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# Teachers Leadership and Trust: Its Effect on Teachers Performance

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**Abstract-** The objective of the research is to verify whether there is direct effect of teachers leadership and trust on teachers performance. The study was conducted at Sukabumi's senior high school by using a survey method with path analysis applied in testing hypothesis and 125 samples selected by simple random sampling. The finding of the research are : (1) There is a direct positive effect of teacher leadership on teacher performance. (2). There is direct positive effect of trust in teacher performance. (3) There is direct positive effect of teacher leadership on trust. (4) There is indirect effect of teacher leadership on teacher performance through trust. Based on these findings, it could be concluded that any changing or variation occurred at teacher performance might have been directly significant effected by teacher leadership and trust, and also indirectly significant effected by teacher leadership. Therefore, when we want to minimize the variation which occurred in teacher leadership, these factors such as teacher leadership and trust are necessary to be taken into account.

**Index Terms-** Teacher leadership, Trust, Teacher Performance

## I. INTRODUCTION

Education enormously contributes to the progress of the nation and the development of national identity. Among many national development agendas, education is one of the most important agendas that is strategic and need more serious attention from all sides, because education is a determinant of the future progress of a nation. The development of the education sector undertaken by the government together with the community is an effort in the implementation in one of the national idea generation, namely the intellectual life of the nation. Education is one investment of human capital, that determines the quality of human resources (HR) of a nation.

The problem of education in Indonesia still needs extra attention, both in terms of government policy and from the internal problems of the school. School as an organization consists of principals, teachers, students and other school residents. Teachers are one of the keys to successful education, especially at the school level. School needs teachers who have good working behavior, quality, and commitment to the school itself.

According to Hary and Burhanudin (2008:72), "there are three main priorities that have been determined by the government to develop education in Indonesia: improving equity and access, enhancing quality and relevance, and strengthening management and accountability"

The extent to which teachers' contribution in realizing school goals is determined by many factors, one of which is the tendency of teachers to demonstrate extra behaviors. This behavior leads teachers to take positive actions that benefit to the school organization. Based on the results of interviews with High School Supervisory Coordinator Sukabumi Education Office, problems that arise in carrying out the duties and functions of teachers is high school teachers in Sukabumi still have teacher performance understanding limitations. Low teacher performance indicator seen by the lack of extra awareness to improve the quality of education through continuous quality learning process, lack of innovation in advancing schools, teachers generally do not have their own initiative to work, there must be special pressure from their superiors to work better , they work only to meet established work standards.

The above problems are believed to be caused by various factors, one of which is trust. Trust is a personality based on honest, courageous, wise and responsible element. High trust can encourage extra role behavior in teachers. Such extra role behaviors can improve organizational effectiveness. The idea generation and goals of the organization will be achieved, the coveted quality will be real and felt by all the citizens of the school and related parties. In addition, other factor affecting teacher performance is teacher leadership. Teacher leadership model is very suitable applied in school because the leadership model that in line with the achievement of teaching and learning process makes teachers showing good attitude and behavior in improving teacher leadership.

This study examines the direct effect of teacher leadership on teacher leadership, the direct effect of trust on teacher performance, the direct effect of teacher leadership on trust, and the indirect effect of teacher leadership on teacher performance through trust.

## II. LITERATURE REVIEW

Teachers performance is the behavior of employees who contribute to the organization aims to improve the efficiency and effectiveness of organizational functions. Concept of performance is simple defined by Griffin (2014:78) "performance behaviors are the total set of work related behaviors that the organization expect the Individual to display". And teacher performance is simple defined by Colquitt et. al., (2009:43). "Teacher performance behavior is defined as voluntary employee activities that may or may not be rewarded but that contribute to the organization by improving the overall quality of the setting in which work takes place". Teacher

performance is also elaborated by Stephen P. Robbins and Mary Coulter., (2011:677) define teacher performance as follow; “teacher performance that’s not part of an employee’s formal job requirements, but which promotes the effective functioning of the organization. Example of good teacher performance include helping others on one’s work team, volunteering for extended job activities, avoiding unnecessary conflicts, and making constructive statements about one’s work group and the organization”.

According to Wanida Deepaena, Shotiga Pasiphola and Siridej Sujivaa (2015:273) teachers performance scale can be used to select teachers; it will probably help schools to get teachers that have capabilities in work performance and have organizational commitment. This will impact the organization’s effectiveness in the long run. Based on Schemerhorn.,(2010:336), “teacher performance behaviors is a willingness to go beyond the call duty or go to the extra mile in one’s work.” Support theory Schemerhorn, According to Jahangir (2004:75) “ Successful organizations have employees who go beyond their formal job responsibilities and freely give of their time and energy to succeed at the assigned job

Concept of teacher performance is elaborated by McShane and Von Glinow., (2010:17) “teacher performance is various forms of cooperation and helpfulness to others that support the organization’s social dan psychology context”. According to Campbell and Nelson (2011: 184) teacher performance is defined as “ teacher performance is enhanced most through employee involvement programs aimed at engaging employees in the work organization rather than through employee involvement in employment decisions in operations.” Kreitner dan Kinicki (2010:174) says: “teacher performance consist of employee behaviors that are beyond the call of duty, such gesture as constructive statements about the department expression personal interest in the work of others, suggestion for improvement, training new people, respect for the spirit as well as the letter of housekeeping rules, care for organizational property, and punctuality and attendance well beyond standard of enforceable levels”

Teacher leadership is a person's behavior in communicating the goals of the institution's goals, providing constructive feedback and developing curriculum tailored to the needs of the school. According to Wayne and Cecil.,(2013:439) “Teacher leadership emphasizes the improvement of teaching and learning in the school” technical core. Teacher leaders attempt to change such school factors as curricular content, teaching methods, assessment strategies, and cultural norms for academic achievement”. Then Khan and Ali., (2011:2668) state that “teacher leadership is strongly concerned with teaching and learning including professional learning of teachers, as well as students’ growth”.

Based on Jennifer M. George and Gareth R. Jones (2008:87) : Furthermore, “nothing succeeds like success” and research suggest that because of their success leaders are also able to instill trust or faith in their subordinates. These leaders encourage and support their followers to be innovative and creative and do not as sign blame when things go wrong but encourage them to try again. And when subordinate trust their leaders, this increases members perceptions of procedural justice which in turn, leads

employees to engage in teacher performance that also raise performance.

According to Hoy and Miskel., (2013:312) ”teacher leadership is the principal monitoring student progress, providing constructive feedback, maintaining high academic standards, and performing active observation of teacher. Shared leadership complements the teacher leadership thrust by involving teacher and parents in such school decisions as selecting texts, influencing instruction, allocating school resources and adhering to locally developed school improvement plans. Such leadership provide the driving force for development of four essential support within the school professional capacity, school- learning climate, parent school community ties, and teacher performance guidance. Lunenburg and Irby.,(2006:221) also propose that “the teacher leadership of the principal is a critical factor in the success of a school’s improvement initiatives and the overall effectiveness of the school.

Trust is a part of credibility. Trust is the people characteristic in interacting with their environment, it is identified by the congruity between what they say and what they do. Colquitt et al., (2011:594) propose the “trust as the perception that an authority adheres to a set of accept able values and principles.” Henry Cloud (2008:31) says “trust as (1) the quality of being honest and trustworthy; honest or uprightness; (2) the condition of being whole, not broken into parts.”. Christopher F (2010:12) states that “ trust refer to that is honest and ethical, making personal trustworthy, trust is the a opposite of seeking self- interest at the expense of other, it’s about being honest-no lying, cheating, or stealing.”

Barbara Killinger.,(2010:12) also says that “trust is the quality of being honest and having strong moral principles; moral uprightness. It’s generally a personal choice to upload oneself to consist moral and etical standar.”. The other definition is proposed by Mc Shane and Vow Glinow (2010:362), they state that “trust involves truthfulness and consistency of words and actions, qualities that are related to honest and ethically.”

