectations

H₁ Succession planning practices contribute to meeting stakeholders' expectations

1.5 Justification

Being a place of pride in virtually every economic sphere, NGOs have aptly been considered as 'the turbines of growth, social equity, development and catalysts for socio-economic transformation (Harris and Fitzpatrick, 2009; McGivern; 1989; Roddy, 2004). The NGO Coordination Board (2009) indicates that having assumed a more significant prominence in the Kenyan socio-economic realms, the NGOs come at a time when there are growing distresses emanating from inequality, poor

distribution of incomes and wealth, poor access to economic, social and infrastructural facilities, inadequate social capacity building, unemployment in the formal sectors that resulted from economic tribulations, enduring societal uncertainty and market unpredictability. With the immense recognition of the role of NGOs, the intention of this study, therefore, was to raise various concerns about the relationship between the conventional resource planning and succession planning on NGO growth and sustainability. Additionally, the study suggested several significances for adequate successional planning practices regarding organizational performance and equally to recommend pinpointed areas for further research. Evidently, several efforts have been geared toward succession planning research, especially in the developed economies (Adler and Gordon, 1992; Athey and Burnside, 2007; Bendell, 2006; and Gross, 2013). Essentially, such studies have sparsely been conducted in a developing economy, particularly Kenya, much less targeting successional planning practices for NGOs upon which this study is anchored.

1.6 Scope of the Study

Intrinsically, the study set out in October, 2015 to assess the effects of successional planning practices on the performance sustainability of (NGOs) in Kenya. Particularly, from a population density of 100 NGOs based in Nairobi. The study drew from charitable, empowering, participatory, service, community-based – CBO, national and international NGOs.

1.7 Limitations of the Study

Considerably, the study was constrained by time. This occurred on the part of NGOs' executives who the study had challenges timing their presence during weekdays owing to their busy field schedules. Additionally, some participants were unwilling to offer adequate responses, particularly, on management concerns. Notably, the study depended on the assumption that the respondents would be open, willing, and truthful in giving needed information.

II. LITERATURE REVIEW

Organizational performance as a concept emanates from the idealization that any entity will possess voluntary association of resources i.e. productive assets (capital, human, financial, marketing) under meeting organizational objectives, mission and mandate (DeCenzo, 2005). Staff retention, addressing organization conflict (Tornudd, 2003), and shareholder expectations (Colakoglu, Lepak and Hong, 2006) are a vital aspect contributing to effective and sustainable performance (Rothwell, 2010). Imperatively, associating performance based on the strategic association of resources is a prerequisite to identifying and adopting effective successive planning practices that will ensure such performance is continually pursued in the short and long run Samuel (2013).

2.1 Theoretical Review

2.1.1 System's Theory

Lincoln (1985) perceived management of organization through the systems theory. He noted that an organization, just as a system, will exist and operate in a system entailing a range of

components associated to pursue an identified goal. If a single component fails or is inadequate, the entire system is incapacitated too. Essentially, through the 'system theory', such a system will possess integrals such as inputs/ resources (capital, human, financial, marketing), processes (strategizing, planning, operations, control), outputs (goods, services), and lastly aftermaths (organizational productivity, consumer/ stakeholder wellbeing). Ideally, the systems theory describes management as procedural and pursuing organizational succession in all spheres (Harris and Fitzpatrick, 2009; Lincoln, 1985). As such, an organization must align entirely all its wits, resources, and strategies for the system to prosper. Notably, the study identifies these aspects as staff retention, organizational conflicts' resolution, and shareholder outcomes as being integral components that must be systematically aligned through a continued planning and enriched practice. Further, (Huang, 2001) conceptualizes the essence of a successional chain as resulting from continued planning practices. He posited that successive chains fostered synergy, which will be a prerequisite for crafting complimentary or supplementary functionalities for attaining and sustaining performance.

2.1.2 Chaos Theory

Auxiliary, the 'chaos theorists' articulate that with continued operationalization, a system will gradually generate complexity and devaluation, and in the process, will be more unpredictable (Byrne, n.d.). Inherently, there will be a growing need to support the system, including replacement, restructuring and improved infrastructure. With the 'chaos theory', the complexity will grow to an un-tolerable level; thus, will elicit breakdown, splitting, collaboration with other complex systems, or entire collapse. In the presence of effective planning and management, Katz (2000) noted that effective management is a feasible tool when curbing the uncertainty of what managerial or planning practices are to be applied in organizational operations and when to apply them. Such practice calls for a repetitive managerial and planning procedure (Byrne, n.d.). The theory described the fundamentality of handling succession of the human capital and the eventual performance. Clearly, the 'chaos theory' illustrates that successional management coupled with other policies interchanges with organizational practices as progressed by Santorin (2004).

2.1.3 Relay Succession Planning Model

Santorin (2004) developed the first succession model. With "Relay Succession Planning" model, Santorin articulated that the top-level management must pass on their roles and responsibilities to a successor over a period. Organizations preparing this model were found to perform better than those that had not adopted the succession planning strategy. It was because the possible successors had over time been exposed to organizational roles, responsibilities, as well as, challenges. Indeed, they had been prepared to proactively handle both the opportunities and shortcomings in the pre-successional phase. Obviously, the current position holder was able to pass the baton to their successors, offering the latter a chance to validate their reins of leadership and at the time benefit from training. Eventually, successors should perform better in the post-succession phase. Nonetheless, the model indicated that not all

organizations would source the successors internally, but others would opt to source externally to introduce fresh vision and ideas, thus, fostering change in the organization.

2.1.4 Scharmer's Theory U-Model

Scharmer (2007) developed the second succession model. It highlighted that the top-management had an obligation to embrace and implement successional planning. Firstly, the model perceived successional planning as emerging from the immediate future and enhancing a concept of a 'U' process entailing five movements/ aspects, which could elicit possible change (Scharmer, 2007). The movements embed; (i) Co-initiating (the phase where an organization develops common goal with all stakeholders concerning a future event); (ii) Co-sensing (the phase where an organization appraises the necessities at hand collectively transversely/ on all frontiers – this stage enhances innovation, idea generation); (iii) Presencing (the phase where an organization commences to value their future they so envisage – The futuristic planning appraise a foundation stone for organizational change aimed at an expected end/ outcome. Additionally, in this stage, an organization lets go off any unresolved past concerns and forges ahead to more realistic future); (iv) Co-Creating (Here, the organization looks into the future and prototypes- What could the future hold?). At the fourth stage, Scharmer (2007) indicates that the organization could conceptualize successional planning as a long-term, as opposed to focussing on organizational immediate or current requirements. It is agreed upon by Katz (2000) who described the necessity to examine the organization's strategy and policy, which denote the needed credentials of the successor as a step in realizing a dynamic and sustainable plan in place. (v) Co-Evolving (Scharmer (2007) articulates this could enhance change in an organizational and facilitate implementation of succession planning strategies in the context and scope of an emerging and uncertain future).

2.2 Empirical Review

Empirical evidence has indicated inadequate human resource management and planning capabilities to be the greatest hindrance to NGOs' success and survival (Huang, 2009). As such, successional human capital development practices and adoption accounts only for over 60% of the NGOs' success (Kleinsorge, 2010). Every business entity will seek to reduce or if possible eliminate uncertainty in moving their staff and the backlash that comes with ever training new staff. Notably, NGOs are often hampered with the impediment; not only linked with perpetual evolving economic, social, political environment, but also, the aspect of changing elements and dynamics of their staff (Bendell, 2006). NGOs find themselves in compelling circumstances that impend their survival concerning their capacity to retain their productive staff (Huang, 2001). Further, the situation is adverse as when their productive staffs move to other enterprises; they are often needed to identify, hire, and recruit new staff, which is often very inefficient (GoK, 2012; Taylor and McGraw, 2004). Staff mobility in itself is very detrimental for NGOs because through it, NGO eventually loses qualified and skilled staff, shrink institutional memory, and loss of organizational identity.

2.3 Performance Sustainability and Survival

Performance and survival are implicitly the primary goals of any organizations (Gross, 2013). They require the association, investment, and efficient utilization of resources (Devero, 2004). Performance and the eventual survival underprops all other objectives and goals any organization could have (Gross, 2013). Emphasis on these goals influences the satisfaction and implementation of other organizational objectives. Gross describes the two as the 'unwritten law of every organization'. As such, the NGOs just as other for-profit organizations should focus on survival as a prerequisite for its sustainability (Bendel, 2006). These aspects have been observed to be hindered by several internal and external variables, which appear to drain from the efforts by organizations to achieve their objectives through implementing succession planning practices, including staff retention, internal conflicts, and stakeholders' expected outcomes amongst others.

2.4 Succession Planning Strategy

Taylor (2004) outlined successional planning as relating to human capital planning and development including such practices as job filling for key positions, retaining talent and staff, reducing turnover rate, developing careers, supervisor' support, reducing organizational conflicts and nepotism. Further, Couch (2013) described successional planning as 'the deliberate and systematic emphasis to identify leadership necessities, identify pools that show high-potential personnel at all organizational levels, enhance the progression of mission-critical leadership competencies in the personnel through an intended development, select personnel from the identified pools for pivotal roles and then, continually evaluate and monitor progress. However, successional planning is not all about the filling and retaining of organizational positions Kleinsorge (2010). Indeed, it entails a 'smart' management strategy, which could potentially, ensure that the organization retains effective, certifiable and proven skills, and make sure that it has in place the human capital (skills, competencies, personnel) it needs, or on hand, in order to promptly and proactively respond to the rapidly changing, dynamic and embedding complexities that characterize today's business environment (Scharmer 2007). Ostensibly, the organization could draw from the retained high-performing personnel, both now and in future. It is viewed as a management strategy 'with an eye' for the performance in the long-run McGivern (2011).

2.5 Stakeholders' Expected Outcomes

Stakeholders will cover those entities (individual or organized) in the operation environment that will possess vested interests in the existence of NGOs (Samuel, 2013). NGOs' stakeholders are divergent with varying expectations. Such stakeholders will include; government requiring compliance, suppliers concerned with providing NGOs of essentials, community and community groups that expect service delivery and welfare advancement from the NGOs, other NGOs who offer a complete role in the sector, and donors who are the main anchors of their existence through capital development and financing Onyango, Njanja and Charles (2014). Samuel (2013) describes that involvement of stakeholders in the planning and implementation of NGOs' social services facilitates the attaining

of efficiency, ethical practices, and sustainability. Intrinsically, this study focuses on the donors and benefices of the NGOs activities. Especially, beneficiaries will include community and community groups. It will draw from a description by Samuel (2013) to determine the level at which meeting shareholders'

expectations influences performance sustainability; regarding NGOs' adherence to donors' and beneficiaries prospects.

2.6 Conceptual Framework

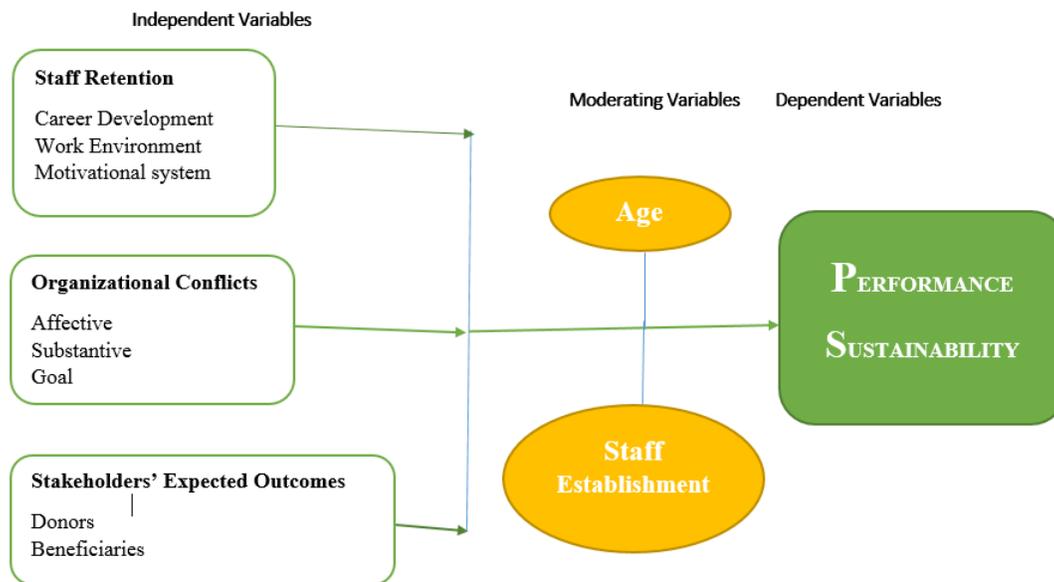


Figure Conceptual Framework for the Study Source: own modelling

III. METHODOLOGY

3.1 Research Design

Notably, the study had settled on a descriptive research design in data collection from the respondents. According to Mugenda and Mugenda (2003), the descriptive research design as utilized in this study aimed a fact finding through streamlining a cross-sectional research that was ideal for this case as it was a direct resource of significant knowledge concerning human capital, organizational conflicts, and shareholder outcomes. The descriptive approach also avails questions of whom to study, what when to observe, and how to collect data and analyze it.

3.2 Study Population

According to Donald and Delno, (2006), the population will entail a range of individuals' items, ranges or cases from which samples will be taken for measurement and inference. Equally, Mugenda and Mugenda (2008) agrees with this outline and as such possessing homogenous characteristics by which the study produces the results. The population was 1170 NGOs registered with the NGO Coordination Board and based in Nairobi from whom the study obtained respondents (NGO Coordination Board, 2013).

3.3 Sampling Frame

The sampling frame will include a list, directory or index of cases from which the sample will be selected (Mugenda and Mugenda, 2008). The subjects from the sampling frame depicted the units of observation in the study. The study's sampling frame was the NGOs based in Nairobi.

3.4 Sampling Size and Sampling Technique

The study, given the current constraints of resources, especially time could not cover the entire population. From a population density of 100 NGOs based in Nairobi, that was selected depending on the convenience and proximity the study randomly sampled 10% of the population to sample 10 NGOs based in Nairobi from where 50 respondents were identified. Questionnaires were prepared for the 50 respondents. Going by the guidance by Orodho and Kombo (2012), the study had employed the purposive sampling techniques to identify the respondents who hailed from the top, middle, and lower levels of management of the NGOs and selected donors and beneficiaries. The selected respondents showed a homogenous cluster of interest.

3.3 Data Collection Instruments

This study employed the open-ended and closed questionnaires to collect data the respondents. Mellenbergh (2008) identified the questionnaire as a research tool including a set of questions and other prompts pursuing information gathering from respondents. The secondary data was sourced from the literature, which was reviewed from previous researches and peer-reviewed scholarly repositories.

3.4 Response Rate

Of the 50 administered questionnaires, 4 of them were returned blank and missing some pages; they were discarded. Additionally, 13 others were inappropriately filled, thus, questioning their reliability. The study settled on rejecting them and furthering the remainder 33 for data coding, clustering, entry and analysis. Thus, a 66 % response rate. It was viable for further analysis; based on Mugenda and Mugenda (2008) who described 50% rate as adequate for data validation.

3.5 Data Analysis and Presentation

Considering that the study collected both qualitative and quantitative data, the descriptive and content analysis was used for analysis. Initially, the data was checked for completeness consistency then check for validity and reliability. For presentation, statistical excerpts and frequency distributions were adopted guided by Cooper and Schindler (2008). As such, the following model was used for the linear regression as well as assisting to determine the effect of successional planning practices on the performance sustainability of NGOs:

$$Y_i = \beta_0 + \beta_1 X_i + \beta_2 X_{i2} + \beta_3 X_{i3} + e_i$$

Where: Y_i = Performance Sustainability of NGOs

X_i = Staff Retention

X_{i2} = Organisational Conflict

X_{i3} = Shareholder Expected Outcomes

e_i = Error Term

$\beta_0, \beta_1, \beta_2, \beta_3$ = Constant of Regression (Unidentified Parameters)

IV. FINDINGS AND DISCUSSION

This section was based on the discussion of the results attained through analysis data with the SPSS tool. Firstly, the results of the data analysis will be availed then proceeded with the discussion. The first section of the questionnaire sought information regarding the demographics of the respondents (gender, age, marital status, educational level, and work experience). Proceeding, the second part of the questionnaire examined respondents' opinions on their NGOs' succession planning practices. Part three of the questionnaire aimed specifically at successional human capital planning reduce staff turnover rate, and succession planning facilitates staff retention, and NGOs' donors and beneficiaries benefit from succession planning. The respondents were required to point out their responses based on a seven-point Likert Scale where 1 (strongly disagree) and 7 (strongly agree).

4.1 Demographics of the Respondents

The results from the first segment are as summarized below illustrating the demographics of the respondents for the study. Expressively, the male constituted 55.1% of the respondents while 44.9% were female. However, the gender proportion was relatively distributed. Entirely all 33 respondents had formal education, where 3% were Ph.D. holders, 48% were MSc. And MBA qualified, the remaining 49% had a graduate degree or diploma. This cluster occupied the top, middle and lower (supervisory) positions in the sampled NGOs. From the marital status, 29.9% were single while 64.7% were married, and the remainder preferred to avoid the question. Notably, from this cluster, there was no indication of either divorce, engagement, separated or widowed. Based on the work experience, 40.2% of the respondents were on the job for 10+ years, 37.8% of the respondents had an experience of 6-10 years, and 22.0% had been engaged with the NGOs for 0-5 years.

4.2 Moderating Aspects

The study emphasized on the two core cues as; years of existence in the NGO Sector and staff establishment. From the

sampled population of 10 NGOs based in Nairobi, the mean organizational age ($M = 2.93, SD = 1.023$), which engulfed majority of the sample that indicated they had existed for 11-15 years. Correspondingly, the sample possessed a lean establishment ($M = 1.74, SD = 1.005$); the majority had approximately ten employees on an average.

4.3 Correlation Analysis

Proceeding, the correlation matrix is illustrated below as generated from the Person r correlation coefficients occurring between the variables in the study. It indicated that successional planning entailing staff retention, addressing organizational conflicts, and meeting shareholder expectations showed a positive association with the performance of NGOs with a correlation of $r = 0.743, r = 0.641, r = 0.866$ respectively. Reducing employee turnover rate by enhancing successional staff retention was observed to influence performance sustainability of NGOs. Effective and successional organizational conflict resolution showed a positive correlation with the sustained performance of NGO at $r = 0.64$ as was the case of Greer and Virick (2008) who emphasized the correlation of successional planning strategy with organizational performance. Lastly, expected donors and beneficiaries' outcomes benefited from the implementation of the two successional planning practices that had positive correlation with performance. It showed a positive correlation of $r = 0.866$ with performance and correlated positively ($r = 0.890$) with the preceding variables staff retention, addressing organizational conflicts.

4.4 Regression Analysis

From the guiding model; $Y_i = \beta_0 + \beta_1 X_i + \beta_2 X_{i2} + \beta_3 X_{i3} + e_i$, there was a 95% significance for the majority of the p-values being higher than 0.05. In fact, merely less than 0.05 could be considered as having a 95% confidence level. Per se, successional planning practices of staff retention, addressing organizational conflicts, and meeting shareholder expectations showed a positive effect on the performance sustainability of NGOs. Furthermore, conforming to Greer and Virick (2008) the higher absolute value of Beta ($\beta_0, \beta_1, \beta_2, \beta_3$ = Constant of Regression) for each variable mirrored the high significance of that variable as translating into the performance sustainability of NGOs. For this study, the translating/ predicting variables were successional planning practices of staff retention ($\beta_1 = 0.23$), addressing organizational conflicts ($\beta_2 = 0.11$) and meeting shareholder expectations ($\beta_3 = 0.09$) as predicting performance sustainability.

4.5 Succession Planning Strategy

From the analysis was found out that 36% of the entire respondents strongly agreed that their NGO had a structured strategy and was implementing succession practices. 24% of the respondents indicated that their NGO was in the process of structuring the plan, while 28% indicated the organization had only started planning. The remainder 12% were not aware of successional planning strategy in their organization and such strategy had not been developed. Imperatively, although entirely all sample organizations had adopted succession planning strategy, this was not known by all their employees. Possibly, this may have arisen from a failure to communicate and facilitate

change, poor structuring, and lack of specialization as earlier noted as being one of the impediments of sustained performance in NGOs. Similarly, Katz (2000) found a same relative proportion of organizational employees were aware of the Board's strategy when choosing new C.E.Os. For their organizations. Collectively, 29 respondents who comprised 88% of the responses confirmed their respective NGOs' strategic plan had integrated successional planning practices entailing staff retention, addressing organizational conflicts, and meeting shareholder expectations.

4.6 Succession Planning Practices

a) Staff Retention

The results from the third part of the questionnaire indicated that staff retention initiatives were occasionally available, and accessible 26 respondents strongly agreed; they constituted of 78.8%, 16.4% agreed, while the remaining 4.8% indicated such initiatives were not available. Statistically, this implied that a larger proportion of the respondents had at least been introduced to the succession human capital practices, particularly, staff retention aimed at lowering the turnover rate of employees. Also, they indicated they had been involved in these practice. The study conceptual framework had identified indicators for staff retention (Rothwell, 2005), which guide by a seven-point scale were used to examine succession staff retention and its effect on performance sustainability of NGOs. 7= To an extremely large extent, 6= To a very large extent, 5= To a large extent, 4= To a moderate extent, 3= To a less extent, 2= Not at all, and 1= I do not know. Scales 7, 6, 5, and 4 collectively indicated 74.54% of the total responses. Of the indicators, career development was selected as what the organization successional practices most, followed by improving the work environment, and lastly motivational system. Agreeing with Adler and Bartholomew, (1992), the study acknowledges the value of staff retention a competitive strategy in reducing employee turnover, thus, enhancing sustained performance and NGOs' survival. The study had set to test the null hypothesis (H_0) that stated H_0 Succession planning on staff retention has no influence on the sustained performance. Resultantly, it adopts the alternate H_1 Succession planning on staff retention has an influence on the sustained performance.

b) Organizational Conflict

From the study, the organizational conflict had various aspect, namely; affective conflict, substantive conflict, and goal conflict. In outlining these aspects, the study evaluated the extent to which they influenced organizational resolve of conflicts at the workplace. The following scale was used; 7= To an extremely large extent, 6= To a very large extent, 5= To a large extent, 4= To a moderate extent, 3= To a less extent, 2= Not at all, and 1= I do not know. Resultantly, 52% indicated they had experienced affective conflict, followed by 49% who pointed out substantive conflict, while those who had experienced goal conflict were 29%. Notably, the literature reflected organizations as living open systems entailing various interacting units, which jointly perform specific duties and responsibilities within a structure of limited resources (Tornudd, 2003). Fundamentally, conflicts manifest in the organizational workplace regarding the allocation of resources, primary conflict about the structure of their organization and the fundamental nature of their interaction

(Aubert, 1963). The study agreed with Aubert (1963) that resolution could be amicably managed through organizational structures, methods, and processes (Sheppard, 1992). Even so, when organizational conflicts are not addressed among staff or other conflicting parties, it is detrimental and destroys as well, derailing organizational focus and performance. The study had set to test the null hypothesis (H_0) that stated H_0 Succession planning on organizational conflicts has no influence on the sustained performance. Resultantly, it adopts the alternate H_1 Succession planning on organizational conflicts has an influence on the sustained performance.

c) Stakeholders' Expected Outcomes

Particularly, this variable had two indicators, namely; donors and beneficiaries. The results indicated no problematic correlations (higher than 0.8) while the determinant of the matrix was $0.976 >> 0.00001$. Indeed, the correlation output indicated no concerns of multi-co-linearity because all the questions relatively correlated. The influence of succession planning practices on stakeholder expected outcomes was evaluated through a multiple regression analysis involving the various variables of succession staff retention planning and stakeholder outcome and succession organizational conflict planning. The former showed a positive correlation of interaction between effective and successional retaining staff aimed at lowering the turnover rate and achieving performance a prerequisite effort stakeholder involvement. As such, successional planning practices in staff retention had a significant influence on the donors and beneficiaries' expected outcomes. Correspondingly succeeding practices in addressing workplace conflicts were shown to impact positively on the organizational performance. The correlation was evidently positive. This concurred with Samuel (2013) when he was examining the level of NGOs' participation of governance on accountability to stakeholders in Kisumu. Donors and beneficiaries of NGOs draw immensely for an enhanced and continued performance from the NGOs. The study had set to test the null hypothesis (H_0) that stated H_0 Succession planning practices have no contribution to meeting stakeholders' expectations. Resultantly, it adopts the alternate H_1 Succession planning practices contribute to meeting stakeholders' expectations.

V. CONCLUSION

5.1 Summary

One of the most significant objectives of an organization is realizing growth and performance, thus leading to survivability. Hence, it is imperative to employ various resources in the organization to achieve organizational goals. Particularly, the human capital is the most important resource for goals realization. Although, survivability assumes the most emphasis, the study opines that the primary concern is that these organizations perceived successional planning practices as huge and failed to adopt them. Three core independent variables covering the successional planning concept namely, Staff Retention, Organizational Conflict and meeting stakeholder expected outcomes play an obligatory role in stimulating the organizational survival in the Non-Governmental Organizations in Kenya. The high positive correlations between the independent variables and the dependent variable – Performance

Sustainability offer a wisdom avenue for the operationalization and management of these NGOs in an effort of lowering their employees' turnover rate through career development, improving work environment and motivational systems, resolving affective, substantive, and goal conflicts, and meeting expected outcomes by donors and beneficiaries. Additionally, NGOs through successional planning concept will sustain their relevance and remain in the sector in the long-run.

5.2 Recommendations

The study recommends based on the study finding that key challenges included the high NGO's employee turnover rate and growing organizational conflict. It observed that NGOs should establish appropriate staff retention strategies, focus on the fundamentals of organizational communication, conflict management strategies and styles. Such strategies should be implemented at all organizational levels in an endeavour of realizing performance and survivability. Thus, being able to meet their respective stakeholders' expected outcomes. It is essential to conduct appropriate research to examine what other organizations are doing and how they do it to enhance their effectiveness, efficiency regarding resource utilization, processes, and technology, capacity relating to generation of results/ output, as well as, concerns of sustained or continued performance and survivability and lastly their responsiveness to the environment and future uncertainties. Lastly, since the study was more exploratory and descriptive, there is the need for more refined research to define some of the parameters and trends that could not be achieved in this study. Future research should seek to extend the determination of the study to definitively avail solutions for the key issues in succession planning.

5.3 Conclusion

The study attained significant findings to the set objectives of successional planning practices. Accordingly, the study concludes that numerous NGOs in Kenya do not adequately adopt successional planning. Possibly, due to varying perception of the practices by the Board members and top-level management. While some NGOs have adopted the successional planning practices, the adoption is yet to be finalised. Resultantly, there is a poor transition of leadership within the organizations, which is not effective for organization seeking performance and sustainability. The study concludes that effective Succession planning on staff retention, organizational conflicts and meeting stakeholders expected outcomes has sound influence on NGOs' performance.

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Growth Performance of Stevia (*Stevia Rebaudiana Bert.*) as Influenced by Clonal Propagation Methods and Growing Media

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Abstract- The study was conducted to evaluate the growth performance of Stevia as influenced by clonal propagation methods and growing media at the Nursery House of the City Agriculture Office, Casisang, Malaybalay City, Bukidnon, Philippines from September 2015 to November 2015. The study was carried-out in a 3 x 5 factorial arrangement in Completely Randomized Design (CRD) with three replicates and twenty plants per replication with cutting methods (A1 – shoot tip cuttings, A2 – nodal cuttings and A3 – wedge stem cuttings) as Factor A and growing media (B1 – pure garden soil, B2 – ½ garden soil + ½ vermicast, B3 – pure vermicast, B4 – ½ garden soil + ½ sand, and B5 – 1/3 garden soil + 1/3 sand + 1/3 vermicast) as Factor B. Results revealed that shoot tip cuttings in combination with 1/3 garden soil + 1/3 sand + 1/3 vermicast in plastic cups two months after planting significantly produced the tallest plants (13.72 cm), highest survival rates (96% for Factor A and 97.33% for Factor B), least incidence of leaf curling and leaf dark spot (both 1.22 ratings for Factor B), and most number of leaves (26.67) and branches (3.25). However, the combinations of nodal cuttings and pure garden soil showed very poor growth performance with the shortest height, least survival rate, highest incidence of leaf curling and leaf dark spot, and least number of leaves and branches. Thus, propagating Stevias using shoot tip cuttings with 1/3 garden soil + 1/3 sand + 1/3 vermicast media mixture using plastic cups for two months showed the best growth performance. Hence, recommended for mass propagation and herbage production.

Index Terms- Stevia, vermicast, survival rates, wedge stems and nodal cuttings

I. INTRODUCTION

Stevia (*Stevia rebaudiana* Bertoni) commonly known as sweet leaf or sugar leaf is a natural and healthy alternative to sugar and artificial sweeteners. It is a famous perennial shrub of Asteraceae family (Geuns, 2007). It is extensively grown in the subtropical regions, Stevia has long been widely used as sweetener in beverages and mask the bitter taste of certain herbal medicinal plants in several countries like Brazil, Japan, Paraguay, etc. (Parsons and Cuthberston, 2001), however, it is not well known in the Philippines.

The leaves of Stevia are the sources of stevioside, a natural sweetener and is 250-300 times sweeter than sucrose, heat stable, pH stable, non-fermentable and has no effect on blood sugar (Geuns, 2003; Goyal and Samsher, 2010); hence considered and allowed to be called as sweetener by the Food and Drug Administration (FDA) of the US in 2008. Stevia alleviates hypoglycaemia and type 2 diabetes (Soejorto et al., 2002; Ramesh et al, 2006), nourishes pancreas and thereby helps restore its normal function. It also contains high percentage of phenols that reduce the cardiac and cancer diseases (Dragovi-Uzelac et al., 2010) and flavonoids which have high antioxidant activity (Tadhani et al., 2007; Shukla et al., 2009).

Apart from sweetness, Stevia is imbued with stevioside related compounds of rebaudioside A and steviol that offer therapeutic benefits like antihypertensive, antidiabetic, anti-inflammatory, anti-tumor, antioxidant, antidiarrheal, diuretic and immunomodulatory actions. Steviol interacts with the drug transporters, hence proposed as drug modulator (Goyal and Samsher, 2010).

The economic importance, health benefits and high demand of Stevia in both local and export market provide great production, income and livelihood opportunities for farmers, hobbyists and households. Moreover, the crop is adapted over a wide range of climatic conditions in the country and apparently been successfully grown abroad (Qui et al., 2000).

At present, little is known about Stevia as well as its propagation, postharvest handling and processing. There are no protocols on rapid clonal propagation and growing media. particularly in Mindanao or Bukidnon are available.

Thus, the objective of this study was to evaluate the growth performance of Stevia (*Stevia rebaudiana* Bert.) as influenced by methods of clonal propagation and growing media.

II. MATERIALS AND METHODS

The study was conducted at the Nursery House of the City Agriculture Office, Casisang, Malaybalay City, Bukidnon for two (2) months starting September 2015 to November 2015.

The study utilized Stevia mother plants (*Stevia rebaudiana* Bert.), B-net screened nursery structures (9.5 m long x 5.5 m wide x 3 m high) with 50-60% shade, disposable cups (7 oz), cutting propagation tools, hose, garden soil, sand, vermicast, water sources, sprinklers, garden tools, wooden sticks, scissors/cutting tools, plastic twines, rulers/meter stick, weighing scales, cent-o gram balance, polyethylene pots/bags, stevia leaves and stems, blender, empty sacks/mesh nets, packaging/processing tools and equipment.

This study was laid-out in a 3 x 5 Factorial Arrangement in Completely Randomized Design (CRD) replicated 3 times with 20 samples per replication. The three types of cuttings of Stevia served as Factor A and the five combinations of growing media as Factor B, as indicated:

Factor A (Types of Cutting)	Factor B (Growing Media)
A ₁ - Shoot tip	B ₁ - Pure garden soil (control)
A ₂ - Nodal	B ₂ - 1/2 Garden soil + 1/2Vermicast
A ₃ - Wedge stem	B ₃ - Pure Vermicast
B ₄ - 1/2 Vermicast +1/2 Sand	B ₅ - 1/3Vermicast+1/3Garden soil+1/3 Sand

The different treatments and treatment combinations are shown in Table 1.

Table 1. Treatments and treatment combinations

TYPES OF CUTTING (FACTOR A)	GROWING MEDIA (FACTOR B)	TREATMENT COMBINATIONS/ CODES	TREATMENTS
Shoot tip (A ₁)	▪ Pure garden soil (Control –B ₁)	A ₁ B ₁	T ₁
	▪ ½ Garden soil + ½ Vermicast (B ₂)	A ₁ B ₂	T ₂
	▪ Pure vermicast (B ₃)	A ₁ B ₃	T ₃
	▪ ½ Vermicast + ½ Sand (B ₄)	A ₁ B ₄	T ₄
	▪ 1/3 Vermicast + 1/3 Garden soil + 1/3 Sand (B ₅)	A ₁ B ₅	T ₅
Nodal (A ₂)	▪ Pure garden soil (Control –B ₁)	A ₂ B ₁	T ₆
	▪ ½ garden soil + ½ Vermicast (B ₂)	A ₂ B ₂	T ₇
	▪ Pure vermicast (B ₃)	A ₂ B ₃	T ₈
	▪ ½ Vermicast + ½ Sand (B ₄)	A ₂ B ₄	T ₉
	▪ 1/3 Vermicast + 1/3 Garden soil + 1/3 Sand (B ₅)	A ₂ B ₅	T ₁₀
Wedge stem (A ₃)	▪ Pure garden soil (Control –B ₁)	A ₃ B ₁	T ₁₁
	▪ ½ Garden soil + ½ Vermicast (B ₂)	A ₃ B ₂	T ₁₂
	▪ Pure vermicast (B ₃)	A ₃ B ₃	T ₁₃
	▪ ½ Vermicast + ½ Sand (B ₄)	A ₃ B ₄	T ₁₄
	▪ 1/3 Vermicast + 1/3 Garden soil + 1/3 Sand (B ₅)	A ₃ B ₅	T ₁₅

A two-layer 2-ply B-net nursery was established with a height of 3 meters and a considerable 50-60% shade in the inside condition. It has a strong support of metal and wooden frames including the door. The ground terrain inside the nursery was elevated and was compartmentalized with cemented boxes for the set-ups (Appendix Figure 1). The terrain was rolling; hence, canals were defined along the cemented boxes.

The study utilized 10 sq.m. area (10 m long and 1 m wide) and was enclosed by a screened nursery. The area was divided into 45 small plots of equal sizes (0.31 m x 0.38 m or an area of 0.12 sq.m. each plot) corresponding fifteen (15) treatments with an alleyway between plots of 0.076 m. as well as 0.5 m from plots to the nursery wall. The lay-out is shown in Appendix Fig. 2.

A composite sample of 1 kg for each of the growing media was taken and air-dried for chemical analysis. These air-dried samples were then submitted to the City Soil Testing Laboratory, City Agriculture Office, Casisang, Malaybalay City for routine analysis such as organic matter (OM), phosphorus (P), potassium (K) and pH.

All the growing media were sterilized using hot water treatment prior to polypotting.

Stevia planting materials were purchased from a nursery in Baungon, Bukidnon and the plastic cups (7 oz) from an agricultural supply at Malaybalay City. The garden soil and sand were procured from the garden area of the City Agriculture Office, Casisang, Malaybalay City, while the vermicast from an agricultural supply in Malaybalay City.

Each growing medium was weighed equally prior to polypotting with the vermicast as the basis for all the growing media combinations for all the pots. For the growing media combinations, a 100% pure garden soil, 1/2 garden soil + 1/2 vermicast, 100%

vermicast, 1/2 vermicast + 1/2 sand and 1/3 vermicast + 1/3 garden soil + 1/3 sand were allocated to various treatment samples. Twenty plastic cups filled with media mixtures were placed according to their respective lay-out per treatment per replication. For the types of cuttings: three nodes shoot tip cuttings, one node nodal cutting and one inch wedge stem cutting for each sample was prepared. Nodal and wedge stem cuttings were taken from medium to matured stems of Stevia mother plants. All the cuttings were dipped in tap water prior to planting. One cutting was planted per pot.

A total of nine hundred (900) cuttings were planted for the entire study with one cutting per pot. The potted plastic cups were watered using the sprinkler before planting to prevent the cuttings from washing-out if sprinkling is done after planting. Labeling was done according to respective treatments.

A 10 m long x 1.25 m wide transparent polyethylene cellophane was established 0.5 m above the experimental set-up after planting the cuttings to the pots to prevent the young cuttings from direct heat of the sun and heavy rains.

Watering. Water was applied to the cuttings 2 to 3 times a day or as needed. The soil was kept moist all the time, but not water soaked, to prevent the cuttings from wilting.

Cultivation. The growing media were cultivated from time to time where the cuttings were grown to facilitate proper aeration for the cuttings to produce roots.

Diseases Control. Diseases attacking the plants were not controlled, but were being observed and recorded.

Among the data gathered were the average plant height, survival rate, incidence of leaf curling and leaf dark spot, and number of branches and leaves per plant.

The analysis of variance (ANOVA) using factorial in Completely Randomized Design (CRD) was used to solve for the level of significance. The Tukey Test was used to compare significant differences among treatment means.

III. RESULTS AND DISCUSSION

Average Plant Height (cm)

The average plant height of Stevia cuttings at 60 days after planting (DAP) in response to growing media is presented in Table 2. Statistical analysis revealed that heights of stevia cuttings upon termination of the study were highly influenced by the propagation methods (Factor A). Similarly in Factor B, the respective heights of the plants were affected by the growing media used. However, no significant interaction effect was observed between the two factors.

The types of cuttings in propagating Stevias produced different heights at the end of the study. Shoot tip cuttings had the tallest plants with an average height of 13.72 cm which were significantly different from those propagated using wedge stem and nodal cuttings with 4.84 cm and 4.51 cm, respectively (Fig. 1). Since the shoot tip cuttings used at the start of the study had an average height of 5 cm containing 3 nodes from the tip while the nodal and wedge stem cuttings just bulging the bud eyes from the stems, it is therefore expected that those grown using shoot tips had unprecedented leap of the heights compared to the latter two months after the study started. Shoot tip cuttings bind to the idea that growth is fast due to the controlling power of auxin for apical dominance (Hartman and Kester, 2013).

Table 2. Average plant height (cm) of Stevia (*Stevia rebaudiana* Bert.) cuttings at 60 day after planting (DAP) in response to different growing media

GROWING MEDIA (B)	PROPAGATION METHODS (A)			Mean (B)*
	Shoot Tip Cutting	Nodal Cutting	Wedge Stem Cutting	
Pure Garden Soil	11.43	3.73	3.90	6.35 ^b
½ Garden Soil + ½ Vermicast	16.23	4.97	5.23	8.81 ^a
Pure Vermicast	13.81	4.33	4.43	7.52 ^{ab}
½ Sand + ½ Vermicast	12.48	4.57	4.80	7.28 ^{ab}
1/3 Garden Soil + 1/3 Vermicast + 1/3 Sand	14.67	4.93	5.83	8.48 ^{ab}
MEAN (A)**	13.72 ^a	4.51 ^b	4.84 ^b	
F-test:	A **, B *, A x B ^{ns}			
CV:	20.53%			

Means within the same column and row followed by common letters are not significantly different at 5% level of significance based on Tukey's Test.

** - highly significant, * - significant, ns - non significant

According to Lab (2012) that auxin induces shoot apical dominance; the axillary buds are inhibited by auxin, as a high concentration of auxin directly stimulates ethylene synthesis in axillary buds, causing inhibition of their growth and potentiation of apical dominance. When the apex of the plant is removed, the inhibitory effect is removed and the growth of lateral buds is enhanced. Auxin is sent to the part of the plant facing away from the light, where it promotes cell elongation. If there is no cutting happened in

the apical part or the shoot tip, the growth would be faster since auxin is polar, hence, more of its concentration focuses on the apex part.

The growth and proliferation of the cuttings has something to do with the various growing media used based on the independent interaction effects of each factor.

For the various growing media, it showed also that cuttings grown in ½ garden soil + ½ vermicast had the tallest plant with 8.81 cm upon the termination of the study (Fig. 2). It was, however, not significantly different from those grown in (1/3 garden soil + 1/3 vermicast + 1/3 sand) and 100% pure vermicast with 8.48 cm and 7.53 cm, respectively; but were statistically far from those grown in pure garden soil with 6.35 cm only. Based from the soil analysis of the growing media and the kinds of the media themselves, nutrients are contributory to the growth performance of the cuttings especially plant height. According to Hartman and Kester (2013) and Bautista (1994), the 3 macronutrients such as nitrogen, phosphorus and potassium have special roles on the growth and development of the plants which were contained in four organic growing media except with few amounts in pure garden soil alone.

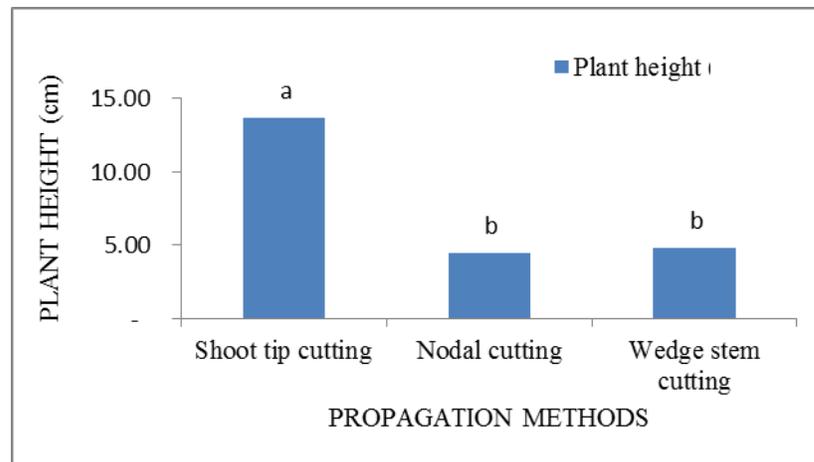


Fig. 1. Average plant height (cm) of Stevia at 60 DAP as affected by propagation methods

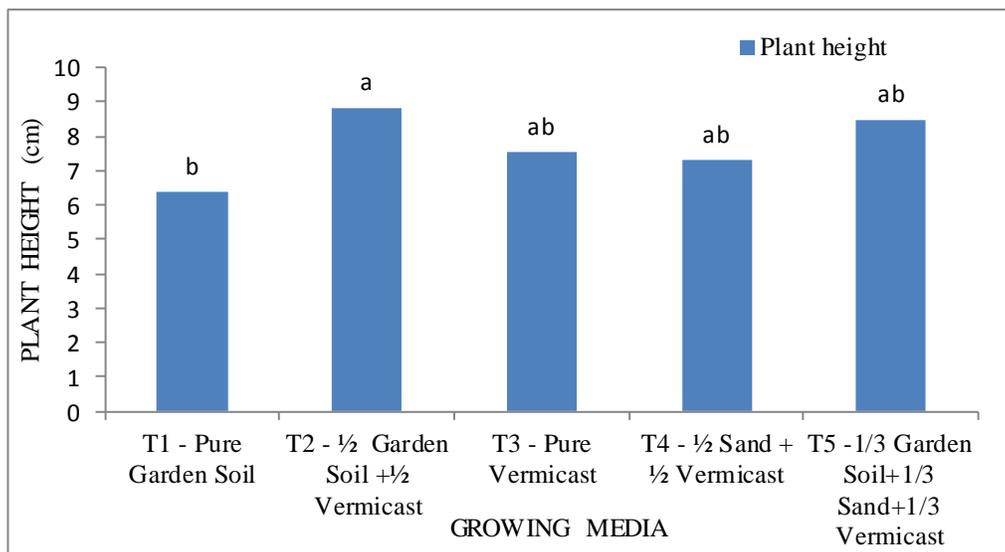


Fig. 2. Average plant height (cm) of Stevia at 60 DAP as affected by growing media

F

Survival Rate

The percent survival of Stevia in response to types of cuttings and growing media is presented in Table 3. Statistical analysis showed no significant difference observed regardless of the types of cuttings (Factor A) and the growing media (Factor B) used. No interaction effect was likewise observed between the two factors.

However, the combination of shoot tip cuttings with 1/3 garden soil + 1/3 vermicast + 1/3 sand as growing media obtained the highest survival rate with 96% for the former and 97.33% for the latter, respectively, though their differences were not that significantly different from the rest of the treatment combinations.

Stevia plants using nodal cuttings in Factor A obtained the lowest survival rate with 92.07%, while those grown in pure garden soil in Factor B had 92.22% survival rate.

According to Kassahun et al. (2013), top cuttings or shoot tip cuttings with three nodes among Stevia plants demonstrated significantly higher values of survival rate (82.5%), but are not that far from cuttings taken at the bottom. Consistently in this study, shoot tip cuttings also obtained the highest survival rate at 96% compared to nodal and wedge stem which had only 92.07% and 93.67%, respectively. Considering that the whole set-ups were placed under screened house or B-net nursery, survival rate had been high for all the treatments.

Table 3. Survival rate (%) of Stevia (*Stevia rebaudiana* Bert.) cuttings in response to growing media

TREATMENTS	SURVIVAL RATE (%)
Propagation Methods (A)	
Shoot Tip Cutting	96.00
Nodal Cutting	92.07
Wedge Stem Cutting	93.67
Growing Media (B)	
Garden Soil	92.22
½ Garden Soil + ½ Vermicast	96.11
Vermicast	92.78
½ Sand + ½ Vermicast	91.11
1/3 Garden Soil + 1/3 Vermicast + 1/3 Sand	97.33
F-test: A ^{ns} , B ^{ns} , A x B ^{ns}	
C.V. (%)	6.20

ns - non significant

Leaf Curling and Leaf Dark Spot Incidence

The incidence of leaf curling and leaf dark spots among Stevia cuttings propagated using different growing media are shown in Table 4. No significant differences were observed regardless of the types of cuttings and growing media as well as their respective interaction effects.

Leaf curling occurred in plants especially Stevia in the younger stage due to deficiency in calcium in the growing media, thus making the leaves to have downward position (Cuenen, 2010). Thus, as shown in Table 5, the highest incidence of leaf curling was observed in propagated cuttings (Factor B) grown in garden soil with 2.0, while the lowest was on cuttings grown in media with 1/3 garden soil + 1/3 vermicast + 1/3 sand with 1.22 incidence per plot. However, their differences were not that significant regardless of the growing media used.

For the propagation methods (Factor A), it was revealed that Stevia cuttings using nodes obtained the highest incidence of leaf curling per plot with 1.80, while the lowest was with those propagated using wedge stems with 1.40 occurrences. Their differences, however, were found not significantly different from each other.

For leaf dark spots, it showed that the lower incidence was observed on cuttings propagated using nodes and wedge stems (both 1.53) in Factor A, with a bit higher incidence on those propagated using shoot tips with 1.73. However, their differences were said to be not significantly far from each other. Likewise, it was revealed in Factor B that stevia cuttings grown in pure garden soil had the most number of leaf dark spots with 1.89, while the least with those grown in 1/3 garden soil + 1/3 vermicast + 1/3 sand with 1.22 plants infected per plot. According to Cuenen (2010), leaf dark spots among stevia plants are due to lack of calcium resulting to chlorosis and necrosis of leaves.

The incidence of both leaf curling and leaf dark spots in Stevia plants only ranged from 1 to 2 plants having these deficiency symptoms per plot with a total of 20 plants in a plot (or only 5 to 10% of the plants in the plot). The degree of damage was just slight and insignificant since only few leaves in selected plants were infected with the symptoms.

Table 4. Leaf curling and leaf dark spot incidence in Stevia (*Stevia rebaudiana* Bert.) cuttings in response to growing media

TREATMENTS	LEAF CURLING INCIDENCE	LEAF DARK SPOT INCIDENCE
Propagation Methods (A)		
Shoot Tip Cutting	1.47	1.73
Nodal Cutting	1.80	1.53
Wedge Stem Cutting	1.40	1.53
Growing Media (B)		
Garden Soil	2.00	1.89
½ Garden Soil + ½ Vermicast	1.56	1.67
Vermicast	1.44	1.67
½ Sand + ½ Vermicast	1.56	1.56
1/3 Garden Soil + 1/3 Vermicast + 1/3 Sand	1.22	1.22
F-test:		
A	ns	ns
B	ns	ns
A x B	ns	ns
C.V. (%)	14.55	19.46

ns – non significant

Average Number of Branches per Rooted Cutting

Table 5 reflects the average number of branches per rooted cutting or per plant of Stevia grown in different growing media. Statistical analysis revealed that propagation methods (Factor A) and growing media (Factor B) highly influenced the number of branches per rooted cutting. No interaction effect was found between these factors.

In Factor A, Stevia grown using shoot tip cuttings obtained the most number of branches per plant with 2.69 and was significantly different from those using wedge stem and nodal cuttings with 1.17 and 0.99, respectively (Fig. 3). Propagating Stevia using wedge stem cuttings was not statistically different from those using nodal cuttings. As Gvasaliye et al. (1990) also reported that the rooting of cuttings was best in cuttings taken from side shoots and from tops of the main shoot in honey grass. Cuttings from the top part of the main stem of Stevia generally gave the best result (Tirtoboma, 1988). Top cuttings with three nodes demonstrated significantly higher values of number of branches per seedling (Kassahun et al., 2013).

According to Hartman and Kester (2013), apical dominance is apparent among shoot tips with high concentration of auxin, thus, promoting growth faster. Shoot tips were already defined having 3 nodes from the tip which were used in the study as compared to nodal and wedge stem cuttings where the buds were still bulging and whose stem nodes have yet to be defined.

Similarly in Factor B, stevia cuttings grown in 1/3 garden soil + 1/3 vermicast + 1/3 sand had the most average number of branches per plant with 2.04. It was, however, not significantly different from those grown in ½ garden soil + ½ vermicast, ½ sand + ½ vermicast and pure vermicast with 1.73, 1.69 and 1.62 branches, respectively (Fig. 4). Those grown in pure garden soil only obtained the least with 0.99 branch per plant. Hartman and Kester (2013) emphasized the roles of nutrients such as nitrogen, phosphorus and potassium in the cell division, differentiation and elongation as well as nutrient uptake and transport to different growth regions in plants; thus, giving rise to the development of many nodal points and branches.

Top cuttings with three nodes demonstrated significantly higher values of number of branches/seedling (7), number of leaves/branch (15) and number of leaves/seedling (56) and lowest values of these parameters were recorded for bottom cuttings (Kassahun et al., 2013).

Table 5. Average number of branches per rooted cutting of Stevia (*Stevia rebaudiana* Bert.) cuttings in response to growing media

GROWING MEDIA (B)	PROPAGATION METHODS (A)			Mean (B)*
	Shoot Tip Cutting	Nodal Cutting	Wedge Stem Cutting	
Pure Garden Soil	2.43	0.23	0.50	0.99 ^b
½ Garden Soil + ½ Vermicast	2.63	1.17	1.40	1.73 ^a
Pure Vermicast	2.71	1.00	1.17	1.62 ^a
½ Sand + ½ Vermicast	2.61	1.27	1.20	1.69 ^a
1/3 Garden Soil + 1/3 Vermicast + 1/3 Sand	3.25	1.30	1.57	2.04 ^a

MEAN (A)**	2.69 ^a	0.99 ^b	1.17 ^b
F-test:	A**, B*, A x B ^{ns}		
CV:	26.86%		

Means within the same column and row followed by a common letter are not significantly different at 5% level of significance based on Tukey's Test.

** - highly significant, ns - non significant

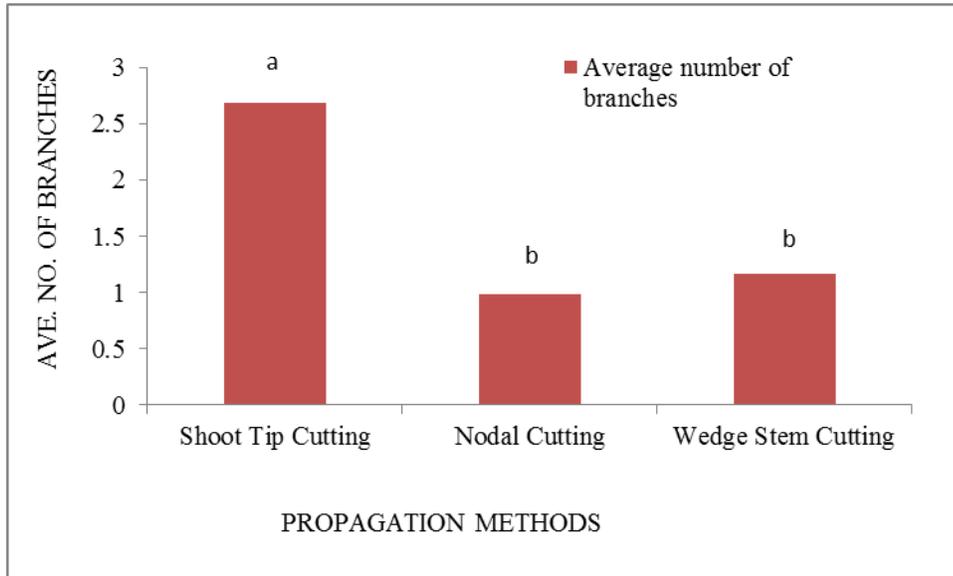


Fig. 3. Average number of branches per rooted cutting of Stevia as affected by propagation methods

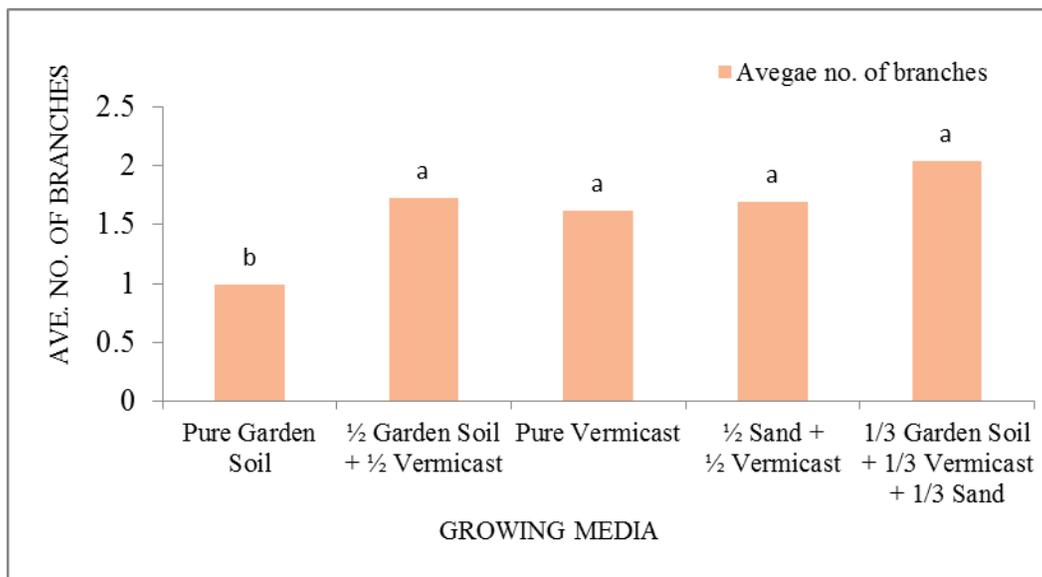


Fig. 4. Average number of branches per rooted cutting of Stevia as affected by growing media

Average Number of Leaves per Plant

Propagation methods (Factor A) as well as growing media (Factor B) greatly influenced the production of leaves of Stevia two months after planting with no interaction effect found between the two factors (Table 6) .