According to Amena Shahid (2013:58). “people who demonstrate trust derive others to them because they are reliable and dependable. They are ethical and can be relied on to perform in reputable and righteous ways even when no one is observant. It is those traits of an individual that are frequently accommodating, compassionate, lucid, candid, and ethical. The other definition, according to Mc Shane & Vow Glinow is “Trust involved truthfulness and consistency of words and actions, qualities that are related to honest and ethically.”

Leadership reflects the assumption that leadership is concerned with a deliberate process of a person to emphasize his strong effect on others to guide, structure, and facilitate activities and relationships within groups or organizations. Effective teacher leadership is essential for the school's academic press to reach the achievements. Based on that idea generation, it is expected that teacher leadership may effect the performance teacher. In this explanation, teacher leadership can effect school performance. School achievement can be achieved if the teacher gives a good process of learning and teaching, thus improved students' understanding ability that effect to increase academic achievement.

Trust is a part of the credibility dimension. The trust is the one of the key factors affecting the teacher leadership. The trust

people means being consistent in action, understanding values, norms, and principles. People with high trust consistently live on positive values. Teacher leadership consists of people who are positive towards their organization so that to improve the performance (teacher) an employee is expected to have an attitude of trust.

Trust is a very essential attribute that must be owned by a leader, to run the duties and functions of leaders must be trusted by subordinates in order to create a good cooperation. If others know that a leader is dishonest or in some way manipulates for personal gain then the leader will lose their trust. Leadership is the ability to effect others, to be able to effect others, a leader must have a trustworthiness by his employee, because the such trust can affect the performance of members of the organization.

### III. METHODOLOGY

The research method used is survey method with a causal approach is characterized by a data analysis technique using path analysis. The nature of the research used to test both direct and indirect effect between variables. Facts studied to see the effect of exogenous and endogenous, ie in the three exogenous variables include (1) Teacher leadership (X<sub>1</sub>), (2) Trust (X<sub>2</sub>) and Teacher performance (3)

The population in this study is all teacher of senior high schools sukabumi. Sampling frame in this study were 130 teacher of senior high school through a simple random sampling technique. There has been determined that the sample size for this study is 125 teacher. To capture the research data, there is used instrument that is in the form of methods of data collection with the scale of attitude.

This item is developed by researchers and has been tested for validity and reliability. Measurement of the validity of the instrument is using the product moment correlation formula. While the reliability of the instrument is applying an alpha Cronbach formula. The experimental results show that from the 40 points of teacher performance questions, there are 32 points which are valid by the calculation of instrument reliability teacher performance of 0.91, items of the teacher leadership variable are 40 points and there are 29 points which are valid by the calculation of the teacher leadership instrument reliability was 0.92, items of the trust variable are 40 points of questions and there are 30 points which are valid by the calculation of reliability of the trust instrument was 0.90. Based on these results, there indicates that the four

### IV. RESULT AND DISCUSSION

Based on Causal effect is calculated using path coefficient (p<sub>ij</sub>). Based on the path diagram below, there are five path coefficients, namely p<sub>31</sub>, p<sub>32</sub>, p<sub>21</sub>, as well as 3 pieces of the correlation coefficient, those are r<sub>13</sub>, r<sub>23</sub>, r<sub>12</sub>.

In table 1 above, indicate that all of the path coefficients significant at α = .05, because is greater than t<sub>table</sub>. Based on the results of path analysis Sub-Structure 1 (X<sub>1</sub>; X<sub>2</sub>; and X<sub>3</sub>) are Coefficient - Sub-Structure 1, respectively obtained values

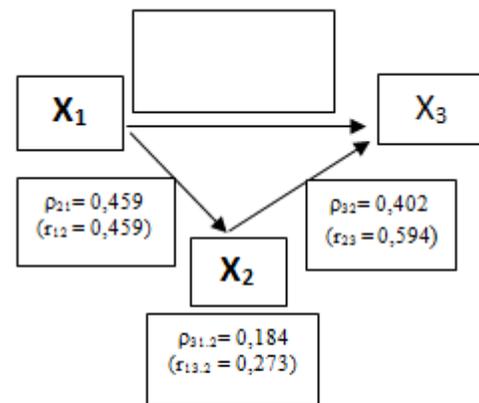
- a.  $\rho_{3 \times 1} = \text{Beta} = 0.419$  [t = 5,76, and the probability of ( sig) = 0.059]

- b.  $\rho_{3 \times 2} = \text{Beta} = 0.402$  [t = 5,53, and the probability of (sig) = 0.040]
- c.  $\rho_{2 \times 1} = \text{Beta} = 0.459$  [t = 5,59, and the probability of (sig) = 0.072]

**Table 1**

Path	Path coefficient	t <sub>cal</sub>	t <sub>table</sub>	
			α=0,05	α=0,01
X <sub>3</sub> X <sub>1</sub>	p <sub>31</sub>	5,76*	1,98	2,62
X <sub>3</sub> X <sub>2</sub>	p <sub>32</sub>	5,53*	1,98	2,62
X <sub>2</sub> X <sub>1</sub>	p <sub>21</sub>	5,59*	1,98	2,62

\*\* P < 0,01



**Figure 1 Causal Effect Between X<sub>1</sub>, X<sub>2</sub> and X<sub>3</sub>**

From the results of the first hypothesis testing can be concluded that there is a direct positive effect of teacher leadership to teacher performance with the value of correlation coefficient of 0.603 and the path coefficient of 0.419. This gives the meaning of directional leadership a direct positive effect on teacher performance. The results of this study are consistent with the opinion of Wayne K. Hoy (2013:312), he says "Teacher leadership, therefore is a deliberate process behavior and practice that promote teacher teacher improvement and effectiveness and are tightly aligned to student outcomes." Teacher leadership is deliberate behavior and practical process that encourage teachers' improvement and effectiveness and is tailored to student outcomes. By this theory, Makes the initial assumption or hypothesis in this research that teacher leadership effect to teacher performance.

According to Jason A Colquitt (2009:41) "The important points should be emphasized about teacher performance behavior. First as you have probably realized, teacher performance behavior are relevant in virtual any job, regardless of the particular nature of its tasks, and research suggest that these behavior can boost organizational effectiveness". In relation to this study, the organization that meant is a school. The

opinions conveyed by Colquitt's behavior can improve organizational effectiveness, as well as the Teacher leadership. Teacher leadership can enhance the organizational effectiveness of the outcomes of the teacher process so that it can improve school academic achievement.

Teachers who apply teacher leadership are teachers who are able to provide a good learning and teaching process to the students. By being able to apply such teacher leadership the teacher can improve his performance in school on every detail of her work. Teachers who apply teacher leadership are able to stimulate students to achieve high academic achievement. In addition, teachers can be a source of the other teachers' inspiration to improve its performance in improving the effectiveness of school organization.

Based on the description above, theoretically and empirically, teacher leadership has a direct positive effect on teacher performance.

From the results of testing the second hypothesis can be concluded that there is a direct positive effect of trust to teacher performance with the value of correlation coefficient of 0.594 and the path coefficient value of 0.402. This implies that trust has a positive direct effect on teacher performance..

The results of this study are consistent with the opinions of some experts. Colquitt, et. al(11: 226) states that "trust has moderate positive effect on performance. Employees who are willing to be vulnerable to authorizes tend to have higher levels of task performance. They are also more likely engage in teacher performance and less likely to engage in counterproductive behavior".

The above statement indicates that trust is an important determinant of influencing performance. Furthermore, the opinions of Stephen P. Robbins and Timothy A. Judge is "employee who trust their supervisors tend to receive higher performance ratings". Workers who trust their bosses tend to receive higher performance ratings. Workers can work together on common goals so that performance can improve. Trust can be interpreted as a desire to depend on others and the expectation that the other will retaliate if the parties cooperate.

In other words, the trust of teachers in an organization will affect the performance in doing its work. If the teacher has a high trust shows the higher the performance too.

From the results of the third hypothesis testing it can be concluded that there is a direct positive effect of teacher leadership on trust with the value of correlation coefficient of 0.459 and the path coefficient value of 0.459. It implies that teacher leadership has a direct positive effect on trust.

The results of this study are consistent with the opinions of some experts, such as Robbins and Judge (2015:40), they state that "trust is a primary attribute associated with leadership; breaking it can have serious adverse effects on a group's performance. As one other noted, "Part of leader's task has been, and continuous to be, working with people to find and solve problem, but whether leaders gain access to the knowledge and creative thinking they need to solve problems depends on how to much people trust them. Trust and trust-worthiness modulate the leader's access knowledge and cooperation". Trust is the main attribute associated with leadership. If the leader is not believed to have a serious effect on the group's performance, the leader's job is to work with others and constantly seek creative ideas and

solutions to find solutions to problems faced by teachers in the learning process at school. A leader has full access to creative knowledge and thinking but its use in solving problems depends on the level of trust of many people on the leader. So trust and worthiness of a leader to be trusted will greatly affect the cooperation in groups and organizations.

James Campbell (2013:396) says that "trust is an essential element in leadership, trust is the willingness to be vulnerable to actions of another. This means that followers believe that their leader will act with the follower welfare in mind".

According to Achua and Lussier (2010:74) "To be viewed as trustworthy, we need to be honest, be loyal in supporting others, keep confidence and do what we say we are going to do. If others find out we have been dishonest or in some way manipulated them for personal gains, we will lose their trust, clearly, to be effective leaders need trust". To be trustworthy we must be honest, faithful in supporting others, keep believing in ourselves and doing what we should do. If others know that we are dishonest or in some way manipulate for personal gain we will lose their trust, therefore to be a leader must have trust.

From the results of the fourth hypothesis testing can be concluded that there is a positive indirect effect of teacher leadership on the performance through trust with the value of correlation coefficient of 0.273 and lane coefficient value of 0.184. This implies that teacher leadership has a direct positive effect on trust.

The results of this study are consistent with the opinions of some experts, such as Garl Yukl (2010:485) "when we trust, become willing to "put ourselves out there". Even though that choice could be met with dissapointment, collective identification with the organization can provide benefits in terms of increased organization commitment and loyallity, redused vacancy, and higher performance. Member loyalty is especially important for organizations that have difficulty recruiting and retaining qualified member the proress by which leaders build member loyalty and commitment to the organization is similar to that described for groups". Meanwhile Frost and Rafilson (1989), they propose that "Studies investigating the relationship between trust and performance are very scarce. However, the reviewed literature suggests that these two variables have common correlates. That is, they both correlate significantly with teacher performance, although in different directions. Furthermore, conceptually it makes sense to expect a positive relationship between performance and trust". Research on trust and performance relationships is still very rare. However, the literature reviewed indicates that both variables have the same correlation. That is, both are significantly correlated with tecaher performance, albeit in different directions. Furthermore, it makes sense to expect a positive relationship between tecaher performance and trust.

According to Cho and Ringquist (2011) stated that there "Found a positive correlation between trust of the leadership and teacher performance of the subordinates. Hence in the present study, trust level of the individual is expected to have some effect on teacher performance that they exhibit. Furthermore, conceptually it makes sense to expect a positive relationship between teacher performance and trust"

Cho and Ringquist found a positive correlation between the trust of leadership and teacher performance from their

subordinates. Therefore in this study, the level of individual trust is expected to have some effect on the teacher performance they can show. This means that trust will emerge in a leadership style so as to elicit teacher performance behavior therefore trust as mediations.

## V. CONCLUSION

The conclusion of the research can be formulated as follows: First, there is a direct positive effect between teacher's leadership on teacher performance. This means that the higher the teacher's leadership, the higher the teacher performance after controlled or not. Second, there is positive effect between trust on teacher's performance. This means that the higher trust, the higher teacher's performance either after controlled or not.

Third there is direct positive effect between teacher's leadership on trust. This means the higher the teacher's leadership, the higher trust after controlled or not.

Fourth there is a positive indirect effect of teacher leadership on the performance through trust. This means that the higher teacher leadership, the higher trust and then the higher teacher's performance.

Based on these findings, can be concluded that teacher's leadership is not alone effect teacher's performance but also depends on trust. This can be seen in the conclusion of the findings that there is a direct effect between teacher's leadership, trust, and teacher's performance

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# Web Authentication based on Trusted Connection

Lawrence Amer

**Abstract-** Demonstrating the ability to develop a new type of defense technique to your administration panel , sensitive folder using a simple user friendly interface to authenticate administration , client authorized permission depending on trusted IP address using a simple front end application which is running in external host ,responsible for managing , organizing sessions ip while on the other hand , a server side scripting file running on background to retrieve these sessions and store them for further authentication process

## I. INTRODUCTION

Now days , Web Applications are the most used and targeted on Cyber space , i am coming with a Cyber Space definition instead of Internet ,because many of users are not just normal users .

There are a new type of users who are considered as threat on the Cyber space called themself as hackers .

Hackers could get into your system in many different ways using Un patched or private vulnerabilities , or by using Social Engineering .

So the defense strategy for these attacks in most cases expensive , and needs a lot of rules to follow , if we are talking about small firm or medium one , it will be hard ,expensive for them to hire security experts to protect them.

Regarding this topic , i have made a research paper to discuss the best way to secure your protected one with simple,easy,cheap project to start with

## Research Guide Index

- 1) Protocols
- 2) introduction into Apache Web Server
- 3) T.Auth project from idea into building .

## II. PROTOCOLS

Is a set of rules that governs the commnications between computers on a network . many different types of network protocols and standards are required to ensure the computers can communicate with each other regarding the type of cards or operation systems .

Reference model defines seven layers of networking protocols as shown below in a box

OSI Layer	Name	Common Protocols
7	Application	HTTP   FTP   SMTP   DNS   Telnet
6	Presentation	
5	Session	
4	Transport	TCP   SPX
3	Network	IP   IPX
2	Data Link	
1	Physical	Ethernet

So as picture above , we can see the OSI Layers , but at this time we are going to explain

Application OSI Layer which is related to research paper .

DNS - Domain Name System - translates network address (such as IP addresses) into terms understood by humans (such as Domain Names) and vice-versa

DHCP - Dynamic Host Configuration Protocol - can automatically assign Internet addresses to computers and users

FTP - File Transfer Protocol - a protocol that is used to transfer and manipulate files on the Internet

HTTP - HyperText Transfer Protocol - An Internet-based protocol for sending and receiving webpages

IMAP - Internet Message Access Protocol - A protocol for e-mail messages on the Internet IRC - Internet Relay Chat - a protocol used for Internet chat and other communications POP3 - Post Office protocol Version 3 - a protocol used by e-mail clients to retrieve messages from remote servers

SMTP - Simple Mail Transfer Protocol - A protocol for e-mail messages on the Internet

### III. APACHE HTTP SERVER . (WIKIPEDIA REFERENCE )

Apache Server is free and open-source cross-platform web server software, released under the terms of Apache License 2.0. Apache is developed and maintained by an open community of developers under the auspices of the Apache Software Foundation.

The Apache HTTP Server is cross-platform; as of 1 June 2017 92% of Apache HTTPS Server copies run on Linux distributions. Version 2.0 improved support for non-Unix operating systems such as Windows and OS/2. Old versions of Apache were ported to run on OpenVMS and NetWare.

Originally based on the NCSA HTTPd server, development of Apache began in early 1995 after work on the NCSA code stalled. Apache played a key role in the initial growth of the World Wide Web, quickly overtaking NCSA HTTPd as the dominant HTTP server, and has remained most popular since April 1996. In 2009, it became the first web server software to serve more than 100 million websites. As of July 2016 was estimated to serve 46% of all active websites and 43% of the top million websites.