The production of leaves conforms to the production of branches (Table 5) on propagation methods and growing media as well as their respective interaction effects. The number of branches likewise determines the numbers of leaves since nodes are borne to every branch.

On propagation methods, it showed that Stevia propagated through shoot tip cuttings obtained the most number of leaves with 22 and was significantly different from those grown using nodal and wedge stem cuttings with 15.87 and 14.73, respectively (Fig. 5). It is also evident that as more branches were produced using shoot tip cuttings, more leaves were likewise being borne because many nodes were also produced regardless of the sizes of the leaves. Faster growth was also observed among shoot tip cuttings as compared to nodal and wedge stems. Cuttings from the top part of the main stem of stevia generally gave the best result (Tirtoboma, 1988).

Results on growing media revealed that the combination of 1/3 garden soil + 1/3 vermicast + 1/3 sand produced the most number of leaves per plant with 20.56 regardless of the independent interaction effects of the two factors (Fig. 6). It was, however, not significantly different from those grown using 1/2 garden soil + 1/2 vermicast with 19.22, but is statistically different from the rest of the treatment combinations.

Those grown using pure garden soil only obtained 13.56 leaves per plot. Stevia grows well in sandy loam soils with an enough supply of water during the month of October as exhibited in the balanced media combinations of 1/3 garden soil + 1/3 sand + 1/3 vermicast. Stevia prefers acidic to neutral soil with a pH range of 6.5-7.5 for its best growth. Saline soils should be avoided as stevia plant is susceptible to water logged conditions. (<http://stevia.blogspot.com>). Stevia will not grow in saline soils (Todd, 2010).

Table 6. Average number of leaves per plant of Stevia (*Stevia rebaudiana* Bert.) cuttings in response to growing media

GROWING MEDIA (B)	PROPAGATION METHODS (A)			Mean (B)*
	Shoot Tip Cutting	Nodal Cutting	Wedge Stem Cutting	
Pure Garden Soil	18.00	10.67	12.00	13.56 ^d
1/2 Garden Soil + 1/2 Vermicast	22.67	17.33	17.67	19.22 ^{ab}
Pure Vermicast	21.67	14.33	14.67	16.89 ^c
1/2 Sand + 1/2 Vermicast	21.00	15.33	16.00	17.44 ^{bc}
1/3 Garden Soil + 1/3 Vermicast + 1/3 Sand	26.67	16.00	19.00	20.56 ^a
MEAN (A)**	22.00 ^a	14.73 ^b	15.87 ^b	
F-test:	A **, B *, A x B ^{ns}			
CV:	8.84%			

Means within the same columns and rows followed by common letters are not significantly different at 5% level of significance based on Tukey’s Test.

** - highly significant, ns - non significant

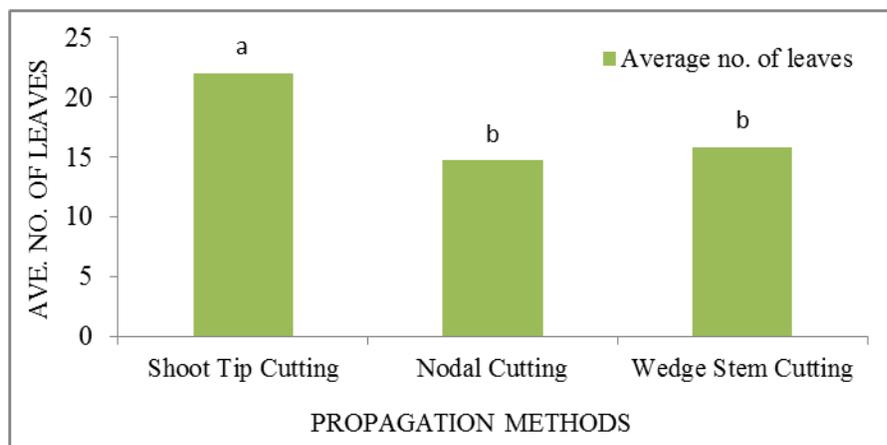


Fig. 5. Average number of leaves per plant of Stevia as affected by propagation methods

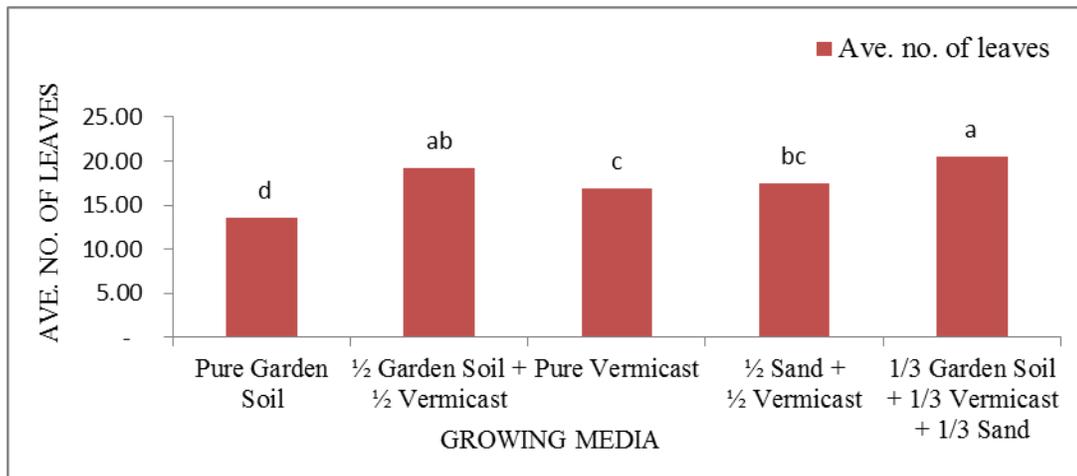


Fig. 6. Average number of leaves per plant of Stevia as affected by growing media

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Domestic rainwater harvesting, a potential tool for socio-economic development in salinity affected coastal Bangladesh

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Abstract- Salinity intrusion is causing acute drinking water crisis in Southern and coastal part of Bangladesh. During dry season major portion of rural people use pond water for drinking which is unhygienic and also becoming saline gradually. This problem has been even more severe since the cyclone SIDR in 2008. Rainwater harvesting is a laboratory proven sustainable drinking water supply solution. Taking Paikgacha Upazilla in Sathkhira district of coastal Bangladesh the study seeks to analyze the way how rain water harvesting can accelerate the access of coastal people to safe drinking water and to what extent they have willingness to accept and pay for the service. After assessing the current condition of access to drinking water, the opinion of rural people about their willingness to install domestic rain water harvesting system in their houses has been assessed. It has been found that more the 50% of respondents drink the water collected from pond and a good number from the rest buy it from sources outside the village at taka three per liter. This research has revealed that major portion of the rural people has willingness to pay at least two taka per liter; higher income people are even willing to pay taka five for the same. Plus, a section of people have expressed their willingness to take this as a small social entrepreneurship opportunity. They are willing to install rainwater harvesting plant for their own and have expressed their willingness to sell the extra water to their neighbor at the price at which they buy and fetch water from sources outside the village.

Index Terms- Domestic Rainwater harvesting, Social entrepreneurship, Salinity.

I. INTRODUCTION

1.1 Background of the study

In the southern part of Bangladesh especially Paikgacha, Shatkhira, Khulna etc. are facing an acute scarcity of safe drinking water due to the adjacency of the Bay of Bengal. This problem has been even more severe after the dreadful attack of SIDR (Coastal Cyclone, attacked in the year 2008). During dry season rural people have no way other than drinking pond, ditch water which is unhygienic and getting saline continuously. Now-a-days the idea of rain water harvesting system has gained popularity all over the world. So the initialization of rain water harvesting system in these affected areas is necessary to minimize the problem of water scarcity. The objective of the study is to supply rain water in the affected areas after the rainy season when water problems is acute. So the opinion of rural people about their willingness to install the system in their house is assessed.

II. REVIEW OF LITERATURE & CASE STUDIES

2.1. Concept of Rainwater Harvesting: Rainwater is an open source of pure drinking water and rainwater harvesting refers to collection and storage of rainwater and other activities aimed at harvesting surface and ground water. It also includes prevention of losses through evaporation and seepage and all other hydrological and engineering interventions and efficient utilization of the limited water endowment of physiographic unit such as watershed (S.Vishwanath, n.d.). The rainwater can be stored for direct use or can be recharged.

2.2 Rain water harvesting project in different countries

2.2.1 Rain water harvesting in Rajasthan, India: Akash Ganga Rain water harvesting, Rajasthan, India has been a successful project mitigating water crisis problem had been faced by a lot of people in the past years. During the dry season, households have to buy water from water vendors at a cost of \$2 per camel cart (which on the average is the minimum daily consumption of a family). With support from Akash Ganga, families now have a secure supply source of drinking water enough for 10-12 months of the year. The Akash Ganga project was selected as one of 30 winning proposals from more than 2,600 applicants for the 2006 competition. The big boost to the project came in 2006, when Akash Ganga won the World Bank's Development Marketplace Award. A \$200,000 grant allowed the project to expand operations to other villages. (Anon., 2009)

The project has the capacity to collect and store rainwater (with average rainfall) sufficient for an entire year. Each village needed an investment of \$100,000. The materials account for 60% to 65% of the total costs and labor expenses constitute 20% to 25%. Some 10% to 15% is absorbed by general and administrative costs. According to the extension proposal, the government will contribute 70% of the funds. The community will pay 15% and the other 15% will be raised from private sources. Revenues will be generated from the fees charged to the villagers for water, and horticulture. A total of 119 household tanks were constructed in three villages in the Alwar district in Rajasthan and an intermediate tank and a recharge well were built. The network stores rainwater sufficient to meet the drinking water needs of these villages. As a community-driven initiative, the project was very careful in its design to develop a scheme that was culturally appropriate and attentive to important issues surrounding social caste, class and gender. (Anon., 2009)

2.2.2 Rain water harvesting in Uganda

Water crisis problem is very severe in Africa especially in Uganda. The field studies confirmed that there is a widespread latent demand for low-cost water storage, especially in Africa, where people are paying US \$18- \$30 for a 200 liter barrel to store water at the household level. EW (Enterprise Works) contracted an international promotion firm Saatchi & Saatchi to develop a promotional campaign highlighting the advantages of *bob* in posters, billboards, brochures, wall paintings and through radio shows. The campaign combines promotional and educational themes to inform potential clients and stimulate demand. In order to understand how price affects the uptake for the product and the impact at the household level, EW is partnering with Innovations for Poverty Action to conduct an in-depth study. A baseline survey has been undertaken in 3,240 households across 81 villages in one district in Uganda. The partnerships formed at the start of the project, and a strong communication strategy ensures that information reaches key organizations (private enterprises, non-governmental organizations, governments, donors, and other interested parties). This project can directly contribute to poverty reduction by improving access to safe water in the home, relieving women and children from the drudgery of fetching water, while improving health and the quality of life of household members. Moreover, reduced medical expenses will directly increase the disposable income in the household. (Naugle, 2011)

III. STUDY AREA PROFILE & METHODOLOGY

3.1. Study Area Profile:

Name of the study Area: Goroykhali of Paikgacha Upazila, Khulna district

Annual Rainfall: 1710m.m.(UNICEF, 2014)

Salinity level: 1000 ppm. (Hasan, 2012)

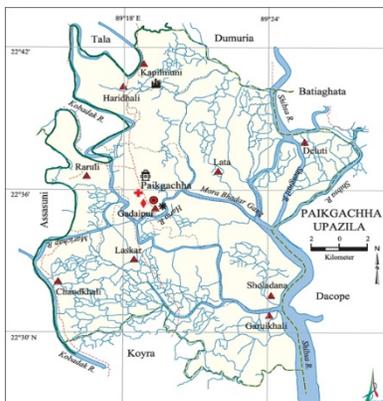


Fig 3.1: Map of Paikgacha Upazilla Source: Banglapedia, n.d.

3.2 Methodology

3.2.1. Selection of Study Area:

Analyzing the opinions of the experts of ITN (BUET) and various information's about geography and salinity problems of the coastal areas, Garaikhali village of Paikgachcha Upazilla under Khulna district has been selected as our study area.

3.2.2. Selection of target group:

The researchers have selected local village people as the target group.

3.2.3. Reconnaissance Survey

Reconnaissance survey has been conducted to gain the general impression regarding the study area and the people of the study area.

3.2.4. Pilot Survey:

A pilot survey has been conducted on every household to get our necessary information.

3.2.5. Correction of Questionnaire:

Some corrections has been made in the questionnaire after pilot survey on this day.

3.2.6. Final Survey: After the correction of questionnaire, final survey has been conducted.

3.2.7. Data Collection

3.2.7.1 Primary Data Collection: The primary data has been collected through questionnaire survey. This data will be collected through following steps-

Sample Selection: The population of village around 15000. Simple random sampling method has been used. The following formulas have been used for sample calculation

$$x = Z(c/100)2r(100-r) n = N x / ((N-1) E^2);$$

$$E = \text{Sqrt}[(N - n)x/n(N-1)]; \text{ Source: (Anon., n.d.)}$$

The researchers have applied a random sample of 30 household surveys which will help to understand the acceptability and participation of the whole village people in the project.

Collected Data type: The researchers have collected informative data such as project participation, willingness to invest on the project, water scarcity problem, source of pure drinking water, type of rooftop area etc. through household survey.

3.2.7.2. Secondary Data collection:

Physical features of the study and various demographic, geographic information's and rainfall data has been collected through analyzing various journals, reports..

3.2.7.3. Data Analysis: The analysis of the data will be performed based on primary and secondary data

IV. DATA ANALYSIS

4.1-Number of Family member and water consumption rate:

From the (Fig: 4.1) it has been found that that quantity of consumption of water increases as family member increases. As a result they have to find several alternative sources of drinking water like pond, tube well, buying from external suppliers and rainwater.

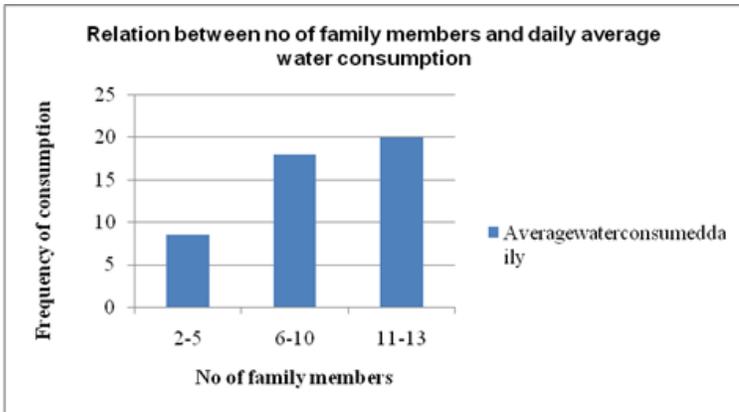


Fig 4.1- Relation between no of family members and daily average water consumption
Source-Field Survey, (2014)

4.2-Sources of drinking water of the study area

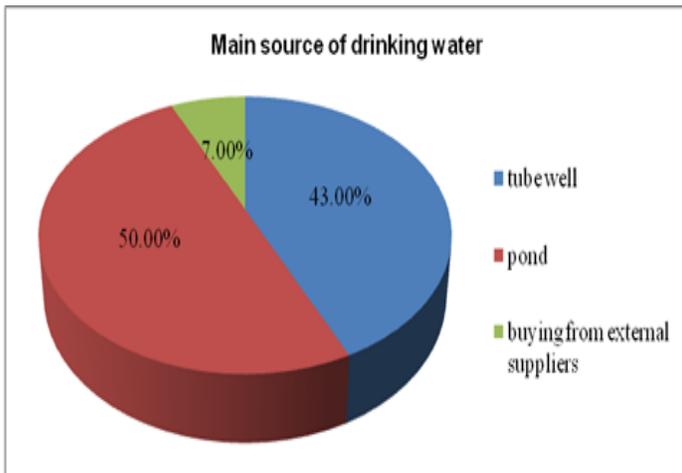


Fig 4.2-Main sources of drinking water
Source-Field Survey, (2014)

The local people collect drinking water from different sources like pond, tube well, buying from external suppliers and rainwater. From the analysis (Fig: 4.2) it has been found that the local people have to depend heavily on the pond as their main source of drinking water.

From the (Fig: 4.3) it has been found that the people prefer buying water from external suppliers as their secondary source of drinking water. These suppliers collect the pond water and sell it to the people in jars. The price of their product is 3 tk per liter.

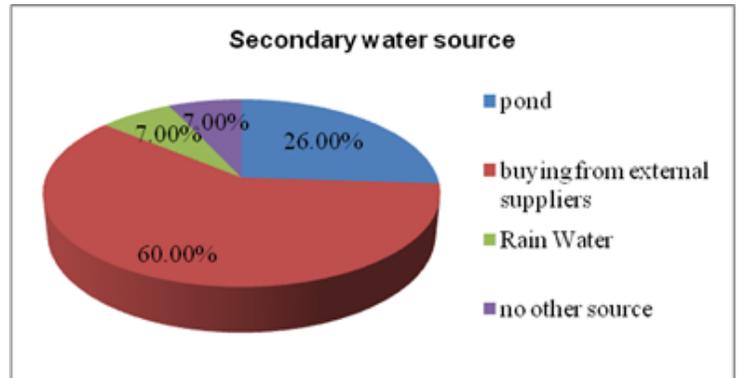


Fig 4.3: Water collection from secondary water source

Source-Field Survey (2014)

4.3-Satisfaction level with the drinking water quality

From the data analysis (Fig: 4.4) it has been found that 93% of the people are not satisfied with the quality of the water they drink.

The water they drink is unhygienic full of debris and some said that there is arsenic in their water.

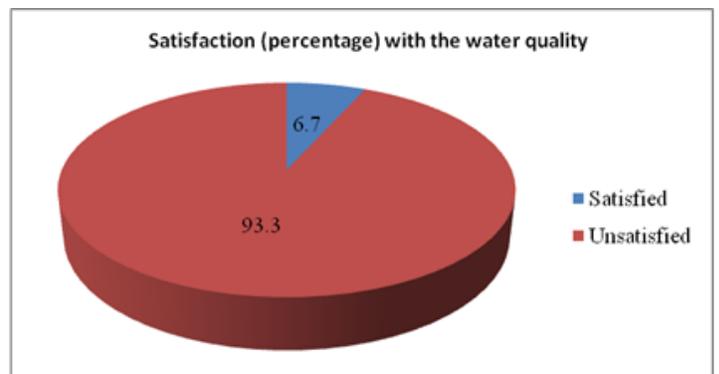


Fig-4.4: Satisfaction level with the water quality
Source-Field survey (2014)

4.4-Distance from water collection point and transportation cost

From field survey it has been found that people on an average living 3-5 km away from water collection point use van and other living adjacent to it depends on foot. So the people have to pay additional transportation cost whether they use various mode like van, rickshaws for collecting water or they buy from external suppliers. They have to pay to the external suppliers 2 tk or 3 tk depending on the distance. From the field survey it has been found that the people have to pay a good amount of money as transportation cost for the collection of drinking water. From the (Fig: 4.5) the linear relationship between distance and transportation cost has been shown and it is apparent that the transportation cost is increasing with the distance.

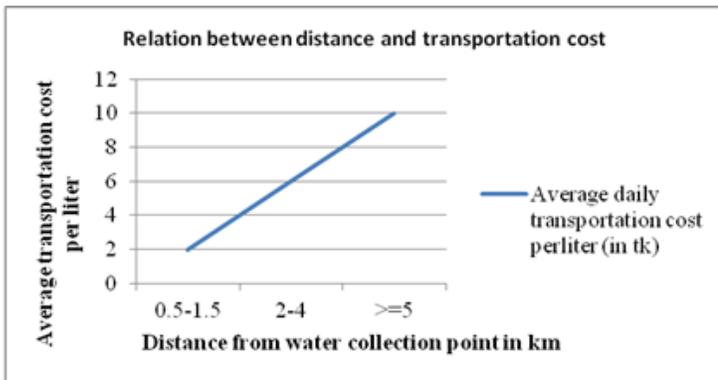


Fig 4.5: Relation between distance and average transportation cost per liter
Source-Field Survey (2014)

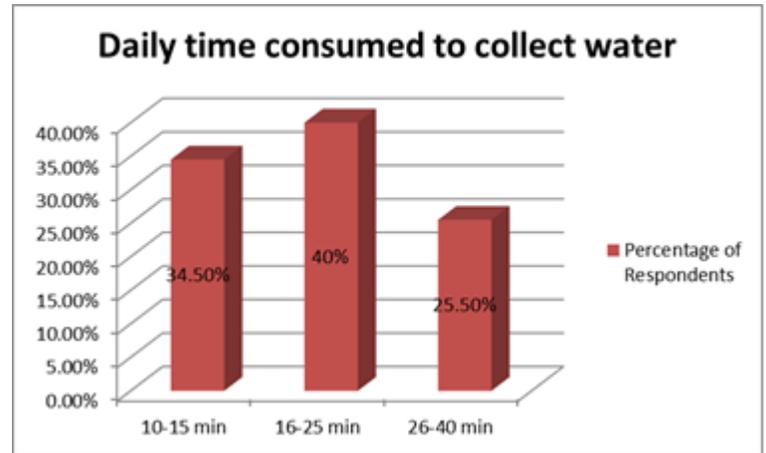


Fig 4.7: Daily time consumption to collect water
Source-Field Survey (2014)

4.5: Problems while water collection

The people have to face various problems while collecting water. From the (Fig: 4.6) it has been found that 67% respondent identified time consuming as their major problems.

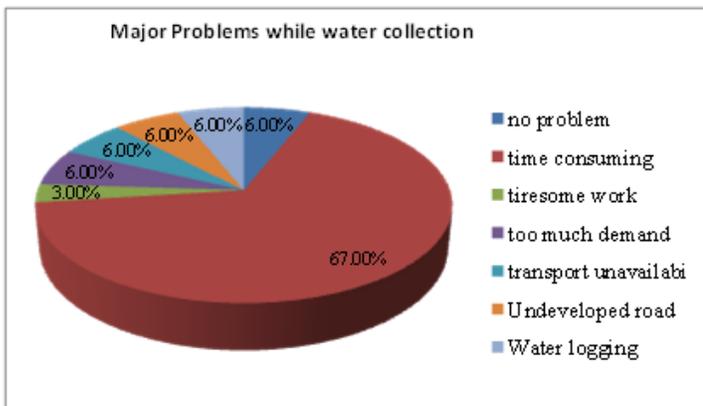


Fig 4.6: Major problems while water collection
Source-Field Survey (2014)

4.6-Total time needed for water collection:

It has been found from the (Fig- 4.7) that time they waste to collect water can be utilized in various productive sectors like fishing, farming, small business etc. If we convert this time in monetary value, it will be observed that they have to spend a good amount of money for water collection.

4.7. Monthly income and total cost for drinking water purpose (including transportation cost): From the Fig:4.8 it has been found that people of the study area spend a significant amount of money from their monthly income for drinking water purpose.

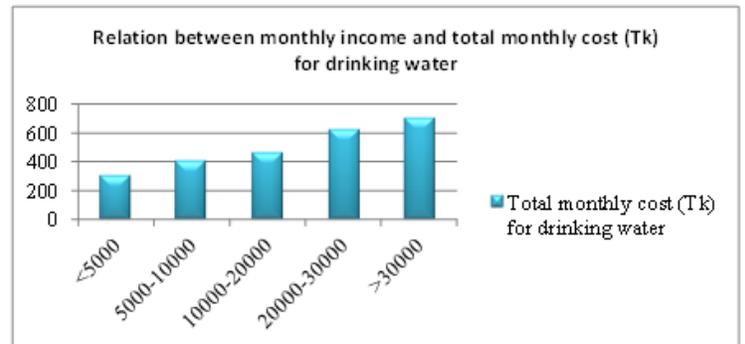


Fig 4.8: Monthly income and total monthly cost for drinking water
Source-Field Survey (2014)

From the (Table-4.1) it has been found that monthly income and total cost for drinking water purpose is positively co-related. People of relatively higher income group spend more in this purpose.

Table 4.1: Statistics measures of income distribution and cost for drinking water

Correlation	Co-efficient of correlation
Pearson's R	.506

Source- Researchers calculation, (2014)

4.8: Educational qualification and willingness to participate in the project: From the (Fig:4.9) it has been found that educated people specially Secondary and above who are conscious about health problems and the need of pure drinking water have agreed to participate in our project.

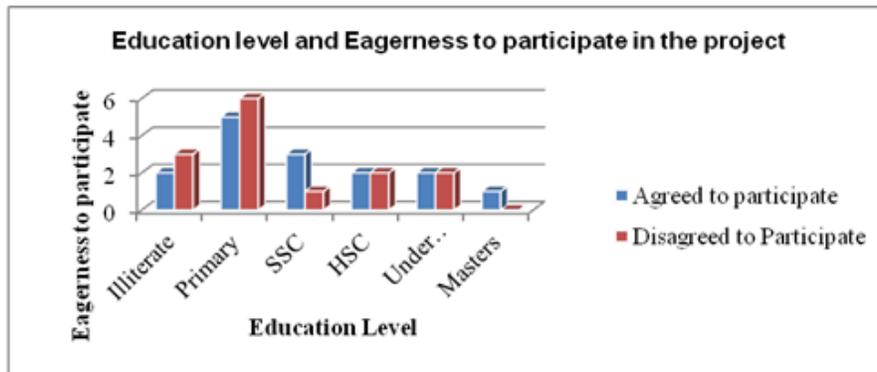
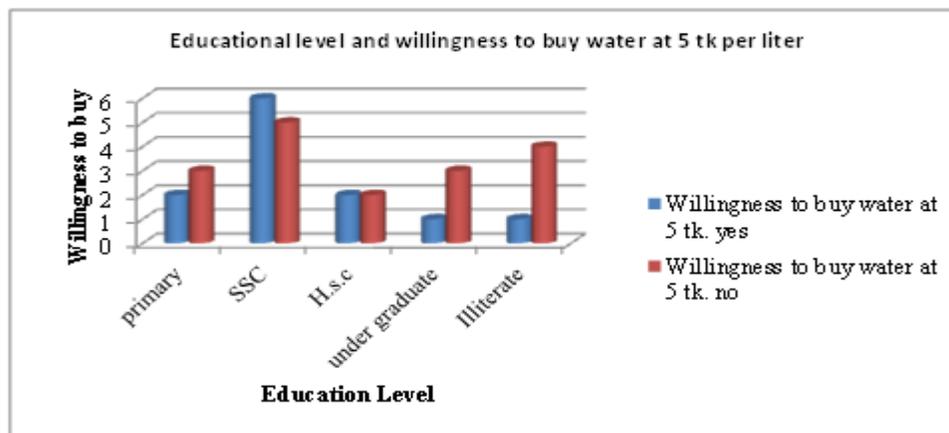


Fig 4.9: Relation between education level and Eagerness to participate
 Source-Field Survey (2014)

4.9: Educational qualification and willingness to buy our product at 5 tk per liter: From the (Fig: 4.10) it has been found that majority of people have shown unwillingness to buy water 5 tk per liter.



Source-Field Survey (2014)
Fig 4.10: Educational level and willingness to buy water at 5 tk per liter

4.10: Variability in the level of income of the local people

From the (Table-4.2) and the (Fig-4.11) it has been found that the value of skewness of the income data of the respondents is 0.076. It denotes that the income data is symmetrical. So there is no major disproportion of income group in this area. So the number of different income groups (high, middle and low) are in equal proportion. Again from the below Fig: 4.12, it can be said that the Kurtosis of income data is platykurtic (as negative). Most of the income value is spread from mode income of the income database.

Number of cases (N)	Mean Income	Skewness		Kurtosis	
		Statistic	Std. Error	Statistic	Std. Error
30	16700	0,076	.427	-.118	.833

Table 4.2: Statistical measures of income distribution
 Source: Researchers calculation, 2014

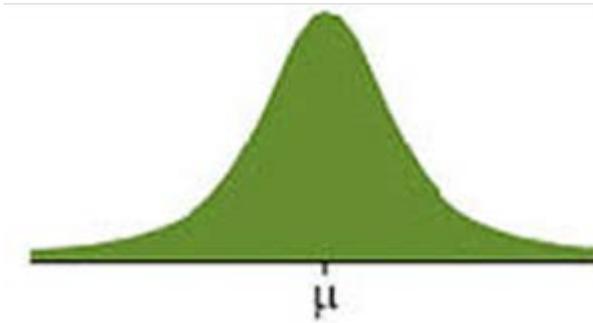


Fig 4.11: Symmetrical Skewness of Income data (Anon., n.d.)

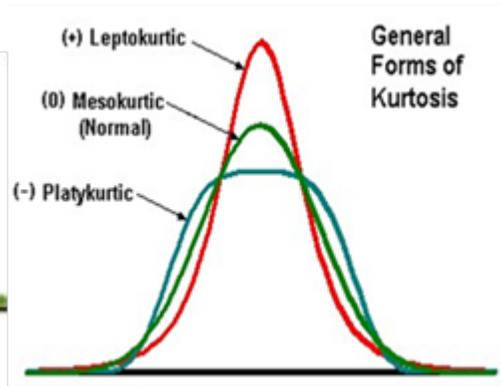


Fig 4.12: Kurtosis of Income data (Anon., 2012)

4.11- Monthly Income and Willingness to participate in our project:

From the (Fig 4.13) it has been found that middle income group (10000-20000) has agreed to participate in our project.

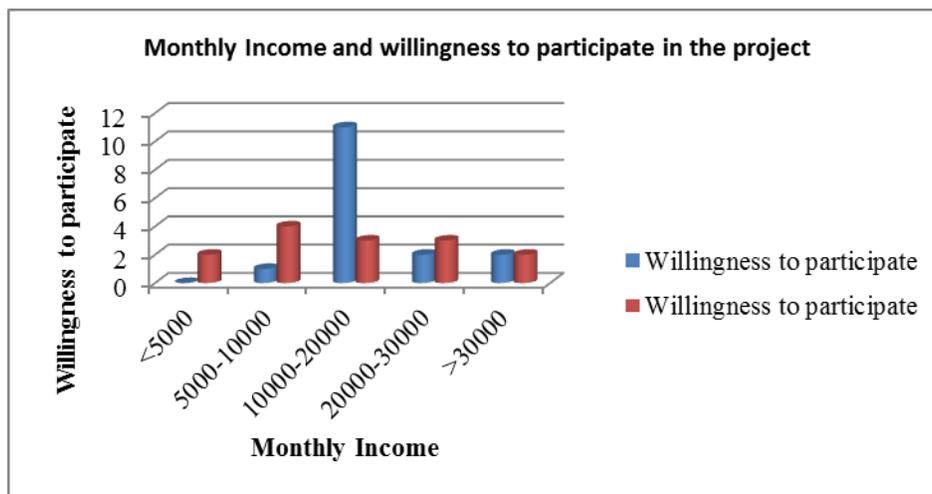


Fig 4.13: Column chart showing monthly income and willingness to participate in the project Source-Field Survey, 2014

4.12: Hypothesis testing whether people are willing to pay 5 tk per liter

Hypothesis: Most of the respondents willing to pay 5 tk per liter

Alternate hypothesis: Most of the respondents are not willing to pay 5 tk per liter

Level of Significance: .05

From the analysis of one sample t-test it is found that there is mean difference (See table:4.4) between of test hypothesis and actual mean. As the t value is -14.470 (See table:4.4) which is greater than 0.05. So the null hypothesis (Most of the respondents willing to pay 5 tk per liter) is rejected. Again as the “t” value is negative, the calculated mean of the sample is less than the test value (here 5 tk.).

From this it can be concluded that, Most of the respondents are not willing to pay 5 tk per liter. Most of the people are willing to pay 2 tk per liter.

Table 4.3: Statistics for willingness to pay

Willingness to pay	N	Mean	Std. Deviation	Std. Error Mean
		16	2 tk	0.9139

Source: Researchers calculation,2014

Table 4.4: One sample “t” test for willingness to pay

Willingness to pay	Test Value = 5 tk		
	t-value	Degree of freedom	Mean difference
	-14.470	15	-3.3063

Source: Researchers calculation, 2014

4.13: Hypothesis testing whether people are willing to share the total implementation cost (5000 tk) of 600 liter tank

Hypothesis: Most of the respondents willing to share the total implementation cost (5000 tk) of 600 liter tank

Alternate hypothesis: Most of the respondents are not willing to share the total implementation cost

Level of Significance: .05

From the analysis of one sample t-test (See Table: 4.6) it is found that there is mean difference between of test hypothesis and actual mean. As the t value is -4.703 which is greater than 0.05. So the null hypothesis is rejected. Again as the “t” value is negative, the calculated mean of the sample is less than the test value (here 3178 tk.). (See Table:4.5)

Table 4.5: Statistics for willingness to share

Willingness to share	N	Mean	Std. Deviation	Std. Error Mean
		14	3178 tk	1449.232

Source: Researchers calculation, 2014

Table 4.6: One sample “t” test for willingness to share

Willingness to share	Test Value = 5000 tk		
	t-value	Degree of freedom	Mean difference
	-4.703	13	-1821.429

Source: Researchers calculation,2014

4.14: Monthly income and willingness to buy water at 5 tk per liter:

From the Fig: 4.14 it has been found that people of higher income group (20000-30000 & 30000+) are willing to buy our product at 5 tk per liter. Rest of the income group showed unwillingness to buy at this price.

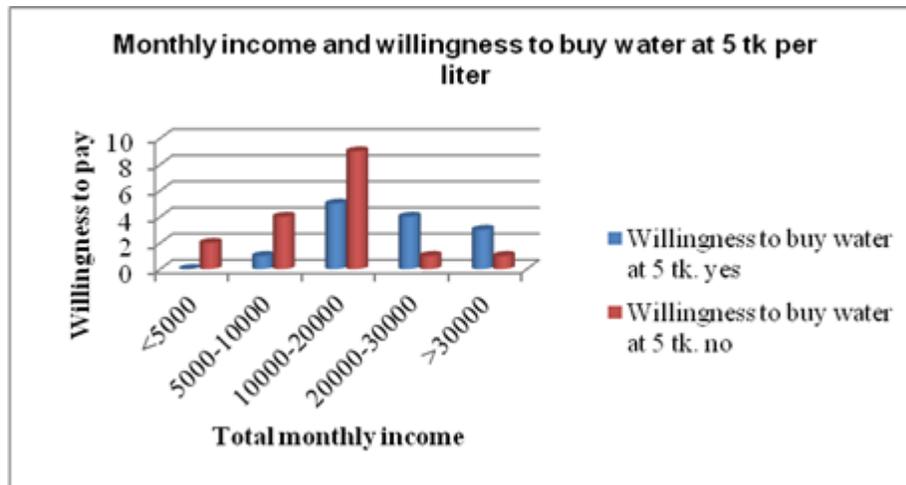


Fig: 4.14: Relation between monthly income and willingness to buy water at 5 tk per liter
Source-Field Survey (2014)

V. SUGGESTIONS & CONCLUSION

Based on field survey and study from the secondary sources, some recommendations are being generated for the successful installation and constant acceleration of the project. They are given below.

- The most prevailing hindrance to this project is lack of consciousness of village people. Effective campaign is recommended to be organized by concerned authorities.
- Government and volunteer organizations have to be convinced to provide adequate financial and institutional support in this regard.
- Incorporating new technologies to minimize initial cost and cost related to purification.
- Proper participation of rural people should be ensured through employment and volunteer activities in the project.

Severe water salinity problem in the coastal area of the country can be better solved through inaugurating the idea of rainwater harvesting. The International Water Management Institute (IWMI) estimated that Bangladesh will face economic scarcity of water by 2025. Besides, sea level rise due to climate change phenomenon will further degrade our fresh water resources. This project is a simple triumph to attain that requirement and for further research work it can play a vital role in this regard. Although people are averse to buy water at rated price they expressed their willingness to participate in this project. In future it is hoped that advanced advent of new technology will lower the price to make drinking water within their reach. When participation from all walks of people will be

ensured, better continuity will be gained with acceleration. Concerned authorities and NGOs should play a vital role in this regard.

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Cytogenetic Analysis in Cases with Sexual Anomalies in Albania

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Abstract- Cytogenetic analysis is a valuable investigation in the diagnostic work up of children with suspected sexual chromosomal disorders. The objective of this study was to describe the prevalence of various types of sexual chromosomal abnormalities in Albanian children undergoing cytogenetic analysis for the time period 1984-2015. The frequencies of sex chromosomal abnormalities were calculated for comparison with data reported in similar previous studies.

Cytogenetic analysis was carried out for all 228 patients. The study was performed in the Cytogenetic Laboratory of Medical Genetics Service in the University Hospital Centre "Mother Teresa", Faculty of Medicine, Tirana, Albania according to the International System for Human Cytogenetics Nomenclature (ISCN 2009).

Turner syndrome was the most common sex chromosome abnormality among diagnosed cases (63,1%). In 144 Turner patients, 40,2% were with classic karyotype and 59,8% were with the other forms of Turner syndrome. The second frequent sex chromosome abnormality in our study was Klinefelter syndrome. Among 81 (35%) cases with Klinefelter syndrome, 73 (32%) cases showed 47/XXY classic karyotype. Triple X syndrome or trisomy X was detected in two patients (0,8%) with 47, XXX karyotype. We also found 47,XYY karyotype in only one patient. In 3 cases (1,2%) had discordance between the chromosomal sex and the phenotype.

We hope that the data gathered by this study will provide a basis for a multidisciplinary team to oversee management of these patients from diagnosis through to adult life.

The types of chromosomal abnormalities identified in this study were similar to those found in other studies.

Index Terms- Aneuploidy, chromosome aberrations, karyotypes, Turner syndrome.

I. INTRODUCTION

Sex chromosomes abnormality (SCAN) is one of the most important causes of disordered sexual development and infertility. In frequency of occurrence SCAs formed by numerical or structural alteration in X and Y chromosomes, are slightly less common than autosomal abnormalities^[1].

However, they are usually much less severe in their effects.

Sex chromosome abnormalities are gender specific. Normal males inherit an X and a Y chromosome while females have two X's. A single Y chromosome is sufficient to produce maleness while it's absence is necessary for femaleness. Female abnormalities are due to variations in the number of X

chromosomes. Male abnormalities are the result of irregular numbers of either the X or the Y chromosome or both^[2].

Cytogenetic analysis is an essential component in the diagnosis and evaluation of children with various sexual chromosomal aberrations with congenital abnormalities, dysmorphic features, developmental delay and/or intellectual disability^[3]. Studies found a wide range of sex chromosomal aberrations in children with suspected chromosomal disorders who were referred for cytogenetic analysis^[4, 5, 6, 7].

The present study is designed to investigate the frequency and types of sexual chromosomal abnormalities in Albanian patients with suspected genetic disorders for the time period 1984-2015 such as: Turner syndrome (TS, the most frequent sex chromosome anomaly in females); Klinefelter syndrome (KFS, the most frequent sex chromosome anomaly in males [about 14-20% of cases with azoospermia]); sex reversal (female 46,XY; trisomy X; XYY syndrome etc. Most of them are with mosaicism karyotype who denotes the presence of two or more populations of cells with different genotypes in one individual who has developed from a single fertilized egg.

Our focus was to identify precisely the role of cytogenetic investigation in confirming the clinical diagnosis, thus allowing a multidisciplinary team to oversee management of these patients from diagnosis through to adult life. Additionally, the frequencies of sex chromosomal abnormalities were calculated for comparison with data reported in similar previous studies.

II. MATERIAL AND METHODS

In this retrospective study, the cases are evaluated newborns and children for suspicion of sex chromosomal abnormality for the time period 1984-2015, postnatally. 228 patients were subjected to a full genetic analysis. Complete genetic examination and pedigree construction was done to exclude known non chromosomal causes of the anomaly.

Firstly, children have been seen and diagnosed clinically by the Service of Medical Genetics in the University Hospital Centre "Mother Teresa", Faculty of Medicine, Tirana, Albania and then the cytogenetic analysis was performed in the Cytogenetic Laboratory of this service.

Cytogenetic analysis was carried out for all the patients. The study included peripheral lymphocyte culture determined by a standard method of G-banding and carried out according to the International System for Human Cytogenetics Nomenclature (ISCN 2009). The frequencies of our study were compared with results of similar studies.

III. RESULTS

In the present study, results of cytogenetic investigations of 228 cases with only sex chromosome abnormalities are reported.

All patients were suspected for sex chromosomal aberrations according to their clinical features. After clinical examinations and cytogenetic analyses they were grouped

according to their karyotyping results and the details of sex chromosome aberrations are summarized in table 1.

Table 1. Sex chromosome abnormalities in patients referred for cytogenetic analysis

Cases	Karyotype	No	Frequency %
Turner syndrome		144	63,1
	45,X	58	25,4
	45,X/46,XY	9	3,9
	45,X/46,XX	45	19,7
	45,X/47,XXX	6	2,6
	45,X/46,XX/47,XXX	2	0,8
	45,X/46,X,i(Xq)	12	5,2
	45,X/46,XX/47,XX i(Xq)	1	0,4
	45,X/46,X r(X)/46,X,i(Xq)	1	0,4
	45,X/46,X,i(Xq)/47,XX,i(Xq)	1	0,4
	46,X,i(Xq)	8	3,4
	46,XX/46,X,i(Xq)	1	0,4
Klinefelter syndrome		81	35
	47,XXY	73	32
	46,XY/47,XXY	5	2,1
	46,XY/47,XXY/48,XXXY	1	0,4
	46,XY/47,XXY/47,XXY/48,XXYY	1	0,4
	46,XY/48,XXYY	1	0,4
Trisomy X 47,XXX syndrome	47,XXX	2	0,8
	47,XXY	1	0,4
Sex reversal	46,XY	3	1,2

TS was the most common sex chromosome abnormality among diagnosed cases (63,1%). In 144 Turner patients, 40,2% were with classic karyotype and 59,8% were with the other forms of Turner syndrome.

TS abnormalities were either numerical abnormalities (120 cases or 83,4%) or structural X abnormalities (24 cases or 16,6%). In cases with numerical abnormality (78 cases), 9 patients (3,9%) had a Y chromosome component (45,X/46,XY). Six cases from numerical abnormalities were mosaicism with two cell lines of 45,X/47,XXX and two cases were mosaicism with three cell lines of 45,X/46,XX/47,XXX.

Among 24 (16,6%) TS patients with structural abnormalities, 3,4% were with 46,X,i(Xq) karyotype. The other TS variants with mosaicism form included 12 patients (5,2%) with 45,X/46,X,i(Xq) karyotype; 45,X/46,XX/47,XX,i(Xq) [0,4%];

45,X/46,X r(X)/46,X,i(Xq) [0,4%]; 45,X/46,X,i(Xq)/47,XX,i(Xq) [0,4%]; 46,XX/46,X,i(Xq) [0,4%]. The second frequent sex chromosome abnormality in our study was Klinefelter syndrome. Among 81 (35%) cases with KFS, 73 (32%) cases showed 47/XXY classic karyotype, while 5 (2,1%) cases showed 46,XY/47,XXY karyotype, one case (0,4%) 46,XY/47,XXY/48,XXXY with mosaicism karyotype, one patient (0,4%) with 46,XY/47,XXY/47,XXY/48,XXYY karyotype and only one case with 46,XY/48, XXYY karyotype.

Triple X syndrome or trisomy X was detected in two patients (0,8%) with 47, XXX karyotype. Karyotypes of two patients with Turner syndrome, one patient with 47,XXX and one patient with Klinefelter syndrome which were confirmed by cytogenetic analysis are showed below (Fig 1a,b,c,d).

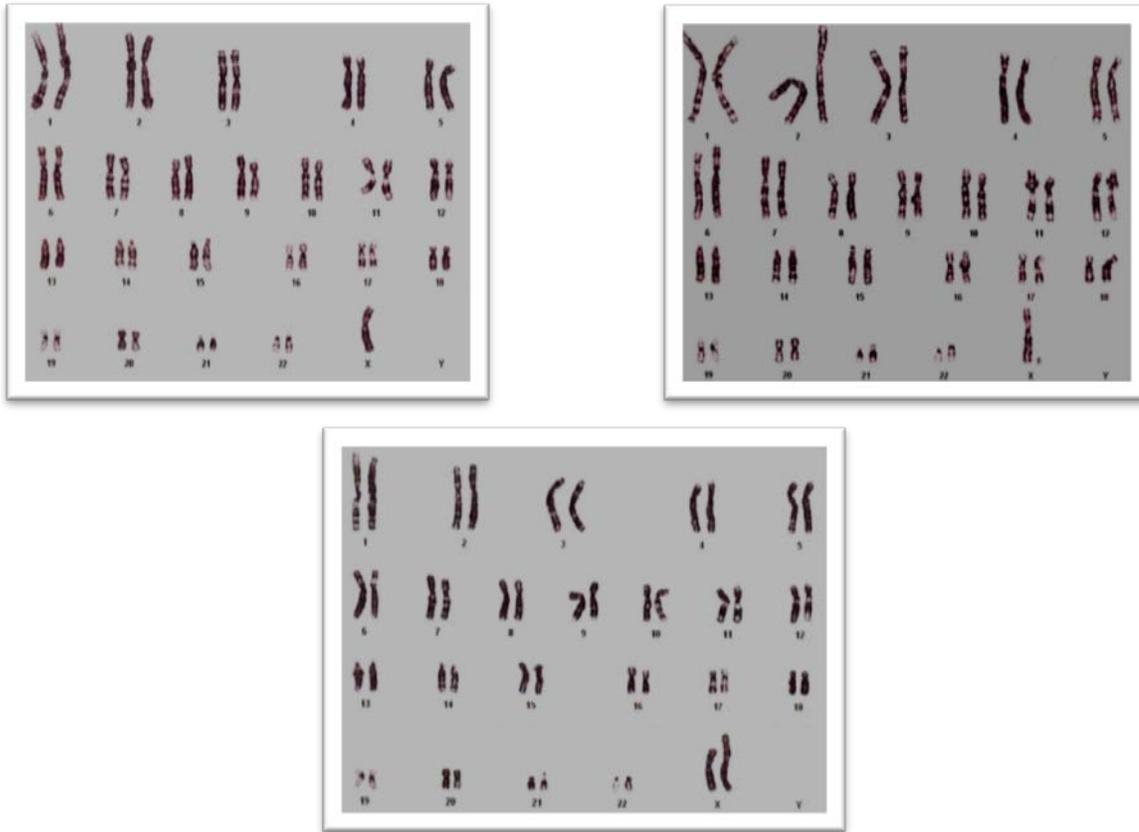


Figure 1a. A patient with 45,X/46,X r(X)/46,X,i(Xq) karyotype

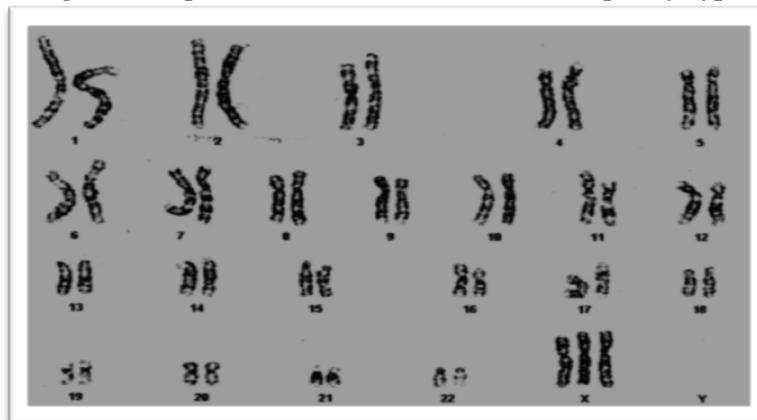


Figure 1b. A patient with 47,XXX karyotype

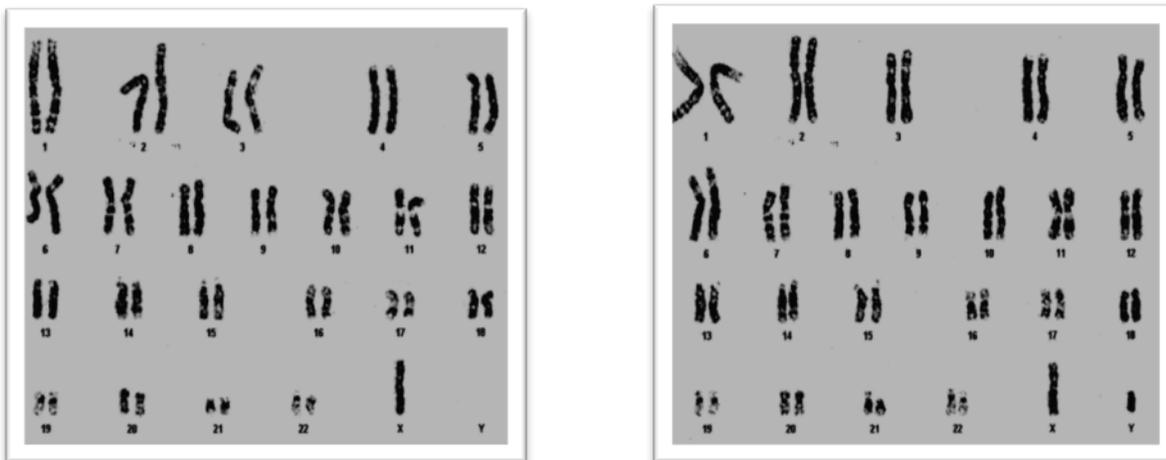


Figure 1c. A patient with 45,X/46,XY karyotype

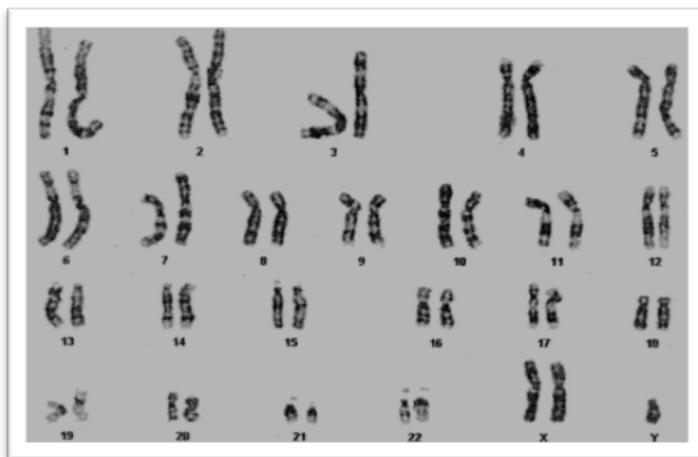


Figure 1d. A patient with 47,XXY karyotype

We also found 47,XYY karyotype in only one patient.

In 3 cases (1,2%) had discordance between the chromosomal sex and the phenotype. Another aim of this study is to compare the distribution of these aberrations with other similar reports performed in different countries (Table 2).

Table 2. Frequency of classic and others form of TS and KFS syndrome in some countries

Country	Classic Turner %	Others form of TS %	Classic Klinefelter %	Others form of KFS %
Brazil	28,6	71,4	20	80
	45	55	89,7	6
Iran	28,6	53,6	55	45
	32	68	66,6	33,4
India	34	66	80	20
	40,2	59,8	91,2	8,8

IV. DISCUSSION

The current study aimed to evaluate the cytogenetic findings in Albanian patients referred for suspected sex chromosomal anomalies that caused a variety of clinical disorders and secondly to compare the distribution of these aberrations with other similar reports performed in the other countries.

Chromosome abnormalities are important causes of lack of development in secondary sexual characteristics, delayed pubertal, miscarriage, infertility, etc. [8, 9]

TS occurs approximately 1 in 2000 females and are the most common factor in infertile women. [10] Monosomy X may arise from meiotic non-disjunction or anaphase lagging during spermatogenesis, oogenesis or from postzygotic error. TS usually results from total or partial absence of one of the two X chromosomes normally present in females. It may also result from a structurally abnormal X chromosome in which deletion or duplication of genetic material has occurred.

TS was the most frequent sex chromosome abnormality (63,1%) of total patients. These abnormalities were either numerical or structural X abnormalities, including mosaics with normal karyotype 46 XX, mosaics with 47 chromosomes, mosaics with long-arm isochromosome, mosaics with long arm isochromosome in the patients with 47 chromosomes, mosaic with X ring chromosome and 46,XY.

We found also patients with 46,X,i(Xq) and 46,XX/46,X,i(Xq) karyotypes. Isochromosome formation may occur in pre meiotic stage, in meiotic cell division or in post zygotic cell division. All individuals with i(Xq) show characteristics similar to individuals with classical 45,X.

The distribution of Turner's syndrome in our study showed that TS variants (59,8%) were found to be commoner than the classic 45,X karyotype (40.2%). Similar findings were reported by studies in Brazil (28,6%; 71,4%) [5], in Tunisia (32%; 68%) [12], in Denmark (45%; 55%) [13], in India (34%; 66%) [6] and in Iran (28,6%; 53,6%) [15]. (Table 2). However, in another Indian study [28] it was found that in 45 cases of TS, the most commonly observed karyotype was 45,X (44.4%), followed by 45,X/46,XX mosaicism (24.4%).

In patients with 45,X/46,XY karyotype the amount of Y chromosome material is not enough to cause the development of any male features, but is associated with an increased risk of developing a form of cancer known as gonadoblastoma. In such cases, it is recommended that the non-functioning ovaries be removed [29].

From the studies in different countries up to 19,7-25 % of 45,X/46,XX patients are fertile and the likelihood to have follicles in their ovaries is highest among mosaic TS girls, so finding 46,XX line in these patients could offer hope toward natural pregnancies by receiving hormone replacement therapy [16,17]. These data show that TS in mosaic status condition is more compatible with life than pure TS [18,19].

The second frequent sex chromosome aberrations was Klinefelter syndrome (35% or 81 patients) being more frequent in infertile males [10]. The extra chromosome is retained because of a nondisjunction event during paternal or maternal meiosis I (gametogenesis) or through a nondisjunction event during meiosis II in the egg.

In general, the findings of this study are in accordance with most investigations which confirm the XXY aneuploidy to be the most prevalent chromosomal aberrations [21, 22, 23, 24]. Here, in this study we found 91,2% of classic form (47,XXY) and 8,8% of mosaicism form. These frequencies are close to those reported in Denmark (89.7%; 6%) [13], in India (80%; 20%) [6], in Iran (55%; 45%) [15], in Tunisia (66,6%; 33,4%) [12]. However, in one Brazil's study it was found that in 80% of KFS cases, the most commonly observed patients were with mosaicism karyotype [28] (Table 2). Studies on mosaic Klinefelter syndromes 46,XY/47,XXY (we observed five cases) reveal that the germ cells with sex chromosomal abnormalities were capable of completing meiosis [14] and the individuals may reproduce with the aid of modern reproductive technology.