### IV. FEATURE OVERVIEW

Apache supports a variety of features, many implemented as compiled modules which extend the core functionality. These can range from server-side programming language support to authentication schemes. Some common language interfaces support Perl, Python, Tcl and PHP. Popular authentication modules include mod\_access, mod\_auth, mod\_digest, and mod\_auth\_digest, the successor to mod\_digest. A sample of other features include Secure Sockets Layer and Transport Layer Security support (mod\_ssl), a proxy module (mod\_proxy), a URL rewriting module (mod\_rewrite), custom log files (mod\_log\_config), and filtering support (mod\_include and mod\_ext\_filter).

Popular compression methods on Apache include the external extension module, mod\_gzip, implemented to help with reduction of the size (weight) of Web pages served over HTTP. ModSecurity is an open source intrusion detection and prevention engine for Web applications. Apache logs can be analyzed through a Web browser using free scripts, such as AWStats/ W3Perl or Visitors.

Virtual hosting allows one Apache installation to serve many different Web sites. For example, [one machine with one Apache installation could simultaneously serve www.example.com, www.example.org, test47.test-server.example.edu](#), etc.

Apache features configurable error messages, DBMS-based authentication databases, and content negotiation. It is also supported by several graphical user interfaces (GUIs).

It supports password authentication and digital certificate authentication. Because the source code is freely available, anyone can adapt the server for specific needs, and there is a large public library of Apache add-ons

### V. THE IDEA OF T.AUTH APPLICATION

Publishing your site ,blog..etc into the Internet is some thing very popular these days specially web application developers made it easy to you to setup it correctly . but many of these websites got hacked or being hacked every day The reason behind this , is the weakness of security knowledge on sites administrators . or even published vulnerabilities that allow hackers to get access into your zone .

Most of usage techniques used these days to protect your site is to install and configure security tools that makes it hard into hackers to get in . but this actually doesn't put an end for hackers there is always a way to break in .

So after deep thinking of a way to know how to secure it in a kind of easy to use the idea of developing a project to do it was screaming in my mind .

My thought was toward developing a way to secure administration folders depending on IP Address Whitelist , but how to do that if there are many administrators and each one of them connecting from dynamic ip address not a static one .

### VI. PREPARATION OF THE IDEA

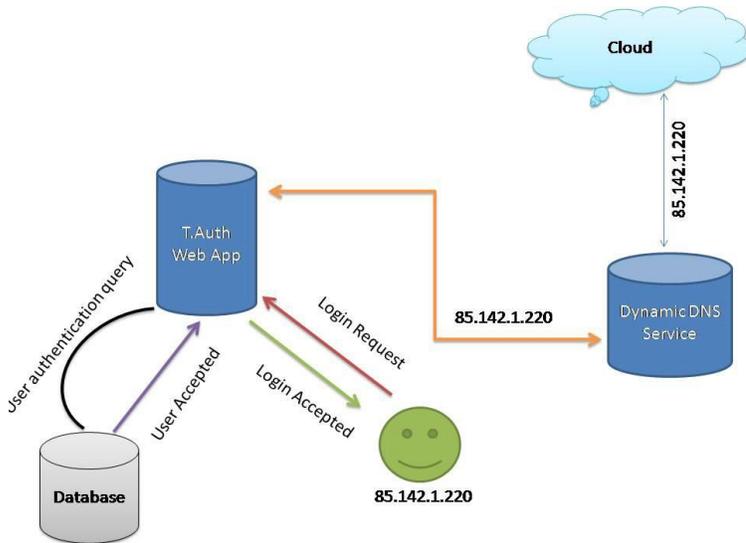
Using Dynamic Dns is the only way that can we use to make sure that host is resolved into IP address .

There are many Dynamic Dns Free Providers like no-ip company , but as you know these applications are standalone and every user must download the client and enter the information then establish the connection , i think it is also hard for simple users and for sure they will not accept it as solution besides every administrator should has his own DNS entries . in this case it is waste of time and energy .

So the only way was is to start building web application which will do all these things to gather with out so much interactions of users .

### Features of T-Auth Web application

- ❖ unlimited users accounts with isolated panels
- ❖ simple and user friendly
- ❖ Dynamic DNS Login information are stored in database
- ❖ Customized external host & domain .
- ❖ monitoring users activity with super administration panel . easy to ban unwanted sessions .



**Project Requirement**

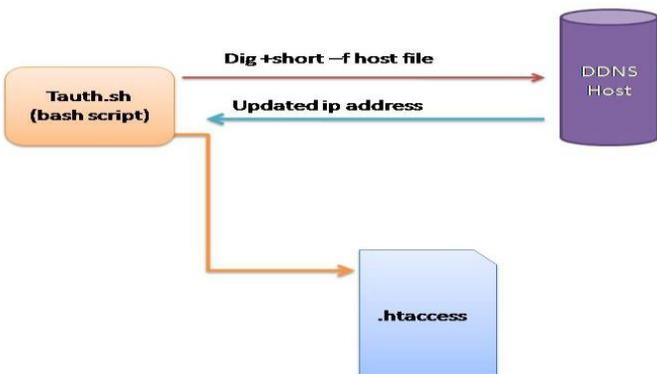
- ❖ Apache Web Server
- ❖ Apache Rewrite mode enabled (Allow Override All)
- ❖ Php 5.6 or above
- ❖ Mysql Database
- ❖ an Account on Dynamic Dns Prodvider (no-ip is supported)
- ❖ Linux Sever

**Working Strategy**

Developing a bash script to get the current Ip address from the selected Dynamic Dns provider the idea of bash script is to add it as cron job into targeted Linux server , and will be running every 5 min to get user updated ip address then add it into .htaccess file on administrator folder . with custom rule to deny all IP Address and only allow the authorized ones .

Below is digram to explain how bash script will connect into specific ddns host to get the new IP Address which is updated from T.Auth CMS php Application .

**Digram 1. 2 - bash script**



**uth Frontend CMS**

Developing this application wasn't easy as expected , since we have to add many feature including permissions ,groups . and connection libraries to start with on establishing DDNS updating through their public Api



CMS contains of :

- ❖ Login user interface
- ❖ table for current ddns host with username , so every user has his own host ddns details stored in database .

Update user current ip after clicking on Activate button

So after clicking on activate it button , the application will connect using details saved and response with connection status .

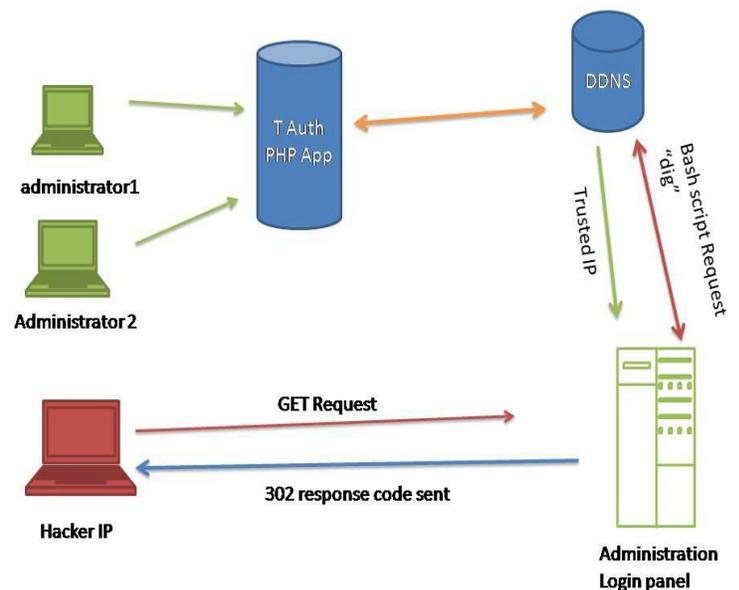


Image above shows expect work of how server will know that administrators are already have their trusted IP Address since they have login into different external host to send their ip address into verification process , which finally will be allowed to get into administrators folders .