We found also some rare mosaic variants with KFS; one male with 46,XY/47,XXY/48,XXXYY karyotype, one patient with 46,XY/47,XXY/47,XXY/48,XXYY karyotype and one patient with 46,XY/48,XXYY karyotype. In three last patients we found extra copies of the X chromosome (48,XXXYY) or extra copies of both the X and Y chromosomes (48,XXYY) in some of their body's cells. The most likely etiology is the non disjunction of homologous chromosomes (during the first meiotic division) or sister chromatids (during the second meiotic division) in the parental germ cells. There is no known factor responsible favoring the development of this syndrome.

XXYY is still considered a variation of Klinefelter syndrome by some definitions, mainly because the pathophysiology of the testicular dysfunction has not been shown to differ from 47,XXY. The most current research does not suggest that there should be any differences in the evaluation and treatment of testosterone deficiency in 48,XXYY compared to 47,XXY [30].

In our study we found 2 patients with 47,XXX karyotype. It mostly derives from maternal non disjunctional errors during meiosis I (63%) or II (17,4%). Only one of three X chromosomes is activated and the others two are inactivated to Barr bodies.

We found only one patient with 47, XYY syndrome that occur almost always due to paternal meiosis II non disjunction and produce high levels of testosterone. These sexual abnormalities like XXX or XYY syndromes have such a mild symptoms that are out of clinical notice. Some of these individuals are unknown of their problems and almost don't refer to any genetic lab, therefore these cases were rare.

This study also indicates that karyotyping still plays an important role in gender assignment of patients with sex reversal. Gender identity is a complex process of differentiation that is affected by numerous variables. Female phenotype can occur in XY embryo when testis determining factor or other genes in the testis determining pathway are lost, mutated or otherwise compromised [11]. Only 1.2% of patients had a discrepancy between the genetic sex and the phenotypic sex. They had normal female phenotype with 46,XY chromosome complement suggestive of sex reversal conditions. This percent was relatively lower than those found in several Indian studies [6, 27]. Rajasekhar et al [26] reported a higher proportion (14.9%) of XY females among 1400 referral cases in India. Many of such cases become apparent in infancy due to sex reversal or during adolescence when they fail to have normal puberty.

V. CONCLUSION

In conclusion, cytogenetic analysis is one of the most useful approaches to investigate the individuals with sexual problems of unknown origin and to confirm the clinical diagnose in patients with a known cytogenetic syndrome or reject the chromosomal abnormality. However we hope that the data gathered by this study will provide a basis for a multidisciplinary team to oversee management of these patients from diagnosis through to adult life.

The types of chromosomal abnormalities identified in this study were similar to those found in other studies.

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Impact of Forest Based Micro Enterprises in Rural Livelihood in Buffer Zone of Bardiya National Park, Nepal

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Abstract- A study was conducted to assess the impact of MAPs based enterprises in rural livelihood's financial capital in buffer zone of Bardiya National Park in 2011 A.D. It included purposive sampling of 105 households from four user committees of four VDCs of Bardiya namely, Thakurdwara, Suryapatuwa, Manau and Patabhar. The study was conducted through household survey, key informant survey and focus group discussions. Among 105 respondents, 59 were found to be cultivating mentha, 7 were chamomile cultivators and 39 were found to be cultivating both mentha and chamomile. The findings revealed that mentha and chamomile based enterprises has positive impact on livelihood's financial capital. The T- test showed that the mean annual income in the household increased having positive impact on many household components. A positive impact of enterprise in income from agriculture and livestock is found, however, no significant impact on the off farm activities because of enterprise was seen. The employment opportunities at the local level were found to be addressed. From the respondent's perception, willing to conserve the biodiversity was found to be increased among the IGAs users after being involved in enterprises through the involvement in various conservation activities. Good initiation on adoption of alternative energy for cooking like biogas was found. Strengths, weakness, opportunities and threats (SWOT) of enterprise were studied. A need for further training for farmers in marketing has been identified in order to maximize the quantity and quality of product.

Index Terms- BNP; IGAs; mentha; chamomile; livelihood; biodiversity

I. INTRODUCTION

Nepal has rich biodiversity per unit area having a network of twenty protected areas covering nearly one fourth of the country's total land area (DNPWC 2012) and houses approximately 7,000 species of higher value plants. Because of this fact, Bhujar *et al.* 2007 and MoFSC, 2009 mention Nepal as twenty-fifth most species-rich country in the world. It is estimated that about 750 species are now in use, of which 20% are traded (Kanel, 1999). Medicinal and Aromatic Plants (MAPs) have a potential for contributing to the local economy, subsistence health needs, and improved natural resource management, leading to the conservation of ecosystem and

biodiversity of an area (Subedi, 1997). Western regions of Nepal contribute together more than 85% of the total collected of herbs in Nepal (GIZ, 2011). Along with collection, rural people are also cultivating valuable plants in their lands or in forests. In developing countries like Nepal, where five percent of total GDP comes from the trade of NTFPs (Subedi 1998), adopting NTFPs based micro enterprises is one of the most viable options to create employment opportunities and consequently to reduce poverty. Moreover, since Nepalese society is characterized by social exclusion, the development of such enterprises can be the good source of income as well as employment to a relatively wider section of Nepal's population, thereby narrowing down income disparities (Shrestha *et. al* 2011).

Different micro enterprises play a beneficial role in supporting the livelihood of rural people, employment generation using locally available resources as a result there is least difficulty in meeting the basic needs of local people. Forest based enterprises (both timber and non-timber) specially essential oils, have been known to be one of the most effective income generating activities (IGAs) to contribute in poverty reduction, realizing this, the 3 years interim plan (2007-2010) has emphasized promotion of forest based enterprises. The average income in Nepal is low but many more opportunities and options for income generation can be found in urban areas than in rural areas (IUCN 2001). To supplement the low agricultural production in the remote districts of Nepal, the government of Nepal has given due consideration to NTFPs as an effective means to enhance the economic benefits to rural people and to help in improving livelihood, household food security and nutrition (Acharya and Subedi 2004). There is a growing optimism on the potential of community based NTFPs enterprises for improving rural livelihood in Nepal (Kunwar 2009).

The aromatic plants like *Mentha arvensis* (mentha) and *Matricaria chamomilla* (chamomile) are profitable cash crop and because of their unpalatable nature to wildlife, the buffer zone communities of BNP are found to be cultivating these plants through the assistance of various Governmental as well as Non-governmental organizations. The cultivation of mentha and chamomile to improve livelihood and to reduce human wildlife conflict was selected as one of the top 12 community based conservation project in BBC World Challenges- 2011 contest (WTLCP 2012). Studies prior showed that rural people are getting major portion of benefit, instead at the cost of local

people, middleman are enjoying most of the benefits (Oslen 1997, CECI 1999 cited in Karki 2003). In such scenario the income that the rural people are generating via micro enterprises might have less value as compared to their labor cost. The cultivation of aromatic plants in own agricultural land replaces the earlier cultivated crops and the probability of cultivation of high earning crops having high market demand increases. In this context, the constraints, issues, challenges of adoption of intervention strategies and its effect on the livelihood need to be identified. The impact assessment from this study helped to realize the real income that communities are generating from the aromatic plants like mentha and chamomile based micro enterprises and their sustainability for their sustenance.

II. LITERATURE REVIEW

A livelihood is sustainable when it can resist stresses and shocks and maintain or increase its capabilities and assets in present and future both, not compromising the natural resources abase at the same time (Chambers 1992). Increase in income and in food security are the points considered in sustainable livelihood framework DFID, 2009. The study focused on the impact of financial capital for sustainable livelihood.

Importance of NTFPs has been increasingly recognized because of their commercial, socio-economic and ecological values together with use values, ultimately providing livelihood support to many poor rural families of Nepal (Kanel 2002). MAPs have been long used for subsistence, traditional therapies and home remedies (kunwar *et. al*, 2009). Due to the immense importance of such high value plants, approx. 161 plant species are harvested for commercial transaction, and about 71 community-based enterprises are operating in Nepal (Subedi, 2006). The use of the MAPs begins as an unselective wild-harvested of plants, to a collection of selected species up to cultivation of the most useful ones. MAPs users' community all over the world ranges from remote forest habitants along with indigenous communities to peri-urban people up to commercial companies (Smith Hall *et. al*, 2012).

About 90 % of MAPs is collected from the wild and few % is cultivated however number of problems like lack of market information, paucity of quality seeds prevails in cultivation (Sharma *et.al*, 2011). Lack of household income makes rural people to depend on high value MAPs (Roy, 2010). Uprety *et. al* 2010 showed that the communities in Bardiya district have engaged in the utilization and trade of several NTFPs in different ways but without paying adequate attention to their conservation. In such scenarios, the present study might revealed that the trend of cultivating aromatic plants mentha and chamomile in own agricultural land solve the unsustainable harvesting of NTFPs leading to the conservation of biodiversity in forest fringe. In addition to this, food insecurity and poor harvest of major cereal crops due to climate change have impelled farmers to compensate the loss of main crops by explore cash-generating activities such as cultivation and trade of valuable MAPs (Synnot, 2012).

III. RESEARCH METHODOLOGY

3.1 Study Area and Data Collection

People of buffer zone of BNP were the study population. Simple random sampling was done to select the first sample and then systematic sampling was done to select the sample size of 104 households from the available household frame list from four user committees. Mentha and chamomile based enterprise was selected because of the following reason:

- The communities in the buffer zone of BNP are participating in cultivation of mentha and chamomile which is actively running enterprises over there.
- WTLCF has been conducting project to improve livelihood by providing seed grant in the Bardiya district.

Study areas are shown in figures below:
Numbers in the circle indicate VDCs,

1. Thakurdwara, 2. Suryaputuwa, 3. Manau and 4. Patabhar



Fig: Map of Nepal showing the protected areas

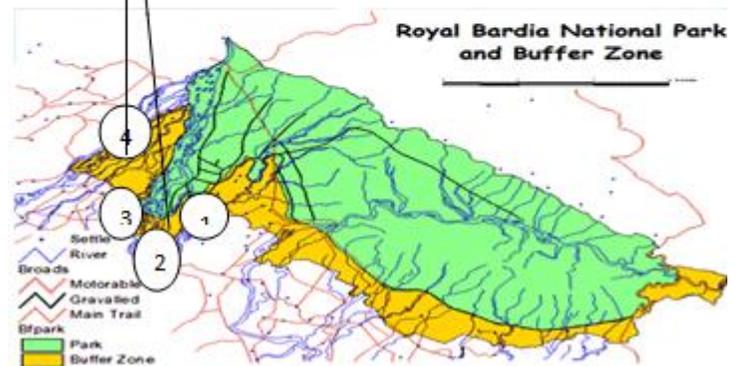


Fig: Map of Bardiya National Park showing study VDCs

Interview schedule was pre-tested prior to field survey for checking the reliability and validity of interview through the selection of 10% of sampled size of 105 respondents in two VDCs Suryapatuwa and Thakurdwara.

Field survey was carried out during 25th June to 10th July, 2011. The respondents were interviewed by administering the interview schedule. At the same time, informal group discussions, participatory observation and key informants survey (Social worker, Ranger, Local leaders, experts, staffs of WTLCF and its partner organizations, NTNC and few beneficiaries) were also done to collect the additional information.

Structured questionnaire was used to gather information on socio-economic condition and income sources then and now after the implementation of IGAs as well as practices adopted for the conservation of biodiversity

3.2 Methods of Data Analysis

The collected data were analyzed using both descriptive statistics like mean, standard deviation, percentage, frequency etc and inferential statistics like paired t test. The data analysis was carried out with the help of a statistical package known as 'SPSS' (Statistical Package for Social Science) and MS -Excel programs.

Indexing was used to rank the problems faced by farmers while involving in running an enterprise of aromatic plants. Problems were ranked by giving 5 points scale value for most serious, very serious, serious, less serious and very less serious

respectively. The index was computed by using the following formula:

$$I_{imp} = \frac{\sum (s_i f_i)}{N}$$

Where, I_{imp} = Index of importance, \sum = Summation, s_i = Scale value, N = Total numbers of respondents and f_i = Frequency of importance given by the respondents.

IV. RESULT AND DISCUSSIONS

4.1 Socio economic condition of the respondent

Age, sex, ethnicity, family size, level of education, occupation, farm size etc were categorized and measured.

Respondent's characteristics by Sex

Respondent's categories	Male	Female	Total
Mentha cultivators	38 (64.40)	21 (35.6)	59 (100)
Chamomile cultivators	5 (71.43)	2 (28.57)	7 (100)
Both mentha and chamomile cultivators	26 (66.67)	13 (33.33)	39 (100)
Total	69 (65.71)	36 (34.29)	105 (100)

Respondent's characteristics by Age

Respondent's categories	Less than 15	15 to 59	More than 59	Total
Mentha cultivators	0	57 (96.61)	2 (3.39)	59 (100)
Chamomile cultivators	0	7 (100)	0	7 (100)
Both mentha and chamomile cultivators	0	39 (100)	0	39 (100)
Total	0	103 (98.1)	2 (1.9)	105 (100)

Family size of respondents

Respondent's categories	Small family (<5)	Medium family (5- 10)	Large family (>10)	Total
Mentha cultivators	12 (20.34)	39 (66.1)	8 (13.56)	59 (100)
Chamomile cultivators	0	6 (85.71)	1 (14.29)	7 (100)
Both mentha and chamomile cultivators	2 (5.13)	28 (71.79)	9 (23.08)	39 (100)
Total	14 (13.33)	73 (69.52)	18 (17.14)	105

Mean: 7.4, Standard deviation: 2.72

Landholding size of respondents

Distribution of landholding (ha)	Mentha cultivators	Chamomile cultivators	Both Mentha and Chamomile cultivators	Total
Small (< 0.5)	40 (67.8)	5 (71.43)	26 (66.67)	71 (67.62)
Medium (0.5 to 1)	16 (27.19)	2 (28.57)	11 (28.21)	29 (28.16)
Large (>1)	3 (5.08)	0	2 (5.13)	5 (4.85)
Total	59 (100)	7 (100)	39 (100)	105 (100)

Mean: 0.54, Standard deviation: 0.5, Range: 0.13 to 5.33

Similarly, from the direct questionnaire survey, the major respondents were found to be Janajati (90.48 percent) followed by Chhetri (7.62 percent) and Brahmin (1.9 percent). Thirty two percent of respondents were just literate followed by illiterate (21.9 percent), primary (20.95 percent), Secondary (13.33 percent), and SLC and above (11.43 percent) respectively. Agriculture remained the major occupation of the respondents.

4.2 Impact on financial capital

Gross income before and after adoption of enterprises

To find whether the program has made impact on the gross income of the users after the implementation of the program, paired t- test was done.

Table 1: Paired t- Test for income before and after IGAs

Total annual household income before IGAs – total annual household income after IGAs	Mean	S.D	S.E mean	95% confidence interval of the difference		T	Df	Sig.(2-tailed)
				Lower	Upper			
	-12396.780	13060.064	1274.53	-14924.225	-9869.33	-9.727	104	0.000

Note: Degree of freedom: 104, Std. Deviation: 13060.064, Std. Error Mean:1274.53,Sig. two tailed: 0.00

Since the calculated value of t is greater than that of tabulated value 1.98, it is found that the income of the respondents varies significantly before and after the implementation of the program. Mean annual household income is found to be increased by Rs.12, 396. This showed that the program has positive impact on income generation of rural households in study area.

Paired sampled statistics of income from different components in households

To find whether the program has made impact on the gross income of the users in different sectors of total household income after the implementation of the program paired t- test was done for individual sectors which are shown in table below:

Table 2: Paired t- test for different components of income before and after enterprise

Change in household income before and after IGAs		Annual income from agriculture (before- after)	Annual income from livestock (before- after)	Annual income from off farm (before- after)
Mean		-9961.06	-981.428	-1644.82
95%Confidence Interval of the Difference	Lower	-12190.07	-1407.95	-3553.14
	Upper	-7732.058	-554.90387	-263.48791
t- value		-8.86	-4.56	-1.76*
d.f		104	104	28
S.D		11517.9540	2203.981	5016.87
S.E		1124.03	215.08	931.60

Based on the above result, income after implementation of IGAs has been found to be significantly different than before. Since the calculated value of paired t is greater than that of tabulated value in income from agriculture and livestock, a positive impact of IGAs in income from agriculture and livestock is found, though the program is found to have no impact on the off farm activities. The calculated value of t is slightly less than that of tabulated value (2.048) in the off farm income of households. The people have found increasing their livestock holding capacity from the income generated from the enterprise.

4.3 Significant beneficial impacts of mentha and chamomile based enterprises found in the study area are listed below:

Changes in lives and livelihood due to IGAs

The most effective changes in livelihood because of the mentha and chamomile based enterprises are found to be in

mainly two vital components: increment in cash flow in 96 respondents (91.43%) and food sufficiency periods increased in 80 households of respondents (76.19%). Similarly increase in employment opportunities for eleven members was found.

Sources of energy for cooking

Firewood is the major source of cooking followed by bio-gas and LPG respectively. The participation in IGAs has decreased the dependency of firewood however it increased in bio-gas and LPG gas. This shows that there is shift of firewood energy towards the alternative energy sources specially biogas. Eleven members had successfully installed biogas plant after being participated in enterprises.

Households in conserving the natural resources after IGAs

It is found that eleven members of enterprises (10.48%) have installed bio gas, 45 members (42.86 %) involve in tree

plantation of trees having fodder as well as medicinal values like *Azadirachta indica*, *Melia azedarach*, *Artocarpus lakoocha* etc. and 69 of them (65.71%) in fodder and grasses cultivation like *sorghum bicolor* after being involved in IGAs which reflects that the farmers are moving toward the biodiversity conservation activities. They thus are in trend of decreasing their dependency on forest and move towards resource conservation and management.

Employment Opportunity in the study area

The study revealed that about 10.5 percent of the respondents got the part time employment opportunity due to enterprise: 5.7 percent of the respondents got the seasonal job of cultivation in other farm lands (daily wages), followed by 2.86 percent of respondents in processing plants and in the cooperatives (1.9 percent) where oil is collected and money is distributed among the farmers.

Along with positive impacts identification study was meant to address the farmers’ problems associated with enterprise in order to make the utmost use and success of enterprise. Production and processing of MAPs, technical skills and knowledge of farmers regarding the production of oil and marketing channel along with paucity of trainings on these aspects were found to be the hindrances for the maximum output of the products in the enterprise.

SWOT analysis

To know the efficiency of mentha and chamomile based IGAs, SWOT analysis was done on the basis of the discussions with the key persons in focus group discussions. Many strengths and opportunities are found for the rural people in such enterprises. Table below shows the SWOT of MAPs based enterprises.

Table 3: Strengths, Weaknesses, Opportunities and Threats of MAPs based enterprise

Strengths	Weaknesses	Opportunities	Threats
Unemployment problem being addressed slowly.	Lack of marketing link for common people.	Inclination towards commercial farming.	Domination of middleman/brokers in marketing.
High demand of products in both domestic and international markets.	Fluctuation in market price.	Increase in agro-tourism	Probability of loss of bio diversity due to mono cropping of aromatic plant.
Decreased risk of damaging crops by wild animals thereby reducing human- wild animal conflict.	Lack of market information.	Increase in women empowerment	Probability in decreasing food security as mentha and chamomile are replacing the major food crops.
Group formation among the local people and improved relation between farmers.	Inadequate monitoring and follow up after the project intervention.	Developed Leadership among the community people.	
Skill and knowledge sharing/enhancement among the local people.			
Increased awareness on biodiversity conservation.			

V. CONCLUSION

From the study it is found the financial capital of livelihood asset is being positively addressed due to mentha and chamomile based enterprises. High percentages of farmers were found to be cultivating mentha, followed by both mentha and chamomile and chamomile only. The findings suggests that aromatic plants mentha and chamomile based enterprises have enough strengths and opportunities to uplift the livelihood of rural people. Increase in the household income due to mentha and chamomile based IGAs make farmers easy access to the various household affairs. The people seemed inclined towards various conservation activities as a result they are being aware about biodiversity conservation. Shift from the traditional energy sources of

cooking i.e firewood towards the biogas was seen after the program implementation which is promoting alternative sources of energy. Further, impact on biodiversity conservation was found to be positive among the respondents after being involved in IGAs via various natural resource conservation activities. Buffer zones itself being the most ecologically sensitive zone, the population of study area were found be satisfied from income of mentha and chamomile cultivation over the poor harvest and loss of major crops thereby decreasing pressure on medicinal plants in the wild. It ultimately enhances bio-diversity conservation with increased production of farmland through MAPs integration.

VI. FUTURE RESEARCH

Since the people of BNP are cultivating aromatic plants mentha and chamomile in their own agricultural land, and only people's perception method is used in this study to study the impact on biodiversity, soil fertility test in an agricultural land and overall impact on bio-diversity due to plants based enterprises would be the scope for future research.

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Post-Conflict Parenting Strategies influencing Primary School Pupils' Academic Achievements in Sigowet and Nyakach Sub Counties of Kenya

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Abstract- The main objective of the study was to examine the role that post-conflict parenting strategies played in primary school pupils' academic achievements in Sigowet and Nyakach Sub Counties of Kenya. The correlational research design was adopted. The researcher used questionnaires, Focus Group Discussions (FGD), key informant interviews and observation checklists in collection of primary data. The Statistical Package for Social Sciences (SPSS 21) was used in data analysis and presentation. The research used both descriptive and inferential statistics in data analysis and interpretation. The post-conflict parenting strategies examined were; teaching discipline, provision of food, provision of learning material, payment of school levies and monitoring child safety. The conclusion is that post-conflict parenting strategies had a significant impact on primary school pupils' academic achievements in Sigowet and Nyakach Sub Counties of Kenya. The study recommends that more needs to be done to mitigate the effect of ethnic conflict on parenting and primary school pupils' academic achievements by; strengthening peace and security programs and setting up rehabilitation centers. This study is expected to fill the research gap in the area of disaster management and humanitarian assistance. The study is also expected to benefit the policy makers in the government and NGOs in formulation of policies regarding education of children in emergencies.

Index Terms- post-conflict, parenting strategies, Primary school pupils, academic achievements, Sigowet and Nyakach Sub Counties.

I. INTRODUCTION

1.1 Background to the study

Concern over pupils' academic achievements in post-conflict societies is a global phenomenon. Academic underachievement among primary school pupils remains a big challenge as demonstrated by the Tenth UNESCO Education for All (EFA) Global Monitoring Report (UNESCO, 2012). According to the report, a total of 250 million children worldwide of primary school age cannot read or write, whether they are in school or not. Majority of these are found in post conflict societies in Asia, Africa and South America (UNESCO, 2012; World Bank, 2003).

In Kenya, inter-ethnic conflicts have closely been associated with general elections in the country. In the 1992-1993 period, inter-ethnic conflicts in Kenya led to the deaths of over 1,500 people and displacement of about 300,000 (Kimani, 2009; Nyukuri, 1997). Following the 2007-2008 post-election

violence over 1,550 people were killed and 11,146 people suffered injuries resulting from gunshots, burns, sharp and blunt objects; and 117,216 private property was destroyed. Parents were confronted with new parenting challenges as school going children were left with physical disabilities and emotional trauma due to the atrocities witnessed (Waki Commission, 2008).

Over the past three decades, the inter-ethnic conflict in Sigowet and Nyakach Sub Counties has largely been fuelled by political tensions due to elections, cattle rustling and boundary disputes involving the two dominant tribes in the region; the Kalenjin of Sigowet and the Luo of Nyakach sub county (Saferworld, 2015). The conflict has led to loss of lives and wanton destruction of property. Parents of school going children have been displaced and their property looted thus denying them the means to support the education of their children in the post-conflict period (Nyukuri 1997; Ngundo, 2014).

Despite these grave consequences of conflict on education, little research has been done on the influence of post-conflict parenting on pupil's academic achievements. The purpose of this research was to determine the influence of post-conflict parenting strategies on primary school pupils' academic achievements in Sigowet and Nyakach Sub Counties of Kenya.

1.2 Statement of the Problem

In the year 2014, several areas of Sigowet and Nyakach Sub Counties of Kenya were hard hit by inter- ethnic conflict. As a result of this conflict, dozens of people were killed and others injured. Over 2,816 people were displaced. (Red Cross, 2014; Oudia, 2014; Ondiek, *et al*, 2014). Despite this, little research has been done on the impact of post-conflict parenting on pupils' academic achievements. While several researchers have done research about the overall impact of conflict on education, the aspect of post conflict parenting and primary school pupils' academic achievements largely remains unexplored (Amir & Naylor, 2014; Shemyakina, 2006). This research examined the influence of post-conflict parenting strategies on primary school pupils' academic achievements in the two neighboring sub counties of Sigowet and Nyakach in Kenya.

1.3 Research Objectives

The overall objective of this study was to examine the influence of post -conflict parenting strategies on primary school pupils' academic achievements in Sigowet and Nyakach Sub Counties of Kenya. The specific objectives were to;

- Identify the post-conflict parenting strategies which influenced pupils' academic achievements.
- Establish the extent to which post-conflict parenting strategies affected pupils' academic performance.

1.4. Research questions

In this study, the two research questions seeking to be answered with regard to post- conflict parenting in Sigowet and Nyakach Sub Counties of Kenya were:

- What were the post-conflict parenting strategies in the post-conflict period?
- Do post-conflict parenting strategies significantly affect pupils' academic achievements in primary schools?

II. LITERATURE REVIEW

2.1. Theoretical framework

This research was guided by the insights of Burton's (1990) Human needs theory on conflict and Mowder's (2005) Parent

Development Theory(PDT) which states that parenting largely encompasses six dimensions; bonding, education ,general welfare and protection ,responsibility and sensitivity. The two theories were chosen because they best explain how various parenting strategies affect pupils' academic performance after conflicts. Burton (1990) in his human needs theory has explored the link between inter-group conflict and the realm of basic human needs, identity, recognition and survival.

2.2. Conceptual model

There are three levels of variables involved in the child's academic performance at primary school level in the post conflict period. Figure 2.1 shows how variables interact to influence pupil's academic performance. Parenting strategies represent the independent variable; the dependent variable is pupils' academic achievements while strategies to enhance pupils' academic achievements represent moderating variables.

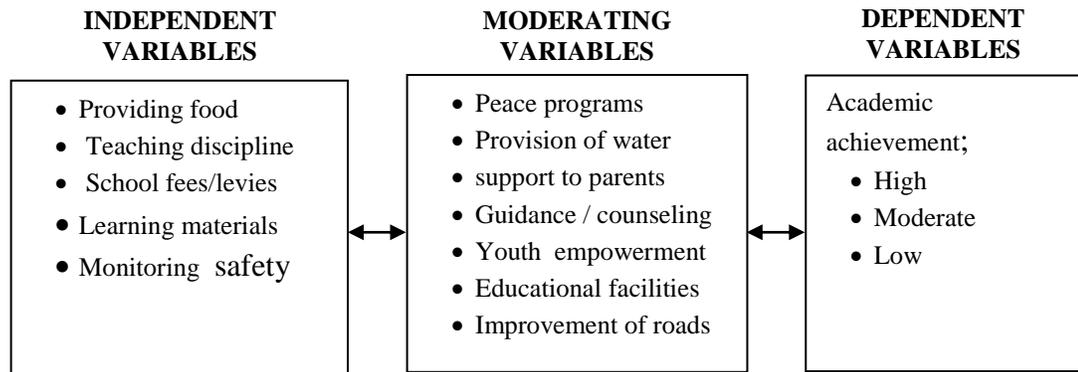


Figure 2.1 Conceptual Model

III. RESEARCH METHODOLOGY

3.1 Research Design

The purpose of this study was to investigate the influence of post-conflict parenting strategies on the academic achievements of primary school pupils in Sigowet and Nyakach Sub Counties of Kenya. The study used the correlational research design to determine whether there was an association between post-conflict parenting strategies (independent variable) and pupil's academic achievements (dependent variable). This research utilized a number of sampling methods. The first was multistage random sampling and the second was purposive sampling.

3.2 Research Instruments

Two questionnaires were developed by the researcher and used to collect data. One questionnaire was used to collect data from 200 pupils and the other from 200 parents. Key informant interviews were conducted between the researcher and key educational stakeholders such as teachers, head teachers, members of PTA, community leaders, Non-governmental Organization leaders, Ministry of Educational officials, and leaders of Faith Based Organizations. Focus Group Discussions

(FGD) and observation checklists were also utilized to obtain data. Data on pupils' academic performance was collected from the school records using the record forms. Secondary data was obtained from the university library, public offices, non-governmental organizations and Faith Based Organizations. School records and files were used to get scores that were used to measure pupils' academic achievement.

3.2 Data Analysis and Presentation

The Statistical Package for Social Sciences (SPSS) computer package was used in data processing, analysis and interpretation. Data from FGD meetings and key informants was analyzed by both descriptive and inferential statistics. The data was presented in graphs, tables, and discussions. Inferences were done from results presented.

IV. RESULTS AND DISCUSSION

4.1. Post-Conflict Parenting Strategies Influencing Pupils' Academic Achievements.

Analysis of the respondents' post-conflict parenting strategies such as teaching discipline, provision of learning

materials, provision of breakfast and lunch, monitoring child safety and payment of school fees was conducted.

4.2.1 Teaching Discipline to Children

Pupils were asked how often their fathers disciplined them in the post-conflict period. The results are shown in Figure 4.1.

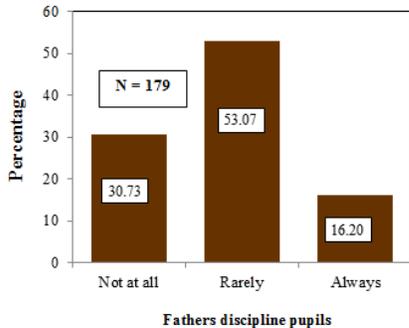


Figure 4.1: Distribution of Fathers Based on how they Disciplined their Children in Sigowet and Nyakach Sub Counties, Kenya

Source: Field Data (2015)

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 37.050$) showed that there was highly significant ($P < 0.01$) variation on the issue of how fathers disciplined their children. Figure 4.1 shows that majority of fathers 95(53.07%), rarely disciplined their children 55(30.73%) of fathers didn't discipline their children at all while 29 (16.20%) disciplined their children always.

FGDs revealed that fathers disciplined children through slapping or corporal punishment. It emerged that parents, caregivers and families needed to know the positive parent-child interactions, including non-violent forms of discipline. These findings agree with UNICEF (2015) which observes that 91 percent of the world's children still face corporal punishment and violent discipline which is associated with negative outcomes such as poor mental and physical health, damage to family relations and increased violence in society. Pupils were asked how often their mothers disciplined them. The results are shown in Figure 4.2.

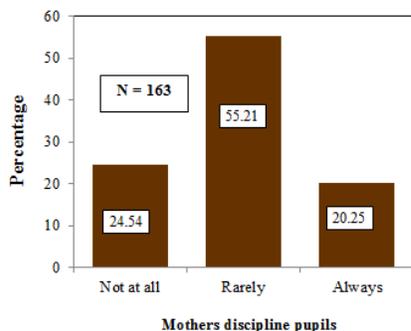


Figure 4.2: Distribution of Mothers Based on how they Disciplined their children in Sigowet and Nyakach Sub Counties, Kenya

Source: Field Data (2015)

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 35.571$) showed that there was highly significant ($P < 0.01$) variation on the issue of whether mothers disciplined their children or not. Figure 4.2 shows that 90 (55.21%) of mothers rarely disciplined their children, 40 (24.54%) did not discipline their children at all while 33 (20.25 %) always disciplined their children. The results reveal the fact that majority of mothers did not discipline their children at all or rarely did so. During FGD meetings some mothers agreed that they spend much time fending for families' basic needs and had no time for disciplining the children.

These findings agree with Dryden Peterson (2011) who observes that parents in the post conflict period are more concerned with meeting basic needs such as food instead of disciplining and monitoring children's academic performance. FGD meetings and interviews with key informants confirmed that mothers, just like fathers, administered discipline through offering corporal punishment further reinforcing the position UNESCO (2010) that majority of the world's children still face this type of human rights violence. Thus, they are likely to grow up as violent youth due to their upbringing.

Pupils were asked if their guardians disciplined them in the post conflict period. The results are summarized in Figure 4.3.

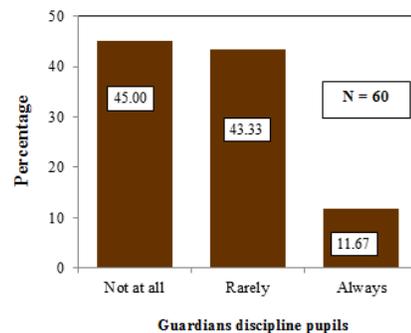


Figure 4.3: Distribution of Guardians Based on how they Disciplined their Children in Sigowet and Nyakach Sub Counties, Kenya

Source: Field Data (2015)

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 12.700$) showed that there was highly significant ($P < 0.01$) variation on the issue of whether guardians disciplined children. Figure 4.3 shows that 27 (45.00%) of guardians did not discipline did not discipline their children at all. On the hand, 26(43.33%) rarely disciplined the children and only 7 (11.67%) always administered. Figures 4.1, 4.2 and 4.3 show variations on the issue of how parents and guardians disciplined children. Interviews with the key informants confirmed that conflict contributed to decreased enforcement of discipline as parents and guardians got more concerned with meeting more urgent needs like provision food.

4.2.2 Monitoring Child Safety

Pupils were asked whether their fathers made sure they were safe while at home. The results were summarized in Figure 4.4.

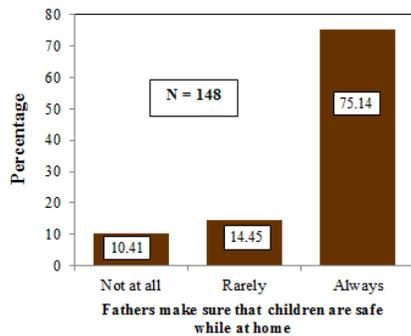


Figure 4.4: Distribution of how Fathers Ensured Children’s Safety in Sigowet and Nyakach Sub Counties, Kenya
Source: Field Data (2015)

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 136.520$) showed that there was highly significant ($P < 0.01$) variation on the issue of whether fathers made sure children were safe when at home. Data in Figure 4.4 indicates that 130 (75.14%) of fathers always made sure their children were safe, 25 (14.45%) rarely made sure their children were safe and 18 (10.40%) made sure their children were safe. From the FGDs it became evident that some fathers never bothered about the safety of their children while others rarely bothered about their children’s safety. The high number of fathers getting concerned with the safety of their children could be attributed to the high insecurity which led to assault of children, injury and even death due to conflict.

Shemyakina (2006) agrees with these findings by pointing out that in the post conflict period, parents become more concerned with the safety of their children, Children are at risk of being molested or assaulted while going to or from school. Forced recruitment into militia is also a potential threat to the children. Girls are at risk of being used a sex slaves. Thus, parents become extra vigilant about the safety of their children to prevent them from getting them into these problems. Pupils were asked whether their mothers ensured they were safe when at home and at school. The results are shown in Figure 4.5.

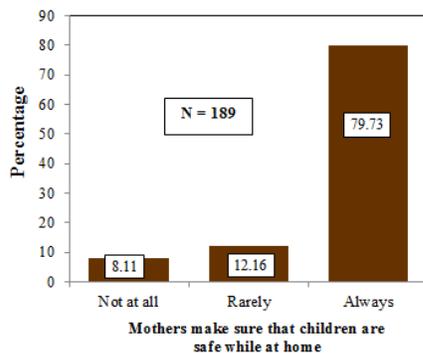


Figure 4.5: Distribution of how Mothers ensured Children’s Safety in Sigowet and Nyakach Sub Counties, Kenya
Source, Field data (2015)

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 143.730$) showed that there was highly significant ($P < 0.01$) variation on whether mothers made sure children were safe when at home. Data in Figure 4.5 shows that 118 (79.73%) of mothers always made sure their children are safe, 18 (12.16%) rarely made sure their children are safe while 12 (3.11%) of mothers didn’t make sure their children are safe.

Pupils were asked whether their guardians made sure their children were safe at school and at home in the post conflict period. The summary of the results is shown in Figure 4.6.

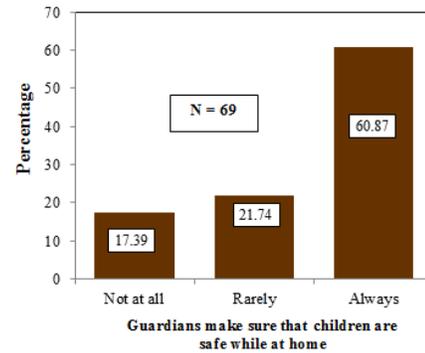


Figure 4.6: Distribution of how Guardians Ensured Children’s Safety in Sigowet and Nyakach Sub Counties, Kenya
Source: Field Data (2015)

The Pearson Chi-Square value ($\chi^2_{2,0.01} = 23.739$) showed that there was highly significant ($P < 0.01$) variation on whether the guardians made sure children were safe when at home. Figure 4.6 indicates that 42 (60.87%) of guardians always ensured the safety of their children, 15 (21.74%) rarely ensured their children’s safety while 12 (17.39%) did not pay keen interest to the safety of their children at all.

From the FGD discussions, it became evident that both parents and guardians were always worried about the safety of their children. Sinclair pointed(2003) pointed out that during and after the conflict period, parents got constantly worried about the safety of their children as they could be injured, assaulted or even for girls , be sexually abused.

4.2.3 Provision of Books and Learning Materials

Pupils were asked whether their fathers selected and purchased learning material for their children in the post-conflict period. The results are summarized in Figure 4.7.

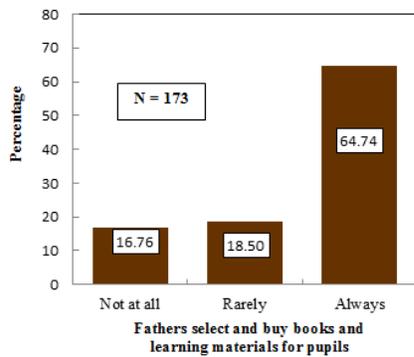


Figure 4.7: Distribution of how Fathers Bought Learning Materials for their Children in Sigowet and Nyakach Sub Counties, Kenya
Source: Field Data (2015)

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 76.867$) showed that there was highly significant ($P < 0.01$) variation on whether fathers selected and bought books/learning material for pupils. Data in Figure 4.7 shows that 112 (64.74%) of fathers selected and purchased learning materials, 32 (18.50%) rarely purchased learning materials and 29 (16.76%) did not buy learning material at all. This was confirmed during FGD meetings that parents failed to buy learning materials as they lacked resources to do so after losing their property in conflict. Pupils were asked whether their mothers selected and purchased books and learning materials for them. The results are summarized in Figure 4.8.

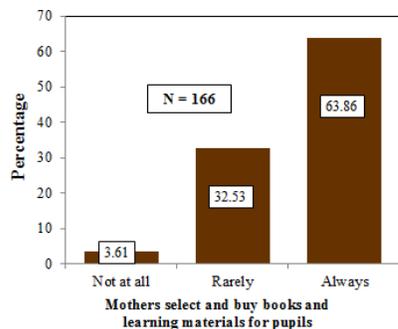


Figure 4.8: Proportion of Mothers who Bought Learning Materials for their Children in Sigowet and Nyakach Sub Counties, Kenya
Source: Field Data (2015)

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 90.410$) showed that there was highly significant ($P < 0.01$) variation on the issue of whether mothers bought books/learning material for pupils. Data in Figure 4.8 shows that 106 (63.86%) of mothers always bought books and learning materials for their children, 54 (32.53%) rarely bought books and learning materials and 6 (3.61%) did not buy books or learning material at all. FGDs confirmed that both parents attempted to purchase study materials for their children but they were limited financially. Those parents who were able to purchase books and learning material were largely those less affected by conflict. These findings agree with Majanga (2014) who pointed out that after the 2007-2008 Post-Election Violence (PEV) in Kenya some

parents lacked money to purchase books and learning materials for their children. Pupils were asked whether guardians purchased books and learning materials for their children. The results are summarized in Figure 4.9.

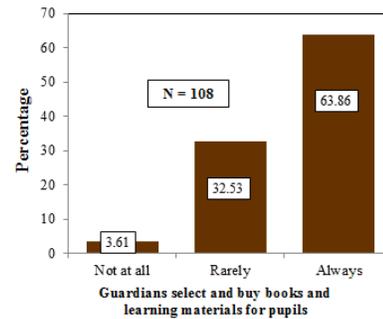


Figure 4.9: Distribution of how Guardians Bought Learning Materials for Children in Sigowet/Nyakach Sub Counties, Kenya
Source: Field Data (2015)

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 50.167$) showed that there was highly significant ($P < 0.01$) variation on whether guardians selected and bought books/learning material for pupils. Data in Figure 4.9 indicates that 70 (64.81%) of the guardians always bought books/learning materials, 25 (23.15%) rarely bought books and learning materials and 13 (12.04%) did not buy at all.

Figures 4.7, 4.8 and 4.9 show that in the post conflict period, 116(67.74%) of fathers provided books and learning materials for their children, 106 (63.86%) of mothers provided books and learning material while 70 (64.81%) of guardians provided learning material. This means that the rest of parents/guardians either rarely purchased or did not purchase at all. Although there is free primary education in Kenyan primary schools in line with the UNO goal of achieving Education For All and the second Millennium Development Goal of eliminating global illiteracy by the year 2015(UNESCO,2012; UNICEF, 2009); pupils are expected to purchase some learning material and pay some levy to complement the effort of the national government. Children schooling in private academies who were less exposed to the ethnic of conflict and whose parents bought learning materials achieved high scores academically.

4.2.4 Payment of School Fees

This study sought to find out how parents paid their children's fees in the post-conflict period in the two sub counties of Sigowet and Nyakach in Kenya. In this study, pupils were asked whether their fathers paid school fees after the ethnic conflict period. The results are summarized in Figure 4.10.

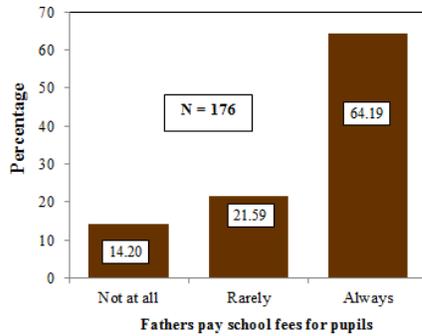


Figure 4.10: Distribution of how Fathers Paid School Fees for Children in Sigowet and Nyakach Sub Counties, Kenya
Source: Field data, (2015)

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 76.920$) showed that there was highly significant ($P < 0.01$) variation on whether fathers pay school fees for pupils. Data in Figure 4.10 indicates that 113 (67.70%) of fathers always pay school fees, 38 (19.88%) rarely pay school fees while 25 (12.42%) did not pay at all. From FGD discussions fathers who were unable to pay fees attributed this to poverty. Fathers from well of families who took their children to academies like Crystal Hill or Sondu Lifeshine Primary managed to give their children good education. FGDS confirmed that cases of early and forced marriages were prevalent as fathers rushed to dispense off with the ‘burden’ of educating the girl child.

These study findings confirm the findings by Shemyakina (2006) that the girl child is even more disadvantaged during the period of ethnic conflict as she may be married off or forced to drop out of school due to economic hardships faced by the family. Pupils were asked whether their mothers paid school fees. The results are shown in Figure 4.11.

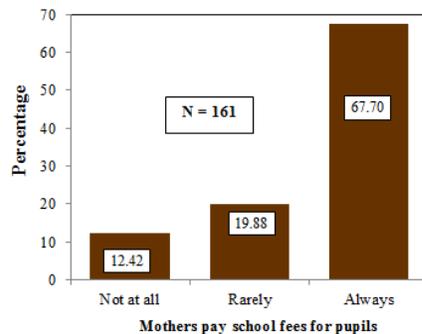


Figure 4.11: Distribution of how Mothers Paid School Fees in Sigowet and Nyakach Sub Counties, Kenya
Source, Field data, (2015)

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 86.910$) showed that there was highly significant ($P < 0.01$) variation on whether mothers pay school fees for pupils. Data in Figure 4.11 shows that 109 (67.70%) of mothers always paid fees, 32 (19.88%) rarely paid fees and 20 (12.42%) did not pay fees at all. FGDs revealed that due to loss of livelihoods parents were unable to pay fees. FGDs confirmed that children whose parents paid fees performed better than those whose parents didn’t bother. Those

who didn’t pay fees were often forced to go home and bring fees thus missing classes unlike those whose learning was not interrupted. This explains why pupils in academies where parents paid fees without delay like Crystal Hill and Sondu Lifeshine did well academically than other public schools like Tabaita or Holo Primary school. Pupils were asked whether their guardians paid school fees. The results are given in Table 4.12.

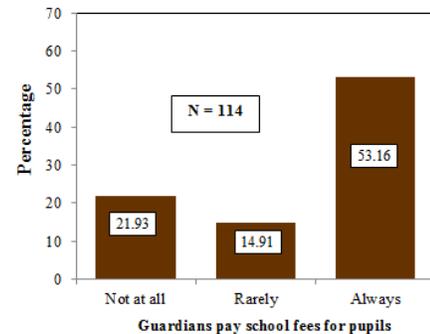


Figure 4.12: Distribution of how Guardians Paid School Fees in Sigowet and Nyakach Sub Counties, Kenya
Source: Field Data (2015)

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 46.474$) showed that there was highly significant ($P < 0.01$) variation on whether guardians paid school fees for pupils. Figure 4.12 shows that 72 (55.16%) of guardians always paid fees, 17 (14.91%) rarely paid fees while 25 (21.93 %) did not pay fees at all. Figure 4.12 shows that some guardians did not pay fees at all or rarely did so. During FGDs, it emerged that some guardians could not afford fees. From the researchers’ observation during school visits, it was evident that some guardians were elderly parents who not only lacked fees but required assistance themselves.

4.2.5 Provision of Breakfast and Lunch to Children

Pupils were asked whether fathers provided breakfast and lunch to their children. The results are shown in Figure 4.13.

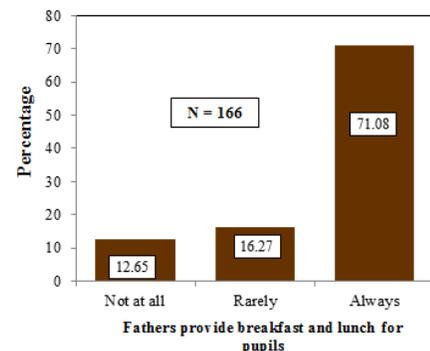


Figure 4.13: Distribution of how Fathers Provided Breakfast and Lunch in Sigowet and Nyakach Sub Counties, Kenya
Source: Field Data (2015).

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 106.733$) revealed that there was highly significant ($P < 0.01$) variation on the issue of whether fathers provided breakfast/ lunch for pupils. Data in Figure 4.13 shows that 118 (71.08%) of fathers always provided breakfast/lunch, 27 (16.27%) rarely provided breakfast/lunch while 21 (12.65%) did not provide breakfast/ lunch at all. Through FGD meetings, parents confirmed that some of them could not provide due to poverty while some considered that as the responsibility of their wives. Pupils were asked whether their mothers provided them with breakfast and lunch in the period after the conflict. The results are given in Figure 4.14.

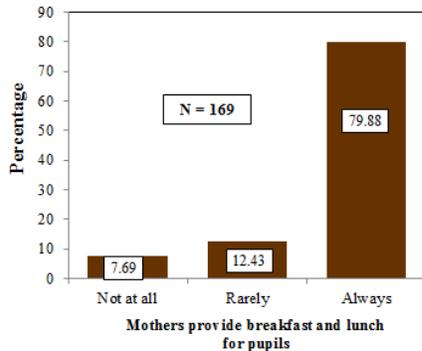


Figure 4.14: Distribution of how Mothers Provided Breakfast and Lunch for their Children in Sigowet and Nyakach Sub Counties, Kenya
Source: Field Data (2015).

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 165.349$) showed that there was highly significant ($P < 0.01$) variation on whether mothers provided breakfast and lunch for pupils. Data in Figure 4.14 shows that 135 (79.88%) of mothers provided breakfast, 21 (12.43%) rarely provided lunch/ breakfast while 13 (7.69%) did not provide lunch and breakfast at all. From the FGD discussions some mothers could not provide breakfast or lunch to their children because they could not afford it. Some parents said that they could only afford one meal in a day.

These findings confirm UNICEF (2009) report which observed that children are at higher risk of food insecurity and malnutrition during and after the period of armed conflict. It is evident from the results that mothers played a big role in providing their children with breakfast and lunch than did the fathers. Through FGDs, key informants who included parents confirmed pointed out that mothers showed.

These study findings further agree with Kafui (2005) whose study revealed that children of SAEMA high performing schools in Ghana performed better than those of SHAMA sub Metro Region because parents of SAEMA high performing schools provided breakfast to their children unlike parents of the poverty stricken SHAMA Sub Metro region. Teachers confirmed that children who were given breakfast and lunch seemed to have more concentration in class than children who were not given lunch or breakfast. Pupils were asked whether guardians provided lunch and breakfast to their children in the post-conflict period. The results are summarized in Figure 4.15.

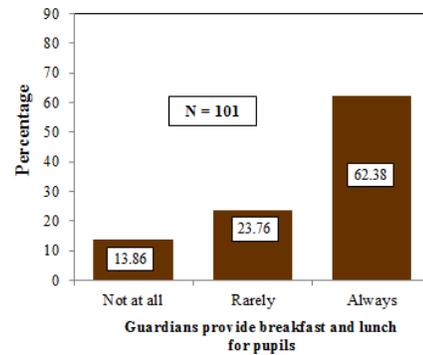


Figure 4.15: Distribution of how Guardians Provided Breakfast and Lunch in Sigowet and Nyakach Sub Counties, Kenya
Source: Field Data (2015)

A Pearson Chi-Square value ($\chi^2_{2,0.01} = 39.822$) showed that there was highly significant ($P < 0.01$) variation on whether guardians provided breakfast and lunch for pupils. Figure 4.15 shows that 14 (13.66%) of guardians provided no lunch and breakfast, while a further 24 (23.76%) rarely provided lunch and breakfast while 63 (62.38%) provided breakfast and lunch. Figures 4.13, 4.14 and 4.15 reveal that some parents and guardians did not provide lunch or breakfast for their children. This affected the academic achievements of pupils as they could not concentrate in class. These findings agree with Majanga (2014) whose study indicated that pupils who had experienced ethnic violence were always hungry at school because their parents could not afford food to make the provision. Majanga (2014) found out that the victims of the post-election violence in Nakuru, Kenya had difficulty meeting basic needs such as food for their families. As a result, their children felt hungry in school and ended up achieving low grades academically.

Ogada (2015) agrees with these study findings by stating that majority of families affected by conflict in Mt Elgon sub county of Kenya adopted various food security coping mechanisms since they could not afford three meals per day. Some skipped breakfast, lunch or supper depending on the availability of food. Skipping of breakfast which is regarded by nutritional experts as the most important meal of the day as it enhances metabolism and concentration was noted as having had an impact on the physiological wellbeing of the pupils in school.

During FGD meetings some head teachers pointed out that they had tried to implement school feeding programs but were unable to achieve much due to financial constraints. Although the government provided some funds for tuition to these schools, the funds were not sufficient enough to implement the school feeding program. In some schools like Tabaita and Kamolok, parents had tried to contribute money towards the program but still the problem of poverty made it unsustainable.

4.2.6 Other Parenting strategies in the post-conflict period.

Pupils were asked to state other provisions that the parents or guardians made to enhance pupils' academic achievements. The results are indicated in Figure 4.16.

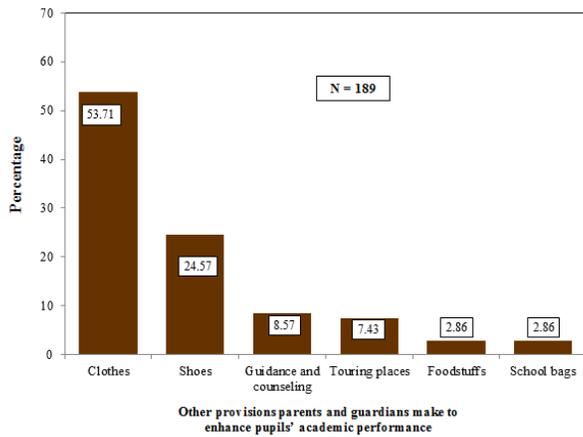


Figure 4.16: Other Parenting Strategies used in the Post-conflict period in Sigowet and Nyakach Sub Counties, Kenya
Source Field data, (2015)

A Pearson Chi-Square value ($\chi^2_{5,0.01} = 206.566$) showed that there was highly significant ($P < 0.01$) variation on other provisions fathers/mothers or guardians made to enhance pupils academic performance. Figure 4.16 shows that 94(53.71%) of parents rewarded their children when they did well with clothes, 43 (24.57%) bought shoes, 15(8.57%) provided guidance and counseling, and 13 (7.43%) took them for tours, 5 (2.86%) bought them foodstuffs while 9 (2.86%) bought them school bags.

From FGD discussions, it emerged that parents who were severely affected by conflict would wish to take their children to educational trips, buy them good shoes or give them other rewards but they were economically hand-capped. On the other hand, parents who were less affected by conflict managed to make these provisions for their children.

These findings agree with Burton's theory (1990) that armed ethnic conflicts have major repercussions on parents and children witnessing them. Apart from death, displacement and destruction of property, parents are deprived of their means of livelihood and are unable to support the education of their children. These findings also agree with Justino (2014) that conflict denies families incentives to send children to school during and after conflict. Due to loss of livelihoods, parents cannot afford basic school requirements nor do offer rewards that can motivate children to perform better academically in the post conflict period.

4.3 Pupils Academic Performance in Primary Schools in Sigowet and Nyakach Sub Counties of Kenya

Objective two aimed at establishing the effect of post-conflict parenting strategies on primary school pupils' academic achievements in Sigowet and Nyakach Sub Counties of Kenya. The study did this by scrutinizing and analyzing the school record scores for pupils during after the conflict. Marks scored at the end of both term one and term two were recorded and analyzed. The five examined subjects; Mathematics, English, Science, Social Studies and Kiswahili all gave a total of 500 marks for the highest achieving pupils.

4.3.1 Marks Scored in End of Term One Examinations in Primary School.

Pupils were asked to record the total marks they scored at the end of first term in the year 2014 out of 500 marks. The results are given in Figure 4.17.