AUTHORS

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# The Management of Student's Pocket Money

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**Abstract-** The purpose of this study is to clarify the factors that influence the management of students' pocket money directly and indirectly in Air Tawar Padang City. A sample of 344 students consisting of 130 students and 214 high school students was obtained by completing the questionnaire. The results show that the family environment, peers, gender and self-control have positive and significant effect on the management of students in Padang City.

**Index Terms-** pocket money; family environment; peers; gender; and self-control

## I. INTRODUCTION

Student's behavior of using pocket money is getting worse. If it continues to be ignored, it is feared that it will have a negative impact on the welfare or success of future students [1], [2]. Several studies have been conducted to socialize the management of pocket money [3]–[6]. For example, Furnham & Milner; Kirkcaldy, Furnham, and T. Martin in [3], [4] socialize pocket money in the community. It is considered a social phenomenon [7]. On the other hand, we consider this phenomenon as an opportunity to develop science. Therefore, this needs to be considered by the community, educational institutions, and government.

The study of pocket money management in Indonesia can be categorized as minimal and limited among students. Students in Padang City know that they use "pocket money" but do not know how to manage their pocket money. The survey shows that 60.7% of students do not manage their pocket money well. Though managing pocket money is a form of responsibility that teaches the meaning of money [8]. Most pocket money is allocated for food, drinks, clothing, and other things [9]. The remaining pocket money is used for school / campus purposes and for savings [10], [11]. We do not find students who set aside pocket money for illness or unexpected events.

Olsson in [12] asserts that every student activity starts from the social environment. Family environment dominates most of the activities at home. The establishment of financial capability in the family environment through interaction between parents and children [3], [10], [13]–[15]. On the other hand, most of the time students are spent outside with peers [16]. This activity creates a bond that affects financial ability through the provision of support and information [12], [17]. Therefore, the social environment greatly improves students' pocket management abilities [12], [17].

Khare in [18] suggests that gender affects the management of the student's pocket money. Male students use money to play games, hang out, and buy cigarettes [16]. Female students use money to buy food, drink and clothing [9]. However, [14] did not see any difference. Therefore, this study to further ensure this relationship.

According to some studies, the low skill of managing pocket money relates to student self-control [19], [20]. High self-control affects proper, controlled, and prudent management of money management [8]. In contrast, uncontrolled behavior indicates that learners have low self-control [16]. Because of that, self control mediates the relationship between the environment of families, friends, and gender towards the management of pocket money. The conceptual frame could be explained as follows:

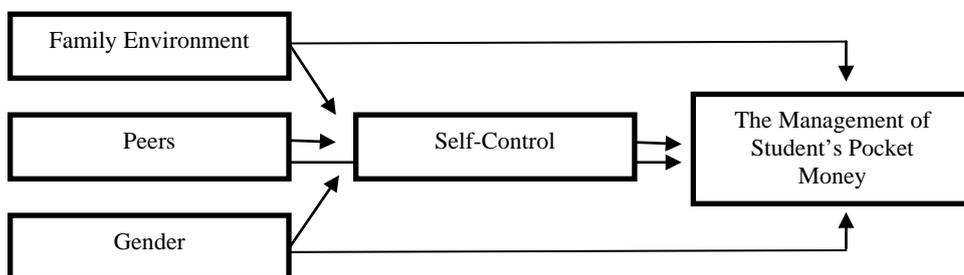


Figure 1. Conceptual frame

This study has several objectives. The first objective is to briefly discuss the management of student pocket money based on the studies that have been done. In addition to information to develop the ability to maintain financial stability. The second objective is to clarify the factors that affect the management of student pocket money directly and indirectly based on the proposed conceptual framework (figure 1).

The next discussion of this study is structured as follows. Section 2 examines the latest literature on pocket money management. Section 3 discusses the methods used to analyze data. Section 4 presents the results of research briefly. Section 5 is the conclusions.

II. LITERATURE REVIEW

Pocket money is the income that the student receives from a parent or guardian [7]. In practice, children are given the freedom to do whatever they want [21], such as spending money, managing money, saving, or for social activities [13]. This freedom is expected to shape the financial ability of their experience [5].

The management of pocket money is a study of financial management [22], which can be determined from the following activities. First, the planning before using the pocket money [13]; to avoid financial crisis problems now and later [21]. Second, keeping incoming and outgoing money [23]; is the first step to get used to a positive routine. Third, arranging expenditures is intended to increase confidence, responsibility, and avoid consumptive behavior [18]. Fourth, set aside some money to save [24]. As venture capital and investment achieve economic prosperity [25].

III. METHOD

The design of quantitative research is using the type of associative research. The population is focused on Air Tawar area consisting of Universitas Negeri Padang, SMA Development of Laboratory of UNP, and SMA Pertiwi 1 which is amounted to 2,447 students. By using proportionate stratified random sampling technique in the Sample of 344 students consisting of 130 (37.8%) students and 214 high school students (62.2%) of which 137 (39.8%) are men, and 207 (60.2%) are women. the age range is between 15-22 years, with an average age of 17 years old.

The questionnaire includes four sections referring to 17 indicators (see appendix). Questionnaires were submitted to respondents for answers based on Likert scale (1) - (5) and nominal scale (1) for female students and (0) for male students. The validity and reliability test were performed for the questionnaire. It was continued with the test of normality, homogeneity, path analysis and hypothesis testing with 5% error rate using SPSS 24.0 program.

IV. RESULT

The purpose of this study is to clarify the indirect influence and direct effect of pocket money management variables using lane analysis. The path analysis is divided into 2 structures. The first structure (Table 1) describes the influence of family environment variables, peers, and gender against self-control variables. The second structure (Table 4) describes the influence of the family environment, peers, gender, and self-control over the management of student pocket money.

Table 1. Results of structure 1

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	28,719	6,071		4,730	0,000
Family Environmnet	0,538	0,086	0,321	6,229	0,000
Peers	0,223	0,062	0,189	3,605	0,000
Gender	0,362	1,032	0,018	0,351	0,726

Dependent Variable: Self-control

Based on the result of structure 1 (Table 1) family and peer environment variables have significant effect while the gender variable has no effect and not significant with sig value  $0,726 > \alpha 0,05$ . The *Triming Test* takes out the gender variables of the model. The results can be seen in Table 3 below:

Table 2. Results structure 1 (without gender variables)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	29,120	5,995		4,890	0,000
Family Environment	0,538	0,086	0,321	6,237	0,000
Peers	0,219	0,061	0,185	3,609	0,000

Dependent Variable: Self-control

The final result of structure 1 (Table 2) shows that the coefficient of path variable of the family environment is  $\beta = 0.321$  and the sig value.  $0.00 < \alpha 0.05$  means having a positive and significant influence. Peer variable coefficient coefficient of  $\beta = 0,185$  and sig value.  $0.00 < \alpha 0.05$  means having a positive and significant influence. The effect of other variables can be calculated through the value of  $R^2$  (Table 3) as follows:

Table 3. Large influence of independent variables of structure 1

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,414	,171	,164	9,184

$$Px_4\epsilon_1 = \sqrt{1 - R^2} = \sqrt{1 - 0,171} = 0,911$$

The first path analysis structure between the family environment, peers, and other variables of self-control can be seen in Figure 2 below:

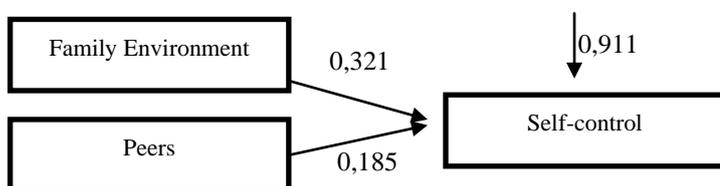


Figure 2. Structure of path analysis 1

Structure 2 describes the direct influence of family environment variables, peers, gender, and self-control on the management of student pocket money in Air Tawar Kota Padang. The output results (Table 4) describes the path coefficients. Output Output (Table 5) describes the contribution of other independent variables.