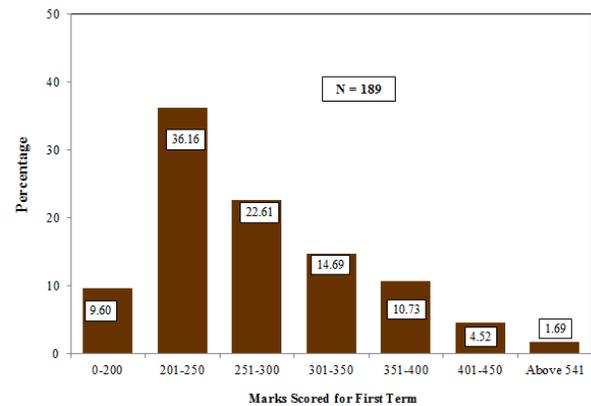


Figure 4.17: Distribution of Marks Scored in Primary Schools in First Term in Sigowet and Nyakach Sub Counties, Kenya

Source: Field Data (2015)

A Pearson Chi-Square value ($\chi^2_{6,0.01} = 103.593$) showed that there was highly significant ($P < 0.01$) variation on the marks scored for first term. Data in Figure 4.17 shows that 17 (9.60%) pupils scored below 200 marks, 64 (36.16%) scored between 201-250 marks. Further, 40 (22.60%) respondents performed moderately by scoring 251-300 marks. Among the high achievers, 26 (14.69%) pupils scored between 301-350 marks, 19(10.73%) scored between 351-400 marks, 8(4.52%) scored between 401-450marks while3 (1.69%) scored above 451 marks out of a total of 500 marks.

The results reveal that some pupils fared poorly in their end term exams while others achieved high grades. Being the conflict period this confirms the fact that conflict contributed to the low academic achievements for some pupils. FGD meetings confirmed that during this period, there was increased absenteeism from school due to insecurity. Some of the big boys participated in the conflict .Some school head teachers complained that pupils stayed away from school for as long as two months. Some pupils could not get 300 marks and above which is required to secure them a chance in well performing national or county schools.

4.3.2 Marks Scored in End of Term Two Examinations in Primary Schools

Pupils were asked to record the marks they had scored at the end of second term in the year 2014 out of a total of 500 marks. The results are shown in Figure 4.18.

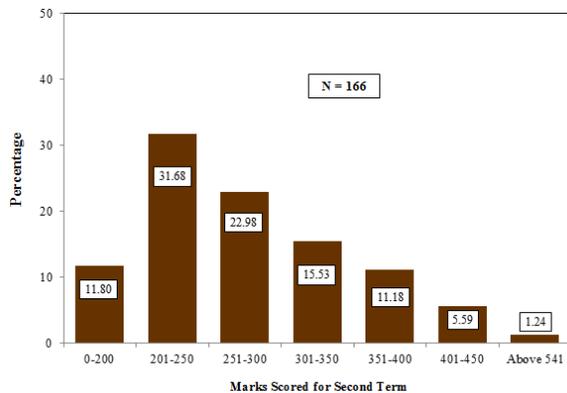


Figure 4.18: Distribution of Marks Scored in Term Two in Primary Schools in Sigowet and Nyakach Sub Counties, Kenya
Source: Field Data (2015)

A Pearson Chi-Square value ($\chi^2_{6,0.01} = 72.261$) showed that there was highly significant ($P < 0.01$) variation in marks scored in term two. Figure 4.18 indicates that 19 (11.80%) pupils scored below 200 marks, 51 (31.68%) scored between 201-250 marks. These categories can be considered low achievers. The results also show that 37 (22.98%) respondents performed moderately by scoring between 251-300 marks. The high achievers were 25 (15.53%) who scored between 301-350 marks, 18 (11.18%) who scored between 351-400 marks, 9 (5.59%) who scored 401-450 and 2 (1.24%) who scored above 451 marks.

Figures 4.17 and 4.18 show significant differences between the low achieving, moderately achieving, and high achieving pupils. According to Ministry of Education (2014), pupils who scored 300 marks and above joined high performing county or national schools in Kenya. Those who scored moderately between 251-300 marks joined county schools while those who scored below 250 marks joined low performing sub county schools. The presence of high achieving pupils with 300 marks and above could be attributed to the availability of well secured private boarding schools which were less affected by ethnic conflict.

According to FGD meetings with parents, low academic performance was caused by ethnic conflict which deprived them of livestock, food stocks and finances they required to support the education of their children. Interviews with teachers and head teachers revealed that some pupils experienced trauma which made them to perform poorly academically. From the FGD reports, parents of schools such as Tabaita, Holo and Ngege which are in conflict prone zones always ranked last in Sigowet Sub County while schools like Ngege and Holo recorded low performances in Nyakach Sub County. Teachers complained that whenever conflict occurred on the border, it affected syllabus coverage and eventually caused poor performance in national exams such as KCPE.

These study findings agree with Sinclair (2003) whose research showed that pupils who had experienced conflict had memories of the massacre of their parents, relatives and friends, family property destruction and rape of family members. Thus, they had poor concentration in class and performed poorly academically. Shemyakina (2006) pointed out that when children

in conflict communities are able to continue attending school four years after the conflict, their ability to learn may seriously be impaired by psychosocial distress or poor physical health.

V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Findings

The general objective of the study was to determine the influence of post-conflict parenting strategies on primary school pupils' academic achievements in Sigowet and Nyakach Sub Counties of Kenya. Analysis of post conflict parenting strategies showed that some parents were unable to enforce discipline, provide books and learning materials, monitor child safety and pay school fees for their children. The findings indicated that in term one 81 (45.8%) pupils were low achievers, 40 (22.6%) moderate achievers and 53 (31.6%) were high achievers. In term two, 70 (43.5%) were low achievers, 37 (23.00%) were moderate achievers while 54 (33.50%) were high achievers. Low and moderate academic achievements can be attributed to inter-ethnic conflicts which interfered with parental socio economic status and parenting style. The study generally did establish that post-conflict parenting had a negative impact on pupils' academic achievements in the post conflict period.

5.2 Conclusions

The general objective of the study was to establish post conflict parenting strategies and their impact on primary school pupils' academic achievements in Sigowet and Nyakach Sub Counties of Kenya. The study did this by analyzing the following parenting strategies; teaching discipline, providing lunch and breakfast, providing learning materials, monitoring child safety and payment of school fees. The study established that conflict affected negatively parenting and primary school pupils' academic achievements in Sigowet and Nyakach Sub Counties.

5.3 Recommendations

Conflict adversely affects parenting and pupils' academic achievements in the post-conflict period. This study recommends that intervention programs by both government and humanitarian organizations should engage more closely with the households affected by conflict in order to alleviate their suffering and facilitate the process of conflict recovery. There is need to put in place mechanisms that will not only empower the parents both socially and economically but also target the education of the children affected by ethnic conflict.

Both the national and county governments should come up with proactive policies on how to support the education of children during and after the emergency period. The national government, county governments and humanitarian agencies should modify their operational approaches to ensure greater complementarity between humanitarian and development interventions.

5.4 Suggestions for Further Research

Based on the findings of the study in Sigowet and Nyakach Sub Counties of Kenya, the researcher makes the following suggestions for further research:

- i. A similar study be done in another county or sub county facing ethnic conflict to determine the effect of post conflict parenting strategies on primary school pupils' academic achievements in comparison to this study findings.
- ii. Further research is needed on children affected by armed ethnic conflict in primary schools to establish the impact of such conflict on their post primary studies.
- iii. Supportive research should determine the impact of parental trauma on the educational achievements of pre-school children in the post conflict period.

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Real Time Information and Communication Center based on webRTC

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Abstract- This paper presents how to do Advance communication between two or more browsers without having any issue. Web RTC API (Real-Time Communications) and Asterisk virtual PBX, Using P2P (peer to peer), Real time outbound calls, video conferencing with two or more browsers and Live chatting, File sharing and also QoS Characteristic Asterisk Call center Engine for handle the SIP calls which are coming outside to the network, Using AGI Scripts for handle the route of the inbound calls and also give some instructions to the call flow. Handling files and support to download files automatically.

Index Terms- HTML5, VoIP, WebRTC, QoS, Asterisk, SIP, File sharing, Real Time Communication

I. INTRODUCTION

Real time communication (RTC) allows to find information areas like social media, live chat, video conferencing and unified communications and collaboration are all possible today because of developments in real time communications. Analog phone becomes to the smart phones for make communication easier, also created SIP phones to make calls with IP addresses through the Internet, For the real time communication between internet browsers, there is a open source project called webRTC. WebRTC enables mostly peer-to-peer communications over the web without the installing a client software or plugin. This is done by leveraging HTML5 and JavaScript in the browser. Asterisk also an open source project which perform as virtual PBX ([Private Branch Exchange](#)) and found by the Organization called Digium. This PBX used to mainly handle calls which are coming from digital or analog Lines. There are some advance methods and configurations have to do in this virtual PBX before the run time.

By using these two open source projects and give a solution to make peoples day to day works get much easier by accessing a single web site. On this website people can make calls or video calls, Live Chatting ,File Sharing and also without typing any single word in Search Engine and can find the documents that want (eg: Passport Application, ID Application, Some Government related Exam Applications) by making simple call through the web browser. That call directly come to the IVR or Live Agents. After that Person can talk with this Agent and tell their requirement. Agent can track the calling party. Otherwise Form the IVR that call automatically goes to the correct location and download the Application or the Document to their pc asking the location that wants to save it.

In the sever side Asterisk can handle more than 5000 inbound calls simultaneously, each and every call it get a recode, That recode include, IP address of particular computer , Location (Address), Who is Answered, What are the documents did they get , Duration and a voice recode.

Addition to that System provides file sharing between browsers, do Live Chatting, get video calls or Conference calls. Without installing different kind of software in PC People can do Communications with their favorite web browser. This will help to fulfill people needs without wasting time in Queues or searching on Internet. All communication can do with this system. And only thing that people want is internet connection with a computer, Laptop or Smart Phone Etc. that can run your web browser

In parse II describes about previous works that was done by the researches Parse III describe our approach to implement a complete call center solution with using webRTC it includes Generate SIP calls, Handle the SIP calls, Live Agents, QOS characteristics and Automated downloads. Parse IV describe the conclusion and Pace V describes the future works .From this onwards II will describe background and related works , from III our approach will be explained and our approach has its sub categories as what are the features in client side , generate calls via SIP between web clients , webRTC and asterisk , QOS , asterisk and softphones , call flow , agents and track ,automated download . IV described conclusion finally future works

II. BACKGROUND AND RELATED WORKS

The pervasive increment of VoIP technology devices cause rapid explosion of various Communities applications, videos and online Television (TV) channel designed for users to increase their links in any network with the development of this technology introduces Web Real Time Communication (RTC). WebRTC allows No plug-ins, cross platform, low development and usage cost , browser to browser communication using peer to peer connection then it will avoid third Party plug-in dependency[1][8][12].

Instead of installation of separate software's, the desired communication features can be used in the browser immediately. This program built on JavaScript Sockets programming. Communication held on between two networks with real time video streaming feature with help of special protocol as well as reliable communication with protocols such as Session Initiation Protocol (SIP), Session Description Protocol (SDP), Hypertext Transfer Protocol (HTTP) and the Real-Time Transport Protocol

(RTP) and the browser base open publishing(BOPlish) [2][10] [11].

Instead, the desired communication features can be used in the browser and immediately two browsers to communicate without any servers and transmitted data between two peers is encrypted by Datagram Transport Layer Security (DTLS) protocol to ensure the security of data [3][12]. A Web based real-time communication system, Hypermodal, based on the concept of temporal linkage between resources [4]. Consumers and enterprises alike are rapidly adopting voice-over-IP (VoIP) technologies, which offer higher flexibility and more features than traditional telephony infrastructures[5][10].

Application of technologies for reception and transmission of streaming data in web browser: definition of the most popular technologies among the major participants of market of streaming data transfer, working with a web browser, the possible scope of application of streaming reception and transmission from a web browser, as well as the prospects for availability of a technology for end-users [6]. The advanced services like media mixing, session recording regards to videoconference must be included in the WebRTC. Furthermore, technical issues like bandwidth availability of networks, differences in networks and devices, screen size problems and processing power issues need to be solve immediately. The multiple control unit can be used to overcome above issues very effective manner [7].

The Information technology (IT) technicians need to prepare the systems before the session and need to check the availability of latest plugin within the existing system. The web browser cannot handle everything alone in videoconferencing. Furthermore, all the parties who join for the videoconferencing also need to do the same procedure again and again. The WebRTC make above complex steps to the task of button click event. The evolution made by the WebRTC is filled a huge gap in modern videoconferencing regards to traditional videoconferencing methods [9].

Asterisk is an open source project which is done by the Digium. This actually a virtual PBX and can handle SIP Calls which are coming from internet and can handle Calls which are coming from Analog Phones. This Asterisk sever can send DTMF (Dual Tone Multi Frequency) input to the computer that would serve as commands for execution of different programs on the computer and relay voice the output in the form of narrated voice to the user [13] Asterisk based voice exchange makes it possible for people to use their phones either fixed or mobile to call others in the country and internationally for a fraction of the prices they pay now[14]. In Asterisk There is very interesting part CallId IVR (Interactive voice Respond) from this system can route the call Automatically and find the destination of the call[15].

III. OUR APPROACH

What are the features in Client side

There is a small inbuilt Application in web browser (It can be an Application or simple website). From this Application client has different communication options Such as Live Chatting, Video conferencing, Talk to Live Agents with virtual softphone and virtual extension also client name and Get the related documents (Automatically Downloading). This is a simple Application and easy to use without having any pervious knowledge of handle sip calls. Figure: 1 explains the web Client Interface

(Figure1.1)



(Figure 1.2)



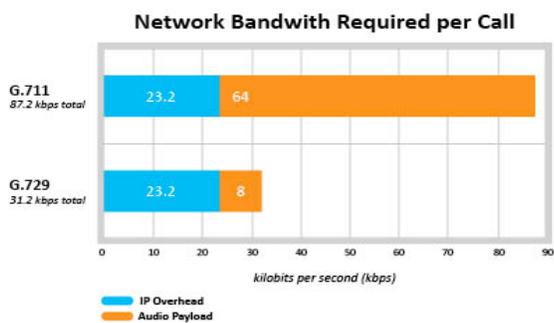
(Figure 1.3)



Generate Calls via SIP between web clients

For Generate SIP calls client should have working head phone and working Microphone. After client connect to the Application they can check their devices and make sure they are working. From User interface there are some options as explained in Figure: 1. Client click the button which is in the interface sip call will automatically generate from the browser (webRTC enable)

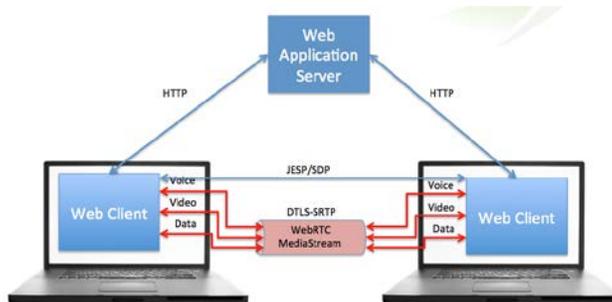
In default webRTC is supporting G.711 and Opus codes(Opus can handle a wide range of audio applications, including Voice over IP, videoconferencing, in-game chat, and even remote live music performances) for sending Audio stream. G.711 will give the best call quality for VoIP on the basis that it uses no compression at all, and as a result, the call quality sounds like using a regular ISDN phone. This Codec is supported by most VoIP providers. But when using G.711 codec it provides an uncompressed high quality voice, but uses a lot of bandwidth. To ignore this issue System use G.729 codec, G.729 is considered to offer a good level of call quality at a low bit rate of 8Kbps (kilobits per second), which would mean that you would be able to get more calls through your bandwidth that if you were to use the G.711 Codec. Different between G.711 and G.729 explain in Figure: 02



(Figure: 2)

For Video webRTC has VP8 and also H.264 codecs, VP8 has no limit on frame rate or data rate. It utilizes 14 bits for both width and height, which makes the maximum resolution 16384x16384 pixels. VP8 is often compared with H.264, a popular video codec that requires licensing royalties. Some commenters have noted the two codecs are highly similar in quality. When comparing h.264 and VP8, to get h.264 have to paid but VP8 is free

Using these codes (G.729 and VP8) and without using any plugins first implement a P2P communication system. Webserver doing the communication. And also Live chat system can be implemented by using Data stream without using any plugins as describe in Figure: 3



(Figure: 3)

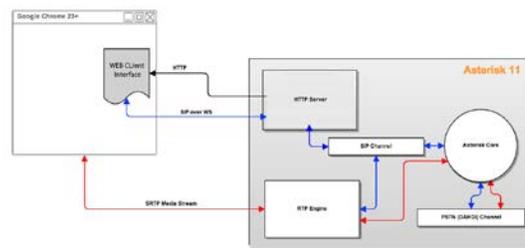
WebRTC and Asterisk

Combining WebRTC and Asterisk Call center Engine together it can make a good communication with web clients and Agents (who are provide a services to the clients). Asterisk is a virtual PABX and it can be hosted. When select the Asterisk version, 11 is better than other versions. And before install the Asterisk should build with

- res_http_websocket,
- res_crypto
- chan_sip.

After that need to configure [Asterisk's built in HTTP server](#). Then select whatever bind port or bind address,. Port address that is used as bind port and address are used for talk over when using a Web Socket transport. After, configure the range of ports to use for RTP media. Then have to create a dial plan to handle the inbound call flow. Asterisk can handle SIP traffic which are coming from HTTP server and RTP engine, as a service System do not use any analog phones for the communication.

Through the firewall these ports should open. 5060 for SIP calls, some routers block the 5060 port. TO handle SIP calls and default port of SIP is 5060. 8088 For TCP and 1000-2000 UDP/RTP port range. In Figure: 4 describe this scenario



(Figure: 4)

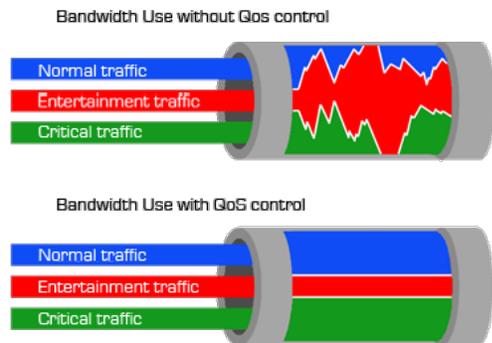
(QOS) Quality of service between web Client and Asterisk

User open the browser log the site in any deferent environment and any kind of the device. When Request any information to the office talk with webRTC. Client provided their public IP address to QoS provider before. Router can access Asterisk sever IP address and Client IP address

If router verify IP address it will provide Quality of service. When data packet will going through in wire (layer 7). Increase

rate of data packet throughput at packet go through wire. Delay time will reduces.

Asynchronous Transfer Mode (ATM), Ethernet and 802.1 networks, SONET, and IP-routed networks may use this technology. QoS arrange traffic in same band width. Three of traffics consider. This scenario is explaining in Figure: 5



(Figure: 5)

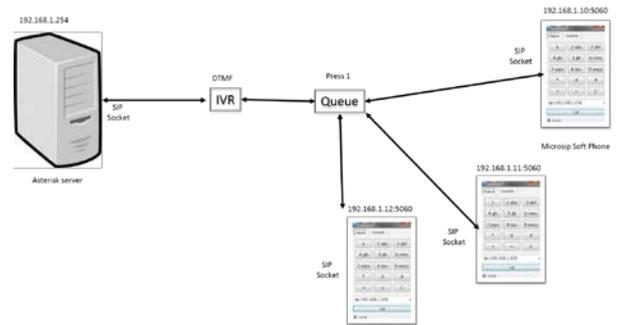
0								8								16								24								32							
Source Port																Destination Port																							
Sequence Number																																							
Acknowledgment Number																																							
Data Offset				Reserved				C E U R				W C E R				G K A P				R S Y I				N F				Window Size											
Checksum																Urgent Pointer																							
Options																								Padding															

(Figure: 6)

If user log the web site and request information. Packet use TCP/IP protocol for voluble and reliable. If when any data packet will send add 1 bit to “urg” flag. In sender it is considered as Urgent pointer on TCP header in receiver’s transport layer. Therefore packet will no wait receiver or sender buffer. It will gives huge priority in end devices. If data will wait application layer buffer or application layer buffer unauthorized percent will can receive refer to Figure: 6

Asterisk and Soft Phones

To communicating between Asterisk and Agents system using Softphones. There are many soft phones but system using Micro sip Soft phone. This soft phone also an open and customizable. Default this phone Support G.711 Codec but need to change it for G.729 codec. And block the video codes. This soft phone specially design for the windows platform. Connecting Agents soft phones to Asterisk server describes in Figure: 7



(Figure: 7)

Call Flow, Agents and track

There is some number of Agents for handle the calls which are coming from the web. Using dial plan and AGI Scrip system planned to handle calls. IVR (Interactive voice respond) is used for automated the system. When SIP call comes to the Asterisk server it can track the call using IP address and get the

(Figure: 8)

```

Dial plane
-----
extension.conf
[general]

[globals]
QUEUE_1=Information
QUEUE_2=Documents

[default]
exten => 1011,href,SIP/1011
exten => 1012,href,SIP/1012
Handle inbound SIP call
exten => s,1,Answer()
exten => s,n,Monitor(wak,m)
exten => s,n,Background(prompt press 1 for press 2 for)
Agent Queue1
exten => s,n,Verbose2,Call queue as configured in the QUEUE_${EXTEN} global variable)
exten => s,n,Set(thisQueue=${GLOBAL(QUEUE_${EXTEN})})
exten => s,n,Getall(S["${thisQueue}"] = "${thisQueue}_1)
exten => s,n,Verbose2, -> Entering the ${thisQueue} queue)
exten => s,n,Queue(S[${thisQueue}])
exten => s,n,Hangup()
Automated file sharing
exten => s,1,AGI(Connect to the DB and get the informatin and send back to webdiets browser to download)
exten => s,n,Play(Thank you)
exten => s,n,Hangup()
    
```

Location and customer provide details. Then save that details in to the database. According to the route of the call run a shell script or AGI scrip and get the documents which are request by web client, from the database. Then send those Files to the customer’s PC for the downloading. Without getting a call. Web client can do a live chat with Agents and then also Agent can send the information or the documents that client requires. Tested Dial plan shows in Figure: 8

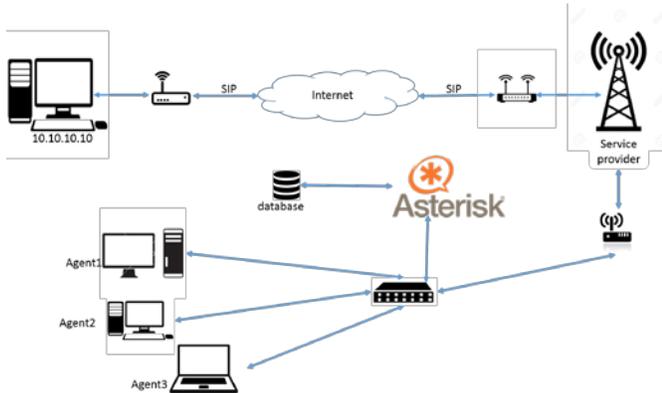
Automated Download

This is something interesting part which planned to integrate with the system. After SIP call coming to the Asterisk Server It can route to the IVR or Live Agents. When calls goes to the IVR client can get the

Information or the document that he want by Pressing virtual soft phone which is in the web Application, Asterisk can Identify DTMF digits and route the calls according to the DTMF inputs. Using AJAX SIP call permissions and AGI scripts system

try to get information from the database and send it to the browser and automatically download to the client PC

Real time Communication and Call center shows in Figure: 9



(Figure: 9)

IV. CONCLUSION

This paper introduces Using Asterisk Call center, webRTC build a complete call center solution. Any web Client coming to the system can simply click the buttons and get calls, this is a totally free service. Providing this solution to the web clients who are busy with their schedules can collaborate people who are in live and get information and documents that they want. Not only can that most of the organizations private companies Hospitals use this solutions for make their client’s satisfaction.

V. FUTURE WORK

In future works system hope to hair Agents As part time workers by providing an Android Application with inbuilt soft phone. Then Agent can handle All SIP calls which are coming from the Asterisk server and send the files that client requesting from them.

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Security Issues in VoIP and Solutions through Cloud Computing

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Abstract- VoIP Stands for Voice over Internet Protocol which is an alternative way of making telephone calls at a cheaper rate. Traditional telephone calls are replaced by VoIP rapidly as a result of cost efficient. The basic necessities of utilizing VoIP comprises of hardware and software such as a computer or any device which supports it, including microphone and speaker, with a relevant VoIP related software, and an active internet connection. VoIP transmits the sound that is received by the microphone over standard internet infrastructure using IP Protocol to the particular recipient(s). In order to establish a complete VoIP system for making calls from one person to another person, a VoIP service provider is compulsory, which can also be known as a central nervous system resembling to passing of messages to and fro in the human body. Cloud computing is another concept which has risen far well in the enterprises. Cloud computing helps functioning the organizations and their systems while upgrades are taken place without affecting the system. In a layman's term, everything is connected to a system where users can also gain access to additional systems other than the main system which is indirectly connected to the main system. In this research, we discuss the reliability of VoIP in terms of Bandwidth dependency, Power dependency and Security threats and also how to overcome the dependencies and threats through cloud computing.

Index Terms- VoIP; Reliability; Security issues; cloud computing

I. INTRODUCTION

Cloud Computing", a rising concept throughout the years in the industry, is derived from the technical terminology called storm from its birth. Wikipedia describes the cloud computing as a paradigm of computing in which is dynamically scalable and rapidly virtualized resources are provided as a service throughout the internet." In the context of VoIP, the Cloud is actually a means by which is carrying and service providers can give infrastructures component and application platforms to customers economically whilst being beneficial and as required or which are on demand. But how is hype differentiated from reality? And, is the Cloud truly relevant in the services of telecommunications industry?[10] Inside the VoIP industry, companies which are based on cloud technology, go to security infrastructure and policies which the Software as a Service (SaaS) provider has implemented can minimize market using a suite of services created to fit their target consumers' and enterprises' procured requirements. From collocation services in

premium sites all over the world to Class four wholesale and Class five retail infrastructure, to platforms and software around the world, it is essential to understand the challenges of sourcing the cloud elements of these types of services. There are actually three relevant categories. [1]

1.1 Infrastructure as a Service (IaaS)

Resources that are delivered by means of service such as power, hardware, bandwidth and core components of network, are fundamental requisites in providing services and 'cloud' infrastructure. Items like UPS, CPU, generator options, network components, data storage and disaster recovery procedures, etc., must be evaluated. Further, clientele may be offered accessibility in order for Cloud Network components analysis to achieve more transparency [2]

1.2 Platform as a Service (PaaS)

Choosing the platform on which VoIP services will be launched is vital to the security and reliability of the cloud-based offering. An acknowledged trending manufacturer will deliver a scalable, reliable and redundant platform in conjunction with tech support process and ongoing engineering and expertise to ensure stability. VoIP Logic depends and varies on several experienced hardware and software vendors. The quality of known platform vendors is achieved through their established records. These connections among us, enables to score relatively higher in end-user satisfaction [2].

1.3 Software as a Service (SaaS)

These applications are accessed on the web via browsers. Policies are generally set in place by the operator which provides the necessary flexibility and reliability. For example, in a scenario such that the user ponders about the significance of the satellite communication along with cloud based VoIP. This research paper discusses vulnerability to fraudulent, adequate protection for security such as denial of service (DOS) attacks, IP addresses or domain addresses hijacking, unauthorized traffic, etc. it can be another substantial consideration. It is pragmatic to partner with an IaaS, PaaS and SaaS provider when a service provider has extensively researched their own requirements including the capabilities of their network, the platforms as well as the managed services provider. It is beneficial to offset not owning and operating your own infrastructure. Various configuration decisions can be made having a better cloud service whereas the responsibilities will nevertheless require active attention along with a full comprehension of all facets of a VOIP (Voice Over IP) service offerings.[10]

VoIP in Cloud communications

Cloud communications are Internet-based voice and data communications where telecommunications applications, switching and storage are hosted by a third-party outside of the organization using them, and they are accessed over the public Internet. Cloud services is a broad term, referring primarily to data-centre-hosted services that are run and accessed over an Internet infrastructure. Until recently, these services have been data-centric, but with the evolution of VoIP (voice over Internet protocol), voice has become part of the cloud phenomenon. Cloud telephony refers specifically to voice services and more specifically the replacement of conventional business telephone equipment, such as a Private branch exchange (PBX), with third-party VoIP service.

II. BACKGROUND AND RELATED WORKS

At the beginning of the research the development team studied various research papers and documents from various sources. There is no similar existing system for this system. Summary of the findings is follows;

Cloud based VoIP Application in Aircraft Data Networks [3] is a Research that talked about the importance of the satellite communication along with cloud based VoIP. In this research paper it discussed about the different VOIP protocols named Session Initiated Protocol (SIP), Skinny Client Control Protocol (SCCP) and H.323. Proposed architecture of this research referred to as Cloud based VoIP ADN Architecture (C-VoIP ADNA). First requested data from the flight send to the satellite then the satellite send the request to the ground station situated on the earth. Nearest ground station receives the signal and sends it to the VoIP application running on the cloud. The data is fetched from the cloud; and it is send back to the Storage Area Network (SAN) from where the ground station receives data; then the data is fetched from the cloud, it is send back to the SAN from where the ground station receives it. Using a high speed link all the ground stations are connected to the SAN.

Metamorphosis in VOIP Cloud Computing Services Used in VOIP [4] using different servers transfer the voice over data network in the traditional VoIP. The servers located on the different geographical areas that hard to transfer the voice over the internet. Over the cloud Voice or data calls can transfer. Using different ISP (Internet Service provider) business servers route the calls to the remote/home office or to the enterprises. To transport voice over data network in the traditional VoIP human voice must be "packetized". When transferring the voices in traditional VOIP using different servers it automatically increases the cost of communication and decreases the graph of quality of service. This research discussed about the way that to provide the good quality service to transfer the voice over the network.

Security and Privacy in Cloud Computing: A Survey [1] this is a survey for identifying the security and privacy status of cloud computing. This research investigates the security and privacy concerns current cloud computing systems. Cloud computing used to refer both applications delivered as services over the internet. Most of the users haven't correct idea about the security of the cloud computing, it allows providers to develop

some functions such as scalability, availability, reliability, performance and etc. for make it more user friendly.

Cloud Computing Security – Trends and Research Directions [1] this research divides the common security issues around the cloud computing into four main categories as follows. Cloud infrastructure, platform and hosted code- This category discussed about possible virtualization, storage and networking vulnerabilities. And this covered vulnerabilities that may be contained in the cloud software hosted code and platform stack, which gets immigrated to cloud and also the physical data- center security aspects.

Data- In this category concerns about the function as follows; data remanence, data integrity, data lock in data provenance, data confidentiality and user privacy.

Compliance- According to its size and disruptive influence, cloud is tempting attention from regulatory agencies, especially around data location and security audit.

Access – This includes the content around cloud access, user identity management and encrypted data communication.

Cloud Computing: Issues and Challenges [5] This research discussed about the current adoption associated with numerous challenges in Cloud Computing named Costing Model, Service Level Agreement, multi-tenancy model, what to migrate and Charging Model. A number of cloud computing are essential to the level difference. Before choosing the best IT resources and assets needed to keep an organization. In - house IT assets and capabilities to perform their basic functions and activities related to the outsourcing of cloud while. Data Security and Privacy Protection Issues in

Cloud computing [6] according to this research can identified the many security issues related with cloud computing. Some of the safety issues can be mentioned as follows; long-term viability, data segregation, Privileged user access, investigative support, regulatory compliance, data location and recovery. Traditional data security and privacy protection is similar to the content of data security and privacy protection in cloud. And also is related in every stage of the data life cycle.

VoIP Security [7] A VoIP deployment faces a various threats from different networking layers and trusted areas within the network. According to this research attacks that VoIP network faced can be categorized as follows:

VoIP Application Level Attacks, Eavesdropping, Call Hijacking, Message Integrity, Toll Fraud, Resource exhaustion and Denial of and etc. Non Trusted Identities, VoIP Protocols Design Flaws, Functional protocol testing or Fuzzing, Availability, Attacks against the underlying VoIP devices' Operating System, Configuration Weaknesses in VoIP devices, Physical access are some of other attacks that VOIP network faced.

Security Challenges in Cloud Computing According to this research in cloud computing there are two major challenges named security and privacy. Virtual environment of cloud computing lets user access computing power that violate that contained within their physical world. User has to transfer data throughout the cloud for entering this virtual environment. There are several areas in Information security can be discussed, such as Losing control over data, Data Integrity, Risk of Seizure, Incompatibility Issue, Constant Feature Additions, Failure in Provider's Security, Cloud Provider Goes Down are some of

Information security issues can be faced. And there are network security issues also with the cloud computing when transmitting the data. The issues can listed as follows; Distributed Denial of Service (DDOS) Attack, Man in the Middle Attack, IP Spoofing, Port Scanning, Packet Sniffing and etc [8].

A Review on Cloud Computing: Design Challenges in Architecture and Security in this Research paper discussed about the design challenges in cloud computing architecture and the security challenges that can faced by using the cloud computing most of the business companies deducted their It cost. But most of the times the cloud based computing environment easily hacked by the other users [3]. As a solution Most of the times it can be encrypt the data. But in cloud computing it's hard to encrypt it. So no security for the system users who used the cloud based computing environment [9].

A Survey on Security Issues in Cloud Computing in this research Define and analyze the several unresolved issues threatening to the Cloud computing. Cloud servers deny the access to data lying in the cloud in any sort of internet breakdown. Sometimes the whole system had been down for hours. There are several network attacks in cloud computing environment such as DNS attacks, SNIFFER attacks, Issue of Reused IP Address, BGP prefix hijacking. In Application level security this research discussed about Security concerns with the hypervisor, Denial of service attacks, Distributed denial of service attacks, Cookie poisoning, Hidden field manipulation, Backdoor and debug options and etc. This research discussed about the various solutions against to this attacks [4].

III. RESULTS AND DISCUSSION

In Voice over Internet Protocol (VoIP) the voice is transmitted as compressed packets and delivered by a decompression algorithm and this has to be taken place in a very short amount of time maybe milliseconds if this is not done properly the quality of the VoIP is affected sometimes the sender may echo his own voice. VoIP is highly dependable on the Bandwidth, VoIP normally does not work over a dialup connection, and it works great on a mobile broadband or a wireless network or a cellular connection.

VoIP does not work if there is no active internet connection it means that if there is no internet then the user cannot communicate through VoIP. Poor connection is also a major disadvantage, when using VoIP if the connection quality is not good the user will not be able to communicate with the other party and the user will end up hating the technology and the network provider. Using a shared connection in VoIP also affect the quality of the VoIP calls, if the user is connected over a high speed broadband connection its effect will be minimum also if there are several users connected through the connection each user will be using the bandwidth and it leaves the user a little bandwidth which will not be enough to reach the quality VoIP calls.

To communicate through VoIP it also needs electrical power, if there is a power interruption the modem, router will not work so the user will not be able to use the service, although UPS (Uninterrupted Power Supply) is available it will allow the user to connect to the internet only for a certain period of time.

There are several security threats concerned to VoIP theft of the service is a threat where the hacker steals the service while the cost is passed to another person, Eavesdropping or interception of calls is also a major security threat where the hacker steals confidential information about the users and uses them for his needs, DOS attack Denial Of Service is an attack on a network, the hacker floods the target network and disrupts the service of the user, through this the hacker gained the control of administration privileges of the service. Call tampering involves the tampering a call in progress in this the hacker send noise packets to the network and affects the quality of the VoIP call it causes a long silent in calls and delayed response from the receiver from the other end. Man in the middle is also a security threat where the hacker alters the signal by sending SIP (Session Initiating Protocol) messages and possibly altering the communication between two parties who think that they are directly connected to each other .The above security threats can be overcome, as a counter measure the user can use encryption, use secure wireless network, physical security like firewall or use a authentication method in VoIP protocol.

When looking the mentioned problems regarding the reliability of VoIP systems, Backup power is important for an uninterrupted network connection this will help to retain the internet connection in the router or the broadband device if there is a power failure. Broadband bonding is joining multiple bandwidth lines to increase the bandwidth of the connection and also acts as a backup in case one connection fails. Using a dedicated network for VoIP connection allows the user to be secure from any virus or attacks, by connecting it to a firewall the user can allow only the specific protocols required for VoIP communication and block the others. Using separate lines for internet and voice will allow the user to use VoIP with high quality bandwidth.

IV. CONCLUSION

As a conclusion, we've briefly discussed in this research paper about VOIP and Cloud computing, several dependencies in VOIP such as Bandwidth and Power and the security threats and how to overcome these issues by using Cloud Computing technology. Literature review emphasizes mainly about cloud based VOIP applications, the importance of the VoIP services and traditional methods of VoIP, Classifying Cloud computing into four parts and the Data security of Cloud computing and VoIP security. By doing the background research works of the Literature review, we briefly discussed about the importance of the above topics, as well as the problems which can be solved using our new system. Furthermore, we discussed how Cloud computing could affect VoIP as infrastructure, platform and software categories. Therefore, it is important to know that by using the Cloud computing, especially Cloud communications in VoIP could help to deduct the dependencies in VoIP and reduce the risk of current security threats in VoIP. This would be a vital concern in future and by solving these, it would help to get the maximum benefit out from the VoIP system using cloud computing.

V. FUTURE WORK

VoIP Bandwidth

VOIP Bandwidth consumption naturally depends on the codec used. When calculating bandwidth VOIP, one can't assume that every channel is used all the time. Normal conversation includes a lot of silence, which often means no packets are sent at all. So even if one voice call sets up two 64 Kbit RTP streams over UDP over IP over Ethernet the full bandwidth is not used at all times.

VoIP Threat

1) Social threats are aimed directly against humans. For example, misconfigurations, bugs or bad protocol interactions in VoIP systems may enable or facilitate attacks that misrepresent the identity of malicious parties to users. Such attacks may then act as stepping stones to further attacks such as phishing, theft of service, or unwanted contact (spam).

2) Eavesdropping, interception, and modification threats cover situations where an adversary can unlawfully and without authorization from the parties concerned listen in on the signaling (call setup) or the content of a VoIP session, and possibly modify aspects of that session while avoiding detection. Examples of such attacks include call re-routing and interception of unencrypted RTP sessions. [11]

3) Denial of service threats have the potential to deny users access to VoIP services. This may be particularly problematic in the case of emergencies, or when a DoS attack affects all of a user's or organization's communication capabilities (i.e., when all VoIP and data communications are multiplexed over the same network which can be targeted through a DoS attack). Such attacks may be VoIP-specific (exploiting flaws in the call setup or the implementation of services), or VoIPagnostic (e.g., generic traffic flooding attacks). They may also involve attacks with physical components (e.g., physically disconnecting or severing a cable) or through computing or other infrastructures (e.g., disabling the DNS server, or shutting down power)

4) Service abuse threats covers the improper use of VoIP services, especially (but not exclusively) in those situations where such services are offered in a commercial setting. Examples of such threats include toll fraud and billing avoidance.[12]

5) Physical access threats refer to inappropriate/unauthorized physical access to VoIP equipment, or to the physical layer of the network (following the ISO 7-layer network stack model).

6) Interruption of services threats refer to non-intentional problems that may nonetheless cause VoIP services to become unusable or inaccessible. Examples of such threats include loss of power due to inclement weather, resource exhaustion due to over-subscription, and performance issues that degrade call quality.

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Cloud Technologies for Presales Consultants

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Abstract- Today IT (Information Technology) teams want to do more with less resources and with less budget. Cloud adoption is the best approach to handle this scenario. With the advent of lot of cloud technologies, there is a great advantage and opportunities for the presales consultants to promote better business decision across the enterprise.

Index Terms- Cloud, IT

I. INTRODUCTION

Cloud model enables users to request software environments by choosing from a predefined service catalog using a self-service provisioning framework. The key benefits of these clouds are agility and faster deployment of services. As software are provisioned and de-provisioned, the associated computing resources are consumed and then released. Computing resources can be consumed for the duration of a project, and then be automatically de-provisioned and returned to the resource pool. Computing costs can be tracked and charged back to the consumer.

II. FACTORS DRIVING ORGANIZATIONS TO DEPLOY CLOUD ENVIRONMENTS

Organizations are drawn to cloud service because it can simplify IT infrastructures, making it easy to deliver business functionality to many users and multiple divisions from the same hardware and software infrastructure, while automating manual provisioning processes. Provisioning new databases in traditional environments can take days or weeks. Cloud services can get this done within minutes.

III. FINANCIAL MOTIVATION

One of the most appealing aspects of Cloud service is that consolidation of software results in a smaller hardware footprint, which lowers costs. In addition, many users and departments share the infrastructure while paying for individual resource as services, which drives down the unit price of those services.

IV. BENEFITS TO IT DEPARTMENT

IT is continually asked to do more with less. IT leaders are looking for ways to increase agility while reducing cost and risk. Demonstrating the performance and resource requirements associated with running various application loads can help them realize the value of Cloud services.

V. BENEFITS TO MANAGEMENT

Capital Expenditures (CapEx) are incurred to create future benefit i.e. acquisition of assets that will have a useful life beyond the tax year. Operational expenditures (OpEx) are those expenditures required for the day-to-day functioning of the business. Cloud services generally follows the OpEx model, enabling consumers to avoid large upfront investments in hardware, software and services. This cost structure especially resonates with line of business managers

PRIMARY PLANNING CONSIDERATIONS

Thorough capacity planning to ensure cloud services can meet user needs and uphold the service level agreements that are established, especially as more applications are deployed and the environment gets more popular. Carl Olofson, a research director at IDC says to be overly generous with capacity. "Instead of doing planning and analysis from the inside out, and then trying to fit everything within those choices, ask yourself: what do users need? what are their performance requirements? then figure out what kinds of technology you need to meet their future requirements. Once you have cloud service capabilities and people can request them, the demand may be higher than you initially expect." Eytan Dallal Vice President of IT at Land of Lincoln Health Insurance briefs on ten considerations to cloud.

1. Security: Do cloud services offer a higher level of security/protection than your current environment? Can they provide 3rd party audit reports on their security?
2. Risk: Is my organization willing to house mission-critical data off-premise? What's the likelihood of bankruptcy / likelihood of failure / likelihood of negligence? Who has input into the cloud decision and did they take into account the risks? In the end, who is accountable for the decision? Is the cost of downtime greater than the savings achieved by moving to the cloud? This will make a big difference when up against a risk averse culture.
3. Legal/Compliance: Does a cloud environment meet compliance requirements (HIPAA, PCI, CJIS, SOX, retention, etc) that your current environment does not support, or would otherwise be too expensive to build? Who owns the data? What's your access to the data? Most providers will provide auditable information that their systems meet compliance standards, but the accountability is generally on the customer to report and prove compliance to a governing agency. Providers will generally not indemnify customers when it comes to the customer's lack of compliance.
4. Personnel: Management and Technical: Does the cloud provider have a strong management / account team? Do they

offer technical expertise you don't have within your organization?

5. Cost/Savings: Does cloud computing and all its features offer a significant net savings to your organization over 5-10 years; if not, can you justify the increase in cost? Have you factored in all costs to the organization (people, energy, space, insurance, downtime, training, etc)? The term "significant" is defined by your business -- spending \$1 million but saving \$1.1 million over 10 years may not be significant enough. Consider the opportunity costs with the cap-ex dollars.

6. Backup and redundancy: Does the cloud provider offer better/faster backup and recovery of your data, and geo-redundancy for immediate recovery points? Is going to the cloud part of your disaster recovery / business continuity solution?

7. Service Level Agreements: Can the provider deliver on your service level requirements? Can they provide a history of outages, recovery times, and impact to the customer? Don't rely on the contract and credits. Your downtime is far more devastating financially than the credits you'll get back from the provider for missing an SLA. Do the research yourself to find out if they have the infrastructure to support you and respond to issues in a timely way.

8. Location: Is the facility physically secure? Located on a fault line? High risk area/coast? International locations? Geographically diverse? Do they have data centers offshore and will data be replicated to those data centers?

9. Exit Strategy: Or, the "pre-nup" as I like to call it. How long would it take you to move out of the cloud, or to another provider? Will the provider be cooperative and deliver a seamless transition when it's time to separate from them?

10. New Features: Does the cloud provider offer the following benefits, if needed:

Accessibility: Does your corporate strategy and technology strategy require that users have 24/7 access to data, regardless of geography and platform?

Compatibility: Will your apps work in the cloud? Does the provider have the compatible systems to work with your organization, users, and customers?

Reliability: Is a cloud environment more reliable than your current environment?

Storage and Expansion: Like Moore's Law, data storage requirements double every 2 years. Can your data center accommodate this growth?

Speed to Deliver: Will cloud deliver a faster method of delivering/deploying services (infrastructure, platform, apps, services, etc)?

Your CIO, CTO, IT Director, or technical engineer should be able to articulate all these considerations in plain English. He or she should also be able to demonstrate a solid governance process for cloud operations (adding, removing, changing) and should be prepared to describe the changing role of IT once the organization moves to the cloud.

VI. CONCLUSION

This research paper is an attempt to evangelize the cloud technology that presales consultants can use for today's business and management. Cloud technology has been discussed under different heads so that presales consultants can take this to customers and provide a different area of expertise and technology shift for the customers.

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Why the IT women are more stressed than the other working women in India?

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Abstract: India is a booming hub for software related jobs; women are equally getting a better employment as men. Though women are getting job most of the women are not able to withstand in the IT industry for a long time or not able to level up in their career. Because the IT work culture is new to Indian women family structure is more complex than the western world. Though Indian women are mentally strong and capable of multiple tasking in due course they are developing stress.

Index Terms: Indian women, stress, IT industry

I. INTRODUCTION

Multiple roles and professional women:

Indian family structure is the most complex family set up in the world. In olden days people are in the joint family and the work of the women is to take care of household chores and to take care of the kids. And in the joint family there will be more women members and the work will be shared by them. Financial and other outside works will be taken care by the male members of the family. But now Indian families are undergoing rapid changes due to the increased pace of urbanization and modernization. Indian women belonging to all classes have entered into paid occupations. At the present time, Indian women's exposure to educational opportunities is substantially higher than it was some decades ago, especially in the urban setting. This has opened new vistas, increased awareness and raised aspirations of personal growth. This, along with economic pressure, has been instrumental in influencing women's decision to enter the work force. Most studies of employed married women in India have reported economic need as being the primary reason given for working.

IT industry in India:

The Information Technology (IT) sector in India holds the distinction of advancing the country into the new-age economy. The growth momentum attained by the overall economy since the late 1990s to a great extent can be owed to the IT sector, well supported by a liberalized policy regime with reduction in telecommunication cost and import duties on hardware and software. Perceptible is the transformation since liberalization – India today is the world leader in information technology and business outsourcing. Correspondingly, the industry's contribution to India's GDP has grown significantly from 1.2% in 1999-2000 to around 4.8% in FY06, and has been estimated to cross 5% in FY07. The sector has been growing at an annual rate of 28% per annum since FY01.

II. WOMEN IN IT INDUSTRY IN INDIA

Women have always been the centrifugal force in a society and this is not just the story of the modern times. It has its roots from ancient times. Women have always been portrayed stereotypes within the society but now is the time for change and a change being brought by women themselves.

The talent pool of qualified women professionals must be effectively tapped to strengthen industry and the economy.

Effects of multiple roles:

Multiple role-playing has been found to have both positive and negative effects on the mental health and well-being of professional women. In certain instances, women with multiple roles reported better physical and psychological health than women with less role involvement. In other words, they cherished motivational stimulation, self-esteem, a sense of control, physical stamina, and bursts of energy. However, multiple roles have also been found to cause a variety of adverse effects on women's mental and physical health, including loss of appetite, insomnia, overindulgence, and back pains.

An increasing number of articles have promoted the importance of work-life balance. This highlights the current concern within society and organizations about the impact of multiple roles on the health and well-being of professional women and its implications regarding work and family performance, and women's role in society.

Work-family conflict and family-work conflict in a IT women's life:

Work-life balance is the maintenance of a balance between responsibilities at work and at home. Work and family have increasingly become antagonist spheres, equally greedy of energy and time and responsible for work-family conflict (WFC). These conflicts are intensified by the "cultural contradictions of motherhood", as women are increasingly encouraged to seek self-fulfillment in demanding careers; they also face intensified pressures to sacrifice themselves for their children by providing "intensive parenting", highly involved childrearing and development. Additional problems faced by employed women are those associated with finding adequate, affordable access to child and elderly care.

Difference between IT work and other work

1. Different work culture

2. Different working zone.
3. Need to work and interact with different people.
4. Having daily, weekly and monthly deadlines to finish off their work.
5. Need to work in multiple projects.
6. Need to learn new technologies and keep us updated to withstand in the company.
7. Need to travel abroad on long and short time basis.
8. No stipulated working hours ,sometimes need to work
9. No consideration for women
10. Women need a high exposure in the real time happenings.
11. Cannot take leave as we wish.

III. CONCLUSION

Though IT provides a good source of income to women and give a financial rise in the family,

Women working in IT industry undergo a tremendous stress particularly married women with kids. The researcher believes that a best supporting structure should be provided for all the women, the most valuable asset on the earth.

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Low Frequency Biological Effects on Human Body Cells

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Abstract- The Exposure to electromagnetic fields is not a new phenomenon. However, during the 20th century, environmental exposure to man-made electromagnetic fields has been steadily increasing as growing electricity demand, ever-advancing technologies and changes in social behavior have created more and more artificial sources. The general opinion is that there is gradual hazardous effect at the cellular level related to human health. The study of the low frequency radio frequency wave revealed that different dimension of EM wave have not shown any DNA damage directly hurt there is concern about evidence of cellular effect of EM. Extremely low frequency electromagnetic radiation has received considerable attention recently as a possible threat to the health of persons living near high tension electric power lines, distribution substations, and even in close proximity to common household electric appliances. Ionizing radiation is all around us, and it has been this way since the creation of the Earth. As such, life on Earth has evolved in an environment exposed to ionizing radiation, and has adapted to be able to thrive in its presence. The DNA may be irreparably damaged due to low frequency. Cells with damaged DNA that survive and reproduce can lead to cancer, and failure to correct damage in cells that form gametes (reproductive cells) can result in mutations being passed on to off spring When cells are exposed to ionizing radiation, damage can occur either by direct action or indirect action.

Index Terms- Biochemical reaction, Electromagnetic field, Epidemiological RF, Radio frequency, Sterilization, etc.

I. INTRODUCTION

Until now no satisfactory mechanism has been proposed to explain the biological effects of these fields. This study is to investigate effect of MW radiation on cell proliferation. Health risks associated with such fields include a wide variety of ills ranging from disruption of normal circadian rhythms to childhood cancers. Risk assessment has been particularly difficult to determine in light of an ostensible lack of close-response relationship. The Exposure to electromagnetic fields is not a new phenomenon. However, during the 20th century, environmental exposure to man-made electromagnetic fields has been steadily increasing as growing electricity demand, ever-advancing technologies. Everyone is exposed to a complex mix of weak electric and magnetic fields, both at home and at work, from the generation and transmission of electricity, domestic appliances and industrial equipment, to telecommunications and broadcasting.

Tiny electrical currents exist in the human body due to the chemical reactions that occur as part of the normal bodily

functions, even in the absence of external electric fields. For example, nerves relay signals by transmitting electric impulses. Most biochemical reactions from digestion to brain activities go along with the rearrangement of charged particles. If a cell is exposed to radiation, the probability of the radiation interacting with the DNA molecule is very small since these critical components make up such a small part of the cell. However, each cell, just as is the case for the human body, is mostly water. Therefore, there is a much higher probability of radiation interacting with the water that makes up most of the cell's volume. When radiation interacts with water, it may break the bonds that hold the water molecule together, producing fragments such as hydrogen (H) and hydroxyls (OH). Heating is the main biological effect of the electromagnetic fields of radiofrequency fields. In microwave ovens this fact is employed to warm up food. The levels of radiofrequency fields to which people are normally exposed are very much lower than those needed to produce significant heating. The heating effect of radiowaves forms the underlying basis for current guidelines. Scientists are also investigating the possibility that effects below the threshold level for body heating occur as a result of long-term exposure. To date, no adverse health effects from low level, long-term exposure to radiofrequency or power frequency fields have been confirmed, but scientists are actively continuing to research this area. The electromagnetic spectrum includes forms of energy ranging from cosmic rays and X-rays on the high frequency side to microwaves and electricity on the low frequency end Hertz (Hz) is the term commonly used to describe frequency or the number of times per second that electromagnetic waves alternate. Extremely high frequency radiation such as X-rays and gamma rays are referred to as ionizing and are able to disrupt matter by stripping electrons from atoms. The current controversy focuses on the opposite end of the electromagnetic spectrum, extremely low frequency radiation (ELF).

Biological effects

It is not disputed that electromagnetic fields above certain levels can trigger biological effects. Experiments with healthy volunteers indicate that short-term exposure at the levels present in the environment or in the home do not cause any apparent detrimental effects. Biological effects are measurable responses to a stimulus or to a change in the environment. These changes are not necessarily harmful to your health. For example, listening to music, reading a book, eating an apple or playing tennis will produce a range of biological effects. Early development is characterized by the rapid proliferation of embryonic cells, which then differentiate to produce the many specialized types of cells that make up the tissues and organs of multicellular animals. As cells differentiate, their rate of proliferation usually decreases,

and most cells in adult animals are arrested in the G₀ stage of the cell cycle. An adverse health effect causes detectable impairment of the health of the exposed individual or of his or her offspring; a biological effect, on the other hand, may or may not result in an adverse health effect.

It is not disputed that electromagnetic fields above certain levels can trigger biological effects. Experiments with healthy volunteers indicate that short-term exposure at the levels present in the environment or in the home do not cause any apparent detrimental effects.

High frequency radiation or fast moving particles plow into a living cell with enough energy to knock electrons free from molecules that make up the cell. These molecules with missing electrons are called ions. The presence of these ions disrupts the normal functioning of the cell. The most severe damage to the cell results when the DNA (deoxyribonucleic acid) is injured. DNA is at the heart of the cell and contains all the instructions for producing new cells. The DNA is a complex molecule formed of two long strands that are twisted around each other and linked by chemical subunits. There are two major ways that radiation injures the DNA inside your cells.

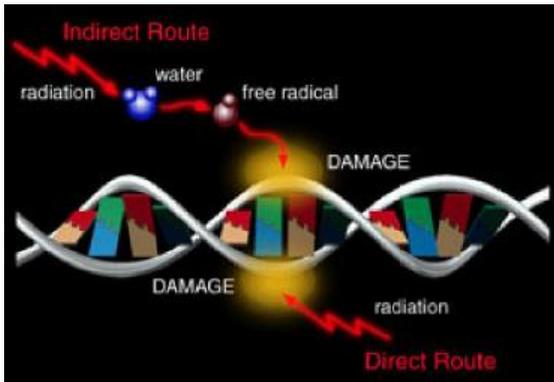


Fig.1. Biological effect on DNA cells

There are two main ways of radiation that can damage the DNA inside cells. Radiations can strike the DNA molecules directly, ionizing & damaging it. Alternately, radiation can ionize water molecules, producing free radicals that react with damaged DNA molecules.

In response to growing public health concerns over possible health effects from exposure to an ever increasing number and diversity of electromagnetic field sources, in 1996 the World Health Organization (WHO) launched a large, multidisciplinary research effort. The International EMF Project brings together current knowledge and available resources. In 1996 the World Health Organization (WHO) launched a large, multidisciplinary research effort. The International EMF Project brings together current knowledge and available resources of key international and national agencies and scientific institutions. The cells of adult animals can be grouped into three general categories with respect to cell proliferation.

The UV-photon is directly absorbed by the DNA (left). One of the possible reactions from the excited state is the formation of a thymine cyclobutane dimer (right). The direct DNA damage leads to sunburn, causing an increase in melanin production, thereby leading to a long-lasting.

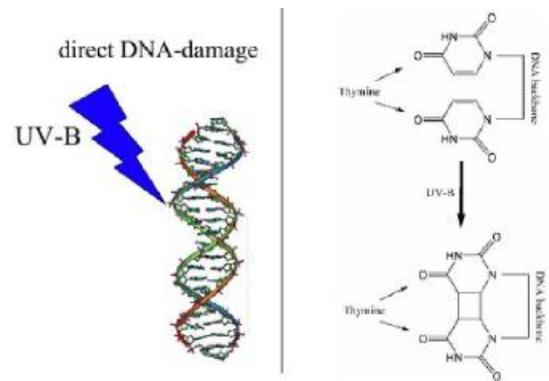


Fig.2. Direct effect on DNA cells

Neurobehavioral EFFECTS ON living cell

People are generally exposed to MPBS radiation under arfield conditions, i.e. radiation from a source located at a distance of more than one wavelength. This results in relatively homogenous whole-body exposure. MPBS exposure can occur continuously but the levels are considerably lower than the local maximum levels that occur when someone uses a mobile phone handset. Recent study that measured personal exposure to radiofrequency electromagnetic fields in a Swiss population sample demonstrated that the average exposure contribution from MPBSs is relevant for cumulative long-term whole-body exposure to radiofrequency electromagnetic fields. it is of minor importance for cumulative exposure to the head of regular mobile phone users. Personal exposure measurements assess the total radiation absorbed by the whole body, whereas spot measurements quantify short-term exposure in a single place, usually the bedroom.

II. EFFECTS ON PREGNANCY AND CANCER

There is little scientific evidence to support the idea of electromagnetic hypersensitivity. Recent Scandinavian studies found that individuals do not show consistent reactions under properly controlled conditions of electromagnetic field exposure. Some members of the public have attributed a diffuse collection of symptoms to low levels of exposure to electromagnetic fields at home. Reported symptoms include headaches, anxiety, suicide and depression, nausea, fatigue and loss of libido. To date, scientific evidence does not support a link between these symptoms and exposure to electromagnetic fields. Many different sources and exposures to electromagnetic fields in the living and working environment, including computer screens, water beds and electric blankets, radiofrequency welding machines, diathermy equipment and radar, have been evaluated by the WHO and other organizations. The overall weight of evidence shows that exposure to fields at typical environmental levels does not increase the risk of any adverse outcome such as spontaneous abortions, malformations, low birth weight, and congenital diseases. There have been occasional reports of associations between health problems and presumed exposure to electromagnetic fields, such as reports of prematurity and low birth weight in children of workers in the electronics industry, but these have not been regarded by the scientific community as

being necessarily caused by the field exposures (as opposed to factors such as exposure to solvents).

Despite many studies, the evidence for any effect remains highly controversial. However, it is clear that if electromagnetic fields do have an effect on cancer, then any increase in risk will be extremely small. The results to date contain many inconsistencies, but no large increases in risk have been found for any cancer in children or adults. Some individuals report "hypersensitivity" to electric or magnetic fields. They ask whether aches and pains, headaches, depression, lethargy, sleeping disorders, and even convulsions and epileptic seizures could be associated with electromagnetic field exposure.

Research on this subject is difficult because many other subjective responses may be involved, apart from direct effects of fields themselves. More studies are continuing on the subject.

III. GENERAL EFFECTS OF ELECTROMAGNETIC FIELD

The electromagnetic spectrum includes forms of energy ranging from cosmic rays and X-rays on the high frequency side to microwaves and electricity on the low frequency end Hertz (Hz) is the term commonly used to describe frequency or the number of times per second that electromagnetic waves alternate. Extremely high frequency radiation such as X-rays and gamma rays are referred to as ionizing and are able to disrupt matter by stripping electrons from atoms. The current controversy focuses on the opposite end of the electromagnetic spectrum, extremely low frequency radiation (ELF). The strength of electric fields is directly related to voltage, the higher the voltage, the stronger the electric field. Electric fields are easily blocked by normal building materials from which houses are constructed. Their strength decreases rapidly with distance from the source. The current controversy focuses not on electric fields but on magnetic fields which produce a series of force waves in concentric loops around electric currents. Both animal and human studies on the effects of ELF electromagnetic fields have shown a decrease in the secretion of pineal melatonin, a hormone which stimulates the daily cycle of sleep and wakefulness, the circadian rhythm. Research on the effects of electromagnetic fields on reproduction have produced mixed and equivocal results. Studies of chicken eggs and miniature swine have indicated slight possibilities of abnormal development, while other studies have shown no measurable effects.

It is difficult, if not impossible, to determine the exposure received by any individual, since magnetic fields vary according to electric usage during different times of day and seasons of the year. Instead, most studies have substituted configuration of wires near the study site as a proxy measure. The accuracy of this measure is particularly suspect in studies of patients from three decades earlier. The low number of childhood cancer patients

does not allow many studies, even those which indicate positive findings, to reach statistical significance.

IV. CONCLUSIONS

This study is based on methodology and architecture of useful and effectiveness biological effects of electromagnetic and RF microwave signals. These negative effects are particularly important in the electromagnetic fields in the Radiofrequency (RF) zone which are used in communications, radio and television broadcasting, cellular networks and indoor wireless systems. The general opinion is that there is no direct evidence of hazardous effects on human health incurred by low-frequency radiofrequency waves. Studies at the cellular level, which uses relatively higher frequencies, demonstrate undesirable effects. so many popular media health related messages, there is a basic core of facts embedded in an alarmist package which tends to generate hysteria among the public.

Studies at the cellular level, which uses relatively higher frequencies, demonstrate undesirable effects.

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is taken on these security risks and same penetration testing are repeating until system at least 90% of free of security attacks

1) Data collection: Various searching methods are used to get the data of a targeted system. One can also use web page source code analysis standards are used to get large amount of valuable information about the system, soft wares and plugins and the version of it. Many free tools and services available in the internet which can give you information like database or table names, Database version, software versions, hardware used in the system.

2) Vulnerability Assessment: Based on the data collected from the step one can find the security weaknesses in a not secure system. This helps penetration testers to launch attacks using identified starting points in the system.

3) Actual Exploit: This is crucial step. This required special skills and techniques to launch attack on the system. Professional penetration testers use their skills to launch attack on the system.

4) Result analyzing and report preparation after completion all the penetration test's detailed reports are prepared for taking reliable actions. All identified vulnerabilities and recommended corrective methods are listed in these reports. Reports can be customized in several formats such as, XML, Excel, MS Word, HTML, or PDF as organization needs.

There is no doubt that penetration tests are very critical where information security is very crucial. Organizations have to make a decision on whether or not to hire professional penetration tester. Costs of penetration tests are depending on the complex and size of the system. Pen testers charge for hourly fee this depends on the pen testers experience also [1]. .

In Section II will cover the background and related works which are similar to pen testing and network security

In Section III Types of security threats, how important is pen testing to current society? Evolution of pentesting, how secure data in these days? and how to prevent those kinds of network security attacks?

Section IV describes the Conclusion

Section V describes the Future works

II. BACKGROUND AND RELATED WORKS

Penetration testing probably feels like the part of security, but it is also a small part. It's also exceptionally broad. This penetration testing is significantly used to mean any one of the following as an umbrella:

- Vulnerability Assessment
- Security Assessment
- Security Audit
- Penetration Test
- Social Engineering

It could be argued that exploit development is actually outside the scope of the term, even though in some engagements

custom exploit development may be performed. Just so we're on the same page, let's do a very brief description of what I mean by each of those.

Vulnerability Assessment

In this type of engagement the tester will be attempt to determine, the architecture and properly analyze it for weaknesses. It look to see what services are currently running, the software versions those are, try outs to capture how things are connected and configured together, how it uses the services, and the sort of security protections may be available in place. Taking all that information to identify prospective weaknesses and report on them. This will include findings relating to out of date software versions, weak configurations like using HTTP when they should use HTTPS, no of limited firewalls which are insufficiently used, etc. The whole concept in here is to look for problems and report about those, actually it is not to hack into systems.

Security Assessment

In mostly a security evaluation is a complete vulnerability evaluation followed up with an approach and procedure review. This will allow the assessor to judge, not only if the procedures are in line with policy, but also whether the business unit's plan needs arranged up. This is vital because a technical vulnerability assessment will not explain about whether or not files which are sensitive commonly stored in unlocked file cabinets in the main lobby, or discarded in the normal trash.

Security Audit

Audits can be more likely an assessment, with one specific differentiation. An audit is a strict formal test across a standard which is pre-determined or set of standards. An assessment may use standards like protocols. A report of an assessment will consist of anything the assessor thinks may become a drawback of the organization. An audit, somehow, is limited to testing only from which is described in the standard. The specific intent here is that an audit is very formal, repeatable, and predictable. Mostly audit reports may consist additional, or informational, findings very reminiscent of an assessment. They should not be binding, and they should be used to inform compliance against the tested standard.

Penetration Testing

This is effectively a more thorough form of a Vulnerability Assessment. Once the tester has analyze weaknesses they will then try to exploit those weaknesses. It helps determine whether the findings in the assessment are to be false positives, in the case of a software version that should be vulnerable but contains back ported patches in security. The vulnerabilities will be tested by it against mitigating controls. It is one thing to have a finding that the company's ERP solution is a year behind on patches. It is another to demonstrate that being behind on patches allowed an attacker to get details payroll information. A penetration test will not occasionally involve a specific approach or procedure review unlike a security assessment.

Social Engineering

During a social engineering engagement team will try to con or access the organization in case of ex-filtrate information. This is where you get into the types of things you will normally familiar with movies like spy shows. You will probably do some dumpster diving, experiments to badges, talk your way earlier security, pose as the CEO and attempt to convince the help desk to change your password, etc. As part of a penetration this may sometimes include test but may not sometimes.

In the end, all of these things require specific skills. Some of them are technical, some of them are personal, and some of them are organizational. Your best bet is to start somewhere else to break into the penetration field. It is generally the case that the best way is first know how to make it work and then how to break in to it. The people we have talked to, or read about, who do the best got their beginning as developers, administrators of systems, network administrators, or something more like that. It is essential that at the end of the day you are not hacking into a server for your own fantasy. You are figuring out how things should be break with a beneficial view to notify the client what they are allowed to do to fix it. If your report cannot be consisted of suggested recommendations on the TNS listener then it does not actually a problem whether you accessed the database.

Reporting a hack with proper recommendations are useful to the client. Therefore just simple report will not satisfied this need. And it would make your employer look bad as much you would be doing a harm to him [2][3].

Similar Researches

Acunetix an automated web vulnerabilities application security testing tool that audits web applications by checking for vulnerabilities such as SQL Injection, Cross site scripting, and other exploitable vulnerabilities It uses web-server based installation. For testing purposes, interacting with the console. . At the time of this writing, AcuSensor is used primarily with PHP and .NET web applications. It identifies more vulnerabilities than a traditional black box web security scanner and reduces false positives. Acunetix allows WVS to find such vulnerabilities, including XSS, Server Side Request Forgery and Email Header Injection. Another ability is search for subdomains based on DNS records automatically [4]

W3af Identify vulnerabilities like SQL Injection, Cross-Site Scripting, Guessable credentials, unhandled application errors and PHP misconfigurations. Web Service support. Exploits .OS commanding, remote file inclusions, local file inclusions, XSS, unsafe file uploads and more.WML Support (WAP). w3af is divided in two main parts, the core and the plugging.This coordinates the process and provides features that plugins consume. Plugins share information with each other using a knowledge base [5].

Burp Proxy is a HTTP/S proxy server for attacking and testing web applications. It operates as a man-in-the-middle between two end points of servers, and allows the user to intercept, inspect and modify the raw traffic passing in both directions. It uses various intelligent techniques to generate a content and functionality. It is developed for penetration testers, and to fit in closely with existing techniques and methodologies for performing manual and semi-automated penetration tests of

web applications. Manually modifying and reissuing individual HTTP requests, and analyzing their response. Transforming raw data into encrypted format. It is capable of intelligently recognizing several encoding formats using heuristic technique. It is an automating customized attacks against web applications [6].

Grendel-Scan is an open-source web security testing tool which has an automated testing module for detecting common web application vulnerabilities. It has the ability to find simple web application vulnerabilities, but its designers state that no automated tool can identify complicated vulnerabilities, such as logic and design flaws. Grendel-Scan tests for SQL injection, XSS attacks, and session management vulnerabilities, as well as other vulnerabilities. Grendel Scan is a powerful web application scanner that can help identify potential security gaps across websites. It has many features which are useful tool for pen testers, in particular those who may not have much (or any) penetration testing experience across their web applications [7].

Web Scarab is a framework for applications that communicate using the HTTP and HTTPS protocols. It is written in Java, many other platforms. It has several modes of operation, implemented by a number of plugins. Common usage of Web Scarab operates is an intercepting proxy, allowing the operator to review and modify requests created from browser before data sent to the server, and to review and modify responses returned from the server before they are received by the browser. Web Scarab is able to intercept both HTTP and HTTPS communications. The operator can also review the conversations (requests and responses) that have passed through web Scarab. Web Scarab provides some features and plugins that will aid the pen-tester to get a solid understanding about a web application's behavior[8].

IronWASP is an open source system for web security vulnerability scanner.pentesters can create their own custom security. Expert user with Python/Ruby scripting expertise would be able get the full potential of the platform, a lot of the tool's features are simple to be used by absolute beginners.it has the features of Full & Semi Automated Scans, Scan Customization Option and High Scan Precision: Scan 1 Parameter of 1 Request for 1 Active Plugin. It did however, make a clean (and unexpected) take away by being the only winner in the new and hidden Invalidated Redirect category[9].

Qualys Express is a cloud-based kit for security and compliance solutions for small businesses with limited budgets and staff. It monitors browser whether Internet perimeter servers, websites and web apps are up to date and securely configured. It even lets you extend the same protection to internal computers to make your organizations secure, inside and out. It express from Qualys uses the software-as-a-service (SaaS) model to provide vulnerability and compliance management services to customers. It combines vulnerability scanner,PCI compliance, along with web application scanning and malware detection, into a single hosted console. This offers both security novices and veterans an easy way to maintain awareness and as this reduces the time it takes to do a full test, allows to work more efficiently. This does functions such as RXSS, SQLi, webapp scanner, WebApp Scanner, Web Service scanner, CGI Scanner. [10]

VEGA is a free and open source scanner and testing platform to test the security of web applications. It can help you

find and validate SQL Injection, Cross-Site Scripting (XSS), inadvertently disclosed sensitive information, and other vulnerabilities. It is written in Java, GUI based, and runs on Linux, OS X, and Windows. Thus it includes an automated scanner for quick tests and an intercepting proxy for tactical inspection. The Vega scanner finds XSS (cross-site scripting), SQL injection, and other vulnerabilities. Vega can be extended using a powerful API in the language of the web: JavaScript. This contains with functions such as RXSS, SQLi, LFI, RFI, WebApp Scanner. Automated Crawler and Vulnerability Scanner, Customizable alerts, SSL MITM, Database and Shared Data Model are some of the features of it. [11]

III. OUR APPROACH

Network Security Types

Network security is different kind of activities which is design to secure the network. These kind of activities mainly consider about usability, reliability, safety of network and data of network. The main topic which directly connect to the network security is network security attack. Current day's large number of companies, people, and governments willing know the others secrets which is more crucial to those parties. Those data can be cost more than millions of dollars. So in victim's side they are hiring the professional pentesters. in society side the hacker rate is increasing significantly. According to the Mcfee which is a largest network security technology company these types of attacks are commonly used by hacker.

DDOS (Distributed denial of service) attacks are used to make an online service unavailable by increasing the traffic to the source service from multiple sources. Most of the free software's are being downloaded from the torrent sites contains Trojans which can be used to DDOS attacks. According to the Arbor network's ATLAS threat report more than 2000 daily DDOS attacks are discovered. VeriSign/Merril Research states that 1/3 all the online downtime incidents happened because of DDOS attack. DDOS attacks come in many different forms, from Smurfs to Teardrops, to Pings of Death Common types of DDOS attacks are

1. Traffic attack : traffic flooding attacks send a huge volume of TCP, UDP and ICPM packets to the target.
2. Bandwidth attacks: overloads the target with massive amounts of junk data.
3. Application attacks: Application-layer data messages can deplete resources in the application layer, leaving the target's system services unavailable.

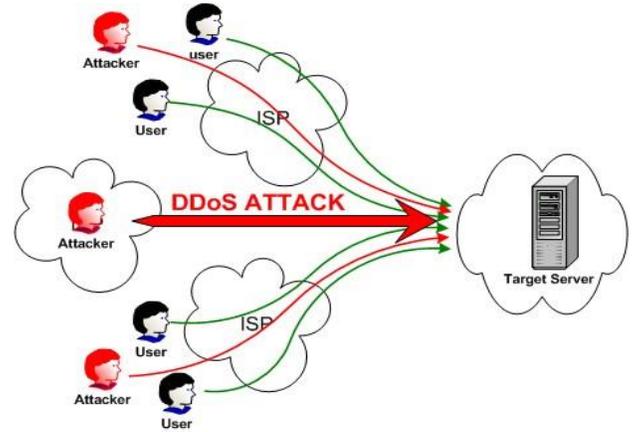


Figure 2

(Source: <http://info.singtel.com/business/products-and-services/internet/singnet-ddos-protect>)

Brute force is attack type use to decrypt a encrypted file with the help of a software. This encrypt file contains valuable datas. To brute force there is large portion of words in single file to test whether data file can be decrypt using those words one by one. This is very time consuming process. Time can be depend on the encryption algorithm also. so the hackers connect to fast server and execute the software. Ars Technical reported that a 25-GPU cluster could crack every Windows password which uses NTLM algorithm under 8 characters in less than six hours.

Eavesdropping (sniffing) is intercepting the communication between to end-points. To this there are many specialized eavesdropping tools available. Specialized program used to check the packet data transfer between to end point and then use cryptography to get the data from those packets. Depending on the network sniffing can be effective Lan Environment with hubs: Very easy because hubs duplicate every network frame to all ports Lan Environment switches only transfer a frame to the port. to this arp spoof mechanism used WAN Environment: to this sniffing pc router between the client server communications. One way to implement this exploit is with a DNS spoof attacks to the client.

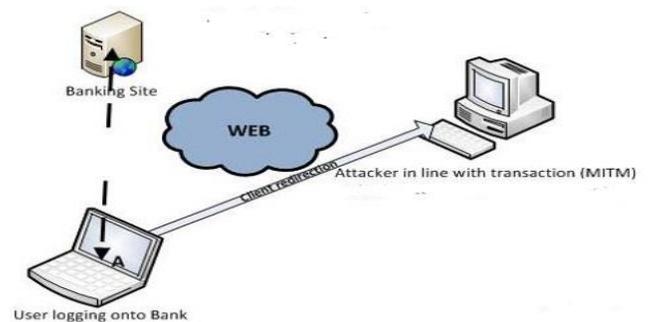


Figure 3

(Source: <http://www.valencynetworks.com/images/mitm-attack1.png>)

Earlier day's security risk affects only for Windows Systems' new vulnerability have found that affects the most versions of the Linux and UNIX operating systems this call shell shock and Bashbug. Bash used as command language interpreter in Linux and Unix systems. New vulnerability is Bash can also be used to run commands passed to it by application. One type of command send environment variables. Environment variable are affects the way processes run on computer. Symantec regards this vulnerability as critical, since Bash is highly used in Linux and UNIX operating systems running on Internet-connected computers, such as Web servers.

Browser attacks is security attack where attacker installs a Trojan horse in victim's computer and capable of modifying the web transaction happening real time .Many experienced web user are aware of scams and phishing. These can be identify trough link from any other notification. But the uniqueness of this browser attack method is the transaction happened only when normally expected prompts and password requirements.

Points of effect:

Browser Helper Objects – dynamically-loaded libraries loaded to Internet Explorer upon startup

Extensions – the equivalent to Browser Helper Objects for Firefox Browser

API-Hooking –Technique used by Man-in-the-Browser to perform its Man-in-the-Middle between the executable application and its libraries

JavaScript – By using a malicious Ajax worm, as described on Ajax Sniffer

Botnets (zombie army) are interconnected network computer which are infected with a malware which users doesn't know and controlled by hackers in order to perform tasks. Botnets use to send scam email transmit viruses and etc. Botnets are considered as a biggest online threat today. Botnets is capable of developing a large-scale DDOS attacks. Botnet uses left opened internet port and from a small Trojan horse program those left opened ports can be left for future activations. In a particular time, the zombie army controller can unleash the effects of the army by sending a single command, possibly from an Internet Relay Channel [12].

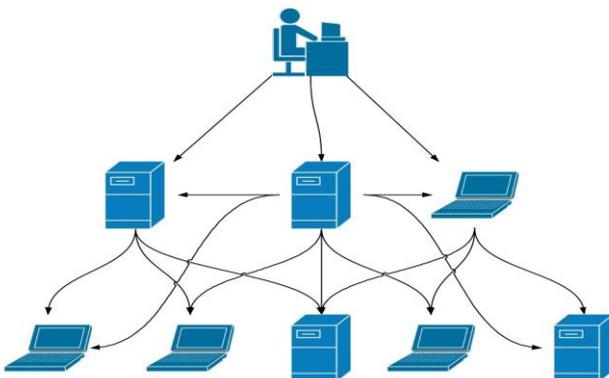


Figure 4

(Source:https://www.chmag.in/system/files/jan2011/momsguide_1.png)

Evolution of pen testing

A penetration test, occasionally pen test, is a method of evaluating the security of a computer system or network by simulating an attack from a malicious source, known as a Black Hat Hacker, or Cracker. Regarding the evolution of pentesting, it can be divided into four eras. In the first era, 1993 Dan Farmer and Wietse Venema have found Black hat methodologies which means that it improves the security of your site by breaking into it. Actual purpose was to Penetration from the Internet. Methods were not formal, state of art. Screenshots with shell and couple of words were the results of pentest.one of the main objectives at that time was to prove that networks are vulnerable those is shown in figure one. Therefore to show the business industry that there is a need in security because at that time many people were not believing it. After 2000, in the second era it used more complex pentesting. The purpose was to penetration from the internet and hacking web sites. The first version of OSSTMM, Programs like CORE IMPACT were the methods used back then. Report with vulnerabilities and their countermeasures were the results of pen testing. This was a part of SDLC for WEB development after secure development and code analysis.

Middle 2000, in the third era networking become better and there is a need to assess security more deeply. There were several objects such as Wireless, SCADA, Users (social engineering), DBMS, Applications, ERP and Mobile. The purpose was to Deep assessment of an application or technology.it used OWASP, WASC, OWASP-EAS, OSTMM, NIST and ISSAF as methods. Training: Blackhat/HITB/Offensive security and CEH, CREST, CPT, GPEN Certifications were the two main teaching. Standardized reports with the list of vulnerabilities, their risks and countermeasures gives the results of pen test. This was Part of PDCA for Application/Technology implementation.

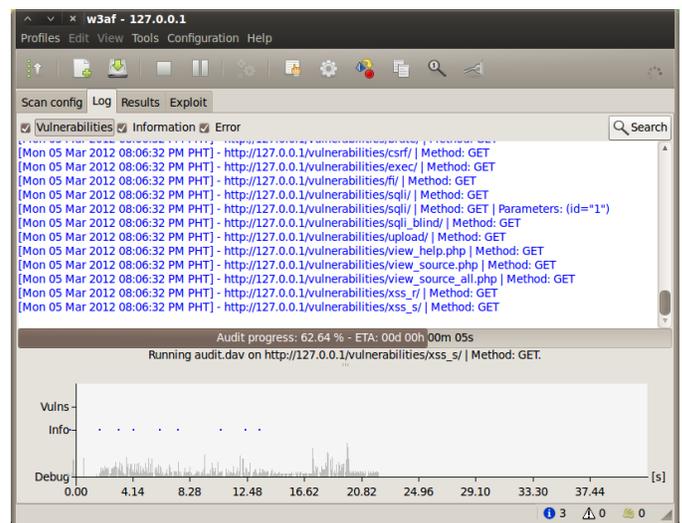


Figure 5

(Source:http://2.bp.blogspot.com/DX7otj2qBdY/T1Ssp_poKhI/AAAAAAAAAWU/fiHjX3Cyu8/s1600/w3af.png)

The fourth era is known to be the Business-oriented Pentest, Business-critical systems were the main objects. The purpose is to show how technical vulnerabilities can be used for

business threats. OSTMM, NIST, ISSAF with business process analysis were the methodologies. All that we have plus business-process analysis, specific knowledge of business area were the teaching. The results of pen test report that shows real business risks which can cause Fraud, Sabotage and Espionage [13].

How important is Penetration Testing to current society

As many Web applications are developed daily and used extensively, it becomes important for developers and testers to improve these application securities. Pen testing is a technique that helps these developers and testers to ensure that the security levels of their Web application are at acceptable level to be used safely. Different tools are available for Pen testing Web applications. Nowadays, Web applications are used worldwide by users for their personal needs but what make Web applications more and more important are the business intentions to use the Web. Currently, most of the businesses provide services to its customers using the Web and many of them depend on the Web to do their business in order to make benefits from the global accessibility of the Web. For example, E-commerce is a novel commerce model based on computer network; the E-commerce model depends mainly on money and whenever you find money in any field, risks become higher and new type of attacker who have a mission to steal money from you not just for fun and self-motivation will be founded. The benefit of penetration testing is increased security and security awareness for organization. It will provide with in-depth, actionable reporting and analysis to facilitate planning, strategies, and provide practical solutions to the organization security deficiencies. Organization will learn the attacks their systems and networks are vulnerable to. We will understand whether or not your current defenses would protect your organization against viable attacks. Your high-risk vulnerabilities will be exposed. Possibly the most important benefit of penetration testing, using an external party, is that the knowledge gained will help both management and staff to see the "security truth" and will dispel myths of "it couldn't happen to us." A third party offers an unbiased, realistic measure of your existing security and provides expert remediation to help mitigate risk and align with best security practices. While penetration testing is the ultimate tool for hardening overall security to the organization.

Penetration testing occurs when organizations engage trusted third-party security professionals to simulate attacks by real intruders against their systems, infrastructure, and people. Penetration testing provides you with a thorough analysis of the current security of your organization. The results of penetration testing are presented in an executive report that contains details of the existing security posture of your organization, possible consequences of an actual attack, and, normally. Penetration testing is the most thorough possible analysis of your security because actual vulnerabilities found are exploited to understand the depth and breadth of how your organization can be compromised. Your organization will be able to understand its current level of security and the consequences of an attacker breaking in through your defenses. Application penetration testing is the ultimate, indispensable method for ensuring application security in the modern age of targeted cyber threats against software. Application penetration testing plays the critical role to any application against potential attacks. Until you have a

third party, with no ties to the development or business attack it "full out", like a thief going for it all or siphoning off a piece of everything, or a saboteur who just wants to bring you down entirely and "erase" you. . . . Until you

Undergo these mock attacks, you will never know how well (or if) you will survive a targeted attack. Application penetration testing will expose any security weakness that is the result of your application's interaction with the rest of your IT infrastructure. You will be shown how our team exploited vulnerabilities to gain unauthorized access and violate security. You will also receive strategies and recommendations on the steps that you should take to mitigate these vulnerabilities. One of the most important organizational goals is security awareness regarding software development. It consistently find that the well-earned confidence of internal development team at making impressive software, with a great user experience, tends to lead to an overestimation of the development team's (or an application's) security capabilities. Software security is in itself a highly specialized field of study. After application passes through the application penetration testing process, and the normal depth and breadth of security flaws are uncovered, we will gravitate to a better understanding of up-to-date security requirements. System will help understand the flaws of software development lifecycle (SDLC), how we exploited them, and then instill better development and deployment practices moving forward [14].

How secure data in these days and the new ways of pen testing?

Tons of data store in the internet either business or individual it is important to keep secure the data from access to unauthorized people. Data protection and vulnerability assessment method reconstruct since the begin. In the current trend IT people they have wisely methods to protect the data. Recently they introduce white hat [15] , there they create a dummy hacker by themselves who identify the security weakness in a computer system or network. Before the real hacker access the data, according to state the system owner that will fix it.

The next current trend is ethical hacking, Businesses and government-related organizations that are serious about their network security hire ethical hackers and penetration testers to help problem and improve their networks, ethical hacker [16] who will perform by an individual or company to aid to identify the security weakness in a computer system or network. Ethical hacker will attempt to bypass the security boarder this information will help to improve the system security and eliminate any potential attacks. By conducting penetration tests, they will look some basic question [17]

What information/locations/systems can an attacker gain access? What can an attacker see on the target? What can an attacker do with available information? Does anyone at the target system notice the attempts?

How to prevent security attacks?

Computer security is a process of prevention and detection unauthorized usage computers. Prevention helps to stop unauthorized access to a computer system. Detection helps you to determine whether or not someone attempted to break into your system. Team has found many preventing methods some of them discussed below. DLP appliances allows to track the travel

of data in real time or by collecting data and summarizing it in daily or weekly reports. DLP system that can intercept and read SSL or other encrypted messages, or users will be able to defeat the purpose simply by data encryption they send outside the network. DLP appliances and firewalls focus on traffic being sent outside the network. Use packet inspecting tools like Network Analysis and Visibility (NAV) products to inspect the data of packets moving within the internal network. NAV tools can examine the contents in deep and look for similar words or types of data inside a document or file.

Powerful way is using a firewall. Most modern firewalls are capable of filtering both inbound and outbound traffic, but many firewalls configured for only control the former. Set up outbound rules on firewall to explicitly block or allow the network traffic that matches the criteria. Encrypting sensitive data will make it more difficult for those inside the network be able to manage information even if they do manage to intercept it and take it outside. Encrypted data cannot be read without specific algorithms. even hacker got the data they cannot use them in any harm manner without decrypting it. This is a very effective way of securing the data from outsiders. Virus guards are very common way of securing the personal data. Installing virus guards does not let install any soft wares that are harmful to the computer system or misuse its specification (DDOS). There are many virus guard which are very powerful and easy to use (Kaspersky, Norton, AVG etc.)

Limits the number of allowed login attempts for an IP Address. It allows to manually block an IP address from logging into system. It delays execution after a failed login attempt helps to prevent brute force attacks.

If any critical data is required to register to a site it is good to make sure whether it is HTTPS secured sites. Most of browser are warning before go to harmful site.

IV. CONCLUSION

This paper discussed, for systems to remain secure, the security posture must be evaluated and improved continuously. Establishing the organizational structure that will support this ongoing improvements is essential in order to maintain control of cooperate information systems. Penetration tests offer unparalleled insight into an organization's security effectiveness as well as a road map for enhancing security. By hiring experts to simulate a cyber-attack, vulnerabilities can be identified and corrected before they are exploited by a hacker or malicious insider. Therefore team has found many general preventing methods such as limits the number of allowed login attempts for an IP Address, using HTTPS secured sites when critical data is required to register to a site, installing powerful virus guards, Encrypting sensitive data. Apart from these it has found powerful factors in the manner of DLP appliances and firewalls, which focus on traffic being sent outside the network. Use packet inspection tools such as Network Analysis and Visibility (NAV) products to inspect the contents of packets moving within the internal network. NAV tools can examine the contents in great depth and look for particular words or types of data within a document or file. However it is essential that appropriate efforts should be undertaken in the proposed methods to introduce

effective network security, which could help mitigate the effect of security failures.

V. FUTURE WORK

Pen testing strategies are now converted from one shot a year exercise to annual programs, where secure code review, static and dynamic, is combined with penetration test of targeted areas. The financial sector, in particular, considers penetration testing as an annual product, versus a one-time service. Professional firms use human intellect and tools to make whole code exploitations of cybersecurity and development practices with emphasis on testing components. Effective penetration testing teams will consist of 3-5 highly trained professionals and specialists, executing the pen test assignment with well-rehearsed scrum efficacy, communication, division of tasks, re-prioritizing backlog, tracking, addressing new issues, and re-focusing to maximize value of both individual and the team contribution, commitment and ownership of the project from start to end. Teams adapting lean methodologies would typically achieve individual contributors of same background. As cyber security product vendors make products better at capturing the critical attacks, attackers will be forced to evolve their attacks as well as their skillset. The human factor is always play a big part since humans are the ones that can make the greatest security technology in the world completely useless by not configuring it correctly or by being social-engineered to turn it off. PowerShell in Windows also a growing attack vector as it does not trip AV. So team imagine using a system's tools against itself will also play a part in the types of attacks we see a lot of in the future.

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Institutional Environment Difficulties Encountered by Food Technology Students of Capsu Mambusao Campus

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Abstract- This study was conducted last March 2014 at Capiz State University, Poblacion Mambusao Campus to determine the different difficulties encountered by Bachelor of Science in Food Technology and Entrepreneurship students when taken as a whole and when classified according to year level. Respondents were the seventy-one bonafide BSFTE students. Open-ended questions about general environment of the CapSU, Food Technology Department were given and were then classified as physical environment and social/interactive. Data gathered were tabulated, computed and analyzed using frequency count and percentage for the descriptive analysis. Results of the study revealed that the majority of the institutional environment difficulties of students were from the physical environment aspects. First year BS Food Technology and Entrepreneurship students had both the highest physical and social/interactive environment difficulty.

Index Terms- institutional environment difficulties, Food Technology students

I. INTRODUCTION

The impact of institutional environment on students' performance has been the subject of many research studies. The physical environment or the resources provide comfort, security and better understanding of courses hence affecting their learning and ultimate achievement (Engin-Demir 2009 and Wößmann,2003). While social and interactive environment encourages participation and discussion of the students in the course and enhances their creative skills. An interactive environment in which students are appreciated to ask questions, given the freedom to choose tasks, supported for unusual ideas, taught to learn from failures and encouraged to participate in decision making process enhances their creative skills, learning and students' achievement (Amelink, 2005).

Overall instruction at Capiz State University was excellent. Instructions in terms of curriculum and program studies, instructional process, methodologies and learning opportunities and classroom management were all excellent (Marquez, 2015). Since the study of Marquez (2015) was done few years ago, it might be timely to assess the institutional difficulties of Capiz State University Food Technology and Entrepreneurship department students in terms of physical and social/interactive environment when taken as a whole and when classified according to year level after the department was stricken by Super Typhoon Yolanda. This study might provide baseline information for the possible rehabilitation of BSFTE Department

and for the further assessment of institutional environment as it affects instructional process.

II. RESEARCH ELABORATIONS

This study was conducted at Capiz State University, Mambusao Satellite College, Mambusao, Capiz last March 2014. The respondents of the study were the seventy-one proportionately and randomly selected bonafide BSFTE students during the second semester of school year 2013-2014. The research instrument used was in a form of open-ended questions that were given to every students who were allowed to have one answer only to indicate the most institutional difficulty that the respondent have encountered. Their answers were then classified according to two identified types of institutional environment difficulties. Part I elicited information on the name and year level of students. Part II was composed of open-ended questions about the students' problems in the institution. The data gathered were subjected to descriptive analysis such as frequency count and percentage.

III. RESULTS OR FINDINGS

Majority (50 or 70.00%) of the respondents encountered institutional difficulties in terms of physical environment, and the rest (21 or 30.00%) in terms of social or interaction environment.

When classified according to year level, almost majority of the respondents from BSFTE I (60.00%) stated that they have difficulties in the physical environment of BSFTE Department, followed by BSFTE II (26.00%), then by BSFTE III (8%) and BSFTE IV (6.00%). Likewise, BSFTE I had the highest percentage (47.62%) of social/interactive environment difficulties, followed by BSFTE III (23.80%) while BSFTE II and IV students had the least percentage (14.28%) of difficulties encountered in terms of social/interactive environment aspects of the department.

IV. CONCLUSIONS

1. Majority of the institutional environment difficulties of students were from the physical environment aspects.
2. First year BS Food Technology and Entrepreneurship students had both the highest percentage in terms of physical and social/interactive environment difficulty.

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Evaluation of Community-Based Forest Management Project in Ma-asin, Iloilo, Philippines

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Abstract- The study on Community-Based Forest Management (CBFM) was conducted in Maasin, Iloilo, Philippines. The aim of the study was to assess the status of Maasin CBFM. The objectives of the research are: (1) to determine the socio-demographic characteristics of the beneficiaries of Maasin CBFM; (2) to assess the inputs, interventions, approaches, and strategies undertaken in the said CBFM; (3) to evaluate the CBFM outputs and outcomes; and to find out the status of Maasin CBFM. The design of the study was descriptive. There were 335 participants as the population and the respondents of the survey were 77. They were the sources of primary data. Secondary data of the study were gathered from Department of Environment & Natural Resources (DENR) which provided the characterization of Maasin CBFM in terms of bio-physical, socioeconomic, and infrastructure. Aside from the respondents of the study, there were also key informants for the triangulation method of research. The instruments for the respondents and key informants were subjected to validation and that of the respondents was further pretested for reliability. The findings of the study were: the training in decision making, farming systems, erosion control, values, post-harvest operations, marketing of produce, biodiversity conservation, management, forest conservation, organic farming, soil and water conservation were practiced by the beneficiaries; the inputs for CBFM were comprehensive to include—crop seeds, tree and fruit tree seedlings, farm-to-market roads, fertilizers and marketing assistance, and technical assistance; generally, outputs were sound except for political intervention and policies and farm practices of the beneficiaries which need further improvement; and in general, the status of CBFM is “good” but needs to be improved to the “very good” level.

Index Terms- CBFM, status, characterization, outputs, inputs, outcome, intervention, practices

I. INTRODUCTION

“People first and sustainable forestry will follow” sums up the concept of CBFM. The government of the Philippine Republic believes that by fulfilling the needs of local communities, they themselves will join hands in protecting and managing the very source of their livelihood. The evolution of community forestry was for improving the forest resources management and focusing on issues in the environment where centralized management failed (Pandit & Bevilacqua, 2011).

The CBFM goals include promotion of: (a) sustainable management of forest resources; (b) social justice and improved well-being of local communities; and (c) strong partnership of

local communities with the DENR. In spite of paramount progress, continual improvement in the cooperation of local as well as national governments with forest communities points to the key point of better forest management by communities. A multiplicity of futures scenarios have been propounded to help in the decision process for the good of the environment (Evans et al., 2008).

A study performed in the Amazon of Brazil showed that there are a number of challenges that should be confronted for development of a strategy for sustainable management of forestry. These challenges are in Table 1. The table depicts the impact of challenges in management on other obstacles (Hajjar et al., 2011).

Table 1. Challenges in management of forests (Hajjar et al., 2011)

Ownership of land	Rights of the beneficiaries to use the land must be ensured so that he is motivated to protect and manage it.
Organizational capacity	People’s organization (PO) must be trained in order to make sound decision for their forestry community. This activity of the government must be effective.
Capital	The help of NGOs (Non-Government Organizations) must be sought to provide capital for forest communities. Collaboration of DENR and local governments in this must be effective.
Technical knowledge	Lawful management of the forest must be ensured and the people in the CBFM community should be trained in technical knowledge not presumed.
Legal management	The DENR approval of work plan for the forest community should be well performed. Thorough study of the plan must be done before approval and the people trained.
Illegal loggers	Once the trees are grown up, the protection of the forest must be ensured to be free from illegal loggers. Again, training of the community on this must be effective.
Easy market access	Market access of the forest community must be fast and easy as ensured in the program.
Infrastructure for the community	Infrastructure for the area are needed for efficient forest management.
Skills in management	Skills in management must be possessed by the community as needing training from government authorities. The science of

	forestry has many elements and managerial sciences are one (Young, 1982).
Economic returns on activities	Activities in the farm must ensure economic returns to the beneficiaries so their improvement in socioeconomic aspects will follow.

The features of CBFM are security of tenure and social equity. For a conservation program within a Community forest to succeed, involvement of the community is imperative. Security of tenure on the land is a must. Policies of governments in the CBFM have failed and the social equity must be governments' concern (Nagendra, 2007).

In management of the forest in CBFM, the people are the ones concerned. Good timber in terms of quality and for soil and water conservation must be introduced (Barnard & Foley, 1984). There are many produces of the forest that are useful to the forest communities at the same time conserve soil and water. Pulp production for income is common in the Philippines (Hyman, 1983).

Agroforestry in the CBFM lands are important source of livelihood and food needed in the homes and for sale. The practice of agroforestry has been acceptable to many people worldwide (Kristjanson et al., 2012). Food and forest trees in the land are raised simultaneously. While spaces within rows of trees are provided for crops or for grazing, agroforestry makes sense and gives economic returns to the farmers. The use of leguminous fast growing trees for fertilizer purposes is as beneficial as synthetic fertilizer in agroforestry (Akinnifesi et al., 2006).

Agroforestry in the slopes have contribution to ecology. The advantage of biodiversity is one. Socioeconomic improvement of the farmer is another. Ecology in the land is balanced because it is conserved and preserved. The totality of the land is used (Patish, 2008).

CBFM as a concept of social forestry aims to alleviate the people from poverty and preservation of the natural resources in the forest community. Whether success in CBFM particularly CBFM in Maasin, Iloilo, Philippines has been achieved is the goal of the study.

II. METHODOLOGY

The venue of the study was in Maasin CBFM, Maasin, Iloilo, Philippines. The respondents of the research consisted of 77 CBFM beneficiaries who were asked to answer a researcher-made instrument. The design of the study was descriptive which, according to Ardales (2008), aims to determine the condition at the time of the study and determine the causes of particular phenomena. The selection of respondents was with the use of simple random sampling. The research instrument was validated by a panel of jurors consisting of five members. The reliability of the instrument was determined using 15 beneficiaries from Maasin CBFM not included in the respondent-proper. Secondary data for the study were gathered from DENR. The gathering of data was performed by the researcher himself. All statistical analyses were performed using the SPSS (Statistical Package for Social Sciences) computer software Version 17.

III. RESULTS AND DISCUSSION

Overall positive outputs and outcomes of the CBFM project have incited the significant efforts of DENR in changing the community member and the association which benefited from the project in Maasin watershed. There were outward important significant improvements in the CBFM projects namely the five components this are the reforestation, agro forestry, bamboo plantation, rattan plantation and rehabilitation of riverbanks that was established. Likewise livelihood opportunities were also given to the community member beneficiaries. There were infrastructures development established in the like bunkhouses, look-out tower, access trail, nurseries and fire lines that were helpful to the community. The beneficiaries were trained technically and assisted in marketing their goods and the availment of different livelihood projects; thus beneficiary changes on the management practices, crop production landholding capacity and increase in income of the community member beneficiaries.

The CBFM project provided technical and marketing assistance to member-beneficiaries. Forty five respondents or 58.44 percent received technical assistance from local LGUs, provincial government, Department of Environment and Natural Resources, Metro Iloilo Water District, and NGOs in Maasin, Iloilo before CBFM project implementation. Likewise, 30 respondents or 38.96 percent received marketing assistance from said agencies. It also revealed that the number of respondents who received technical and marketing assistance increased from 45 to 72 and 30 to 56 respondents, respectively. The data showed that with the CBFM, technical and marketing assistance increased with 93.51 percent and 72.73 percent of the respondent receiving the assistance.

Before the implementation of the CBFM project in Maasin, Iloilo livelihood opportunities for the community members were present. Majority of the community members reported that among the livelihood opportunities offered by LGUs, NGAs, and NGOs farming fruit trees (20.78%), farming crops (19.48 % and raising livestock (12.99%) were availed of. Moreover, sawali production and trading (89.61%) and hog fattening (19.48%) were also availed of by the community members before the CBFM. Likewise, raising poultry, rice trading, seedling production, PUB, truck and motorcycle loan, and Hog feeds "buy and sell" were also availed of by community members. Interestingly, current results revealed that 69 respondents or 89.61 percent reported to have availed themselves of sawali production and trading while farming fruit trees was availed of by 88.31 percent of respondents. The CBFM project also provided livelihood opportunities in farming crops to 76.62 percent of respondents with an increase of 44 respondents from 15 before the CBFM implementation in Maasin, Iloilo. Also, community members who availed of seedling production from the CBFM increased from 6 members to 48 members with a difference of 42 respondents.

Generally, livelihood opportunities availed of by community members from the CBFM implementation was increased. This implies that the CBFM project attained its objective of uplifting the economic well-being of the community members by providing livelihood opportunities for every member-beneficiary.

The positive change in technologies is indicative of community member beneficiaries respondents acknowledgement of the benefits and advantages of the adoption of those technologies. Before the community-based forest management was implemented in the area, gabion (51.95%) followed by terracing (45.45%), Agroforestry (20.78%), SALT 2 (16.88%), SALT 1 (12.99%) and SALT 3 (10.01%) these technologies adopted thru introduced by Department of Environment Natural Resources, other Government Organizations, and Non-Government Organizations involved in the area before CBFM. During the CBFM thru trainings and seminars, informal education conducted there was a changed and increased in adoption of technologies, highest was obtained by SALT 1, soil conservation and food production (29.2%), followed by terracing conservation of soil (88.3%), SALT 3, sustainable agro forest land technology (76.6%), agroforestry, diverse crops and trees (75.3%), SALT 2 agriculture and forestry (58.4%).

Overall the change in crop grown by the community member beneficiaries of the CBFM project from the original crops grown in the area rice (58.44%), followed by own (57.59%), cacao (44.16%), bamboo (38.96%), coffee (37.66%), coconut 31.17%), abaca (25.97%) rattan (23.38%), and achuete (20.78%), respectively were changed to the following: rattan (92.21%), coffee (83.12%), cacao (77.92%), corn (75.32%), corn (75.32%), rice (64.94%), coconut (62.43%), abaca (59.74%), and achuete (51.95%), respectively. The change in crops grown in the area was triggered by the technologies being adopted/introduced in the area and economic benefits gained from the said crops.

Moreover, the change of land holding from 1.75 hectares average land holding before the project, increased to 5.78 hectares average land holding at the implementation of the CBFM. The highest percentage change was in business income (49.48%), followed by farm income (21.05%), employment income (19.59%) and non-farm income (9.88%).

The implementation of CBFM project was not without problems as the community member beneficiaries were challenged by the lack of commitment on the general objectives (76.62%), lack of transparency on the records especially financial matters resulting to doubts in project implementation (59.74%), lack of genuine commitments to improve the lives of the members (67.58%), lack of understanding on the whole functions and roles of watershed on the lives of human being (53.25%), mismanagement of the records resulting to uncooperativeness of the records resulting to uncooperativeness of the members (32.47%), and the "wait and see" behavior of the Politics/Policies.

There is a theory on the social production of scale and multiple social and natural science methods to interrogate village-scale community-based forest management (CBFM) in southern Malawi, focusing on boundary demarcation, rule formulation and scaling, and dynamics of external facilitation. Examination of political agendas of those who pursued, gained from, or protested particular scalar CBFM arrangements uncovered otherwise hidden scalar politics, whose outcomes impeded more than they advanced CBFM goals. He argued that clarifying the scalar politics and configuration of forest governance arrangements can lead to a more nuanced understanding of m CBFM challenges and create new

opportunities for addressing them Containerized, single-level CBFM institutions mismatched interacting social, ecological and institutional scalar configurations and confounded CBFM. Unequal international-donor/national and national/community scalar relations were as important as intra-community dynamics in explaining performance of CBFM. They constructed CBFM on a shaky foundation that put institutional and personal agendas and short-term goals over long-term socioecological sustainability. The politics of rescaling forest rules from village to (broader) Traditional Authority level alienated them from communities and undermined enforcement. Diverse motivations behind a scale-related strategy that separated usufruct from territorial rights in allocating forests mostly undermined socioecological CBFM goals. While scale is not the key or only explanation of CBFM performance, negotiated scaling offered a proactive way to anticipate scale-related conflicts in particular settings, and for communities to create institutional forms that minimize such conflicts at local or intermediate scale levels. Findings support strong,. Well-resourced states and caution against donor-driven quick fixes (Hula, 2014). The politics may influence the policies which the associations in CBFMs are framing. They may be effected by donor politicians or agencies on the latter's likes and dislikes. Despite this fact, if the donors are sincere in helping the association, no discrepancies will arise (Hula, 2014).

IV. CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of the study, the following conclusions were arrived at: The training in decision making, farming systems, erosion control, values, post-harvest operations and marketing of produce, biodiversity conservation, community-based forest management, forest conservation, organic farming, soil conservation and water conservation were generally useful to the participants. Generally, the inputs to the CBFM are comprehensive. They received crop seeds, tree and fruit tree seedlings, farm-to-market roads, fertilizers and marketing assistance, technical assistance and were provided with livelihood opportunities which needed to increase income. In general, the CBFM outputs are very sound, although some aspects such as politics, policies and farm practices need improvement. The status of Maasin CBFM is good but this needs to be improved to the very good level.

Based on the results of the study, the following recommendations are put forward:

Continuous training on forest management must be conducted so that the beneficiaries are educated on the importance of watershed to ensure conservation and protection of the Maasin watershed. Technical assistance must be intensified for the program beneficiaries to ensure the sustainability of managing the Maasin watershed. Strict implementation of the local ordinances must be done and must be followed. Discipline and moral values of the beneficiaries must be strengthened as they are the stewards of the natural resources. They must learn to love, care and be committed to protect the Maasin watershed.

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Democracy Accordance with the Image of God "Trinity"

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Abstract- Democracy today often associated with religion, law, economics and education. This is due to the power that uses the label of democracy but practicing injustice, suppression of human rights, suppress human freedom, pluralism is less appreciated and recognized as well, the policy and the law in favor of the ruling majority. In the Bible human uniqueness is the man's responsibility before God and neighbor. Picture of life that singles out, get rid of, and oppressive is a deadly act of human rights, undemocratic actions. The history of democracy in a span of time that has been so long with the level of intensity is different, as well which have been adopted by almost all countries are different in terms of geographic location, history, culture, and development levels have resulted democracy controlled with the purpose of which is no longer free mankind but it has been deadly human capacity. Democracy was time studied in greater depth so as not misused meaning and role to oppress his being. Meaning God "trinity" as three persons who become One, who love each other and communicate with each other in close fellowship can be studied to feed relevant to democracy. The nature of God "trinity" as Three Persons which one will help give a different perspective on democracy. The concept of democracy in God "trinity" is a picture image of democracy is open to communicate freedom for man and broker that provides power to reflect real democracy actions negate oppression of any kind against a human. Therefore democracy in God "trinity" will discuss three points, namely : (1) Democracy is philosophically in relation to God "trinity" (2) The function of democracy in relation to God "trinity", and (3) The procedure of democracy in terms of with God "trinity"

Index Terms- Democracy, God "trinity"

I. INTRODUCTION

Concept "trinity" is one of the concepts of Christianity is a mystery to most difficult to grasp. However, just because it is difficult to understand, it does not mean the concept is not true. The concept states that God consists of three persons: God the Father, God the Son (Jesus), and God the Holy Spirit, but one in nature. The three persons it is from eternity and will remain there forever. God the Father did not create the Son and the Holy Spirit, and vice versa. Faced with statements This will the image of God "trinity" can be interpreted as the One God in three "Trinity". A life of one in three contains the question whether it is possible to occur, it's possible three in one, can come together, fellowship and summarizes the life that does not cause division and conflict. Communion and unity of life that how yan g is done in three i's private are fused, without contradicting the principles and identity of each. The three persons of God have the same

attributes. They are one in substance and one in essence, and therefore they are one God.

This way of thinking as a human being can certainly oppose the life of one in three persons. But that God "triune" did not cover up its presence in the person to "trinity" an even God, the Son Jesus Christ, and the Holy Spirit are united and related in a divine life. Not only was God "triune" shows the unity and fellowship that can be built from a third person has a different role. The meaning of unity and communion in three persons with different roles can explore the values associated with democracy. Democracy is essentially promising people could live to work together, a free human being, humans can govern themselves in a manner that serves the aspirations of social, actually can inherit other values of the form to "trinity" God's. Other values that intended is harmony, love, communication, and fellowship among the three persons of God be an example of democracy applied in our daily life. Life sharing, circulating, mutual acceptance, and united through communion.

II. DEMOCRACY

Most people are probably already familiar with the word democracy. But democracy is a concept still misunderstood-understand and abused-used when totalitarian regimes and dictators trying to gain popular support by attaching a democratic label on themselves. The term refers to a democratic ideals and a political system. In etimologis democracy is deveni the Greek, is derived from the word *demos* meaning people, and *kratos* or *kratein* which means power or power. So democracy can be translated as "rule by the people" or "people in power" or with another statement, the *government or rule by the people*. Historically, the democratic system practiced in statehood Yunani between the 4th century BC to the 6th century BC. Democracy is practiced in those days shaped directly (*direct democracy*) [Miriam Budiardjo, 1996].

In a democracy, government is only one of the elements that coexist in a social structure of institutions are many and varied, political parties, organizations and associations. This diversity is called pluralism in a democratic society do not depend on the government as life, legitimacy, or their power. As an ideal, democracy, among others, guarantees their freedom in many aspects of life, providing a foundation to various aspects of life, provide the foundation their equal treatment for citizens, pushing for improved welfare, and put the interests of the community of interests of individuals, groups and classes [Zamroni, 2011]. The long history of democracy provide an alternative for us that democracy is a better way to govern than alternative that is not democracy.

Robert A. Dahl explained that democracy produced results, among others: (1) avoid tyranny; (2) rights (3) the general freedom; (4) self-determination; (5) moral autonomy; (6) human development; (7) keep the main personal interest; (8) political equality; (9) seek peace, and (10) prosperity [Robert A. Dahl,2001]. Meanwhile, the John Dewey democracy is always in alliance with humanism, the belief in the potential contained within human nature. However, it can not be guaranteed that if a man's character is left alone, freed of constraints beyond the arbitrary will produce a successful democracy. John Dewey and then see another facet of democracy that democracy means belief in the humanistic culture should remain and expressly recognized moral character [John Dewey,1998].

In this study there was an idea that democracy can be used as a value system that gives instructions for humans in social interaction in order to achieve a life that is peaceful, prosperous and mutual appreciation and respect in life. Aspects that should be worked on the meaning of democracy, among others :

1. Democracy is an attitude of eliminating violence by order of peace and justice.
2. Democracy leads to the desire to live together with tolerance in an inclusive culture or civilization, religious, aesthetic, moral and intellectual.
3. Democracy proceed with their effective participation. Equal opportunities and effective on policies and decisions.
4. Democracy guarantees individual freedom to decide their own fate.
5. Democracy seek moral responsibility over total in human development.