Table 4. Results of structure 2

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6,096	5,874		1,038	0,300
Family Environment	0,271	0,085	0,167	3,170	0,002
Peers	0,139	0,059	0,122	2,350	0,019
Gender	2,170	0,967	0,110	2,244	0,025
Self-control	0,287	0,051	0,297	5,647	0,000

Dependent Variable: The management of student's pocket money

The result of structure 2 (Table 5) shows that the coefficient of path of family environment variable equal to  $\beta = 0,167$  or 16,7% with sig value.  $0,002 < \alpha 0,05$ , meaning the family environment has a direct and positive direct effect on the management of pocket money. Peer variable coefficient equals to  $\beta = 0,122$  or 12,2% with sig value.  $0,019 < \alpha 0,05$ , meaning that peers have a direct positive and significant effect on the management of student pocket money. The gender variable coefficient of  $\beta = 0,110$  or 11% with the sig value.  $0,025 < \alpha 0,05$ , which means that gender has a direct and positive direct effect on the management of students' pocket money. The coefficient of self-control variable path is  $\beta = 0,297$  or 29,7% with sig value.  $0,000 < \alpha 0,05$ , means that self-control has a direct and positive direct effect on the management of student pocket money.

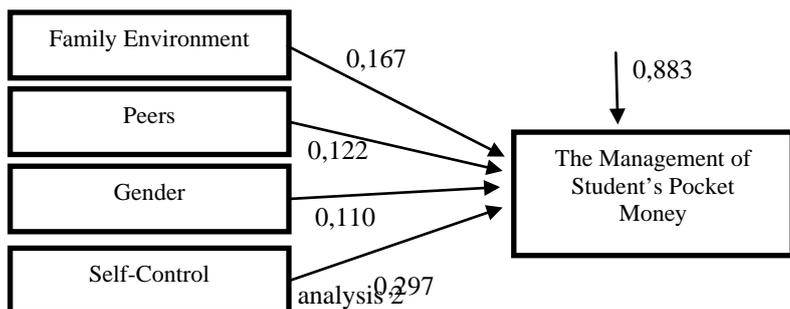
Tabel 5. Large influence of independent variables of structure 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,471	,221	,212	8,606

The effect of other variables can be calculated through the value of  $R^2$  (Table 5) as follows:

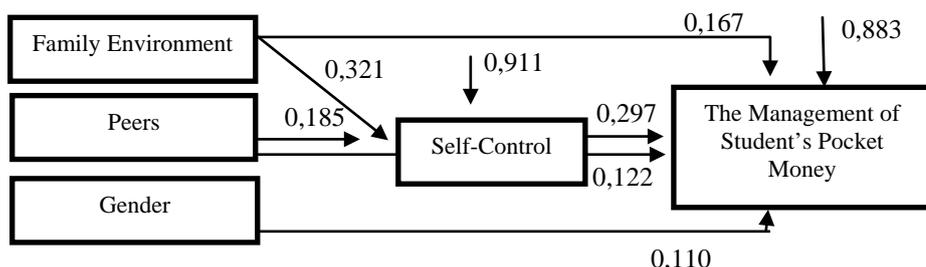
$$Py\epsilon_2 = \sqrt{1 - R^2} = \sqrt{1 - 0,221} = 0,883$$

The second path analysis structure between family environment, peers, gender, self-control and other variables on student pocket management can be seen in Figure 3 as follows:



The result of the first and second structures combined into one part will form a new pathway structure. It could be seen in Figure 4 as follows:

**Figure 4** The end structure pathway



V. CONCLUSION

Managing pocket money is one way of avoiding consumptive behavior and minimizing negative impacts. Planning and execution are the key to managing pocket money. Mature planning will facilitate the process of activities to be implemented. Good implementation refers to prepared planning.

Pathway analysis clarifies the indirect influence and direct influence on the management of student pocket money. First, the family environment and peers have an indirect effect on the management of pocket money through self-control. This suggests that the family environment and peers form a student self-control that is useful for managing pocket money. This forming process is created through the exchange of information, the sharing of experiences, and the sharing of knowledge on how to manage the pocket money. Second, the family environment, peers, gender and self-control directly influence the management of pocket money.

APPENDIX

Table 1a. Questionnaire Instrument

No	Variable	Indicator	Measuring Scale
1.	Pocket Money Management	1) Making pocket money planning 2) Managing the spending of pocket money 3) Making reserved funds	Likert Scale
2.	Family Environment	1) Interaction between parents and their children 2) Parent motivation 3) Giving motivation	Likert Scale
3.	Peers	1) Togetherness 2) Physical support 3) Ego support 4) Being intimate	Likert Scale
4.	Gender	1) Male 2) Female	Nominal Scale
5.	Self-control	1) The ability to control behavior 2) The ability to control stimuli	Likert Scale

- 3) The ability to anticipate events
  - 4) The ability to interpret events
  - 5) The ability to make decisions
- 

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# A Brief Outline of Bio-Statistics in Medical Research

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**Abstract-** Bio-statistics is the important branch of statistics and is related to medical field. Also it plays an important role in the field of research. The main role of statistics in research is to designing a research, analyzing data and draw meaningful conclusions. The meaningful conclusion can be drawn by using proper statistical tests. Statistics also helps to reduce large volume of raw data which must be suitably reduced so that the same can be read easily and can be used for further analysis. This article covers the brief outline of data, qualitative data, and quantitative data. Also give a brief outline of measures of central tendency (location), measures of variability (dispersion), statistical inference (parametric and non-parametric tests) and give brief outline of sample size calculations.<sup>[4]</sup>

**Index Terms-** Biostatistics, data, Parametric and non-parametric, measures of location, measures of dispersion (variation)

## I. INTRODUCTION

The process of converting data into meaningful information requires a special approach called statistics. Statistics is the branch of methods for making wise decisions in the face of uncertainty. In other words, it can be defined as collection, summarization, organization, analysis and interpretation of numerical data. Biostatistics is the science that helps in managing medical uncertainties. It mainly consists of various steps like generation of hypothesis, collection of data and application of statistical analysis. An ample knowledge of bio-statistics is important for research scholars, medical students, and nursing students so that they can design epidemiological study accurately and draw meaningful conclusions and inadequate knowledge of biostatistics leads to biased results and conclusion which may lead to erroneous conclusions and also may lead to unethical practice.

## II. DATA

Data means raw facts and figures, from which a meaningful conclusion may be drawn. If you want to understand a phenomenon of any disease you must have a data so that you will be able to know the pattern and incidence of disease. Data will be further divided into two categories qualitative (categorical) and quantitative (numerical) data. Data which is non-numerical called qualitative data e.g, gender, habitat, health status, etc. Data which is numerical called quantitative data e.g, number of

patients, pulse rate, etc. Quantitative data may be further divided into categories discrete and continuous.<sup>[2]</sup>

Discrete data can take on only integer values whereas continuous data can take on any values. For instance the number of cancer patients treated by a hospital each year is discrete but height of the cancer patient is continuous. Some data are continuous but measured in a discrete way e.g, your age, it is common to report your age as say 28. Classification of data shown in <sup>[1]</sup> [Figure 1].