III. GOD "TRINITY"

God "trinity" is not a fantasy picture, not speculation, not a recording of a human. According to G. Greshake, faith in the "trinity" is not grounded in some texts of the New Testament, nor is the result of speculation, but is really a basic experience of the New Testament. Likewise, the Trinity is not a doctrine or ideology but rather events, experiences that God Father, through His Son Jesus Christ in the Holy Spirit brought him, approached the man, gave himself over and completely to them and pull them into his life divine [Gisbert Greshake,2003]. Meanwhile, according to Leonardo Boff, Trinity not the answer to human problems. Trinity is the revelation of God, as He is His, as Father, Son and Holy Spirit in a reciprocal relationship lasting, interpenetrate, in love and fellowship, the things that make a trinity that God truly one. God "trinity" means unity in diversity [Leonardo Boff,2004]. "Triune" God (each containing both private Personal other, Personal permeates each other, one stayed in the other and vice versa). In Latin theological formulation used *circumin cessione* ("c" in the word active means impregnating each other) or *circumin sessione* ("s" depicts one another are one in another and vice versa). The unity intact God, the Son, and the Holy Spirit reveals that unity happens in these *three* names have a key strength that can not be separated.

In the concept of the Old Testament concept of God "trinity" is understood in the concept of creation. Aurelius Augustinus explains in Nico Syukur, God who is God's creation of the "trinity" which in itself has the love and fellowship.

Indications of a "triune" God is "In the beginning God created the heavens and the earth." (Gen. 1: 1). Although creating a verb is singular and has a singular subject, *Elohim*, the Hebrew word in referring to God in this verse, is plural, then appropriately interpreted it as referring to God "trinity". Further in the phrase ... "Let us make man in our image, after our likeness" (Gen. 1:26), the word dressing plural can not refer to angels because they have never been associated with God in His creative activity. Consequently, more than one person involved. The plural pronouns do not mean anything otherwise (cf. Gen 3:22; 11: 7) [Nico Syukur Dister,2004]. The specialty of the second about God is presented to us is the Spirit of God. The Spirit of God was hovering over the water. Spirit of God who came to David, the Psalmist and of praise of Israel. God's Spirit left Saul, and an evil spirit that possessed him, Zechariah the prophet said, "Not by might nor by power, but by my Spirit, saith the Lord of hosts." (Zechariah 4 : 6). *Elohim* show that God is one in three persons. *Elohim*, God; *Ruach*, God is Spirit. "Let us make man in our image, in our likeness." Another statement which indicated the Old Testament is Then King Nebuchadnezzar was troubled, then got up immediately; he said to his ministers, "Did not we have three people who throw with bound into the fire?" They replied to the king: "True, O king!" He said: "But I see four men walking around in the midst of the fire unharmed, and the fourth is like the Son of God!" (Daniel 3: 24-25). Personal is seen throughout the Old Testament. You can call it an *epiphany* or the appearance of God and *Christophany* or appearances of Jesus our Lord before he became incarnate. Always there are three persons in the Old Testament, God *Elohim*, *Ruach* touch with the Spirit of God and the Angel of the Lord concerning Jesus Christ our Lord. In the Old Testament God revealed Himself in three persons in one entity have equal and He is in eternity. Written in Nico also explained that God is not one but united. In other words, God is not enclosed in itself, but the reality is always in the process, which gave birth to the second and third personal [Leonardo Boff, 2004].

In the New Testament Jesus demonstrated the inseparable unity with God the Father, "I and the Father are one" (John 10:30); "Anyone who has seen me has seen the Father ..." (John 14: 9). Inside his last prayer for His disciples before his passion, he prayed to the Father, so that all his disciples be one, just as the Father in Him and He in the Father (Jn 17: 21). Thus It reminds us of the revelation of God the Father himself, about the divinity of Jesus because God the Father calls Jesus the Son of His beloved, that at the time of the baptism of Jesus (Luke 3: 22) and at the time of the Transfiguration on Mount Tabor (Mt 17: 5) .In expressed his unity with God the Father, Jesus also stated his unity with the Holy Spirit, the Spirit whom he had promised to his disciples and he named as the Spirit of truth who proceeds from the Father (Jn 15: 26). The Spirit is also the Spirit of Jesus, because He is the Truth (John 14: 6). This unity is reaffirmed by Jesus in his last message before ascending to heaven, "... Go therefore and make disciples of all nations, baptizing them in the name of the Father, Son and Holy Spirit ..." (Matthew 28: 18-20).

Description of the relationship of God "trinity" can be explained not outside God but in Him. If the relationship was not outside, then the relationship of God "trinity" is a relationship that is in unity. Unity of God "trinity" is the unity of the mutual

giving of divine life, in relation to each other that they keep giving different but one entirely. Meaning that there is unity in God "trinity" is the unity of reciprocity to keep each other, give each other, and have eternal unity. Personal third is related to one another. The difference in origin does not divide the divine unity, but instead shows the interrelationships between the Personal God. Connected with the Father the Son, the Son to the Father, and the Holy Spirit is associated with both. One God, the Creator of all that lives by itself has a presence in person. One God, who created man with the ability to speak, should he himself stated in His Word. God who created life in every living creature, is he himself who lives in the spirit. Therefore, it is certain that the "trinity" holy must be in one and only God. Their essence is one, that is God "trinity".

IV. DEMOCRACY IS DEFINED PHILOSOPHY OF GOD "TRINITY"

The political system in which people live also consider each other equal politically, equally sovereign, has all the capabilities, resources and institutions they need to govern themselves is a form of political system envisioned Greeks especially in Athens with the number of people slightly , These communities live in the first half of the fifth century BC and society this is the first time the term democracy appears. Democracy (*democratia*) to the root *demos* means people and *cratia* which means governance or power, the overall sense is rule by the people (Roberth Dahl, 1989). Democratic forces in this society characterized, in favor of the people, protect the rights of individuals, and the leader is obliged to govern for the benefit of society as a whole. People naturally constitutes an important element and therefore leaders who truly qualify will govern for the people's interests. Although the practice of democracy nationalities still *exclusive* and not *inclusive* [Robert A. Dahl.2001]. Democracy has an important meaning for the people who use it, because the democratic right of people to determine their own course of state organizations is guaranteed. Therefore, almost all the understanding given to the term democracy has always given importance to the people in spite of the position operationally implications in different countries are not always the same. Just to show how people put on an important position in this democratic principles below will be quoted some sense of democracy.

Democracy as the basis of statehood gives the sense that at the level of the last people leave provisions in the basic problems concerning their lives, Including in assessing the wisdom of state, because it determines the life of the people's wisdom [Noer,1983]. Thus, democracy is a state organized by the will and the will of the people, or if the terms of organization, it means a state organization that is done by the people themselves or the principle of the people's approval for sovereignty in the hands of the people. Democracy can be defined as "rule by the people" or "people in power" the full meaning rule by the people. The critical question, whether indeed the people govern, who "the people" and what it means "the people rule". Democracy rests on the people's representatives of human rights, living together and of association, to proceed with their effective participation, and

tolerance for cultural differences or civilizational, religious, aesthetic, moral and intellectual.

Donations can be interpreted from God "trinity" of the philosophy of democracy, among others, as three distinct persons but God "trinity" is always wanted, to do the same, think the same, need each other, different can actually help each other and serve, need each other. Model God "trinity" is a model for democracy show how the unity and diversity are interconnected, exchanging diversity, full of solidarity, and always build a relationship of living together with the sincere. A correct understanding of God "trinity" is not going to get rid of the democratic process to defend liberty rests, justice, equality, and consent of the governed (the people). The relationship of God "trinity" that without a contract, but was able to build a relationship of complete union, giving hope for democracy to maintain the commitment to guarantee human rights, to give a certain liberty in work, work to enjoy the fruits of their own labor.

V. INHERITANCE FUNCTION OF DEMOCRACY IN "GOD TRINITY"

Language democracy has played an increasingly important role in all fields. function democracy has been in identification is an important factor for promotion and protection of human rights, keeping peace and stability between countries, and as individual rights. But it is unfortunate for the democratic functioning has been functionalized with one in the long history of democracy. Shapiro, confirmed that,

Democrats are committed to rule by the people. They insist that no aristocrat, monarchs, philosopher, bureaucrat, expert, or religious leader has the right, in virtue of such status, to force people to accept a particular conception of proper Reviews their common life. People should Decide for Themselves, via Appropriate procedures of collective decision, what collective Reviews their business should be [Ian Shapiro.1999].

Democracy committed to be governed by the people. Commitment does not exist nobles, kings, philosophers, bureaucrats, experts, or leaders religion has the right, in virtue The status, to force people to receive concept certain living together right. People should decide for themselves, through a joint decision. This opinion gives the view that democracy can serve as a driving force that involves respect for human dignity and liberating people develop ideas, also impose limits on the power of the state not to interfere with private life and public accountability. Backman, *et.al* explained, *Democracy rests on two fundamental principles: the principle of 'individual autonomy': that no-one should be subject, to rules that have been imposed by others; the principle of 'equality': that everyone should have the same opportunity to influence the decisions that affect people in society* [Backman, Elisabeth and traff ord, Bernard 2007]. The function of democracy in the study inidapat opinion interpreted as a system that puts power in the organization, equality, freedom and competitive in every option, it also involves the participation of all segments with an open democracy.

Democracy was principally concerned with the system of government, namely the representative government in a council. If dealing with a system that means the function of democracy is

not a name but a process. The function of democracy in the process of realizing further involve the role of government that could join hands with the people and they are the minority, including the right of individuals to choose their own representatives. But without realizing the existence of the democratic functioning of the government system to get used to the performance of the government is incompetent and inefficient show their power as representing the rights of the people. As a result, the function of democracy that should express the aspirations of the people can only appear as a contest.

The function of democracy is supposed to work with the rights of individuals (communities), minority rights, free and fair elections, human rights guarantees, as well as limiting constitutionally government. Claims that make democracy function can not come to the surface is the use of authority and arbitrary power of the government. Rests and learn from the teachings of God's trinitarian meaning it can be found that the authority and power of three distinct persons are not used to a particular personal interest. Although God "trinity" is different in person, but three persons were still one, remains open, and still embrace. Three persons who fought together to drain life for all mankind without viewing the background. Streamed for human life is a life that relationship intimacy between God "trinity" with humans. God "trinity" does not create distance and difference between God "trinity" and humans, but instead the relationship in the context of difference unites, even a journey of self-sacrifice to redeem and liberate mankind from sin.

Thus the legacy of God "trinity" of democracy-related functions are : (1) as the system controller for democracy who fight for freedom, common interests, accept differences and maintaining unity. (2) as a representation of God "trinity" the which does not use power to get rid of groups or individuals and not threaten human race, (3) as an environment that can realize the unity of relationships that do not cause tension, but give priority to unity, harmony, peace and agreement, and (4) establish the structure of interpersonal relationships are integral to the people, become a person who represents the people together and be there for each other, always in communion relationships with the people who is unrestricted and unhampered.

VI. INHERITANCE PROCEDURE DEMOCRACY IN GOD "TRINITY"

Is democracy something promising? A democracy may not guarantee anything. One of the many guarantees of democracy is the opportunity to earn success through the democratic process is very open, but the risks of failure always accompanies. But not independent life, deprived of justice in the name of democracy, the difference made criticism-criticism that is marginalizing and demeaning, rights of minorities are preserved in packaging majority presses, and finally democracy thrives but short-lived because it is difficult in practice. These figures show nothing wrong in democratic procedure, the practical implications of democracy are not designed in a proper procedural concept. Roberth & Christian explains.

Procedural democracy is a democracy in the which the people or citizens of the state have less influence than in traditional liberal Democracies. This type of democracy is

Characterized by voters Choosing to elect representatives in free elections [Roberth & Christian,2001].

Meanwhile, according to Hunting, *procedural definition of democracy: "A modern nation-state has a democratic political system to the extent that its most powerful decision makers are selected through fair, honest, periodic elections in which candidates freely Compete for votes and in the which virtually the entire adult population is eligible to vote "* [Huntington, 1997].

Both of the above opinion directs the democratic functioning of the procedure that the interests and decisions that come from the people (adult human). The decision was agreed in a fairness and honesty, and in honesty and fairness required open process. For Robert Dahl, basically procedural nature is a traditional approach to democracy, where about in every country be marked by several institutional political. Simply put, democracy in a procedural sense is simply how to choose government. Broadly speaking, interpretation procedural mostly composed from two process : participation and contestation. dispute cover competition peace which is definitely needed for democracy, principles think legitimacy of the opposition, rights to challenge *incumbent*, protection freedom expression and association, the existence of free and fair elections, and political parties and the consolidation system. Participation capture idea popular sovereignty, which presuppose protection right to choose and presence universal suffrage [Roberth A. Dahl,1998].

Observing the opinions of the above, it was explained that the democratic procedures give you the freedom to be autonomous, independent, exchange ideas and opinions that are open, have debates open space to find the truth of the preferred and common action in the public interest. In democratic procedures there are opportunities to justice, freedom expression; appreciate the variety of alternative sources information, autonomy associations, and inclusive citizenship, so as not to kill and disrupt humanist values. The majority of control in democratic procedure can be ensured more peaceful association, or even inseparable from the right to assemble, protest, and demand change. The government should in democratic procedures remain the maintenance of peace, by not using authority to protest or prevent the silencing dissidents groups to voice their opinions. Democratic procedures have concocted values greater democracy delivers government to uphold freedom, independence, confidence, rights and responsibilities are greater to the people.

Along with it from the standpoint of God "trinity" struggle for democratic procedures may materialize Latin word *communion*, communion is more of a turn of events; a process which a number of different individuals, with each giving a part in his life and to carry out joint life, precisely find unity in diversity [Gisbert Greshake,2003]. God "trinity" in the inheritance procedure more democratic transfer procedures in the value of mutual relations and solidarity, personalities from the inside since eternity without beginning bonded to one another, there are always together and never exist separately. Order persons of God "trinity" in the concept of the procedure does not distinguish, separate, specialized, individual uniqueness of each individual but each person procedure value harmony,not at odds with each other, feeling increasingly less when not dependent from one another, and prioritizing agreement on the concept of

difference. God procedures "triune" did not have significant autonomy against each other, being together, united in communion identity even though each one is unique and does not appear as a contradiction. Reality procedures more focused on building partner openness, equality, communicating and Relating to share in communal.

VII. CONCLUSION

The affirmation of democracy in God "trinity", which shatters the meaning of God "trinity" in, (1) democracy philosophically in relation to God "trinity" (2) the function of democracy in relation to God "trinity", and (3) procedures of democracy in relation to God "trinity" in essence is not a fabrication. The nature of God "triune" God the Father, the Son, and the Holy Spirit exist only in exchange of life between the Father, Son, and Holy Spirit. Each Personal Divine was entirely directed to and coming from the other in a reciprocal relationship of the most profound, in which every private while giving and receiving. (1) Democracy is philosophically in relation to God "trinity" (2) the function of democracy in relation to God "trinity", and (3) the democratic procedures in relation to God "trinity" supposedly can Realize the value of God "trinity" is not autonomy one against the other, but the whole of their identity comes only in one of the other, being together with others and directed to others. Concerned with the sovereignty of the people, government by consent of the governed, the minority rule, rights of minorities, respect for the rights of human freedom is responsible and honest, due process of law, pluralism, social, economic and political, nevertheless values of tolerance, pragmatism, cooperation and consensus.

Democracy that show how the unity and diversity are interconnected, how it should relate. The union was legal if it occurs in diversity, in there together, in recognition of the other, in exchange with and when required by him. In contrast it is willing to serve each other and become one in service. Representatives rests on the alliance should not be an individual, which as something enormous, cover and turn off the people who are bound in a community. Rests on reciprocity, respect the personal dimension, understanding the reality of the people, and

find a way that does not at odds between representatives of the people.

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Transformational Leadership Style Effects on the Job Satisfaction of Government Employees

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Abstract- This study aims to analyze and explain the effects of transformational leadership style on job satisfaction. Design / Methodology / Approach : Test models created and analyzed descriptively as well as Structural Equation Model. The method used is survey method with the participation of respondents were 341 local government employees. The results of research in tian indicate that there are effects of transformational leadership style on job satisfaction has a positive and significant, indicating that the transformational leadership style are enhanced quality will influence and improve employee satisfaction.

Index Terms- Transformational Leadership, Job Satisfaction, Local Government.

I. INTRODUCTION

Leadership is the most important competitive advantage of an organization (Gilley, McMillan & Gilley, 2009). Jones (2005) states that in case of dysfunctional leadership, the same as the dysfunctional organization. Al-Sawai (2013) said that the leadership initiatives related to refinement. Therefore, according to Roehl (2015), the current leadership has to be understood broadly as the leadership is now carried out through a system that is no longer on the leadership of a single individual. In addition, it is also able to adopt an approach that focuses on multi-role. The social, political and organization has also become very important in explaining the behavior of the leadership itself.

According to Chuang (2013), a number of organizations are facing an urgent need to develop leadership at all levels for the organization to operate in an environment increasingly dynamic and complex. Kotter (1995) complements that it is a challenge and the reason for including in the public sector organization to undergo a transformation. Rost (1991) said that, in this century we are in a competitive global environment and multicultural thus require a more rapid response to change in order to survive. People also often expect leaders to take responsibility for organizational transformation. Sekerka et al., (2009) argued that in order to confront these changes, the leadership must be aware of and prepare employees for a key component to the effectiveness of organizational change. Hillel (2006) and the Draft (2005) states that the change-oriented leadership style is characterized as transformational leadership style. Rex et al., (2012) defines transformational leadership as a leadership style that seeks to positively transform the followers and achieve the desired changes through strategy and organizational structure.

According Veiseh et al., (2014), as a new paradigm, transformational leadership had a remarkable influence on the

development of the organization's culture. Saskhin and Saskhin (2003) also stated that transformational leadership is a new paradigm that combines what is good from the old paradigm. Embry et al., (2008) see this time there is a shift of research and application of leadership theory, that of leadership transactional to transformational leadership, because of the many results of the research showed that transformational leadership is more effective than transactional leadership.

The model of transformational leadership is an expansion of transactional leadership conducted by Bass (1985) and has been further refined by Bass and Avolio (1994). Transactional and transformational leadership model originally developed by James MacGregor Burns (1978), and transformational leadership were first distinguished from transactional leadership is by Downton (1973). Both models of leadership is different but it is not a process that is equally exclusive.

According to the authors, none of the right type of leadership to the management of an organization, but transformational leadership itself is the latest model, popular and practiced. According to Van der Voet (2013), the use of transformational leadership style than in the private sector, has also been tried even has penetrated into the nonprofit sector, such as the government sector. Metcalfe and Metcalfe (2006) confirm that the frequency of the theory of transformational leadership is used in research in the public sector was also caused by the many weaknesses that are on the three bow great leadership theory and the theory of transactional leadership before, so that these theories have been regarded as a paradigm obsolete (old paradigm) in research in the public sector. According to Tucci (2008), some important characteristics of leadership in the public sector, one of them is doing a shift from transactions to transform in order to avoid a narrow focus and only transaction-oriented individual.

This indicates that the transformation of leadership in the public sector is an important factor in order to form a better government (Schacter, 2000; Van der Voet, 2013), including changes in the orientation of human resource management in the ranks of public bureaucracy to realize the ideals of good governance (Sutiono & Sulistiyani, 2011). The author argues, public services become one of the important issues in the reform of public administration in various countries, as well as to the context of contemporary Indonesia.

According Tjiptono (2007), to adapt to globalization, the Indonesian government should improve the structure of the bureaucracy, improving the quality of government employees, and develop a modern and efficient system. The development of human resources will improve the quality of services provided to citizens. Currently, the main task is significant in Indonesia as a

country that is facing a variety of new developments such as democratization and decentralization. The study results Basri and Nabihah (2014), said there were concerns about government organizations, especially local government, namely the lack of accountability, one care of her resources, inefficiency and ineffectiveness of institutions. Muhlis (2014) states that one of the problems faced by local governments in Indonesia are ineffective leadership and poor employee performance in producing outputs or targeted results.

In connection with these problems, then in addition to the issue of leadership, as well their insistence to evaluate human resource management and performance of public sector personnel (Sutiono & Sulistiyani, 2011). Individual performance is strongly influenced by the knowledge, abilities, skills, and expectations (Widodo, 2005). Associated with the hope one of them is a matter of job satisfaction. Spector (1997) states that an important reason why job satisfaction should be given greater attention is because this variable to some extent a reflection of the attention was good, where people deserve to be treated fairly and respected.

Therefore, this study linking factor transformational leadership and job satisfaction. This study is based on the addition to the issue of public sector officials, also a number of previous studies, ie for example by Jaussi and Dionne (2004), said that leaders play an important role towards employee satisfaction; Judge and Locke (1993), said that the leadership style is one of the determinants of job satisfaction; then Seltzer and Bass (1990) also showed a significant relationship between transformational leadership and effectiveness of job satisfaction of subordinates.

Based on the importance of employee satisfaction in relation to the transformational leadership style, the study aims to determine empirically the relationship or influence on the perception of transformational leadership style on job satisfaction of employees. The problem is whether transformational leadership style can give a positive effect to the job satisfaction of personnel in public sector organizations? It will be proved by testing the hypothesis about the presence or absence of a positive and significant influence on the effect of transformational leadership style on job satisfaction of local government officials. In this regard, local government organizations have Maros, South Sulawesi Province, Republic of Indonesia, to be subjected to research.

II. RESEARCH METHODOLOGY

1. Design Research

This study examines the type descriptive causal relationships between variables that focuses on the study of transformational leadership style and job satisfaction, which is directed to describe the characteristics of the proposed variables related to the phenomenon that occurs in fact based on the perceptions of employees through a survey method.

2. Population and Sample

The study population was a civil servant in the scope of the Regional Government of Maros, South Sulawesi province. Simple sampling using Proportional Random Sampling method.

The number of respondents who participated were as many as 341 people.

3. Engineering and Design Data Collection Data Analysis

Search data is collected through technical documentation, observations, questionnaires and interviews. Quantitative data were analyzed by descriptive (describing the results of respondents' assessment of the appropriate variables are considered), and analysis of Structural Equation Modeling (SEM) that integrates multiple analysis formulation approach, namely: factor analysis, the model structure and path analysis.

III. RESULTS

1. Testing research instruments and the characteristics of the respondent.

Through testing research instruments, showed that the two variables, transformational leadership and job satisfaction are valid (have the corrected item values greater than 0.50), and reliable (Cronbach Alpha uses the standard 0.60). Characteristics of respondents consisted of several categories among other age categories shows that respondents aged over 31 years, and the participation of women is greater than men to fill out a questionnaire research and quadruple mass employment in over 10 years and held the position of structural began lowest to highest.

2. Analysis of Research Variables Description

Transformational Leadership : the results of the frequency response of respondents regarding the perception of charisma attributes indicators show leadership have good managerial abilities; inspirational motivation assess the leadership has been instrumental in grow and develop innovation and creativity of employees; intellectual stimulation showed leadership always provide ideas, innovative ideas and suggestions; individualized consideration, assess the leadership can be a good adviser; and idealized influence show leadership always stressed the importance of commitment to the organization.

Job Satisfaction : the indicators of correspondence between the work and personality, shows that the profession as an employee in accordance with the personality of the respondents; perceptions of respondents about the incentive indicators assessing pension / retirement as a civil servant has been according to expectations; monitoring indicators showed leadership has directed his attention in anticipation of not fulfilling the employee; perceptions of respondents on indicators colleagues considered that a co-worker in the organization of mutual support in every activity.

3. Factor Analysis

Computational results indicate that the goodness of fit criteria put forward as a condition fit a model has been fulfilled and declared fit / good for both variables. Means, the proposed model is a model of end of transformational leadership and job satisfaction so that the model used in further analysis, namely, first comparing the cut-off value of the result estimation model, and the results have been eligible goodness of fit, so it can be assumed that the model confirmatory factor analysis variables of transformational leadership and job satisfaction is expressed

well. Second, these results are evaluated to determine which variables Observe used together can describe each variable.

The results indicate that all the variables that make up Observe variables of transformational leadership and job satisfaction all otherwise valid with an adequate level of internal consistency. Then the confirmatory test results showed that transformational leadership as an indicator of intellectual stimulation Observe the dominant variable, while on job

satisfaction shows that the indicator Observe incentives as the dominant variable.

The model that has been qualified goodness of fit further evaluated to determine whether the variable Observe used together can describe the variables of transformational leadership and job satisfaction. Let us look at the following table.

Table 1. Evaluation of Loading Factor (λ)

Constructs	Indicator	Loading Factor (λ)	Reliability Construct
Transformational leadership	<i>Atributed charisma</i>	0.683	0.975
	<i>Inspirational motivation</i>	0.806	
	<i>Intellectual stimulation</i>	0.813	
	<i>Individualized consideration</i>	0.784	
	<i>Idealized influence</i>	0.619	
Job satisfaction	Conformity Between Work and Personality	0.751	0.976
	Incentive	0.789	
	Supervision	0.745	
	Co-workers	0.761	

Source: Sports Results Data (2015)

Are shown in Table 1, the value of the loading factor was ≥ 0.40 , means the better to describe the variables of transformational leadership and job satisfaction.

4. Full Analysis Model

For the determination of value in the model, then the model testing variables grouped into exogenous variables (transformational leadership/X) and endogenous variables (job satisfaction / Y). Exogenous variables is a variable whose value is determined outside the model, while the endogenous variable is a variable whose value is determined by an equation or model-established relationships. Structural model is said to be good if in the development of hypothetical model theoretically supported by empirical data.

After the evaluation criteria against which the suitability index models and the model was said to be fit, will next be seen how far the causal relationship developed in the hypothesis on the model, which was tested by t test (critical ratio). Table 2 shows the values of the regression coefficient (regression wight estimate) and the critical ratio (t). The hypothesis will be accepted if the critical ratio (t) is greater than 1.960 or p value ≤ 0.05 .

Structural Equation Modeling analysis model proposed in this study include a direct influence paths between the latent variables (exogenous) and latent variables (endogenous). The estimation results of the model can be seen in the picture below.

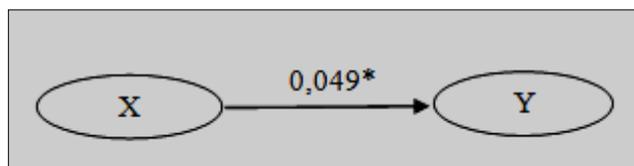


Figure 1. Results of the research model estimation

Note: * = significance at the level of < 0.05

Based on Figure 1, then analyzed the functional relationship between exogenous and endogenous variables, and

computational results obtained coefficient values are compiled in Table 2.

Table 2. Variable Significance Testing

Independent variables	Dependent variables	Direct Effect			
		Standardized	Critical Ratio	P-Value	Information
Transformational leadership	Job satisfaction	0.296	1.966	0.049	hypothesis Accepted

Source: *Sports Results Data (2015)*

Based on analysis of the influence between variables in Table 2, it was explained that transformational leadership variable significant effect on job satisfaction of local government employees. This is interpreted as the impact of the transformational leadership also affects employee satisfaction.

IV. DISCUSSION

Based on the analysis of data, all indicators of the variables of transformational leadership and job satisfaction declared valid and reliable from whole grains statements or the factor analysis. The coefficient of transformational leadership variable effect on job satisfaction shows there is a positive and significant impact. Transformational leadership that improved quality will influence and improve employee satisfaction.

Testing instrument research on transformational leadership variable in charisma attributes indicators show that the "leadership is a fun person" has a high validity rate compared with the statement "the leadership has excellent managerial ability" and "leadership is able to be fair". This implies that the leader's personality becomes an important aspect as the manifestation of leadership charisma. Variable transformational leadership on indicators of inspirational motivation indicates that the statement "the leadership is able to raise the morale" has a level of high validity compared with the statement "leaders foster innovation and creativity of employees" and "leadership capable of increasing enthusiasm", it implies that employee morale tends to be determined by the ability of its leaders.

Description of transformational leadership variable revealed that the indicators charisma attributes rated well by the respondents, it is shown by the attitude of the respondents who agree if the leader has a fun person; leadership have excellent managerial ability; as well as leaders have a fair attitude. Indicators inspirational motivation rated well by the respondents, it is shown by the attitude of the respondents who agree if leaders foster innovation and creativity of employees; leadership capable of stimulating employment; as well as leaders able to raise the enthusiasm of government staff.

Intellectual stimulation becomes an important indicator of a role in shaping the construct of transformational leadership. Means, transformational leadership qualities on the organization of local government is determined by the attitude of the leadership can deliver a good idea, leadership can provide innovative input, and leaders have high creativity. This result confirms that the importance of ideas, innovative and creative attitude possessed by any leader at all levels of structural.

Statistical value of the coefficient of transformational leadership showed positive and significant impact on job satisfaction. Studies conducted in the public sector and Hussin Omar (2013), Atmojo (2012) and Bushra et al., (2011) reinforce the results of this study that the transformational leadership determine the level of job satisfaction. Riaz and Haider (2010); Long et al (2104); and Voon et al., (2011), each employee satisfaction research results explain the impact of transformational leadership style.

V. THEORY AND PRACTICE IMPLICATIONS

The results of this research complements studies theories that reveal the relationship between transformational leadership and job satisfaction. This study proves that the hypothesis is accepted through testing between these variables, shows the importance of the type of transformational leadership in the organization of local government as an effort to increase job satisfaction. To that end, it is necessary to make sure that the individual judgment of the leaders to get support from employees in order to improve performance and efficiency.

VI. CONCLUSION

Transformational leadership showed positive and significant impact on job satisfaction. Testing instrument research on transformational leadership variable implies that the personality of leaders is an important aspect as the manifestation of leadership charisma.

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District Government Accountability Model Raja AMPAT in the Field of Health Service in Perspective Special Autonomy

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Abstract- The implementation of special autonomy for Papua Province since 2001 until the year 2014 has been entered into 13. The implementation of special autonomy in Papua have bring a lot of change and progress for indigenous Papuans in various development sectors such as health. However, the implementation of special autonomy in Papua still reap a lot of criticism, one of which is indigenous Papuan community dissatisfaction against the implementation of various development programs and activities funded by the local government of the special autonomy funds, such as missing the target and uneven in its implementation. Therefore, accountability is required to provide an explanation for what has been done by the bureaucracy. This study aims to find a model of accountability of local governments Raja Ampat district in the health care field in the era of special autonomy. The approach used is a qualitative approach to the type of research is descriptive. The focus of this study describe the model and find the model of local government accountability in the health care field in Raja Ampat. This study uses interview, observation and documentation. Data were analyzed through qualitative data analysis includes the structuring of data, data reduction, data presentation, and conclusions or verification. These results indicate that the model of accountability of local governments in the field of health services in the district of Raja Ampat in the era of special autonomy, still adhered to a closed system. This means that the accountability model is used for this follow bureaucratic rules exist which is rigid, hierarchical and closed.

Index Terms- accountability, autonomy, health services, bureaucracy

I. INTRODUCTION

The existence of local authorities with the concept of autonomy is basically one embodiment to streamline government services in the context of geographic and demographic broad and big as the state of Indonesia. By giving some authority in the central government to local governments or the so-called decentralization, the hope is that government services to its citizens increasingly on hold and further improving the quality and access to services can be improved continuously in line with the intensification of interaction between citizens and government (Soerjodibrotto, 2011).

Departing from the basic principle of the enactment of Law No. 32 of 2004, then in Papua since 2001, enacted Law on

Special Autonomy for Papua, namely Law No. 21 of 2001 on Special Autonomy for Papua. Enforcement of special autonomy for Papua Province since 2001 until the year 2014 was entered in the 13. In the process, the implementation of special autonomy in Papua have bring a lot of change and progress for indigenous Papuans in various sectors of development. As an illustration that during the year 2010-2012, the government has special autonomy funds significantly to the budget of Papua and West Papua.

Raja Ampat Regency Government, during the period 2006-2013 allocated a budget of 366.450.377.337 IDR, to finance the development of the health sector. The fund is intended for the construction and development of health centers into inpatient health centers (pustu) and some into a clinic. The available funds are also used to build additional and village polyclinics (polindes) in some villages, as well as the procurement of medical equipment both in the clinic, health centers (pustu), and village polyclinics (polindes). The budget allocation is also indicated for the procurement of medicines, public nutrition improvement, procurement of furniture health centers, and the development of health infrastructure more (LKPI Regent of Raja Ampat, 2013).

Health development should be seen as an investment to improve the quality of human resources, among others measured by the Human Development Index (HDI). In the measurement of HDI, health is one of the major components in addition to education and income. Health is also an investment to support economic development as well as having an important role in poverty alleviation efforts.

When further analyzed the problems as mentioned above, it can be said that issues like this happens due to lack of good planning and management of the program, in particular the management system of programs and activities in the health sector, both at the level of provincial and district governments. According Yoteni (2015) that some of the symptoms inherent in the life of society in Papua lately that might be a factor inhibiting the implementation of special autonomy as a whole including the behavior of government officials (in Papua), the behavior of politicians and public behavior. According Widodo (2001) the government brought closer to the governed (the people) will be able to identify what the needs, problems, desires and interests and aspirations of the people is good and true, hence the policy created will be able to reflect what the interests and aspirations of the people it serves.

Therefore, one solution to address these issues is to restore the system of local governance. One of them by applying the principles of local governance is good (good local governance).

Good governance (good governance) is one of the latest paradigm in the science of public administration today. So that in its implementation should be acceptable politically, legally effective and administratively efficient (Baderi, 2009). Four main elements or principles that can give a picture of public administration, characterized by good governance are accountability, transparency, openness, and the rule of law (Sedarmayanti, 2004).

According Pohan (2000) that good governance (good governance) are not limited to how the government exercised its powers properly, but more important is how the community can participate and controlling the government the authority to run properly. Therefore, good governance is often seen as a building with three poles. Third's pole is transparency, accountability and participation. In connection with the third important element in the implementation of good governance as mentioned above, in this study are the focus of research is on the element of accountability. This was confirmed by (Tjokroamidjojo, 2000 in Rachmat, 2006) that in order to create a system of governance that is characterized by good governance, the government is expected to apply the principles of accountability, in addition to transparency, participation and the rule of law. Accountability is the capacity of public authorities to account for the success or failure in carrying out its mission in order to achieve the objectives and targets periodically. This means that every government agency has an obligation to account for the achievement of the organization in the management of the resources entrusted to him, from the planning stage to implementation and monitoring and evaluation (Pohan, 2000). Accountability is a measure that indicates whether the activity of the public bureaucracy or services carried out by the government is in conformity with the norms and values espoused by the people and whether public services are able to accommodate the needs of real people. Thus the accountability associated with the philosophy that the executive should be responsible directly or indirectly to the public.

Governmental organization created by the public and for the public interest. Therefore it is necessary to account for the actions and policies to the public and state administration in the study referred to accountability. Therefore, accountability is required to provide an explanation for what has been done by the bureaucracy. Tjokroamidjojo (2000) states that accountability is the obligation of individuals or government officials entrusted with managing public resources is concerned with it to be able to answer a wide range of matters relating to accountability. Further, he said that accountability is a term applied to measure whether public funds have been used appropriately for the purpose in which public funds were set.

Bureaucratic accountability mechanisms are often used as a mechanism to manage the public agency. Function mechanism bureaucratic accountability involves two things, (a) the relationship of formal and organized between superior and subordinate to the need to follow the provisions that can not be denied or questioned, (b) the supervision of a closed or standard systems or clarity in the regulations that have been set (Widodo, 2001). Furthermore it is said that the policy of public accountability of officials government officials in Indonesia are regulated in Presidential Instruction No. 7 of 1999. Where in the implementation of the accountability of the government agency,

there are several underlying principles, namely (a) there must be a commitment from the leadership and the entire staff of government agencies concerned, (b) must be a system that can guarantee the use of resources consistent with the legislation in force, (c) must be able to demonstrate the level of achievement of goals and targets, (d) should be oriented towards achieving the mission and measure the results ,

The policy of decentralization and regional autonomy will not achieve optimal results if the accountability process is not working as it should. Mawhood (1987) in Manggaukang (2006) stated that the main purpose of the decentralization policy is an attempt to achieve political equality, local accountability and local responsibility. Relation to the implementation of the special autonomy, accountability is also part of the local community instrument for the sovereign, as the lofty ideals of the special autonomy that Papuans should be healthy, educated, prosperous and dignified. One of the obligations of local government in accordance to Law No. 32 of 2004 about local government is an obligation to do the planning, control, dissemination and implementation of development programs to all interested parties. Under article 27, paragraph 2 of Law No. 32 of 2004 on local government, local governments have an obligation to submit a report on Regional Government (LPPD) to the government, Report Description Accountability (accountability report) to the Parliament, and provide information reports local governance to the people.

According Dwiyanto (2008) that the government is usually willing to embody the values of good governance as far as their interests do not interfere. The government is willing to be open and participatory if by being open to engaging stakeholders during the process of policy formulation and implementation, did not reduce their chances of doing corruption. This has been one of the causes is exemplary and abstinence in governance in a region simultaneously.

According Thoha (1997) that to find a good government, is dependent upon some of the following: (a) actors from the government in this regard is largely determined by the quality of the resource officers, (b) institutions that are used by the actors of governance to actualize its performance, (c) the balance of power that reflects the extent to which the system of government that should be applied, (d) leadership in public morals bureaucracy, resourceful, democratic and responsive. From some of the statements and issues raised above, it is empirically there is a link between the accountability of local government bureaucracy with the quality of health services in the district of Raja Ampat. Especially from the planning to the implementation stage in public health programs.

II. RESEARCH METHODS

This study used a qualitative approach (qualitative methods). While looking for answers about the accountability of local governments in the field of health care, and the factors supporting and accountability of local government in the health care field in Raja Ampat, then this type of research is descriptive. Associated with the formulation of the problem and research objectives to be answered in this research, the focus of this research is: To describe the model and find the model of local government accountability in the health care field in Raja Ampat,

especially in the era of special autonomy in Papua. The research location in Raja Ampat, West Papua province. Types of data collected in this study are primary data and secondary data. The primary data sourced from informants and direct observation. While secondary data from various documents and legislation relevant to this study. Data collection techniques used in this research is the direct observation, interviews and documentation. Qualitative data analysis techniques used include: structuring of data, data reduction, data presentation and conclusions or verification.

III. RESULTS

The Government Accountability Model Raja Ampat Regency in the Field of Health Care in the Era of Special Autonomy

Observing the form of local government accountability in health services in the district of Raja Ampat, Papua special autonomy era concluded that the accountability model used is closer to the old pattern of public administration (old public administration). It is seen from the pattern of implementation or wellness programs, ranging from planning and implementation activities of the health service still embrace accountability formal, hierarchical and legal. Where found that the administrators or employees working in accordance with the laws, regulations and standards prescribed for them, by the hierarchical leaders and elected officials. Based on the research that in Raja Ampat, since the implementation of special autonomy in Papua in recent years, every year local government budget or a city located in the province of Papua and West Papua to get a budget allocation of special autonomy which amount is determined by land area, population and other criteria. Sharing mechanism budget amounts for each sector of development in every district of the city, returned to the head of their respective regions. In Raja Ampat, the mechanism for the allocation of budgets to finance various development programs and activities, including the health sector, starting from planning and proposing of program priorities of each SKPD including the Department of Health and Hospital Raja Ampat to the Regional Development

Planning Board (Bappeda) Raja Ampat, through consultation and local development plans.

Deliberation in the local development planning, will be viewed and discussed the activities that will be a high priority of the proposed activities of the Regional Work Units (SKPD), for input into the priority activities next year. After the approval of the regional planning agency (Bappeda) and the executive budget team, then the activities that qualify (version executives) will be submitted to the Regional Representatives Council (DPRD) of Raja Ampat, in the form of Public Policy Budgets (KUA), Priorities and Budget Ceiling while (PPAS) to be studied and discussed together between the legislative and the executive. Activities that qualify in this discussion will be set by the Raja Ampat district legislature in the form of local regulations. Once set, then all the activities that qualify are returned to their respective work units, including the Department of Health and Hospital Raja Ampat to be implemented. In the implementation of health care, work units technical, namely the Department of Health and hospitals are expected to be responsible for a variety of programs and activities undertaken, whether the responsibility for programs and activities undertaken, professional, obedient to the applicable rules and can be supervised, both from the immediate supervisor but also from the legislature (DPRD). In this research, there are several factors supporting and Government Accountability Raja Ampat Regency in Health Care in the era of Special Autonomy. Some of the contributing factors in question is the Law Papua Special Autonomy (Act 21 of 2001), the grant of allowances Performance Area (TKD) for all employees in the district of Raja Ampat, and institutional structures of health are adequate to support health services in the district of Raja Ampat. While the factors inhibiting the Government Accountability Raja Ampat Regency in Health Care in the era of Special Autonomy is health human resources are still lacking, in terms of both quality and quantity, geographical conditions, budgets, and culture. Based on the above, the following empirical model can be visualized Government Accountability Raja Ampat Regency in Health Care in the era of special autonomy, as Figure-1 below :

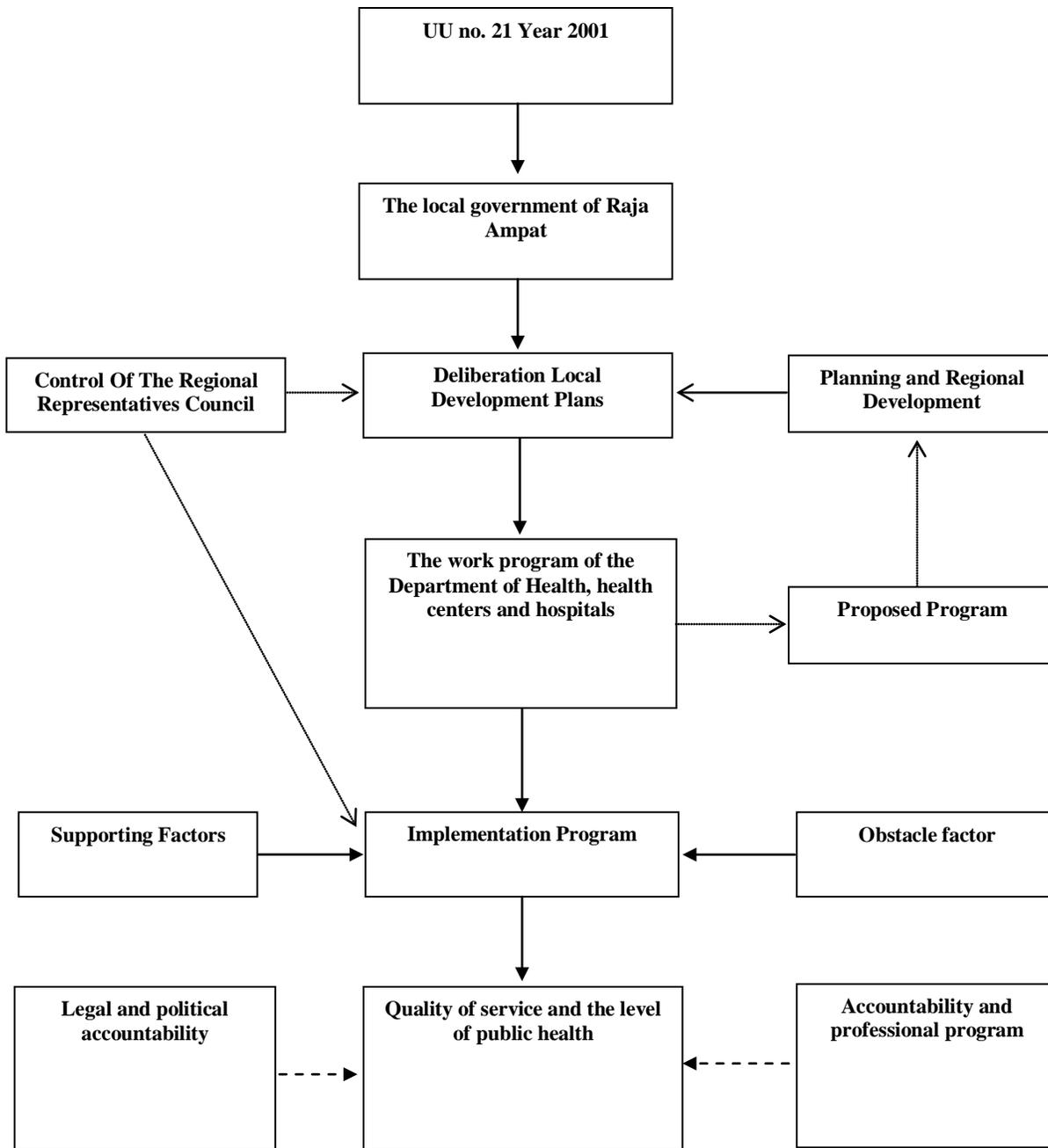


Figure 1. Empirical Model District Government Accountability Raja Ampat in the Field of Health Care in the Era of Special Autonomy

IV. DISCUSSION

The Government Accountability Model Raja Ampat Regency in the Field of Health Care in the Era of Special Autonomy.

Based on the results of the study on the implementation of the Government Accountability Raja Ampat Regency in the Field of Health Care in the era of Special Autonomy in Papua, it is known that the mechanisms of accountability of local governments as measured from program accountability,

professional accountability, legal accountability and political accountability is built hierarchically and emphasizes the responsibility of hierarchically from parts of the executive to the head on it. The results of the study on the accountability of local government of Raja Ampat in the era of special autonomy as measured from program accountability, professional accountability, legal accountability and political accountability adopted from accountability model Romzeck and Ducnick (1987), revealed that between planning and implementation of programs are not appropriate, many program which is based on

desire, not based on need. Therefore, the programs and activities conducted so far have not answered the health problems in the district of Raja Ampat.

Then for professional accountability, it is known that the apparatus implementing the public health services in the district of Raja Ampat, yet meet the standards of quantity and quality. Then the supporting facilities and infrastructure services is still minimal. For legal and political accountability found that the legal instruments that guarantee the health of existing organizational structures, but the legal instruments or Standard Operating Procedure (SOP) is a guideline or a reference work for officials was minimal even yet exist. Then linked to the monitoring conducted by the legislature to the executive, it is known that the legislature only to supervise or control at the time of preparation and discussion of programs and during the implementation of the program, but did not carry out supervision or control over the implementation of health care.

According Romzek and Dubnick (1987) that strategies to manage the expectations, the accountability of public administration take various forms. The focus here is on four alternative systems of public accountability is the accountability of the bureaucracy, political accountability, professional accountability and legal accountability. Further, he said that each based on the difference that involves two important factors: (1) whether the ability to set and control the expectations held by some specific entities within or outside the institution; and (2) the level of control given entity in setting expectations of the institution.

Then associated with supporting factors and factors inhibiting the implementation of the accountability of local governments Raja Ampat district in the health care field, it was found that the antecedents consists of the special autonomy law, their performance allowance and institutional structures. While inhibiting factor consists of human resources, budget, geography, and culture.

Factors supporting health services in Raja Ampat during these include special autonomy legislation gives full authority to command the area set and take care of his own government, including in the field of health care according to the condition of the area. Then the performance of their allowances for officials who served in the administration of Raja Ampat, encourages morale for employees, which is supported by a good organizational structure.

Then inhibiting factor accountability of local governments Raja Ampat district in the health care field has been comprised of health human resources became one of the causes, of which the quality and quantity that there has not been adequate. Then the geographical location of Raja Ampat islands and as composed of the oceans as a barrier to health care to the community. Then the operating budget clinic or health centers (pustu) that cause infrequent visits to every village officials in its service area, and also influence people's culture that still believe in mystical things that cause health care to be blocked. Based on the analysis of all indicators in the implementation of the accountability of local governments in the field of health care, it can be visualized on the model or an alternative model of local government accountability Raja Ampat district in the health service in the era of special autonomy, as in figure 2 below.

The study findings were compiled in this study is an analysis of the findings from field research and literature review, especially those related to health care accountability model in Raja Ampat. In this study, the model described is the sum of the actual reality (empirical model), which was later modified into the form on the model, which tries to portray an ideal form of government accountability Raja Ampat regency in the field of health care in the era of special autonomy.

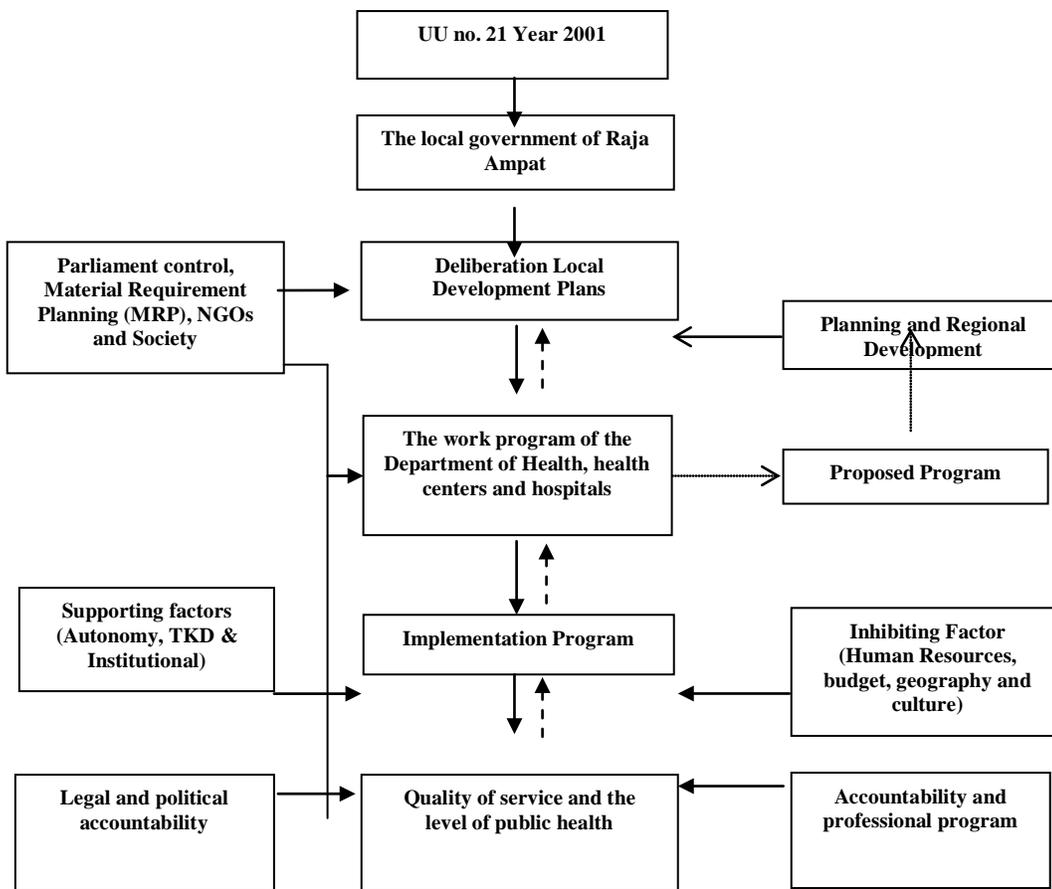


Figure-2. Accountability Recommendation Model Raja Ampat Regency Government in the Field of Health Care On Special Autonomy Era.

The results showed that the model of accountability of local governments in the field of health services in the district of Raja Ampat in the era of special autonomy, still adhered to a closed system. This means that the accountability model is used for this follow bureaucratic rules exist which is rigid, hierarchical and closed. This condition causes little chance of access for stakeholders to be involved in the development process in the health care field. This condition occurs when the planning and implementation of health development programs. From experience so far that the entrances to the parties that there is, however narrow closed even under certain conditions. Based on the research findings as described above, the authors put forward the proposition of research findings as follows: Proposition Findings : If the local government of Raja Ampat want to realize regional government accountability in health care both in the era of special autonomy, then the model of accountability of local government in the health care field should be open, so that access for stakeholders to be open and joined together with government in the process of planning and implementation of health development program.

V. CONCLUSION

Based on the results of research and discussion, the authors can conclude that the accountability model Raja Ampat regency government in the health care field in the special autonomy based on the survey results revealed that still adheres to a closed system. This means that the accountability model is used for this follow bureaucratic rules exist which is rigid, hierarchical and closed. This condition causes little chance of access for stakeholders to be involved in the development process in the health care field.

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Study on Economic Actors Work Ethos Salafi in Ambon (An Anthropological Study)

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Abstract- This study aimed to describe the work ethic Salafi economic actors in the city of Ambon in particular in Batumerah. That since the outbreak of horizontal conflicts in Ambon city, many traders exodus and the city of Ambon. The opportunity was utilized by some members of the Salafis to plunge into the business world. Until now, this group is quite successful in the field of entrepreneurship. In contrast to other entrepreneurs, they are very disciplined to keep praying in congregation five times, in addition to actively follow the teachings of religion every night. This study intends to reveal their work ethic is there a relationship with an understanding of his religion. This study used a qualitative approach. The data collection is done by observation, depth interview with the economic actors Salafi whether related to their motivation in entrepreneurship, entrepreneurial characteristics they nor their ethics in business. The conclusion is that they are motivated by the principle of work as worship to Allah SWT. As of worship, in the behavior of the economy, they are maintaining the ethics and norms set forth in the Qur'an and Sunnah Rasul SAW, so no offense, either against God's rights and human rights.

Index Terms- work ethic, Salafi economic, city of Ambon

I. INTRODUCTION

Before the horizontal conflict in 1999, the entrepreneurial world in Ambon city at a time of year besides controlled by the Chinese people, as well as Bugis-Makassar, Buton and Padang. The Chinese dominate trade in groceries, building materials, electronics, services and so on. Meanwhile traders who come and Bugis-Makassar tribe dominate the trade in garments. Special traders Buton, besides engaged in the sale of clothing, they also controlled the sale of glassware, fish and vegetables. While the people of Padang engaged in trading business of shoes and sandals. When horizontal conflict in Ambon in 1999, an exodus of Ambon city dwellers on a large scale, including traders, both from the ethnic Chinese, Bugis-Makassar, Buton and Padang. For several years, since the conflict until the end of 2002, economic activity centered-commerce and shopping centers, both in the Old Market, Batumerah Market and Mardika Market Ambon Plaza paralysis. In fact, shopping in the surrounding streets and AY Patty Ambon Plaza not only looted but also burnt. Absolutely economy in Ambon city in total paralysis. The merchants were housed in that area, the exodus to escape to other areas. At the end of 2002-2003, then the merchants of the three regions it gradually began to return to the

city of Ambon, and since then the shopping centers in the city of Ambon start enlivened again with the trading activity.

After the conflict handled well by the government, particularly the security forces on the ground, then gradually recovered stability. Because it gradually traders who have been the exodus to Ambon and started its activities back to normal. This current economic conditions in the city has been completely restored to normal.

Among economic agents currently exist in the area and make a significant contribution to the community and the local government of the Salafi entrepreneurs Ambon City. In general, they include new players in the world of entrepreneurship in the city of Ambon, but their success is quite prominent. They are tenacious, disciplined and be a hard worker. They are not only resilient in entrepreneurship, but also increase their knowledge through diligent study of religion in Abu Bakar mosque every evening, after Maghrib prayers. They are also very disciplined to keep the five daily prayers in congregation. Such a thing is not seen in the behavior of other entrepreneurs, particularly in the city of Ambon. Three characteristics inherent in the employers Salafi that's what the author is a uniqueness that need to be addressed in this paper. In addition to the three characters, they are also known by the Muslim community of Ambon as an exclusive group. They consider only the opinions and practice they are correct, while those outside the Salafi regarded as heretics. In their doctrine, heretics should not be accompanied by a discussion on the subject of religion, should not be accompanied by associating, let alone be a prayer leader. As a result, except in matters of business, in everyday life, they keep a distance with different public opinion of their understanding.

Starting from the phenomenon, the author thought of the theory of "The Protestant Ethic and the Spirit of Capitalism written by Weber (2006)". According to Weber, Calvin's doctrine of predestination and human destiny in the hereafter, is a key factor in determining the attitudes of its adherents. According to this doctrine, fate had determined where safety has been given by God to the people who elected. In such a situation, man is in perpetual uncertainty, whether he is elected or not. Nevertheless, man is obliged to believe that he was among those chosen for salvation. To generate confidence in obtaining salvation, man must work hard, because the only mechanism by which humans can eliminate doubt and certainty will gain salvation (Weber, 2006:). So, in this theory, illustrated that the Protestants in Germany at that time compelled to work hard precisely because it was inspired by the teachings of destiny in the formulation of ijthad Calvin. The essence of the teachings of Calvin as mentioned above that if you want to survive then every Christian must work hard, because by working hard, they will succeed, and

every successful person in the world then it is a sign that he is safe in the afterlife.

In the Qur'an, Islam asked people to create a balance of life in the world and the hereafter. Even Islam makes the world as a bridge to the afterlife. This means that Islam does not only require his time working to enrich themselves in the world solely, then ignore the interests of their afterlife life. Or conversely, humans did not allowed to work just for the sake of sheer worship, then ignores its obligations towards the rights of his wife, children and so forth. It turned out that the behavior of economic actors Salafi, they have the ability in entrepreneurship well, worship maintained a disciplined and extremely diligent study religion in improving the understanding of his religion. In connection with the phenomenon, whether Salafi high entrepreneurial spirit was due to factors understanding of their religion or because of environmental factors, or because of their local culture of each course this requires in-depth assessment.

Based on the phenomenon, the study is intended to find the relationship between the understanding of religion with the work ethic through the formulation of the problem as follows: As the subject matter is "Why People Salafis in Ambon city (especially the Red Stone) it has a good work ethic (success) , were they exclusive? 2. How does an understanding of their religious teachings in the field of entrepreneurship? 3. How to practice their religious understanding, in the field of entrepreneurship?.

II. RESEARCH METHODS

That the focus of research is related to the phenomenon of Salafi Work Ethics, which includes values and norms of any underlying and shape the interpretation of the values and norms in economic behavior. For this purpose, the fundamental thing that needs to be expressed is their religious understanding and application of the religious understanding of the dater, their economic behavior. For the method used is qualitative. In analyzing the problem, besides the author uses anthropological approach to the economy, as well as the psychological approach to reveal any motivation that drives them to such economic activities.

The choice of location for this research Batumerah village, Ambon, with consideration by the Executive Agency of Statistics of Ambon that this village has the largest population in the villages around the city of Ambon, which is 64 thousand inhabitants. On the other hand, he is the only village in the city of Ambon, which has a population of predominantly Muslim. In this village there are a majority of Salafi groups live. In fact, in this village there is a center of education and Salafi propaganda, and this is where proselytizing activities Carried out by religious social Salafi groups coordinate. Generally, the location of economic actors Salafi activity was located in this village. Even in the village of Batumerah is contained residential centers, education and preaching Salafi.

In this study used qualitative research methods, whereas for data collection, use interviews, observation and documentation. In conducting the data analysis done since before the author conducted data collection in the field (when the formulation of the problem), for data collection in the field and after the completion of data collection in the field (after the field data collected).

That the emphasis of the study is directed to the understanding that the values and norms that profess Salafi groups conditioned the work ethic and businessmen in addition to Salafi groups based on experience, they were also encouraged by the understanding of religious teachings espoused. Applications understanding of religious teachings in doing business ventures is of course only be seen on the phenomena of their daily activities continuously. Thus, this research will be conducted with a qualitative approach.

III. RESULTS AND DISCUSSION

Work Ethos Salafi

Ethics Salafi Islam in Economic Behavior

In the conception of Islam, economic activity is an integral part of religious teachings. The formation of the economic ethos in Islam is a religious moral values synergy with the rationality of the calculation of profit and loss (according to Islamic approach), so there is a balance between the two basic elements. The Qur'an gives the instrument to the economic actors: "O those who believe, if you were called for prayers on Friday, then made haste to remember Allah and leave your trading. That is better for you if you only knew. And if you have prayed, then scattered in the earth, and multiply seek God's gift to remember it so that you're lucky. " (Qur'an, 62: 9-10).

The concept of socio-religious make it clear that the economic behavior of the Muslims is essentially a manifestation of the practice of religious teachings. Therefore, to achieve happiness in life is not just rely on cost-benefit calculations of the fulfillment of sheer material, but also associated with things that are intangible. For example, a Muslim work hard to find treasures. Treasure it can be great to draw closer to God and fellow human beings, such as pilgrimage, helping the poor (zakat, donation, charity and endowments), as well as the good deeds of other, sociologically means to lessen the gap structure of social economy "in society. As we know, that the widening "gap" between the rich with the poor people can bring a wide range of social problems, both in rural and urban areas. Meanings live with the concept of welfare (Falah) it refers to the holistic and balanced understanding of the spiritual dimension-material, social and individual, and world-hereafter. Welfare in the world is anything that can give enjoyment of life gained after man leaving this mortal world. According to al Syathibi (1997), welfare and safety of mankind can be achieved when human beings have manifested five things in life, namely maintaining the religion (deen), nourishes the soul (nafs), maintains intellectual (aql), maintain descent (NASB) and maintaining the property (mal).

Nurcholish Madjid, for example, linking the economic concepts to monotheism, charity and morals. While Kuntowijoyo put monotheism as a transcendent force that forms the innermost structure of Islamic teachings. Ihsan itself refers to the definition of the optimization of the actualization of "good works" in order to get the good pleasure of God, while the load morals moral values and ethics in doing the job. Because, the ethos that drives the behavior of a Muslim source of monotheism, charity and Islamic morals.

All of this points to the quality and the basic character of individuals, groups, communities and nations to achieve

competitive advantage. Thus, the shape and the actualization of the work ethic of a Muslim rests on "the intention of the perpetrators" as a subject as defined in the hadith of the Prophet Muhammad, "The value of any work that depends on his intentions." If the intention and orientation of his heart, he will receive the value of work may high. For example, someone will get salvation of the world and the hereafter and if you want to work as best as possible

Instead, someone would produce a low value work and if you want to work just for the pursuit of material interests. Desire or intention is a form of commitment that serves as "a source of inner drive" a person or group of people to work earnestly in normative-theological, work orientation is the realization of the mandate of God on earth with the purpose of managing the various potentials of existing resources. In other words, the working individual or group of individuals can be considered as an effort to find sustenance.

Ibnu Khaldun, as quoted Rahardjo (2002) conceived the work ethic as the emergence of certain values in human life which has its source in his work. Utilization of the value of the work is the key word to search for sustenance. Through His grace, God gives sustenance to everyone. But the main requirement is if he works to get sustenance predetermined Allah SWT.

Allah explains in the Quran as follows: "And say, labor ye (Well on the respective field of work, respectively), then Allah and His messenger and the believers will see (assess) the job". (Qur'an, 9: 105). This concept is a source of motivation to everyone in the work to earn income, profits, and foster economic capital. The formation of the Muslim ethos is closely linked to religious beliefs that are implemented in the form of deeds to God (ubudiyah) and social charity (muamalah) for fellow human beings.

According Kuntowijoyo, (2008), the Islamic conception of mercy for the worlds (rahmatan lil'alamin), asserts that belief in God to be the center of all value orientation. At the same time, the values it puts man as the goal of transformation, because Islam does not only deal with issues of theology, rules, and worship, but also relates to the governance of social life, politics, economics and culture. The third aspect of the latter is based on the faith that is worth as worship to Allah SWT. Paradigm Islam does not dichotomization domain secular life of the world to the Hereafter is the main focus, but actually makes the life of the world as a bridge to the afterlife.

Understanding of Economic Actors Salafi Religious Teachings In the conception of Islam, the economic activity is an integral part of religious teachings. The formation of the economic ethos in Islam is a religious moral values synergy with the rationality of the calculation of profit and loss (from the viewpoint of Islam), so there is a balance between the two basic elements of this. The Qur'an gives the instrument to the economic actors: "O those who believe, if (you) has been called for prayers on Friday, then made haste to remember Allah and leave your trading. That is better for you if you only knew. And if you have prayed, then scattered in the earth, and multiply seek God's gift to remember it so that you're lucky. " (QS. 62: 9-10). What are the more value the concept of entrepreneurship in Islam the concept of entrepreneurship in general is the value of the balance built, that business is not only limited to search the

material, but rather a mandate that must be executed man as gratitude for God's gift in the form of abundant natural, as disclosed in paragraph 10 above sura Jumu'ah (Alhasyir, 2013).

Therefore, every Muslim is required to work to meet their family needs as well as worship according to the Word of God in the letter al Thur, verse 56 which says: "I did not create the Jinns and humans except that they worship". Each role and function according to their respective responsibilities. In relation to economic behavior, both in the field of production, distribution and consumption, economic actors Salafi understanding of the doctrine of muamalah in Islam as follows:

1. Have a strong faith; As an example :

Agus, an informant of the Salafi, said that before joining the Salafi, he sold the white iron. But consumers in the city of Ambon ordinary looking white metal that comes from Ternate, whereas in Ternate, no white iron. White metal sold in Ternate, in fact I was the first marketed there. White metal that I bought in and then I bring to Ternate. But in order to sell my stuff, then I used to lie by saying that "this white metal from Ternate". Finally, they buy from me. After I joined the Salafis, and gain understanding of the religion of the sale and purchase (muamalah) is correct, then I realized that lie in the process of buying and selling that is haraam. Al result, I now no longer lie like that.

First; Based on information from the Agus, understood that before signing joining Salafi, lying is what he would normally do. Second; After joining the Salafi and gain an understanding of religion there did he know that lie in the conduct of the transaction, is haraam. Third; Once he understands that lie in business transactions it is haraam, then since that time he was no longer doing the buying and selling process by lying. In Islam, it is a lie is a sign of hypocrisy. In the books of Hadith, the Prophet Muhammad said: "Sign of the hypocrites that there are three, one of which is a lie". (Hadith Bukhari). In social life everyday, anyone, did not want to hang out with people who like to lie. Because, when we associate with people who love to lie, then a moment later we are deceived by that person. As a result, it is we are dissatisfied. Economic actors who like to lie to customers, after finding out about the markings that he likes to lie to customers, then customers will eventually leave him. They will not buy or bring their vehicle to be serviced in the garage of the economic actors.

2. Having a sincere intention

With sincere intentions, all forms of activity are permissible (mundane work, including trade) turns into worship. As an example:

According to an informant named Arwin, An informant named Arwin (building consultant), said that in doing economic efforts we should accustom ourselves to do a dual thing, the first one is expecting the help of God and the second, sincere work. That's what I've done so far, because when we are sincere to work, then the risk of whatever happens, we will accept gracefully and be patient, otherwise when we are lucky, we are grateful. So I do not really target the profits to be thus and so, important work well with two conditions earlier.

If the record, there are some important things need to be underlined from the informant the information mentioned above.

First, for a Salafi, the work is worship to God. Therefore, in working every economic agent, is required to fix his intention to actually she worked sincerely for Allah. Second, the purpose of worship is to earn the pleasure of God, love of God and expect God's help, now a requirement to get it all depends on the sincere intention. If the intention of an economic agent is not sincere, then he hopes to get ridla God, love, and His help it become futile. Thirdly, in worship, should improve his intention to be sincere for Allah. Do not worship because they want to get the position, wealth as much as possible, and so forth. If someone in worship, because it wants to gain position or riches, and so it is, that means that there are strings attached worship in it. People pray for their self-interest, and then, if he does not get what he wants, then he will move away from God, and no longer want to worship or worship but the intention that people judge him as a devout (riya '), then worship such is not accepted by God.

3. Have budi noble character

Among the manners referred to in the business world, it is like honesty, an attitude of trust and legowa, fulfill the promise. As an example :

An informant named Creator, when I came to the workshop to interview him, the same time there is a prospect that brought the bike come to be done being broken engine in the garage. However, because there are two motors are being repaired engine and unfinished, the informant told the owner of the bike, I just worked alone, so if the motor is already finished my work, new father to take his bike here. But the man replied that: "seng apa-apa, beta taru saja motor ini di sini", kalau sudah selesai itu, baru kerja beta punya". But the Kholiq, do not want to. After he left, I then asked the owner of the shop "why not accept it? He replied, "I do not want to be a burden." If I received the bike, then I have not been working too long, I'll be blamed. " I do not want any problems later on. I better finish this bike first two, then he brought the bike coming.

Of cases, it can be drawn a few important things: First, the owners do not want to blame when motorcycle unencumbered feeling was long done earlier also. Second, apparently the owner of the shop has a principle of order and regularity in the work that first job to be completed first, then move on to the second job, and so on. Third, he wants in order to keep the quality of his work. Because, sometimes, when I saw the amount of work to be done, mechanic and then worked in a hurry. Any work done in a hurry, would also not meticulous craftsman. In the end the quality of the work is not awake. Fourth, when the quality of the work is good, then the customer will be happy, and the workshop will be sprayed advantage with many enthusiasts who come as customers in the workshop, otherwise if the quality of work is not maintained, then the customer will run one after the other to the garage.

Among the good morals is to be consistent in paying debts and tolerance in collecting debts, giving leeway to those who are in debt, then find it difficult to pay for it. As an example:

A third informant, a drug seller herbal. Modal the beginning he was just setting up the place, being sold herbal medicine was loaned by a company distributor of the Salafists in Bekasi in debts. The debt then paid when she filed the request a second time. When she filed the request a second time, and when he has to pay its debts, it was not enough money to pay off debts that

first turns the money is insufficient payment of the total debt first. With his parents reason ill and he had to bring his parents hospitalization at the hospital, he was given the leeway to suspend the payment of some of its debts, with a note later settled upon her request the next item.

Based on these cases, it can be seen that, first, between the two parties (distributors and businesses) there is a relationship transaction debts. The first party is the creditor, which in this case is a distributor, being the second party is the party that owes two, in this case are business people. Second, that between the two sides there is an agreement, especially the second time when he filed a subsequent request herbal products, he must repay previous debt. Third, that at the time of the second party to pay its debts, he was experiencing financial difficulties which did not allow him to pay off the entire debt. Difficulties were submitted to the donor accounts, and with the humanitarian and religious reasons, the provider of accounts receivable gives leeway he (the second party) to suspend the payment of some of its debts. The attitude of the first party in accordance with the hadith of the Prophet who said: "He who provide convenience to people who have trouble in this world, God will give him the ease in the hereafter".

The attitude shown by the creditor, it demonstrates high morals. In addition, such attitude is part of a noble character. That, of course, in line with the example of the Prophet, as his saying as follows: "I was sent to perfect noble character".

4. Businesses that kosher

An informant named Ari, when I interviewed him about his education, he said he was one of the alumni of the College of Computer Science at Jogja. Work now, Besides the help of his parents, he sold the pulse and make key. I asked him: "if he did not think to look for a job in accordance with the educational background. He replied, work was all good, which is important kosher, if managed properly can bring pretty good income. For example, I sell credits in addition to making a duplicate key. In one day he can earn an average of two hundred thousand rupiah. When calculated for a month, then my income could reach six million. That does not include my income from parent figure that I manage. From the experience of the Ari, there are some points of the lessons learned, first, that the output of higher education is not a guarantee that a person get a job in accordance with the level of education. Secondly, there are still people who study in higher education, as they are orientated want to be a Civil Servant. Whereas the purpose of higher education, is not the case. Properly alumni of higher education can create jobs. Third, basically any business, if it is lawful and can be managed properly, it will provide benefits for both economic operators concerned. The bad thing is when economic actors want a big advantage and he justified the means in his business. Fourth, A Muslim businessman should not commit offenses only for the pursuit of high profits that make it run on which Allaah and pursuing forbidden by God. Yet everything is permitted may be a good compensation and full of blessings. Commodity trading is forbidden such as liquor, carcasses, pork, trade usury and the like, will not appease Muslim businessmen honest feelings to his Lord let alone have to throw yourself into all these illicit commerce or make it as a source of business.

5. Accomplishing the rights of people

An informant Amir name, (the seller of goods mix), he said that before he joined the Salafists, when he sells, he always reduce the scales, for example, the sugar that was filled in a plastic bag, when weighed usually not enough of one kilogram, but because it was displayed with the form kilogram bags, then people buy with the price of a kilogram (1 kg per bag).

Likewise with half-kilogram bag. But after he joined the Salafis and he got ta'lim about Muamalat, it turns out practice as he did it, the law is unlawful, since it was, he was no longer doing the fraudulent practices. Furthermore, he said: "according to Ustadz, if we sell it that way, we essentially take the profits from the venture as if we fill hell fire in the belly". Indeed, often times people do such a fraudulent practice, sometimes followed the method performed by a fellow of economic actors. They usually practice like that, because a lot of gain, regardless of the loss on the other hand that the buyers want big profits. Therefore, I give the scales Muslim businessmen will hasten to fulfill the rights of others, whether it be wages, as well as the debt to a particular party. A worker must be paid before his sweat dried. The attitude of people who slow down the repayment of debts is tyranny.

6. Avoid all forms of usury and gross transaction

An informant, named Komeng, I would advise him to increase their capital by using banking facilities, he said: "do not want to, because we take the credit in the bank flowering. Well it is haraam. Furthermore, according to him, all the Salafis do not want to loan money in the bank to increase its business ". According to Ustadz Abu Farhan, the law took the bank credit is 'riba ". And "riba " that includes one of the seven acts that destroy people. A Muslim businessman will better safeguard themselves in order not to fall into puddles usury '. Therefore, all economic actors Salafi abstain from activities associated with usury '. In Islam, he said, Doing business through various forms of illicit transactions, although enacting looked as kosher and promises many advantages which are basically not allowed by Allah and His Messenger.

7. Do not take the property of others in a way that vanity

The honor of a Muslim's property is equal to the honor of his blood. A Muslim's property is not lawful to eat except the purposed in his heart. Among the forms of eating other's property in a way forbidden are: bribes, fraud, manipulation, gambling, hiding the actual price (price camouflage), hoard goods, using the ignorance of people, stretching repayment by the rich, and so forth. Each of them has been mentioned prohibitions in the hadiths authentic.

8. Do not harm others

A Muslim businessman should be a good and respectable competitor. In doing business competition, he still adheres to the rule of "not doing injustice to its competitors, nor avenge injustice competitors to do the same way". He will not play the price of goods, raise and lower prices to the detriment of other traders. He also will not raise the price of goods due to using other people's needs, and because he himself who has the goods. Because people who have the opportunity to control the prices of goods, and then he deliberately make the use of certain he will

accept the punishment of Allah on the Day of Judgement. A Muslim businessman will not sell items that are still in the process of buying and selling transactions with others. He would not bid for goods that are still offered by others. He would not excessively praise the goods when sold. He will also not be exaggerated vilify the goods if he wanted to buy it. He was always controlled by fair and wise attitude of doing things, because it is the nature of nature. With both the nature of that, heaven and earth are enforced.

9. All that is built upon the foundation of true faith and solid

In this case, according to Abu Farhan, one of the Salafi cleric in the neighborhood, he said: "I am also a distributor of herbal". if we really believe that consuming the rights of others was definitely getting a reply hellfire, then anyone and as any entrepreneur, will conduct its businesses in a way that is good and not easily dazzled by the influence of material benefits to be gained. In fact, she will be very grateful to get the advantage that it is having a delicious gift of God. Instead, he will be patient if in his efforts, he was losing. Therefore, according to him, in order that all members of the Salafi including employers, every night, they always follow the teachings, besides to improve understanding of the religious sciences and the laws of Shari'ah, also to strengthen the purity of faith in God.

The Teaching Practice Of Religion By The Perpetrators Of Economics Salafi.

To find out how to practice religious teachings understood by Salafists in the field of entrepreneurship, then it can be seen in the characteristics of entrepreneurs conducted by businesses Salafi. The characteristic in question is in accordance with the principles and values that are based on the Qur'an and the Sunnah of Rasulullah SAW. To be more clear that entrepreneurial characteristics are as follows :

They do not manufacture or sell the product except in accordance with Shari'a, such as entrepreneurship, for they are truly the worship. As worship, then they should do the job according to the instructions of Allah and His Messenger. Principles they hold dear in entrepreneurship are :

First: Sincere solely because of God, not because of any motivation other than Allah;

Second: In running the business, they always invoke the aid of God;

Third: Entrepreneurship in any field, they always underlying purpose was to obtain the contentment, love and won the help of Allah (Ustadz Abu Farhan and Arwin);

Fourth: In entrepreneurship, they avoid all that is forbidden by Allah and His Messenger, both associated with the object (substance) that was traded (substance haraam or not), as well as of procedures, both belonging to usury, nor gharar (deception) which resulted in a losses on the other. For example, the prohibition relating to items prohibited: selling "liquor" or purchase goods, which obviously has known the status of the goods that it was stolen.

They do not sell all of fashions. Clothes they sell only the revealing and worth Bestial the instructions of the Prophet Muhammad. Clothes that are allowed for women is Muslim clothing, which does not accentuate curves and large veiled

hijab; For men, clothing is allowed by Syara 'are for example pants, the pants leg length limit is only up to above the ankle. Therefore, if the pants that cover the ankle, then they do not sell it, because different opinion of the command of the Prophet Muhammad. They also do not sell cigarettes, because for them smoke it in fact does not bring benefits to those who consume them. Because there is helpful, it means redundant. Hence for them, smoking is haraam. And because smoking is haraam, then sell cigarettes was haraam;

They do not sell television because television for they did not bring a positive impact, even more impressions actually a negative impact for children. Therefore, the houses of their own, none of the members of the Salafi who have televisions. Jamal example, when interviewed about household appliances in the home, whether he has the air "television"? Answered by Jamal: "all members do not have a television dl Salafi his house, because of television flu no avail. If there is no benefit, it was said, just a little. Many television shows that can actually damage the mental, moral and religious children. Therefore, he said "none of the members of the Salafi have televisions in his house". Radio too. Therefore, none of the members of the Salafi have the best radio in the house. If they intend to hear the propaganda broadcast on the radio, then simply they open the program that is in Hand Phone (HP) to themselves. And they never buy mobile phones for their children, because even with mobile phones are freely accessible to children, even more dangerous. Because it's mobile phones can only be owned and operationalized by their spouses only. Similarly, according to Jamal (employers Welding Accessories. Related to that principle, then as a seller of electronic goods, Munir (sellers of electronic goods), "only sell goods kitchen wares and home appliances, such as fans, ironing etc";

Based on the phenomenon that I observed, that transaction activity they do is limited at certain times only. When the time for Asr prayer dhuzur and, for example, with their spontaneous stop the activity, because they have to perform prayers in congregation; When I asked about it at Abu Husein Farhan, he said that "prayer approached for their congregation is" mandatory ". Therefore, when the time for obligatory prayer, they must cease all activities in any aspect " Characteristic of them, when it is time for prayer, then all trading activity is stopped, then they prepare leading to the mosque to pray. For those obligatory prayers. For prayers, they always maintain compactness in maintaining and implementing the Shari'ah of Islam. Therefore, when the midday or Asr prayer time, they usually shut down its trading businesses, they also do not open their businesses on Fridays. For Friday, they fully utilize the day as a holiday.

They do not want to use banking facilities. For those credit money in the bank is haraam. If possible, they are better off borrowing to fellow members of the Salafi want to borrow in the bank. But until now no one among those who borrow money, despite of fellow Salafi themselves to increase their capital. The reason is, to borrow money to raise capital, it is possible for one may be considered good, but for me, will increase the burden of debt. Let the little capital, if managed well, God willing, will evolve as well, said Usman. Likewise with Komeng.

They prioritize the quality of work; Therefore, if there is a job offer that would burden them / interfere with another job, although there are still a lot of work that is in the process of

settlement, then the offer should be rejected, even though the pay is more expensive than the work being carried out. As an example case, Kohar for example; she mechanic motors (special loading and motorcycle engines); when I intended to interview him, at the same time there are people coming bring the bike then consult with Kohar, it turns out that there are problems motorcycle on the machine to be repaired (unloaded). However, because there are two motors else while in the process of repair and unfortunately he refused to accept the motor is concerned, but the owner of the motor latter saying "let the motorcycle is placed just here, when it's finished two motors that, then work this". Hearing that, Kohar replied: "no, I do not want to receive; This finishes later (two motors) first then you bring it comes motto ". After he left, I asked Kohar: " why you not take it, right now is counted later!". My suggestion was answered him by saying: "I do not want to be a burden, I want to focus on doing two motors this first". Hear answers like that, I also understand that this Kohar want to keep the quality of his work, he does not want to interfere with the motor load is concerned, because it might work carelessly.

In improving their understanding of the various issues to Islam, then every night they follow the teachings (study groups) in the mosque after maghrib prayers. It is special for the father, were to mothers, usually study conducted in the assembly hall of the mother. Such recitation called ta'lim yaumiyah. In addition to the daily recitation, they usually do lectures' usbulyah (weekly) even syahriyah (monthly). Associated with the motivation that drives them in entrepreneurship, in general they have the same opinion that fulfill their obligations, both as head of the family of the wife and children, as the children against their parents, as fellow Muslims against dluafa 'in the context of social relations, as well as a Muslim against the pillars of Islam, then their motivation accumulation summarized in the following description simply as worship to God :

First, work is an obligation to meet the livelihood of the family, both nuclear family, extended family or others such as the elderly. **Second**, in addition, according to Farhan, Pillars of Islam was not only four (Shahada, prayer, fasting and alms) only, but there are five, namely Hajji for those who can afford. The fifth pillar of Islam precisely cost a lot, not only just for ONH, but it will cost over there, and costs required by the wives and children left behind. Because all of the costs, then as a Muslim, we are required to work hard. **Thirdly**, the exception of the nuclear family, we also have parents who require the cost of living and so on. **Fourth**, Humans are social creatures. Among men with each other need each other. We are aware that all around us, there are still many poor people who need our helping hand. **Fifth**, and the approach side Syar'i, in the Qur'an there are many verses that encourage us to care for the poor. The suggestion will increase to mandatory when a person sleeps in a state of satiety were neighbors in a state of very hungry. **Sixth**, in the Qur'an, Surah al Dzariyat, verse 19, Allah SWT said that "in the treasures of the people who get the excess provision gift of God, there are the rights of the poor. This means that we are obliged to issue rights of poor people were then given to those who deserve it. If we do not leave it to them, that means we owe them. And any debts, shall be paid. Seventh, In a hadith, the Prophet said that "the sustenance that Allah gave to the rich, in fact thanks to the prayers and the sincerity of the poor people".

IV. CONCLUSION

Based on the description and analysis of the above, it can be deduced and this study that the Work Ethic Salafi Economic Actors are as follows:

1. That the Salafi understand the system and economic activity is an integral part of religious teachings. The formation of the economic ethos in Islam is a religious moral values synergy with the rationality of the calculation of profit and loss (from the viewpoint of Islam), so there is a balance between this world and the hereafter. On that basis, then in economic activity, they always refer to the guidance of the Qur'an and Sunnah, both in beliefs, morals and manners as well as the laws that govern the relationship muamalah Shari'a.
2. That was their motivation for entrepreneurship is in the context of worship to God, both in upholding the rights of children, wives, and parents, the dluafa (needy, poor). With the principle of the worship they want to win the love, mercy and help of God.

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Assessment of Nipple Discharge in Symptomatic Patients attending a Main Breast Cancer Center in Baghdad using Ultrasound and Cytology

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Abstract- Background: Nipple discharge is a symptomatic dilemma that causes women distress and worry. Ultrasonography is a vital complementary diagnostic device in the exploration of the etiology of nipple discharge.

Objectives: The aim of the study was to evaluate the role of the gray-scale ultrasound in the diagnosis of intraductal pathology in symptomatic patients with nipple discharge

Methods: A retrospective study included 100 patients who complained of nipple discharge attending the Main Training Center for Early Detection of Breast Tumors in the Oncology Teaching Hospital in Baghdad during the period from January 2015 to September 2015. Their age ranged from 17 to 69 years. Their ultrasound findings were reviewed and correlated with the corresponding cytopathology results.

Results: By reviewing nipple discharge cytology, inflammatory cell infiltration were observed in the majority of cases (66% of the examined symptomatic patients); 8% were cases of duct ectasia and 7% were diagnosed as mastitis. Benign neoplastic lesions were detected cytologically in 6% of cases; all of which presenting with bloody nipple discharge and given a diagnosis of intraductal papilloma. When correlating the ultrasound findings with smear cytology it was concluded that when ultrasound showed there was mild ductal dilation and clear ductal content, the corresponding cytology revealed inflammatory cell infiltration in 61% and 67% respectively. Inflammatory cell infiltrations were the main finding in patient who revealed moderate ductal dilation and turbid content on ultrasound which represented 70% and 82% respectively. In all patients with a cytological diagnosis of intraductal papilloma, ultrasound showed changes consistent with intraductal masses. No malignant cases were detected in the present study.

Conclusion: Ultrasonography is a required adjuvant tool, as a routine evaluation method of investigation in the assessment of causes behind nipple discharge. Its value was illustrated in localizing the ductal problems, assessing the wall thickness and content of the lesion and in defining intraductal abnormalities, especially papillomatous types.

Index Terms- breast ultrasound, nipple discharge, cytology smear, Baghdad

I. INTRODUCTION

Nipple discharge is a symptomatic problem that causes both discomfort and anxiety to many women specifically when

bloody in nature. Tremendous advances have been made in the management of breast problems, mainly through advances in diagnostic breast imaging [1]. The causes of nipple discharge are not well understood. However, nipple discharge is most commonly associated with endocrine alterations and/or medications. These often result in duct ectasia and/or fibrocystic changes in the breast [3]. Changes are often bilateral and may lead to discharge from one or several nipple ducts. The most common cause of clinically significant discharge is intraductal growth of the ductal epithelium, due to hyperplasia, micropapillary proliferation, solitary papillomas and/or ductal carcinoma (both in situ and invasive). Most of the intraductal changes that lead to nipple discharge are situated within 1-4cm of the nipple and the role of pathology in diagnosing these lesions has been investigated earlier [2].

Ultrasound (US) is an indispensable complementary diagnostic tool in the investigation of breast abnormalities [4]. At US, normal ducts are typically invisible; if seen, they appear as thin cylindrical anechoic or hypoechoic structures [8], a normal duct should decrease in diameter peripherally and should not have focal areas of dilatation along its course [9].

The current study was carried out to illustrate the value of US when used in concert with Cytopathology in diagnosing patients complaining of nipple discharge referred to a main center for early detection of breast cancer in Iraq.

Patients & methods

This is a retrospective study that comprised 100 patients complaining of nipple discharge referred to the Main Training Center for Early Detection of Breast Tumours in the Oncology Teaching Hospital in Baghdad during the period from January 2015 to September 2015. Their age ranged from 17 to 69 years.

All patients were subjected to ultrasonography performed by Siemens X300 using a 5-10MHz linear transducer. Patients were examined in supine position with breast and axilla fully exposed. The presence or absence of dilated ducts were assessed including their position, wall thickness and content (clear, turbid or mass filled). The presence or absence of any associated lesions was also evaluated.

The nipple was squeezed gently to obtain the discharge which was evaluated according to its color and content. The discharge was smeared directly onto glass slides which were immediately dipped in 99% ethanol for fixation. After 20 minutes, the fixed smears were stained with Papanicolaou Stain and examined cytological for any abnormal findings.

The ultrasonographic findings were correlated with the corresponding cytological results.

Results

One hundred patients presenting with nipple discharge were included in this study. Their ages ranged between 17 and 69 years (mean 43 years). The age of the patients and the color of discharge are shown in figures 1 and 2 respectively.

Table 1: Categorization of Ultrasound Findings in 100 Patients with Nipple Discharge.

Ultrasound findings		No.	%	
Ductal changes	Dilatation	Normal	21	21%
		Mild *	62	62%
		Moderate	13	13%
		Severe	4	4%
	Distribution of dilated ducts	Retroareolar *	79	79%
		peripheral	0	0%
	Wall thickness	Normal *	77/79	97.5%
		Thick	2/79	2.5%
	Content	Clear *	53/79	67%
		Turbid	22/79	28%
Mass		4/79	5%	

Associated mass	Present	6	6%
	Absent	94	94%
Total		100	

*Most patients had mild, central ductal dilatation, normal duct wall thickness and clear content.

Associated lesions:

Associated masses were seen in six patients, two of them were fibroadenomas, and three were cysts while only one was proved to be carcinoma.

Findings of Nipple discharge smear cytology are displayed in Table 2:

Inflammatory cell infiltration were observed in the majority of cases (66%) of symptomatic patients; 8% were cases of duct ectasia and 7% were diagnosed as mastitis. Benign neoplastic lesions were detected in 6% of cases; all of which were given a diagnosis of intraductal papilloma (presenting with bloody nipple discharge). No malignant case was detected.

Nonspecific findings were observed in 24% in the form of foamy histiocytes infiltration and few benign-looking squamous metaplastic cells, while acellular smears were seen in 4%.

Table 2: Pathological Results of Nipple Discharge Cytology

Cytological finding of nipple smear		No.	%
Acellular		4	4%
Nonspecific		24	24%
Inflammatory		66	66% *
Neoplastic	Benign	6	6%
	Malignant	0	0%

*Inflammatory cells are the most common finding in Cytological smears

Table 3: Correlation between Ultrasound Findings versus Cytopathology Results.

	Ultrasound findings	Cytopathology Results				
		Acellular	Nonspecific	Inflammatory	Neoplastic	
					Benign	Malignant
Ductal changes	Mild dilation	4/62(6.5%)	16/62(26%)	38/62(61%)*	4/62(6.5%)	0
	Moderate dilation	0	2/13(15%)	9/13(70%)	2/13(15%)	0
	Severe dilation	0	0	4/4(100%)	0	0
	Normal	3/21(14.4%)	8/21(38%)	10/21(47.6%)	0	0
	Wall thickening	0	0	0	2/2(100%)	
Duct content	Clear	5/53(9%)	13/53(24.5%)	35/53(66.5%)	0	0
	Turbid	0	4/22(18%)	18/22(82%)	0	0
	Mass	0	0	0	4/4(100%)	

*Most patients with nipple discharge had mild ductal dilatation on ultrasound and inflammatory cells on smear cytology

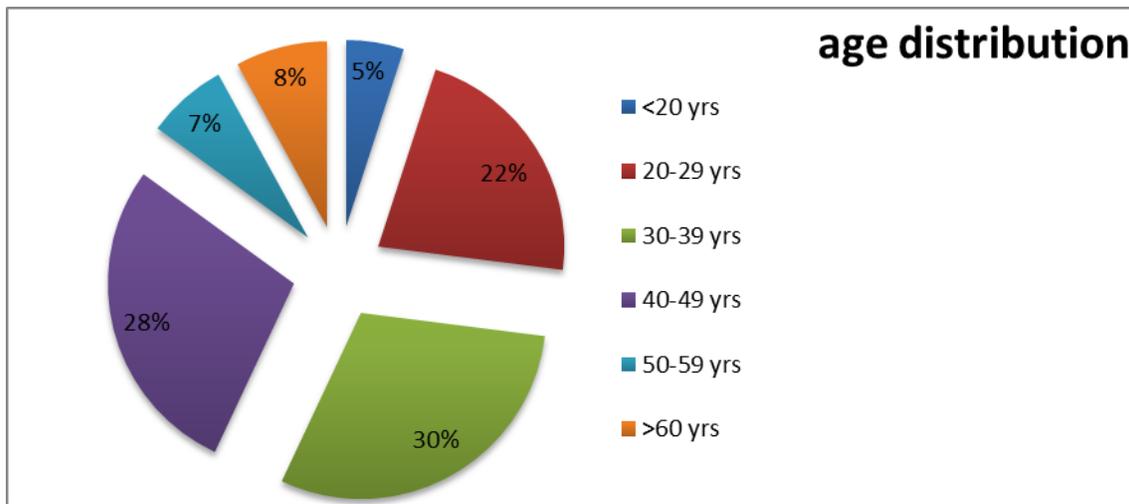
Table 3 reveals the Ultrasound findings versus the cytological results: When correlating the ultrasound findings with smear cytology it was concluded that when ultrasound showed there was mild ductal dilation and clear ductal content, the corresponding cytology revealed inflammatory cell infiltration n 61% and 67% respectively, while nonspecific and acellular findings were seen in 26% and 7% of mildly dilated ducts respectively. Ductal hyperplasia was noted in four patients with mildly dilated ducts which represent 6% of patients with mild duct dilation.

Inflammatory cell infiltrations were the main finding in patient who revealed moderate ductal dilation and turbid content on ultrasound which represent 70% and 82% respectively as the condition in patients with severe ductal dilation where inflammation was seen in all (100%)

When ultrasound report was normal in symptomatic females, cytology revealed inflammation in about 48%...

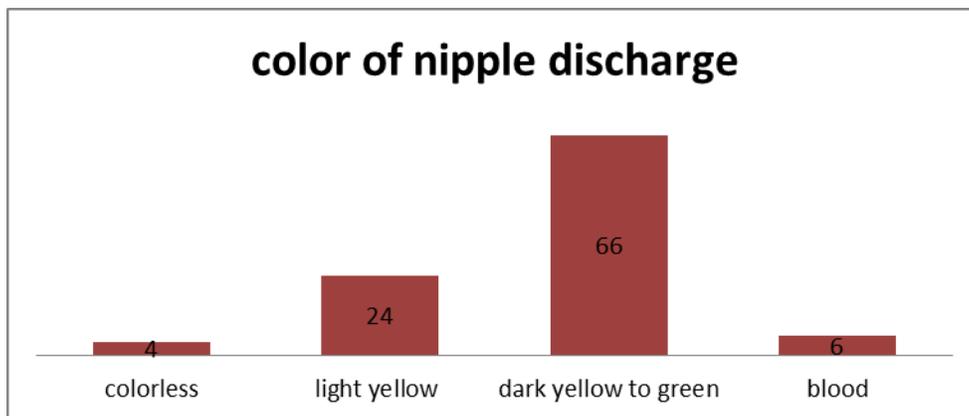
In all patients with intraductal mass on ultrasound, their smear results showed changes in favor of papilloma. As to the case where there was ductal thickening the cytology showed evidence of ductal hyperplasia.

Figure 1: Age Distribution of the Study Population



The majority of patients with nipple discharge were in their third, fourth and fifth decades (22%, 30% and 28% respectively).

Figure 2: Color of the Nipple discharge in the studied population



The Majority of nipple discharge were yellow to green in color which revealed inflammatory by cytology. All bloody nipple discharge showed benign cytological changes. No malignancy was detected.

II. DISCUSSION

Nipple discharge is the third most common complaint of patients seeking medical attention for breast disease, accounting for about 5% of all breast symptoms [15].

Spontaneous nipple discharge is a relatively common manifestation of breast disease. Bilateral nipple discharge involving multiple lactiferous ducts is usually non-pathological.

On the other hand, pathological nipple discharge is typically spontaneous, unilateral, uniductal and may be serous or bloody. The value of nipple discharge cytology has long been a subject of debate. It is usually practiced if patients are having active discharge at the time of assessment.

The commonest cause of bloody nipple discharge is intraductal papilloma or an underlying malignancy, usually ductal carcinoma in-situ. The likelihood of malignancy is greater in postmenopausal women or those presenting concurrently with a palpable mass [16, 17].

It has been reported that a benign nipple discharge cytological diagnosis does not exclude malignancy, and the false-positive/suspicious rate requires confirmation of a malignant nipple discharge prior to definitive patient management [18].

In our study we find that in majority the cause of nipple discharge is benign, ranging from inflammatory to nonspecific findings while the neoplastic is rare cause of nipple discharge especially when its bloody and this is in agree with literature [7]

Tremendous advances have been made in the management of breast problems, mainly through advances in diagnostic breast imaging. High-frequency transducers has significantly enhanced the contrast and spatial resolution of ultrasound in breast tissue. The quality of breast US is closely linked to the performance of the apparatus used for the examination and the talent of the examiner [5]. Linear, broad-bandwidth transducers with maximum frequencies of 10-13MHz are required to depict ductal abnormalities [6].

It has been demonstrated as well that Ultrasonography is not typically used unless the nipple discharge is accompanied by a palpable mass or a positive mammographic finding. It may be useful in presurgical localization if galactography reveals a dilated duct larger than a few millimeters in width. Nevertheless, it was shown that modern, high-resolution ultrasonographic techniques are becoming more sensitive for the visualization of intraductal changes. [18]

Other investigators displayed that Ultrasonography is indispensable as a complementary diagnostic tool in the investigation of breast abnormalities. However, ultrasonography is not commonly indicated for the evaluation of nipple discharge. Ultrasonography is an adjunctive tool for breast evaluation when more specific indications, including an abnormal mammographic finding or a palpable clinical finding, are present. Technological advances in high-resolution ultrasonography mean that in the future this modality may have a role in breast ductal evaluation [19, 20].

The current study revealed that inflammation was the leading cause of nipple discharge in the majority of patients in our study in whom ultrasound either showed mild, moderate or severe ductal dilation with either clear or turbid content. It is worthwhile mentioning that when moderate and severe ductal dilation was noted and when the ducts were echo filled that indicated inflammation in symptomatic patients. In conditions where masses were observed within the dilated ducts by US the cytopathology results revealed intraductal papilloma in all detected cases.

Sometimes the patient could be aware of nipple discharge early before gross ductal dilation seen by ultrasound as demonstrated in this study where the ultrasound was normal in

12 % of cases which showed inflammatory infiltration by cytology...

Ultrasound is safe, painless, doesn't entail radiation, noninvasive and is operator dependent [10]. The detection capability of ductal problems is high; providing the ability of the assessment of ductal content, wall thickness and presence or absence of masses. Within that respect, the results of the present study are comparable with those demonstrated by earlier reports (11,12). Our findings support other studies as well in illustrating that US can predict benignity of lesion [13] and in confirming the diagnosis of nipple discharge cytology [14].

Our findings on the other hand emphasize what has been concluded in earlier surveys, conducted in the same breast cancer center, that highlighted the importance of US and cytology in diagnosing breast lesions among symptomatic Iraqi patients (21, 22).

III. CONCLUSIONS

Ultrasound is an efficient, safe tool in diagnosing the cause behind nipple discharge, specifically when operated by experienced radiologists and high resolution device and when accompanied by thorough history, proper clinical examination and competent cytology results. It is thus recommended as an initial investigation in any patient presenting with nipple discharge.

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الخلاصة

الخلفية: إفرازات الحلمة تعد مشكلة و تسبب للعديد من النساء الضيق والقلق، الفحص بالموجات فوق الصوتية (السونار) يعتبر حيويًا للتشخيص ومكمل في استكشاف الأسباب المؤدية إليها.

المقدمة: كان الهدف من هذه الدراسة هو تقييم دور الفحص بالموجات فوق الصوتية في تشخيص الاسباب المرضية في قنوات الحليب للمرضى اللواتي يعانون من أعراض إفرازات الحلمة.

المرضى والطرق: هذه هي دراسة رجعية لـ 100 مريضة شخّصت الاسباب المرضية للإفرازات الحلمية، و استعرضنا نتائج الموجات فوق الصوتية الخاصة بهم ربطها بنتائج المسحة الحلمية الخلوي.

النتائج: وأظهرت النتائج أن الغالبية العظمى من المرضى كان لديهم اتساع متوسط في الأفتنية (62 %) و محتوى صافي (67 %) .

وكانت جميع القنوات المتوسعة خلف الحلمة في الموقع، وسمك الجدار اعتيادي في 97 % و كشف تحليل الخلايا التهاب في 66 % ، اما تمدد الأفتنية المتوسط شوهد في 13 % فيما كان اتساع الحاد الذي تشهده الموجات فوق الصوتية في 4 % من الحالات ، وكان محتوى الأفتنية عكر في 28 % ناتجة عن التهاب في 82 % و غير محددة في 28 % ، وكان الجدار سميك ينظر في اثنين من المرضى .

الاستنتاجات: الموجات فوق الصوتية هو فحص تكلمي ضروري لتقييم السبب الكامن وراء الإفرازات الحلمية.

مفتاح الكلمات: سونار الثدي، إفرازات الحلمية، المسح الخلوي للإفرازات الحلمية.

Assessment of Risk Status for Coronary Artery Diseases among Type 2 Diabetes Mellitus

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Abstract- Diabetes mellitus (DM) is one of the most challenging health problems in the 21st century and the third major cause of death globally due to its complications. Among the complications of Coronary Artery Disease (CAD) are often asymptomatic in diabetic patients until onset of the myocardial infarction or sudden cardiac death. **Objectives** of the study were to identify the risk status for Coronary Artery Diseases among type 2 diabetes mellitus adults and to find the significant association between the risk status of coronary artery diseases with selected demographic variables like age, gender, BMI, duration of illness, blood pressure, RBS value **Methods:** A descriptive survey was done among 127 diabetic adults at selected villages of Udupi district. Purposive sampling method was used for selection of sample. Tools used were demographic proforma and risk status assessment tool for coronary artery diseases and data was obtained by interview method and using Bio-physiological tests. **Results:** Majority 94 (74%) of the sample were at moderate risk for CAD, only 4 (3.1%) of them at a low risk for CAD. There is significant association between risk status of coronary artery diseases and selected variables like age ($\chi^2 = 10.46, p < 0.05$), gender ($\chi^2 = 10.92, p < 0.05$), duration of illness ($\chi^2 = 28.75, p < 0.05$), blood pressure ($\chi^2 = 24.52, p < 0.05$), RBS value ($\chi^2 = 11.50, p < 0.05$). **Conclusion:** In order to prevent risk for the coronary artery diseases among type 2 diabetic adults it is very important that creating awareness regarding various risk factors CAD and measures for prevention of CAD to maintain their health status well.

Index Terms- Risk status, coronary artery diseases, type 2 diabetes mellitus.

I. BACKGROUND

Diabetes mellitus (DM) is one of the most challenging health problems in the 21st century and the third major cause of death globally. From year 2000 to 2012, 1.5 million deaths have been occurred due to diabetes mellitus and its complications. (World Health Organization [WHO], 2014)

Diabetes Mellitus is a serious condition with potentially devastating complications that affects all age groups worldwide. This typically includes macro vascular complications (cardiovascular morbidity such as coronary artery disease, cerebrovascular disease and peripheral vascular disease).

Among the complications Coronary Artery Disease (CAD) is often asymptomatic in those patients until onset of the myocardial infarction or sudden cardiac death. From year 2000 to

2012 it was estimated that 1.5 million deaths have occurred due to Ischemic heart diseases. (WHO, 2014)

II. OBJECTIVES

To identify the risk status for coronary artery diseases among type 2 diabetes mellitus adults and find the significant association between the risk status of coronary artery diseases with selected demographic variables like age, gender, BMI, duration of illness, blood pressure, RBS.

III. METHODS

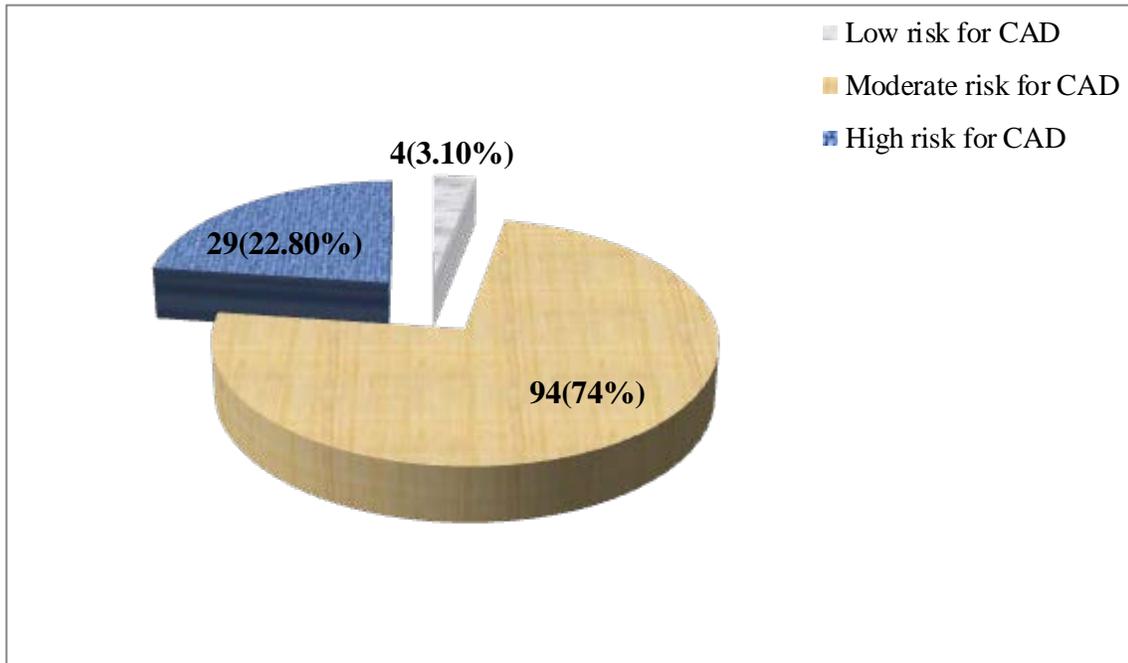
A descriptive survey was used in the study. The sample consist of 127 diabetic adults who were resided at selected villages namely Hirebettu, Athrady, 80-Badagabettu, Herga-A, Herga-B, Alevoru, Malpe, Kadekar, Udyavara, Katapadi, Kapu of Udupi district. From all these villages 127 sample were selected based on purposive sampling method. Tools used were demographic proforma and risk status assessment tool for coronary artery disease and data was obtained by semi structured interview method and also Bio-physiological tests like Height, weight and Blood pressure and RBS was monitored by using Glucometer.

IV. RESULTS

Most (35.4%) of the sample were in the age group of 56-65 years, majority 87 (68.5%) of them were females, most 46 (36.2%) of the sample had 5-10 years duration of illness (diabetes mellitus), around 62 (48.8%) of sample had the history of hypertension, about 87 (68.5%) of them had high blood pressure, around 59 (40.2%) sample had the RBS values > 200 mg/dl, Only 17 (13.4%) were have the history of heredity of coronary artery diseases, most 75 (59.1%) of them had the normal BMI, only 10 (7.9%) of them were overweight, around 44 (34.6%) of them had sedentary occupation and do not do regular exercises, most (92.5%) of them never smoked, only 6 (15%) sample takes alcohol and 4 (3.1%) sample were on irregular treatment.

Figure-1:

**Frequency and percentage distribution of sample based on risk status for coronary artery diseases (CAD)
 (n = 127)**



The data presented in the figure 1 shows that, majority 94 (74%) of the sample were at moderate risk for coronary artery diseases, around 29 (22.80%) of them were at high risk for coronary artery diseases, only 4 (3.1%) of them at a low risk for

coronary artery diseases. (Score of 7-25 low risk for coronary artery diseases, 26-50 moderate risk for coronary artery diseases and 51-100 high risk for coronary artery diseases)

Table – 1
Mean, Median and Standard Deviation Scores of Coronary Artery Risk Status Score (n=127)

Name of the variable	Maximum score	Mean	Median	SD
Coronary artery diseases	100	42	43	8.87

The data presented in table-2 revealed that Mean, median and standard deviation scores of coronary artery risk status scores. The maximum score for the coronary artery risk status was 62 and mean was 42 which shows majority of subjects were vulnerable for coronary artery diseases.

Table – 2

Association between the risk status for CAD (coronary artery diseases) with selected demographic variables (n=127)

Sample characteristics	Risk status for CAD			χ^2	df	P value
	Low risk for CAD	Moderate risk for CAD	High risk for CAD			
1. Age in years						
>60	4	38	6	10.46	2	0.005*
60 and above	0	56	23			
2. Gender						
Male	0	24	16	10.92	2	0.004*
Female	4	70	13			
3. Duration of illness (Diabetes mellitus)						
< 15 years	4	81	12	25.92	2	0.001*
15 & above years	0	13	17			
4. Blood Pressure (in mm of Hg)						
120 < 80	3	30	7	24.52	6	0.001*
120-139 80-89	1	35	1			
140-159 90-99	0	18	16			
> 160 > 100	0	11	5			
5. RBS mg /dl						
<140 mg/dl	3	33	3	11.50	4	0.021*
140 – 200 mg/dl	0	24	37			
>200 mg/dl	1	37	13			
6. BMI						
Underweight	1	6	0	6.54	6	0.37
Normal	3	55	17			
Over weight	0	26	9			
Obese	0	7	3			

* Significant association ($p < 0.05$)

Table -2 shows that there is significant association between risk status of coronary artery diseases and selected variables like age ($\chi^2 = 10.46$, $p < 0.05$), gender ($\chi^2 = 10.92$, $p < 0.05$), duration of illness ($\chi^2 = 28.75$, $p < 0.05$), blood pressure ($\chi^2 = 24.52$, $p < 0.05$), RBS value ($\chi^2 = 11.50$, $p < 0.05$) except for BMI.

V. DISCUSSION

The overall findings of the study revealed that, out of 127 type 2 diabetic adults, 94 (74%) were at moderate risk for coronary artery diseases, 29 (22.8%) of the subjects were belong to high risk for coronary artery diseases, only 4 (3.1%) of the subjects were at a low risk for coronary artery diseases. It showed that majority of the diabetic adults were at risk for coronary artery diseases.

The present study supported by Rajina (2014) results showed that 37 (60%) sample had high risk status, 18 (29%) had moderate risk and 7(11%) had low risk status for coronary artery diseases.

There was a significant association between risk status of coronary artery diseases and selected variables like age, gender, duration of illness, blood pressure, RBS value.

The present study is supported by a study conducted by Bonakdaran et al. (2011) the reported that the prevalence of cardio vascular diseases (CVD) was 20.1% (156). This prevalence of CVD was significantly associated with age, duration of diabetes, hypertension. They concluded that there is high prevalence of CVD in patients with type 2 diabetes.

The present study is supported by a study conducted by Shah & Afzal (2013), it was reported that the prevalence of diabetes and hypertension was found to be 294 (16.63%) and

321(18.16%) respectively. The mean age of males was 55.68 and females was 49.90 who were suffering from diabetes. It was estimated that 244 (13.8%) individuals had prevalence of both diabetes mellitus and hypertension. There was a significant association ($p=0.006$) found between diabetes mellitus with risk factors like age, consumption of alcohol and difference in physical activities.

VI. CONCLUSION

In order to prevent the coronary artery diseases among type 2 diabetic adults it is very important to creating awareness regarding various risk factors for coronary artery diseases and measures to be taken in prevention of coronary artery diseases by following regular health checkups and healthy life style habits to maintain their health status.

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Real-Time Fire Detection for Video Surveillance Applications Using a Combination of Experts Based On Color, Shape and Motion

Surbhi Narwani

Abstract- Fire causes irreversible damage to fragile natural ecosystems and greatly affects the socio-economic systems of many nations especially in the tropics where forest fires are more prevalent. Early detection of these fires may help reduce these impacts.