### A: Statistics: Descriptive and inferential statistics

When we analyze our data it is necessary to use both descriptive and inferential statistics. Descriptive statistics are used to describe our data, summarize our data and organize our data so that we can draw meaningful results. The important descriptive statistical measures that are used to describe, summarize and find out the central value and location of the data are Measures of location and Measures of variability.<sup>[11]</sup>

### 1. Measures of Central Tendency:

Measures of location (central tendency) gives the central value of the data that is used to represent all the values of series. The three important measures of location are Mean, Median, and Mode. Geometric and harmonic mean are not used most often.<sup>[3]</sup> The most important are summarized below:

#### 1.1 Mean

Mean is the first and simplest measure of location. It is the most frequently used measure of location. It can be defined as sum of observation divided by the number of observation. The most important drawback is, mean of a particular group is affected by very small and very large number.

#### Mean = Sum of observation / number of observation

Eg; Birth weights of new born babies are  
3.3, 6.1, 5.8, 3.8, 2.7, 4.1, 3.4, 3.9, 5.1, 3

Mean =  $\sum x_i / n$

Mean =  $3.3 + 6.1 + 5.8 + 3.8 + 2.7 + 4.1 + 3.4 + 3.9 + 5.1 + 3 / 10$

Mean = 4.12kg

i.e Mean birth weight of new born babies are 4.12kg

#### 1.2 Median

Median is defined as middle of observation. It divides the whole data into two equal parts one part comprising all the values less than median and second part comprising all the values greater than median. Median is not affected by extreme values.

Median is the only average used for dealing with the qualitative of data. In median we have two cases odd and even case.

In odd case we arrange the distribution into ascending (descending) order and distribute the series into two parts and middle one is median. In even case we arrange the distribution into ascending (descending) order and calculate average between the two middle values and the middle value is median.

**Eg, in odd cases:-** Birth weights of new born babies are (3.3 , 6.1 , 5.8 , 3.8 , 2.7 , 4.1 , 3.4 , 3.9 , 5.1)

Arrange the data in ascending order  
(2.7 , 3.3 ,3.4 , 3.8 , 3.9 , 4.1 , 5.1 , 5.8 , 6.1)

$\underbrace{\hspace{10em}} \quad \underbrace{\hspace{10em}}$

3.9 is the median birth weight of new born babies.

**Eg , In even cases:-** Birth weights of new born babies are (3.3, 6.1 , 5.8 , 3.8 , 2.7 , 4.1 , 3.4 , 3.9 , 5.1,3)

Arrange the data in ascending order  
(2.7 , 3 , 3.3 ,3.4 , 3.8 , 3.9 , 4.1 , 5.1 , 5.8 , 6.1)

$\underbrace{\hspace{10em}} \quad \underbrace{\hspace{10em}}$

**Arithmetic mean between (3.8 + 3.9)/2= 3.85**

3.85 is the median birth weight of new born babies.

**1.3 Mode:**

Mode is the most frequently occurring value in a set of data. Mode is particularly useful in the study of popular sizes. Mode is the average to be used to find the ideal size in a series.

**Eg**  
No mode  
Raw data : 10.3 4.9 8.9 11.7 6.3 7.7  
One Mode  
Raw data: 6.3 4.9 8.9 6.3 4.9 4.9  
More than 1 mode  
Raw data : 21 28 28 41 43 43

**Table 1: Summary of Central tendency**

Measure	Descriptive
Mean	Balance point
Median	Middle value when ordered
Mode	Most frequent

**2. Measures of Dispersion (variability):**

Measures of dispersion convey information regarding the amount of variability present in the data. If all the values are same there will be no dispersion and if all the values are different there will be dispersion. There will be two possibility of dispersion one is if all the values are close to each other there will be less amount of variability present in the data and second

is if all the values are too much scattered there will be large amount of dispersion present in the data. For among the measures of dispersion range and standard deviation (SD) is most often used measures of dispersion. For the comparison point of view we use mostly the co-efficient of variation (co-efficient of standard deviation).

**2.1 Range**

Range is the simplest measure of dispersion .It can be defined as difference between the two extreme items of series. The utility of range is that it gives us an idea of variability very quickly.

Range= (highest value of series- lowest value of series)

**2.2 Standard Deviation (SD):**

The standard deviation is mostly used in research studies and is regarded as the very satisfactory measures of dispersion. Standard deviation can also be defined as the positive square root of the mean of the squared deviation of the values of mean.The standard deviation describes how much individual measurement differs on the average from the mean.

SD=

A large standard deviation shows that there is a wide scatter of measured values around mean and small standard deviation shows that individual values are concentrated around the mean with little variation among them.

**2.3 Variance:**

Variance quantifies the amount of variability or spread about the mean of the sample.

**3 . Normal Distribution or Gaussian distribution**

Mean and SD are summary measures of the silent features of the data. But in many cases, such summary doesn't adequately describe the full characteristics of the data set. To study scatter in detail, the frequency of subjects with values in specified short intervals are plotted against the intervals. This plot is in terms of bars drawn adjacent to one another with area representing the frequency . This plot is called histogram. When midpoints of the top of the bars are joined by straight line we get frequency polygon. Smoothened shape of this polygon is called frequency curve, and the curve formed in the bell shaped curve. This curve signifies that the frequency is highest for middle of the variables and decline both sides are similar. Mean, Median and Mode are same .Curve is symmetrical. These are the broad features of what is known as Gaussian curve or Normal curve. This frequency distribution is known as Normal or Gaussian distribution.

**4 Statistical Inference:**

Statistical inference means to draw inference about the characteristics of the population. It deals with the estimation of population parameter and statistical tests of significance is drawn on the basis of sample statistics and the findings are expected to be applicable for the entire target population. Some of the below mentioned terms used in statistical inference :

- (a) Hypothesis : Hypothesis means assumption regarding the population.
- (b) Null Hypothesis (Ho): A null hypothesis is usually statement that there is no difference between groups or

that one factor is not dependent on another and corresponds to the no answer.

- (c) Alternative Hypothesis( $H_A$ ) or ( $H_1$ ) : Alternative hypothesis which is complimentary to the null hypothesis.
- (d) P-value: The p-value (probability value) is the probability of event occurring by chance if the null hypothesis is true. The p-value always lies between ( 0 and 1), also it is interpreted by the researchers in deciding whether to reject or retain the null hypothesis . If  $p < 0.05$ , it means that data is statistically significant and if  $P > 0.05$  data is not Statistically Significant. <sup>[12]</sup>[Table 2]
- (e) Type I-error:-  $p[\text{reject } H_0/\text{when it is true}] = \alpha$
- (f) Type II-error:-  $p[\text{accept } H_0/\text{when } H_1 \text{ is true}] = \beta$
- (g) Power =  $p[\text{reject } H_0/H_1 \text{ is true}] = 1 - \beta$

**Table 2 : P values interpretation**

P	Result	Null Hypothesis
<0.01	Result is highly significant	Reject(null hypothesis) $H_0$
$\geq 0.01$ but <0.05	Result is significant	Reject (null hypothesis) $H_0$
Value $\geq 0.05$	Result is not significant	Do not reject (null hypothesis) $H_0$

**4.1 Parametric and non-parametric test**

Parametric test means which deals with the parameters of the population and if the distribution follows normal distribution we use parametric tests. Hypothesis tests which are based on knowledge of the probability distribution that the data follow are known as parametric test, often data do not conform to the normality of the distribution in these situation we can use non-parametric test of the distribution(sometimes referred to as distribution free test or rank method).Non-parametric tests are particularly useful when the sample size is small and when the data are measured in categorical scale<sup>[5][6]</sup>.The commonly used parametric tests are used in research methodology i.e Students t-test and Analysis of variance (ANOVA).

**4.1.(a) Student’s t-test**

Students t-test is a parametric test , it is applicable to find a significant difference between two means . It is used in three situations:-

- (a) To test if the sample mean differs significantly from the population mean (one sample test)
- (b) To test if the population means estimated by the two independent samples differ significantly (unpaired t-test).
- (c) To test if the population means estimated by the two dependent samples differs significantly (paired t-test).