Conventional point smoke and fire detectors are widely used in buildings. They typically detect the presence of certain particles generated by smoke and fire by ionization or photometry. Alarm is not issued unless particles reach the sensors to activate them. Therefore, they cannot be used in open spaces and large covered areas. Video based fire detection systems can be useful to detect fire in large auditoriums, tunnels, atriums, etc. The strength of using video in fire detection makes it possible to serve large and open spaces. In addition, closed circuit television (CCTV) surveillance systems are currently installed in various public places monitoring indoors and outdoors. Such systems may gain an early fire detection capability with the use of fire detection software processing the outputs of CCTV cameras in real time.

Index Terms- Computer vision; Image processing; Real time detection; Fire detection; Notification system.

I. INTRODUCTION

Image processing is a method to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it. It is a type of signal dispensation in which input is image, like video frame or photograph and output may be image or characteristics associated with that image. Usually **Image Processing** system includes treating images as two dimensional signals while applying already set signal processing methods to them. It is among rapidly growing technologies today, with its applications in various aspects of a business. Image Processing forms core research area within engineering and computer science disciplines too. The two types of methods used for Image Processing are Analog and Digital Image Processing. Analog or visual techniques of image processing can be used for the hard copies like printouts and photographs. Image analysts use various fundamentals of interpretation while using these visual techniques. The image processing is not just confined to area that has to be studied but on knowledge of analyst. Association is another important tool in image processing through visual techniques. So analysts apply a combination of personal knowledge and collateral data to image processing.

Digital Processing techniques help in manipulation of the digital images by using computers. As raw data from imaging

sensors from satellite platform contains deficiencies. To get over such flaws and to get originality of information, it has to undergo various phases of processing. The three general phases that all types of data have to undergo while using digital technique are Pre-processing, enhancement and display, information extraction.

In the last years several methods have been proposed, with the aim to analyze the videos acquired by traditional video surveillance cameras and detect fires or smoke, and the current scientific effort focused on improving the robustness and performance of the proposed approaches, so as to make possible a commercial exploitation. Although a strict classification of the methods is not simple, two main classes can be distinguished, depending on the analyzed features: color based and motion based. The methods using the first kind of features are based on the consideration that a flame, under the assumption that it is generated by common combustibles as wood, plastic, paper or other, can be reliably characterized by its color, so that the evaluation of the color components (in RGB, YUV or any other color space) is adequately robust to identify the presence of flames. This simple idea inspires several recent methods: for instance, in fire pixels are recognized by an advanced background subtraction technique and a statistical RGB color model: a set of images have been used and a region of the color space has been experimentally identified, so that if a pixel belongs to this particular region, then it can be classified as fire. The introduction of the HSI color space significantly simplifies the definition of the rules for the designer, being more suitable for providing a people-oriented way of describing the color. A similar approach has been used in [6], where a cumulative fire matrix has been defined by combining RGB color and HSV saturation: in particular, starting from the assumption that the green component of the fire pixels has a wide range of changes if compared with red and blue ones, this method evaluates the spatial color variation in pixel values in order to distinguish non-fire moving objects from uncontrolled fires.

In this paper we propose a method able to detect fires by analyzing the videos acquired by surveillance cameras. Two main novelties have been introduced: first, complementary information, respectively based on color, shape variation and motion analysis, are combined by a multi expert system. The main advantage deriving from this approach lies in the fact that the overall performance of the system significantly increases with a relatively small effort made by designer. Second, a novel descriptor based on a bag-of-words approach has been proposed for representing motion. The proposed method has been tested on a very large dataset of fire videos acquired both in real environments and from the web. The obtained results confirm a consistent reduction in the number of false positives, without

paying in terms of accuracy or renouncing the possibility to run the system on embedded platforms.

II. EXISTING METHOD

In general, the use of flame detectors is restricted to "No Smoking" areas or anywhere where highly flammable materials are stored or used. Existing method followed the rules for filtering fire pixels in the HSI color space. This simple idea inspires several recent methods: for instance, fire pixels are recognized by an advanced background subtraction technique and a statistical RGB color model: a set of images have been used and a region of the color space has been experimentally identified, so that if a pixel belongs to this particular region, then it can be classified as fire.

The common limitation of the above mentioned approaches is that they are particularly sensitive to changes in brightness, so causing a high number of false positive due to the presence of shadows or to different tonalities of the red.

III. PROPOSED METHOD

Flame detectors are generally only used in high hazard areas such as fuel loading platforms, industrial process areas, hyperbaric chambers, high ceiling areas, and any other areas with atmospheres in which explosions or very rapid fires may occur. Flame detectors are "line of sight" devices as they must be able to see" the fire, and they are subject to being blocked by objects placed in front of them. However, the infrared type of flame detector has some capability for detecting radiation reflected from walls. In this paper we propose a method able to detect fires by analyzing the videos acquired by surveillance cameras. Two main novelties have been introduced: first, complementary information, respectively based on color, shape variation and motion analysis, are combined by a multi expert system. The main advantage deriving from this approach lies in the fact that the overall performance of the system significantly increases with a relatively small effort made by designer. Second, a novel descriptor based on a bag-of-words approach has been proposed for representing motion

IV. PROBLEM DEFINITION

The existing system uses only contrast based approach. It does not give efficient result. It takes long time identification and also the result is not accurate.

V. PROBLEM ANALYSIS

The purpose of the System Analysis is to produce the brief analysis task and also to establish complete information about the concept, behavior and other constraints such as performance measure and system optimization. The goal of System Analysis is to completely specify the technical details for the main concept in a concise and unambiguous manner.

VI. PACKAGES SELECTED

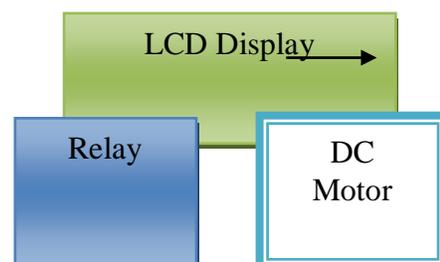
The package selected to develop watermarking is MATLAB and the package has more advanced features. As the system is to be developed in Watermarking, MATLAB platform with windows Application is preferred.

VII. FEATURES OF WINDOWS XP PROFESSIONAL

The ability to become part of a Windows Server domain, a group of computers that are remotely managed by one or more central servers. A sophisticated access control scheme that allows specific permissions on files to be granted to specific users under normal circumstances. However, users can use tools other than Windows Explorer (like cacls or File Manager), or restart to Safe Mode to modify access control lists. Remote Desktop server, which allows a PC to be operated by another Windows XP user over a local area network or the Internet. Offline Files and Folders, which allow the PC to automatically store a copy of files from another networked computer and work with them while disconnected from the network. Encrypting File System, which encrypts files stored on the computer's hard drive so they cannot be read by another user, even with physical access to the storage medium. Centralized administration features, including Group Policies, Automatic Software Installation and Maintenance, Roaming User Profiles, and Remote Installation Service (RIS). Support for two physical central processing units (CPU). (Because the number of CPU cores and Hyper-threading capabilities on modern CPUs are considered to be part of a single physical processor, multi core CPUs is supported using XP Home Edition.) Windows Management Instrumentation Console (WMI): WMI is a command-line tool designed to ease WMI information retrieval about a system by using simple keywords (aliases).

VIII. RESOURCES REQUIRED

In this phase it is necessary to analyze the availability of the resources that are required to design, develop, Implement and Test the project. The resources to be analyzed are Manpower, Time and the system Requirements. Teams of two members are involved in the entire SDLC life cycle except the testing phase. The testing phase is guided by the professional testers before the implementation of the product. Time Analyzed to complete the project is approximately four months with 4 hrs on daily basis except weekends. System requirements are analyzed and listed below.



IX. FEASIBILITY STUDY

The objective of feasibility study is not only to solve the problem but also to acquire a sense of its scope. During the study, the problem definition was crystallized and aspects of the problem to be included in the system are determined. Consequently benefits are estimated with greater accuracy at this stage. The key considerations are:

- ✓ Economic feasibility
- ✓ Technical feasibility
- ✓ Operational feasibility

Economic Feasibility

Economic feasibility studies not only the cost of hardware, software is included but also the benefits in the form of reduced costs are considered here. This project, if installed will certainly be beneficial since there will be reduction in manual work and increase in the speed of work.

Technical Feasibility

Technical feasibility evaluates the hardware requirements, software technology, available personnel etc., as per the requirements it provides sufficient memory to hold and process.

Operational Feasibility

This is the most important step of the feasibility study this study helps to predict the operational ability of the system that is being developed. This study also helps to analyze the approach towards which the system must be developed by which development effort is reduced. Proposed system is beneficial only if they can be turned into information systems, That will meet the organization requirements. This system supports in producing good results and reduces manual work. Only by spending time to evaluate the feasibility, do we reduce the chances from extreme embarrassments at larger stager of the project. Effort spend on a feasibility analysis that results in the cancellation of a proposed project is not a wasted effort

X. LITERATURE SURVEY

FIRE AND SMOKE DETECTION IN VIDEO WITH OPTIMAL MASS TRANSPORT BASED OPTICAL FLOW AND NEURAL NETWORKS

.Kolesov, P.Karasev, A.Tannenbaum . E.Haber

Detection of fire and smoke in video is of practical and theoretical interest. In this paper, we propose the use of optimal mass transport (OMT) optical flow as a low-dimensional descriptor of these complex processes. The detection process is posed as a supervised Bayesian classification problem with spatio-temporal neighborhoods of pixels; feature vectors are composed of OMT velocities and R,G,B color channels. The classifier is implemented as a single-hidden-layer neural network. Sample results show probability of pixels belonging to fire or smoke. In particular, the classifier successfully distinguishes between smoke and similarly colored white wall, as well as fire from a similarly colored background.

A Probabilistic Approach for Vision-Based Fire Detection in Videos Paulo Vinicius Koerich Borges, Member, IEEE, and Ebroul Izquierdo, Senior Member, IEEE

Automated fire detection is an active research topic in computer vision. In this paper, we propose and analyze a new method for identifying fire in videos. Computer vision-based fire detection algorithms are usually applied in closed-circuit television surveillance scenarios with controlled background. In contrast, the proposed method can be applied not only to surveillance but also to automatic video classification for retrieval of fire catastrophes in databases of newscast content. In the latter case, there are large variations in fire and background characteristics depending on the video instance. The proposed method analyzes the frame-to-frame changes of specific low-level features describing potential fire regions. These features are color, area size, surface coarseness, boundary roughness, and skewness within estimated fire regions. Because of flickering and random characteristics of fire, these features are powerful discriminants. The behavioural change of each one of these features is evaluated, and the results are then combined according to the Bayes classy- fier for robust fire recognition. In addition, a priori knowledge of fire events captured in videos is used to significantly improve the classification results. For edited newscast videos, the fire region is usually located in the center of the frames. This fact is used to model the probability of occurrence of fire as a function of the position. Experiments illustrated the applicability of the method.

Visual-based Smoke Detection using Support Vector Machine
Jing Yang, Feng Chen, Weidong Zhang

Smoke detection becomes more and more appealing because of its important application in fire protection. In this paper, we suggest some more universal features, such as the changing unevenness of density distribution and the changing irregularities of the contour of smoke. In order to integrate these features reasonably and gain a low generalization error rate, we propose a support vector machine based smoke detector. The feature set and the classifier can be used in various smoke cases contrary to the limited applications of other methods. Experimental results on different styles of smoke in different scenes show that the algorithm is reliable and effective.

Face Image Abstraction by Ford-Fulkerson Algorithm and Invariant Feature Descriptor for Human Identification Dakshina Ranjan Kisku Debanjan Chatterjee1 , S. Trivedy2 Massimo Tistarelli

—This paper discusses a face image abstraction method by using SIFT features and Ford-Fulkerson algorithm. Ford-Fulkerson algorithm is used to compute the maximum flow in a flow network drawn on SIFT features extracted from a face image. The idea is to obtain an augmenting path which is a path from the source vertex to destination vertex with the available capacities on all edges along a set of paths and flow is calculated along one of these paths. The process is repeated until it is obtained more paths with the available capacities. At the initial stage, face image is characterized by SIFT (Scale Invariant Feature Transform) features and the keypoints descriptor information is taken as features set for further processing.

Keypoints descriptor is used to generate several face representations by using a series of matrix operations which are further used to determine a Directed Acyclic Graph (DAG). The resultant directed graph contains sparse and distinctive face characteristics of a subject from which the face image is captured. We then apply the Ford-Fulkerson algorithm on the directed graph to maintain the capacity constraints, skew symmetry and flow conservation to obtain an augmenting path with available capacities (relation between SIFT points). Finally, we obtain a mathematical representation of a face image and this representation is further encoded to be used as a set of distinctive features for matching. The time complexity of the proposed face abstraction algorithm is found to be $O(VE^2)$ where V is the set of vertices and E is the set of edges in a directed graph.

Optical Flow Estimation for Flame Detection in Videos
Martin Mueller, Member, IEEE, Peter Karasev, Member, IEEE, Ivan Kolesov, Member, IEEE, and Allen Tannenbaum, Fellow, IEEE

Computational vision-based flame detection has drawn significant attention in the past decade with camera surveillance systems becoming ubiquitous. Whereas many discriminating features, such as color, shape, texture, etc., have been employed in the literature, this paper proposes a set of motion features based on motion estimators. The key idea consists of exploiting the difference between the turbulent, fast, fire motion, and the structured, rigid motion of other objects. Since classical optical flow methods do not model the characteristics of fire motion (e.g., non-smoothness of motion, non-constancy of intensity), two optical flow methods are specifically designed for the fire detection task: optimal mass transport models fire with dynamic texture, while a data-driven optical flow scheme models saturated flames. Then, characteristic features related to the flow magnitudes and directions are computed from the flow fields to discriminate between fire and non-fire motion. The proposed features are tested on a large video database to demonstrate their practical usefulness. Moreover, a novel evaluation method is proposed by fire simulations that allow for a controlled environment to analyze parameter influences, such as flame saturation, spatial resolution, frame rate, and random noise

Detection of Multiple Dynamic Textures Using Feature Space Mapping
Ashfaqur Rahman and Manzur Murshed, Member, IEEE

Image sequences of smoke, fire, etc. are known as dynamic textures. Research is mostly limited to characterization of single dynamic textures. In this paper we address the problem of detecting the presence of multiple dynamic textures in an image sequence by establishing a correspondence between the feature space of dynamic textures and that of their mixture in an image sequence. Accuracy of our proposed technique is both analytically and empirically established with detection experiments yielding 92.5% average accuracy on a diverse set of dynamic texture mixtures in synthetically generated as well as real-world image sequences.

Detection of Anomalous Events in Shipboard Video using Moving Object Segmentation and Tracking

Ben Wenger and Shreekanth Mandayam Patrick J. Violante and Kimberly J. Drake Anomalous indications in monitoring equipment onboard U.S. Navy vessels must be handled in a

timely manner to prevent catastrophic system failure. The development of sensor data analysis techniques to assist a ship's crew in monitoring machinery and summon required ship-to-shore assistance is of considerable benefit to the Navy. In addition, the Navy has a large interest in the development of distance support technology in its ongoing efforts to reduce manning on ships. In this paper, we present algorithms for the detection of anomalous events that can be identified from the analysis of monochromatic stationary ship surveillance video streams. The specific anomalies that we have focused on are the presence and growth of smoke and fire events inside the frames of the video stream. The algorithm consists of the following steps. First, a foreground segmentation algorithm based on adaptive Gaussian mixture models is employed to detect the presence of motion in a scene. The algorithm is adapted to emphasize gray-level characteristics related to smoke and fire events in the frame. Next, shape discriminant features in the foreground are enhanced using morphological operations. Following this step, the anomalous indication is tracked between frames using Kalman filtering. Finally, gray level shape and motion features corresponding to the anomaly are subjected to principal component analysis and classified using a multilayer perceptron neural network. The algorithm is exercised on 68 video streams that include the presence of anomalous events (such as fire and smoke) and benign/nuisance events (such as humans walking the field of view). Initial results show that the algorithm is successful in detecting anomalies in video streams, and is suitable for application in shipboard environments. One of the principal advantages of this technique is that the method can be applied to monitor legacy shipboard systems and environments where highquality, color video may not be available.

XI. CONCLUSION

In this paper, we have proposed an efficient method to remove hazes from an image. Our method benefits much from an exploration on the inherent boundary constraint on the transmission function. This constraint, together with a weighted $L1$ -norm based contextual regularization, is modeled into an optimization problem to recover the unknown transmission. An efficient algorithm using variable splitting is also proposed to solve the optimization problem. In comparison with the state-of-the-arts, our method can generate quite visually pleasing results with faithful color and finer image details and structures. Image dehazing often suffers from the problem of ambiguity between image color and depth. That is, a clean pixel may have the same color with a fog-contaminated pixel due to the effects of hazes. For example, some white objects in the scene often have a confusing color with the hazes. Therefore, without sufficient priors, these pixels are difficult to be reliably recognized as fog-contaminated or not fog-contaminated. This ambiguity, revealing the unconstrained nature of single image dehazing, often leads to excessive or inadequate enhancements on the scene objects. From a geometric perspective of image dehazing, we have derived a boundary constraint on the transmission from the radiance cube of an image. Although the boundary constraint imposes a much weaker constraint on the dehazing process, it proves to be surprisingly effective for the dehazing of most

natural images, after combined with the contextual regularization. More generally, one can employ a tighter radiance envelop, not limited to a cubic shape, to provide a more accurate constraint on the transmissions. This may help to further reduce the ambiguity between color and depth, and avoid many erroneous enhancements on the image.

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Effects of awareness and knowledge on breast cancer among intellectuals affiliated to an Iraqi Ministry

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Abstract- Background: Breast cancer is the commonest cancer among females. The lack of adequate skills and knowledge precludes early detection of breast cancer.

Aim of study: To evaluate the level of the awareness and knowledge on breast cancer among different levels of educated women affiliated to a Ministry in Iraq.

Methodology: The sample included 75 females who were subjected to two sets of questionnaire before and after a symposium about breast cancer which has been held in the 15th of April 2013 for 3 hours at the Ministry of Labor and Social Affairs. Twenty questions were asked concerning the frequency of breast cancer, risk factors, and means of early detection, prevention and treatment. The knowledge and attitude were included for evaluation.

Results: There was a significant increase in scoring regarding risk factors, knowledge and attitude. About 55% of the respondents correctly answered 50% of the total score after the lectures than before (30.7%), ($p=0.01$)

Conclusion: The level of awareness and knowledge on breast cancer among the attendees were significantly higher after presenting the lectures.

Recommendations: Educational public health awareness campaigns should be promoted to cover all sectors of the community reaching rural areas; where women are under educated and might suffer from barriers due to religious impact.

Index Terms- Breast cancer, awareness, knowledge, intellectuals, Iraq.

I. INTRODUCTION

Serious attempts to control breast cancer, as a major health burden among women in the world in general and Iraq in particular [1,2], are encouraged due to the noticeable rise in its incidence rates, the higher victims at younger ages, and the advanced stages at time of diagnosis. This was the starting point of the Iraqi national program for early detection of breast cancer, which was initiated in 2001 with the objective of down staging this disease at the time of presentation. Since then specialized centers and clinics for early detection of breast tumors have been well-known in the major hospitals in all Iraqi provinces. [2, 3, 4.]

The World Health Organization (5) and the Breast Health Global Initiative (6) provide guidelines for early detection and screening in middle and low-income countries that encourage public health awareness programs. It has been demonstrated that

early detection and screening of breast cancer, particularly when combined with adequate therapy, could lead to a fall in breast cancer mortality [7].

In 2009 a "National Breast Cancer Early Detection and Research Program" was organized by the authority of the National Cancer Research Center of Baghdad University in order to achieve main objectives that include enhancing knowledge and skills of health personnel, promoting relevant research studies, and raising the awareness of the general population to the common risk factors and means for early detection of the disease.

II. MATERIAL AND METHODS

This is a prospective study which is carried out by the Iraqi National Cancer Research Center. The data were collected during a 3hour symposium that was held at the Ministry of Labor and Social Affairs in the 15th of April 2013 as part of the awareness activities of Iraqi national cancer research program. The main objective focused upon promoting education among the general populations. Seventy five attendees were asked to answer twenty questions before and after the presented lectures as shown in table 1. The questionnaire paper was designed to evaluate the level of knowledge in a studied sample about breast cancer and means of its control.

Twenty questions have been grouped to simplify the calculation. The total score of all questions was calculated before and after the lecture. The four groups of questions were designed as follow:

1. Questions about frequency of breast cancer.
2. Questions about means of early detection
3. Questions about breast cancer risk factors.
4. Questions about prevention and treatment approaches.

Statistical analysis was performed with the SPSS. Univariate data were summarized using standard descriptive statistics, tabulation of categorical variables and histograms of numerical variables. T-test was used to compare means of the continuous variables. Exact tests were used to calculate the p value. In all statistical analyses, a p value < 0.05 was considered significant.

III. RESULTS

Table 1: Questionnaires used for evaluation of the respondents knowledge about breast cancer (same pre and post assessment questionnaire).

No.	Question
q1	Rank of breast cancer in Iraq
q 2	Rank of breast cancer in the world
q 3	Means of early detection of breast cancer
q 4	The best time to do breast self examination (BSE)
q 5	BSE in menopausal woman
q6	The effect of aging on the possibility of breast cancer
q7	The effect of infertility on the possibility of breast cancer
q8	Risk of breast cancer in menopausal woman over 55yr
q9	Risk of breast cancer if menarche starts at 11 years
q10	Risk of of developing breast cancer if the ovaries were removed at an early age
q11	Impact of obesity in postmenopausal women at risk for breast cancer
q 12	The effect of the use of hormonal contraceptives on the likelihood of developing breast cancer
q 13	Do you think that alcohol may increase the likelihood of developing breast cancer!
q 14	Do you think that radiation exposure may increase the likelihood of developing breast cancer!
q 15	Possibility of treating breast cancer through!
q16	Means of breast cancer control
q 17	The main reason behind the increase in likelihood of developing breast cancer in obese women after menopause
q18	Methods of prevention of breast cancer
q 19	Factors that increase the risk of developing the disease
q 20	Factors that help to decrease the likelihood of breast cancer

Seventy-five respondents were involved in the pre assessment while only fifty-three respondents answered the post assessment questionnaire. The mean age of attendees was 38.01 years (SD ± 10.1). The demographic distribution of the attendees is summarized in the tables 2.

Table-2: The demographic distribution of the sample according to marital status and educational levels:

- Educational level	Frequency	Percent
Primary school	9	12.0
College or Institute graduate	66	88.0
Total	75	100.0
Marital status		
Married	50	66.7
Non-married	25	33.3
Total	75	100.0

Table (2) illustrates that 88% of the study population were College or Institute graduates and 66.7% were married.

Table-3: Comparison of scores of answers before and after the lecture.

Questioners	Group	N	Mean ± SD	P
Knowledge and attitude	Pre-Test	75	7.83 ± 3.17	0.006*
	Post-Test	53	9.53 ± 3.52	

The mean scores of the answers were significantly higher after the lecture than before the lecture (p = 0.006).

Table-4: Associations between knowledge and Attitude ranks before and after the lecture.

Group		Knowledge and attitude ranks		Total	p
		Less than 50 %	50 % or more		
Pre-Test		52	23	75	0.01
		69.3%	30.7%	100%	
Post-Test		24	29	53	0.01
		45.3%	54.7%	100%	
Total No of the study population		76	52	128	100%
		59.4%	40.6%		

At the same time there was a significantly larger proportion (54.7%) of individuals who had answered correctly more than 50% of the total score in the post assessment compared to the pre assessment stage (30.7%), (p = 0.01) .

IV. DISCUSSION

Breast cancer continues to represent a major public health problem, and extra gains in survival might be achieved by encouraging women to look for aid more quickly [8]. It has been documented that breast self examination (BSE) along with diagnostic mammography could offer cost effective approaches to early detection of the disease (9). Unfortunately, a high percentage of women are unaware of the benefits of BSE and its procedure [10]. Accordingly that useful and simple examination is often neglected [11].

Our study illustrates that the level of knowledge and education about breast cancer could enhance awareness in women. That has been evident by the significant increase in the rate of correct answers and the higher achieved scores in the level of knowledge and attitude about breast cancer after being instructed by the presenting lectures.

Relatively close findings were displayed in a previous similarly designed study from Saudi Arabia which emphasized the limited knowledge and practice among female Saudi students in schools and colleges [12]. A Jordanian study conducted among 163 nurses and 178 teachers revealed that profession, age and family history significantly influenced breast cancer awareness. Most of the nurses (88.3%) were able to correctly answer the questions; the mean awareness score for nurses was higher than that for teachers. [13].

A similar study among female health care workers in Tehran demonstrated that their knowledge was unsatisfactory and concluded that Iranian women needed more education about breast cancer [14]. That finding was endorsed by another survey from the Islamic Republic of Iran [15]. On the other hand, in a teaching hospital in Karachi, 35% of Pakistani nurses had fairly good level of knowledge about breast cancer risk factors [16] .

In our study it was concluded that among the variables which might affect the level of knowledge, as revealed by this analysis, were risk factors, prevention, treatment and practice of BSE; all of which being vital parameters. Our results are thus consistent with the findings recorded in other surveys which highlighted that behavioral based health interventions could promote women knowledge; change their attitudes and beliefs about breast cancer and the relevant screening and control measures (17, 18).

Fortunately, the Iraqi National Program for Early Detection and Breast Cancer Research has been promoted to involve other collaborating countries in the region (19) in a practical attempt to implement national cancer control strategies. The favorable findings documented in our study justify expanding the spectrum of the implemented awareness campaigns and increasing efforts in order to reach remote rural areas where women are significantly less educated, imprisoned by the cultural impact and thus neglecting their well being needs. Enhancing the potential effectiveness of the visual media in modifying health behavior and promoting public education among the general population about BSE is essentially emphasized as well.

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The Implementation Criteria of a Health Management Information System: A Case of Kenyatta National Hospital

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Abstract- Embracing modern technology is one among very many ways of improving efficiency and reducing costs within healthcare organizations. While the integration of information and health services potential benefits cannot be disputed, there are many challenges which affect its adoption, in fact, majority of organizations have abandoned their newly acquired systems only to go back to their old manual systems.

Objective: The objective of this study was to determine the implementation phase of the implemented Health Management Information System at Kenyatta National Hospital.

Methods: This study was a cross-sectional descriptive study, the targeted population of the study were 263 healthcare workers who were involved in the implementation of the Health Management Information System at Kenyatta National Hospital, the sample technique used was stratified sampling. The study utilized structured questionnaires for 263 respondents in the implementation phase, analysis was done through use of univariate and bivariate statistics. Data presentation was in form of descriptive statistics such as frequency distribution, percentages, pie charts, bar graphs and tables.

Results and Discussions: The data from the implementation phase was summarized in three main evaluation areas targeting the organizational, technical and individual factors that influence HMIS implementation. From the findings, there was a balance in gender, age and cadre at KNH and thus an equilibrium that is anticipated towards HMIS implementation. Facilitating the staff with the necessary equipment for example personal computers is a challenge to KNH. These does not augur well with (Laudon and Laudon, 2008) who stated that the production of quality health-care delivery in a country is guided by the level of the ICT infrastructure possessed and used by that country. Comparison of health workers characteristics and their responses on influence of organizational factors on HMIS implementation showed that health workers' age and duration of employment in KNH were both significantly associated with perception of HMIS implementation. The health workers in the older age groups 36-45 years 31, (38.3%) $P = 0.021$ and 46-55 years 6, (20%) $P = 0.001$ were less likely to agree that organizational factors influenced implementation of HMIS compared to younger 18-25 years 28, (59.6%) health workers. (OR = 0.17, 0.06-0.49. for 46-55 years and OR = 0.42, 0.20-0.88 for 36-45 years). Similarly longer duration of employment was associated with less agreement that organizational factors influence implementation of HMIS.[0-12 months 26, (57.8%) vs 8-12 years 12,(29.3%) OR = 0.3. 0.12-0.74]. Gender did not have a significant association with organizational factors

influence of HMIS implantation (OR = 0.97, 0.59 – 1.59, $P = 0.901$).). Logistical regression analysis showed that participants' responses on the influence of technical factors on implementation of a HMIS were associated with level of management. Health workers in operational/technical level of management were significantly less likely to report an influence of individual factors on HMIS implementation compared to top/strategic level managers. (OR = 0.14, 0.04-0.52, $P = 0.003$), middle/tactical level management responses were not significantly different from top/strategic level managers (OR = 0.51, 0.16-0.52, $P = 0.0257$). Health worker's cadre, gender and duration of employment were not significantly associated with influence of individual factors on HMIS implementation (all P values > 0.05). To support these, Wickramasinghe *et al* (2005) stated that cultural and individual issues need to be addressed in terms of appropriate and relevant content. The findings indicated that two factors: level of management and duration of employment were significantly associated with technical and individual factors affecting HMIS implementation at KNH. The findings indicated that two factors: level of management and duration of employment were significantly associated with technical and individual factors affecting HMIS implementation at KNH.

Conclusions: Based on the results and discussions, Health management information systems can provide tools for managing complex health care challenges and addressing growing information needs, these was characterized in that, most health workers agreed 158 (59.4%) or strongly agreed 64 (24.1%) that KNH used HMIS in routine delivery of healthcare services. Similarly, health workers were more likely to agree that KNH management supports HMIS 177 (66.8%) and that change to electronic HMIS had brought better, effective and efficient healthcare delivery 170 (63.9%). Most respondents 159 (60%) agreed that KNH has developed changes in its structure into a more integrated process of management. In the implementation criterion, the findings indicated that while the other attributes had a significance, gender did not have a significant association with organizational factors influence of HMIS implementation and that two factors: level of management and duration of employment were significantly associated with technical and individual factors affecting HMIS implementation at KNH.

Recommendations: KNH needs to improve their current infrastructure, embrace technology and be updated with the new ways of managing health problems in order to attain international standards.

Index Terms- HMIS- Health Management Information Systems, KNH-Kenyatta National Hospital, HSS-Health Systems Strengthening ICT-Information Communication Technology SDLC-Software Development Life Cycle

I. INTRODUCTION

Health is at the heart of the Millennium Development Goals (MDGs) and Health information systems are critical for reaching universal health coverage. Health systems' strengthening is rising on political agendas worldwide. Precise and nuanced knowledge and understanding of what constitutes an effective health system is growing all the time. At its broadest, health system strengthening (HSS) can be defined as any array of initiatives and strategies that improves one or more of the functions of the health system and that leads to better health through improvements in access, coverage, quality, or efficiency (Health Systems Action Network 2006). The current WHO framework for action on Health systems describes six clearly defined health system building blocks that together constitute a complete health system (WHO, 2009). Many developed countries such as Singapore, Canada, United States of America and United Kingdom have invested huge amounts of money for stimulating Health Management Information System (HMIS) adoption while developing countries are still struggling to make do with the traditional healthcare setup.

Study Purpose: The aim of the study was to assess the implementation criteria in the implementation of Health Management Information System in Kenyatta National Hospital.

II. METHODS

The study was conducted in Nairobi County at Kenyatta National Hospital and used a descriptive purposeful research design. Purposeful sampling, in contrast to probabilistic sampling, is "selecting information-rich cases for study in depth". In this case KNH being at the apex of the National Hospital Referral System was purposefully selected. These shall allow the study to collect data which will be analyzed quantitatively using descriptive and inferential statistics (Kothari, 2004). Therefore, the descriptive survey was deemed the best strategy to fulfill the objective of this study. The design took on a case study at KNH.

The targeted population were 263 accredited healthcare service delivery officers at Kenyatta National Hospital who were directly or indirectly involved in the implementation phase of implementing the HMIS. The scope was deemed appropriate due to the fact that with rise in technology, urban areas and cities in specific embrace it with ease. The scope was also significant to minimize expenses which would otherwise be incurred outside the researchers' residential city.

The researcher used stratified sampling, with stratified sampling; the population is divided into groups, based on some characteristic. Then, within each group, a probability sample (often a simple random sample) is selected. In stratified sampling, the groups are called strata. (Kothari, 2004). Then judgment is used to select the subjects or units from each segment based on a specified proportion, From the study the

independent variables were the organizational, technical and individual factors in the implementation criteria when adopting a Health Management Information System at the Kenyatta National Hospital, since an *independent variable* refers to the status of the presumed cause whereas the *dependent variable* is the presumed effect. Effectual Implementation of Health Management Information System at the Kenyatta National Hospital due to the importance of the implementation criteria thus was the dependent variable.

These was a quantitative Data analysis and was done using SPSS, Ms Excel and Ms Word software's with univariate and bivariate statistics being utilized. Univariate statistics is taking one variable and analyzing it whereas, Bivariate analysis is one of the simplest forms of [quantitative \(statistical\) analysis](#). It involves the analysis of two [variables](#) for the purpose of determining the empirical relationship between them in order to see if the variables are related to one another, it is common to measure how those two variables simultaneously change together. Bivariate analysis can be helpful in testing simple [hypotheses](#) of [association](#).

Before data collection, a permit was sort from the Kenya Methodist University and the Kenyatta National Hospital/University of Nairobi ethics committee. On production of the research permit, consideration for permission to carry out the research was to be granted by the research and ethics board team. The Administrators, staff and the support staff of the departments selected were informed in advance concerning the visits and for data collection in their respective departments and offices. The researcher ensured that confidentiality was paramount and the information obtained used only for the purpose of these study.

III. RESULTS AND DISCUSSIONS

A total of 263 questionnaires were administered to health workers using the HMIS system. Two health workers did not return the completed questionnaire, thus responses from a total of 261 health workers were available for evaluation of the operational criteria phase, representing a response rate of 99.2%.

Social demographics: Out of the 261 health workers who responded to the survey, a total of 152 (57.1%) were male giving a male-to-female ratio of approximately 4:3. The mean age of the health workers was 34.7 years with a SD of 9.3. The modal age group among the health workers was between 26-35 years with 101 (38%) of participants followed by age 36-45 at 82 (30.8%) and the age group aged 56 and above were the minority at 5 (1.9%), and majority 112 (42.9%) of the respondents were health information officers. Clinical staff accounted for 82 (31.4%) of respondents and administration and operation staff comprised 67 (25.7%) of participants. Individuals are among the users of HMIS and different users have different needs (WHO, 2013). The research sought to find out if there is a relationship between the socio-demographics characteristics of the respondents and the HMIS implementation in KNH. Findings indicated that there is a balance in gender, age and cadre at KNH and thus an equilibrium that is anticipated towards HMIS implementation.

In comparison to participant's age and participant's duration, there is a blend among young and older healthcare workers and change management should not be among the

impediments of adopting HMIS as KNH, (2008) puts it that healthcare providers in Kenyatta National Hospital have not reached the optimum for adopting electronic health records, it is unclear what the impediments are, although they want to adopt HIT there are still challenges that need to be contained.

a) Organizational factors influencing HMIS implementation:

Despite the general lack of knowledge on HMIS policy the informants demonstrated adequate understanding of the objectives of the electronic HMIS in KNH. Based on the responses obtained during interviews there were multiple problems related to the manual system that existed in KNH during the pre-implementation stage and these issues served as the basis for objective setting for the current HMIS in the hospital. The main purposes of the HMIS system listed by key informants were to: improve efficiency, improve data quality, reduce loss of hospital data, reduce data archiving and storage requirements, and promote automation and integration of hospital processes and procedures and these indicated why KNH re-aligned its strategic focus and interventions for the Hospital to meet the challenges it faces in the implementation of its mandate and among the strategic plans was adoption of ICT to improve its performance to the expected international standards it intends to achieve (KNH SP, 2013). At least 50% of respondents agreed that more computers should be added to the department, the department collects, analyzes, interprets and stores data in its computers and KNH has a current and up to date ICT infrastructure. This blended well with (KNH SP, 2013) that documented, for KNH to achieve its mission and vision the hospital needs to embrace technology and be up to date with the new ways of managing Health care issues. Comparison of health workers characteristics and their responses on influence of organizational factors on HMIS implementation showed that health workers' age and duration of employment in KNH were both significantly associated with perception of HMIS implementation. The health workers in the older age groups 36-45 years 31, (38.3%) $P = 0.021$ and 46-55 years 6, (20%) $P = 0.001$ were less likely to agree that organizational factors influenced implementation of HMIS compared to younger 18-25 years 28, (59.6%) health workers. (OR = 0.17, 0.06-0.49. for 46-55 years and OR = 0.42, 0.20-0.88 for 36-45 years). Similarly longer duration of employment was associated with less agreement that organizational factors influence implementation of HMIS. [0-12 months 26, (57.8%) vs 8-12 years 12, (29.3%) OR = 0.3. 0.12-0.74]. Gender did not have a significant association with organizational factors influence of HMIS implantation (OR = 0.97, 0.59 – 1.59, $P = 0.901$).

b) Technical factors influencing HMIS implementation.

Study results showed that top management level were more likely to agree or strongly agree 13 (72.2%) that technical factors had influence on HMIS implementation compared to technical or tactical level management. Logistical regression analysis showed that

participants' responses on the influence of technical factors on implementation of a HMIS were associated with level of management. Compared to top/strategic managers the middle/tactical level were less likely to agree that technical factors influence implementation of HMIS [42 (38.5%) vs 13 (72.2%), OR = 0.24, 0.08-0.74, $P = 0.012$]. The staff cadre was not associated with responses on whether technical factors influence HMIS implementation (health information OR = 1.6, 0.9-2.84, $P = 0.113$) administration and operation (OR = 1.36, 0.71-2.6, $P = 0.358$). Gender did not show a significance association with participant views on whether technical factors influenced HMIS implementation (OR = 1.23, 0.75-2.01, $P = 0.415$).

c) Individual Factors Influence on HMIS : Most health workers agreed that health care service delivery is faster with HMIS 167 (62.8%) and that HMIS has brought about better updating and expertise in healthcare service delivery 175 (65.8%). Health worker responses on the influence of remaining individual factors on HMIS were more variable, to support these, Wickramasinghe *et al* (2005) stated that cultural and individual issues need to be addressed in terms of appropriate and relevant content. Health workers in operational/technical level of management were significantly less likely to report an influence of individual factors on HMIS implementation compared to top/strategic level managers. (OR = 0.14, 0.04-0.52, $P = 0.003$), middle/tactical level management responses were not significantly different from top/strategic level managers (OR = 0.51, 0.16-0.52, $P = 0.0257$). Health worker's cadre, gender and duration of employment were not significantly associated with influence of individual factors on HMIS implementation (all P values > 0.05)

IV. CONCLUSIONS

Health management information systems can provide tools for managing complex health care challenges and addressing growing information needs, these was characterized in that, most health workers agreed 158 (59.4%) or strongly agreed 64 (24.1%) that KNH used HMIS in routine delivery of healthcare services. Similarly, health workers were more likely to agree that KNH management supports HMIS 177 (66.8%) and that change to electronic HMIS had brought better, effective and efficient healthcare delivery 170 (63.9%). Most respondents 159 (60%) agreed that KNH has developed changes in its structure into a more integrated process of management. These was in agreement in that many of the respondent were likely to agree (60%) or strongly agree (14.7%) that ICT structure is conducive for the growth and expansion of HMIS in KNH and that cost of ICT equipment and tools affects the application and implementation of HMIS (55.3% and 15.8%, respectively) An important approach to the design and implementation of any HIT and health programme is to identify the various stakeholders who need to be involved and find mechanisms for including their perspectives and concerns and to find ways to mobilize their skills, expertise and resources. In the implementation criterion, the findings indicated that while the other attributes had a

significance, gender did not have a significant association with organizational factors influence of HMIS implementation and that two factors: level of management and duration of employment were significantly associated with technical and individual factors affecting HMIS implementation at KNH.

V. RECOMMENDATIONS ON RESEARCH FINDINGS

The KNH and MOH need to have iterative process before implementing any health management information system.

APPENDIX

Appendixes, if needed, appear before the acknowledgment.

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SECURE BIO-METRIC BASED GLUCOSE CONTROL FOR DIABETIC PATIENTS USING ZIGBEE

ANKUR NAGAR

Selvakumar.A

Abstract- Embedded systems are commonly found in consumer, cooking, industrial, automotive, medical, commercial and military applications. Telecommunications systems employ numerous embedded systems from telephone switches for the network to cell phones at the end-user. Computer networking uses dedicated routers and network bridges to route data.

Consumer electronics include personal digital assistants (PDAs), mp3 players, mobile phones, videogame consoles, digital cameras, DVD players, GPS receivers, and printers. Household appliances, such as microwave ovens, washing machines and dishwashers, include embedded systems to provide flexibility, efficiency and features. Advanced HVAC systems use networked thermostats to more accurately and efficiently control temperature that can change by time of day and season. Home automation uses wired- and wireless-networking that can be used to control lights, climate, security, audio/visual, surveillance, etc., all of which use embedded devices for sensing and controlling.

In this project, a novel non-invasive sensor for the measurement of the glucose concentrations in blood is presented. By using a microstrip band pass filter, a wireless sensor is achieved. In the introduced design, the thumb is placed on the structure of the filter as a superstrate. The response of the filter is dependent on the permittivity of the superstrate. A compact size, linearity and cost effectiveness are the most important advantages of the proposed sensor. The linear behaviour of the filter in terms of the frequency is investigated and for a linear behaviour, a certain frequency for operation is selected. The introduced sensor can be used by diabetics for continuous self-monitoring of the glucose level. The structure of the proposed sensor is designed on the low-

cost substrate, FR4, by compact dimensions of 50 mm × 40 mm × 1.6mm

Keywords- Feature Vector; Kekre transform; Walsh transform; Haar transform; GAR

I. INTRODUCTION

1. Diabetic Patients require continuous blood glucose level assessment in order for proper health maintenance.
2. So a monitoring schedule must be maintained at required period of time without fail.
3. Hence it necessitates to discuss the glucose level with the doctors regularly.
4. Here we automate the monitoring process by wireless sending of glucose level of patients to doctors
5. Use of biometric help for secure database

II. EXISTING SYSTEM

1. Here glucose level is not monitored regularly
2. No automated facility is available for updating the glucose level to the doctors
3. No Security is provided for patient details maintenance
4. Very late process results in improper diagnosis of patients

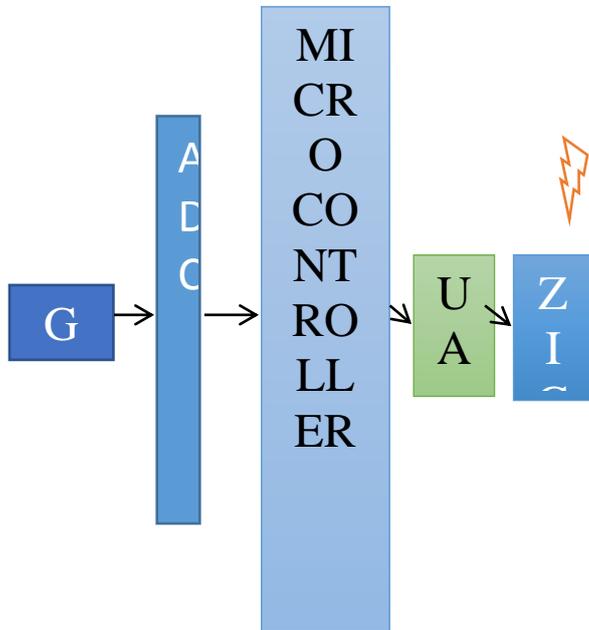
III. PROPOSED SYSTEM

1. Here glucose level is monitored using glucose sensor
2. The glucose sensor value is sent wirelessly using zigbee to the doctor
3. At the receiver side, only authorized doctor can receive the patient information
4. Finger print id is used for checking the authentication of doctor

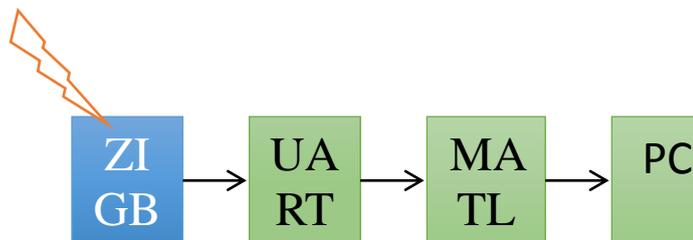
- Based on the authentication the patients details are received and stored in PC

IV. SYSTEM ARCHITECTURE

GLUCOSE LEVEL MONITORING



BLOCK DIAGRAM: RECEIVER SIDE



Methodology for fingerprint

Dataset Preparation:

- Here preparation of dataset is done by collecting Biometric scanned Images of a person
- of different biometrics such as finger, iris & face. All these datasets are stored in a local directory

Feature Extraction :

Here the Images are processed based on different algorithms as per the biometric used. In This papers we extract features of finger , iris & face & generate score values which are used for authentication & further control of devices based on these results

Finger print feature Extraction:

- Fingerprints are the most used biometrics in applications where a high level of security is required. This project implements the identification procedure: it matches one fingerprint among N fingerprints. It uses minutiae points based algorithms: in the enrollment step, the points are extracted from the print. Later on, during the authentication step, the points are matched. This step is implemented using fingerprint enhancement and minutia filtering.
- In a fingerprint, they correspond to either a ridge ending or a bifurcation. There is a duality between the two types of minutiae: if the pixel brightness is inverted, ridge endings become bifurcations and vice versa. The position of the minutia point is at the tip of the ridge or the valley. The orientation is given by the orientation of the arrow formed by the ridge or the valley . First, the local orientation field needs to be computed.

ALGORITHMS / PROTOCOLS

UART PROTOCOL

The Universal Asynchronous Receiver/Transmitter (UART) controller is the key component of the serial communications subsystem of a computer. UART is also a common integrated feature in most microcontrollers. The UART takes bytes of data and transmits the individual bits in a sequential fashion. At the destination, a second UART re-assembles the bits into complete bytes. Serial transmission of digital information (bits) through a single wire or other medium is much more cost effective than parallel transmission through multiple wires. Communication can be “full duplex” (both send and receive at the same time) or “half duplex” (devices take turns transmitting and receiving).

HARDWARE REQUIREMENT:

- Microcontroller 8051
- ADC
- Glucose sensor

- UART
- Pc
- Zigbee
- Power Supply Unit

SOFTWARE REQUIREMENT:

- Keil compiler
- Embedded C
- MATLAB

Microcontroller

All the functions required on a single chip. A microcontroller differs from a microprocessor, which is a general-purpose chip that is used to create a multi-function computer or device and requires multiple chips to handle various tasks. A microcontroller is meant to be more self-contained and independent, and functions as a tiny, dedicated computer.

They are typically designed using CMOS (complementary metal oxide semiconductor) technology, an efficient fabrication technique that uses less power and is more immune to power spikes than other techniques. There are also multiple architectures. A microcontroller is an integrated chip that is often part of an embedded system. The microcontroller includes a CPU, RAM, ROM, I/O ports, and timers like a standard computer, but because they are designed to execute only a single specific task to control a single system, they are much smaller and simplified so that they can include used, but the predominant architecture is CISC (Complex Instruction Set Computer), which allows the microcontroller to contain multiple control instructions that can be executed with a single macro instruction. Some use a RISC (Reduced Instruction Set Computer) architecture, which implements fewer instructions, but delivers greater simplicity and lower power consumption.

Early controllers were typically built from logic components and were usually quite large. Later, microprocessors were used, and controllers were able to fit onto a circuit board. Microcontrollers now place all of the

needed components onto a single chip. Because they control a single function, some complex devices contain multiple microprocessors.

Microcontrollers have become common in many areas, and can be found in home appliances, computer equipment, and instrumentation. They are often used in automobiles, and have many industrial uses as well, and have become a central part of industrial robotics. Because they are usually used to control a single process and execute simple instructions, microcontrollers do not require significant processing power.

Introduction:

The AT89c51 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89c51 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89c51 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89c51 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning.

Features:

- Compatible with MCS-51 Products
- 8K Bytes of In-System Programmable (ISP) Flash Memory

– Endurance: 10,000 Write/Erase Cycles

- 4.0V to 5.5V Operating Range
- Fully Static Operation: 0 Hz to 33 MHz
- Three-level Program Memory Lock
- 256 x 8-bit Internal RAM
- 32 Programmable I/O Lines
- Three 16-bit Timer/Counters
- Eight Interrupt Sources
- Full Duplex UART Serial Channel
- Low-power Idle and Power-down Modes
- Interrupt Recovery from Power-down Mode
- Watchdog Timer

3.2.2. INTRODUCTION TO MICROCONTROLLER (AT89c51):

The AT89c51 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel’s high-density non-volatile memory technology and is compatible with the Industry standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel’s AT89c51 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control application.

-Network, Security & Application layers

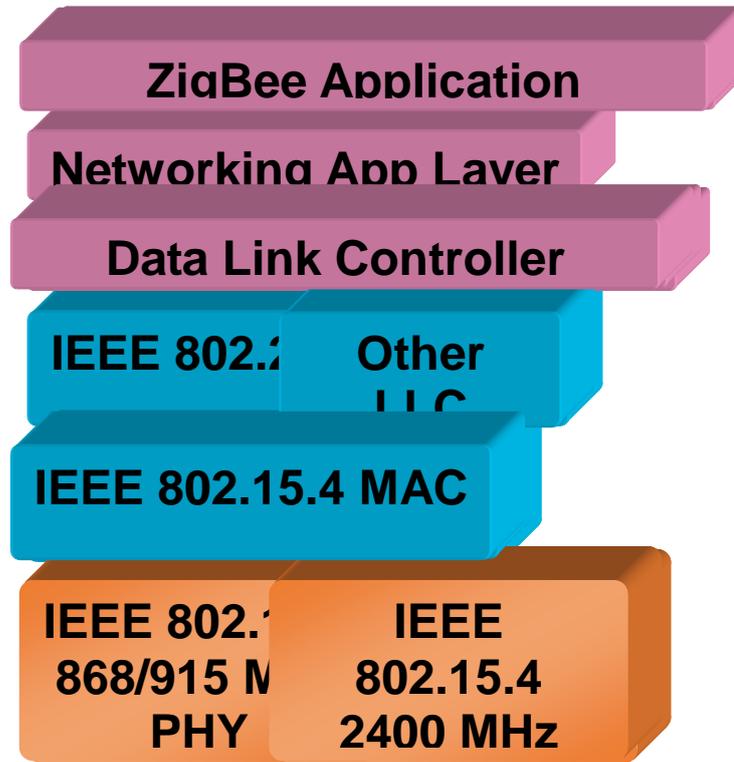
-Brand management

IEEE 802.15.4

-“the hardware”

-Physical & Media Access Control layers

IEEE 802.15.4 Architecture



- PHY functionalities:
 - Activation and deactivation of the radio transceiver
 - Energy detection within the current channel
 - Link quality indication for received packets
 - Clear channel assessment for CSMA-CA
 - Channel frequency selection
 - Data transmission and reception
 - PHY packet fields
 - Preamble (32 bits) – synchronization
 - Start of packet delimiter (8 bits) – shall be formatted as “11100101”
 - PHY header (8 bits) –PSDU length
 - PSDU (0 to 127 bytes) – data field
- The standard specifies two PHYs :
 - 868 MHz/915 MHz direct sequence spread spectrum (DSSS) PHY (11 channels)
 - 1 channel (20Kb/s) in European 868MHz band
 - 10 channels (40Kb/s) in 915 (902-928)MHz ISM band

USB to RS232 Converter Circuit Description

1.0 CIRCUIT OVERVIEW

The USB to RS232 Converter board is a PIC microcontroller based device that receives a USB signal from a PC and converts the signal to an RS232 output. The output signal can be sent to any one of three serial ports. Devices which may be connected to the RS232 ports include the ASI Inc. X-Y Stage, the Olympus Z-Focus, and the Mai Tai LASER.

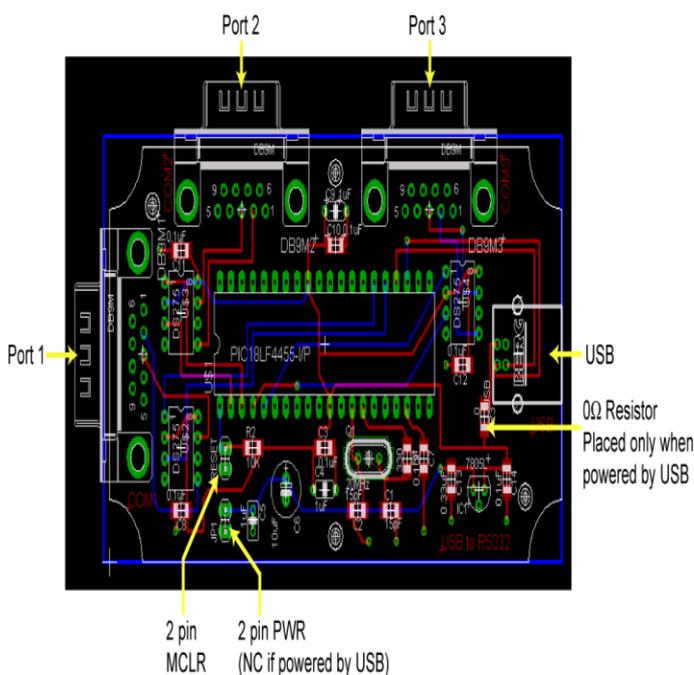


Figure 1: Current PCB Layout

LITERATURE SURVEY:

Title 1: Development of the Portable Blood Glucose Meter for Self-monitoring of Blood Glucose

Author : Qi Li 1, Jingqi Yuan

Abstract :

The work outlined in this paper is towards developing a portable, economy blood glucose meter for self-monitoring of blood glucose, which has high performance-price ratio with multifunction and is attractive to the average people. Its functions include blood glucose concentration measurement, LCD display, historical records

restore, calendar/timer. It enables the patients with diabetes to detect blood glucose with a glucose oxidase electrode independently at home. This paper will outline hardware configuration in the implementation and software management. Especially, graphic trend curve on LCD allows individuals to easily see how actual blood glucose

readings compare with historical records stored in the meter and show how individuals stay within their specific target range so that they can determine how well they are

controlling their diabetes. Experimental results indicate that this device is easy-to-use and suitable for home blood glucose monitoring for patients.

Disadvantage:

Patient data is insecure and is not maintained

Title2 : A 3micro W CMOS Glucose Sensor for Wireless Contact-Lens Tear Glucose Monitoring

Author : Yu-Te Liao, Huanfen Yao, Andrew Lingley, Babak Parviz, and Brian P. Otis

Abstract :

This paper presents a noninvasive wireless sensor platform for continuous health monitoring. The sensor system integrates a loop antenna, wireless sensor interface chip, and glucose sensor on a polymer substrate. The IC consists of power management, readout circuitry, wireless communication interface, LED driver, and energy storage capacitors in a 0.36-mm CMOS chip with no external components. The sensitivity of our glucose sensor is 0.18 A mm mM . The system is wirelessly powered and achieves a measured glucose range of 0.05–1 mM

with a sensitivity of 400 Hz/mM while consuming 3 W from a regulated 1.2-V supply.

Disadvantage:

Data of glucose is not recorded wirelessly

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