**4.1.(b) Analysis of variance (ANOVA):**

When data are normally distributed students t-test can be used to assess the significance of the means of the sample. To

compare the difference between three or more independent groups simultaneously, an analysis of variance, which is parametric test can be used and when there is only one qualitative variable which defines the groups, a one –way ANOVA is performed. In ANOVA we will study two types of variation Between groups and within groups. The ANOVA separates the total variability in the data into which can be attributed to difference between the individuals from the different groups (between group variation) and the variation between the individual within each group (within group variation), sometimes called unexplained or residual variation.

**Non-Parametric tests**

**4.1.2 (a) Chi-square test:**

Chi-square test is non-parametric test and is a measure of significance. This test will be used to find out the association between two events in binomial or multinomial samples. It helps you to decide if the relationship exists but not how strong it is .Chi-square test will be used for categorical data. In medical research when a researcher wants to study the association or relation between two or more variables ,this type of relationship will be studied by correlation or regression . Some times we are interested in studying the association between a continuous variables grouped into categories [Anemia:mild , moderate , and severe] and discontinuous variables grouped into categories [Economic status: lower , middle and upper] and association between two continuous variables grouped into categories [height: short , medium and tall] [weight: light , moderate and heavy] .<sup>[8]</sup>

The important assumption of chi-square test is if any of the expected frequency is less than 5 (i.e  $E < 5$ ) in any one of cell, we use Fisher’s exact test. Fisher’s exact test is used to determine if there are non-random associations between two categorical variables.<sup>[10]</sup>

**4.1.2 (b) Sign test:**

Sign test is simplest of all non-parametric test and is based on the median of the distribution. The test will be used to comparing the single sample with some hypothetical value ( ) for the median in the population. If our sample comes from this population, then approximately half of the values in our sample should be greater than ( )and half of the sample should be less than ( ).In sign test we use signs positive (+) and negative (-) to every observation . When reference value is less than observed value plus sign will be used and when reference value is greater than greater than observed value negative sign will be used. And when reference value is equal to observed value it will be eliminated.

#### 4.1.2 (c) Wilcoxon Signed rank Test:

The wilcoxon signed rank test takes account not only of the signs of the difference but also their magnitude and therefore is more powerful test. Also individual difference is calculated for each pair of results. Ignoring zero difference, there are then classified as being either positive and negative. In addition, the difference are placed in order of size, ignoring their signs and are ranked accordingly. The smallest difference thus get the value (1), the second smallest gets the value (2), etc up to the largest difference.

#### 4.1.2 (d) Mann-Whitney U-test:

Both sign test and wilcoxon signed rank test are helpful non-parametric test and alternative for Mann-Whitney U test is one sample t test and paired test. A non-parametric alternative to the unpaired t-test is provided by wilcoxon rank sum test which is known as Mann-Whitney U-test. This is generally considered when comparison is done between two independent groups.

The proper description of various tests is described in Table 3.

#### 5 Software's used for statistical Analysis are mentioned below:

Software's which are used for data analysis are called statistical software. There was many software's available for analysis point of view, some are free and downloadable from the site.

#### Common statistical software's:

1. SPSS- *Statistical Software for social Sciences* (V23)
2. SAS – *Statistical Analysis System*(v9.3).
3. *Systat* - (13)
4. *BMDP – Biomedical Data Processing package*
5. *S plus* – (6.2)
6. *Epiinfo* (WHO- 3.5.4) *version 7 is latest -Free*
7. *Stata* (13)
8. *Gauss or Pass*
9. *Glim* (14.2)
10. *R software 3.1.2*
11. *statpages.org*
12. *G-power*
  
13. *statstodo.com*

### III. CONCLUSION

Apart from the knowledge of medicine, knowledge of biostatistics plays a vital role in the field of research. The main purpose of this article is to aware medical students what is the applicability and usage of biostatistics in medical field. This brief overview of biostatistics gives a quick summary methods for medical students in their short project and thesis work.

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### Figure 1. Classification of data analysis

**Table 3: Various Tests**

<b>Type of data</b>	<b>Tests</b>
<b>Categorical vs. categorical</b>	<b>Chi-square test and f-test</b>
<b>Categorical vs. continuous</b>	<b>T-test, Mann-whitney Wilcoxon test, ANOVA, Kruskal Wallis , Repeated Measure Friedman test</b>
<b>Continuous vs. continuous</b>	<b>Correlation -r Spearman -<math>\rho</math></b>
	<b>Intra Class Correlation</b>

# Current Prescribing Trends for the Treatment of Urinary Tract Infection in Adults

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**ABSTRACT -AIMS AND OBJECTIVE:** The aim of study was to observe the current prescribing trends for the management of urinary tract infection in male and female patients in government and private hospitals.

**Methods:** A descriptive cross sectional study was conducted in different government and private hospitals of Lahore, Pakistan. Data of 100 patients within 20 years-80years of age, males and females diagnosed with urinary tract infection, was collected using convenient sampling technique during face to face interview with patients. Then data was compiled, analyzed and presented in tabular and graphical form. .

**Results:** Results showed that the most of the medicines were prescribed according to brand names. Currently, (90%) of antibiotics including (58%) of quinolones, (34%) of cephalosporin and (4%) of penicillin antibiotics along with proton pump inhibitors (23%), analgesics (71%), antacids (27%) were prescribed as a combination therapy for the treatment of urinary tract infection. Some side effects were seen like (7%) GI irritation, (2%) insomnia, (1%) low blood pressure. 90% of patients were complied with their treatment.

**Conclusion:** it is concluded that although use of antibiotics is the best option to treat urinary tract infection as mostly it is caused by bacteria but it is also leading to irrational prescribing and misuse of antibiotics. Therefore it is the need of the hour to ensure rational drug therapy and decrease the health care cost to improve patient's quality of life.

**INDEX TERMS:** Urinary tract infection, combination therapy, prescribing trend, rational therapy, patient compliance

## Introduction

Urinary tract infections are the leading infections after respiratory tract and gastro intestinal tract infections and are major cause of both the community acquired and nosocomial infections. [1] The infection may involve any part of urinary system (kidney, bladder, uterus and urethra). Infection of bladder (cystitis) and urethra (urethritis) are known as lower urinary tract infection, whereas, infection of kidneys (pyelonephritis) is termed as upper urinary tract infection. [2] Commonly, UTI is caused by bacteria (E.coli), however it can also be caused by fungi (Candida) or virus (Herpes simplex virus-2). Most of the bacteria that cause UTI enter through the intestine or through the vagina. [3]

UTIs can be categorized as complicated or uncomplicated urinary tract infection. If it occurs in patients with structurally or functionally abnormal urinary tract it is known as complicated UTI and if in patients with anatomically normal urinary tract then it is called uncomplicated UTI. [4].

Urinalysis is a physical, chemical, and microscopic examination of a urine sample (specimen) , the results obtained by this test indicates that whether the individual has urinary tract infection or not.[5] The second type of urine test is chemical examination or dipstick test in which the strips check for presence of nitrites or white blood cells (leukocytes) in urine.[6]

There is an evidence-based guideline for the treatment of UTI in adults. It includes a three day regimen of trimethoprim-sulfamethoxazole and a 5-day course of nitrofurantoin recommended as a first-line therapy for the treatment of uncomplicated UTIs. A 3-day course of fluoroquinolones can be quite effective. [7] The combination of amoxicillin + an aminoglycoside, a 2nd generation cephalosporin + an aminoglycoside or a 3rd generation cephalosporin intravenously can be recommended as first-hand

treatment of complicated UTI [8]. Low-dose antimicrobial prophylaxis remains effective in many clinical settings and can be safely used for years in patients with recurrent UTIs; however, increasing antimicrobial resistance may eventually limit its efficacy [9].

Pharmacists can play a pivotal role in management of UTI by his/her patient counseling skill on how to take the medications so that outcome of therapy can be improved. [10]

### **Materials and Methods:**

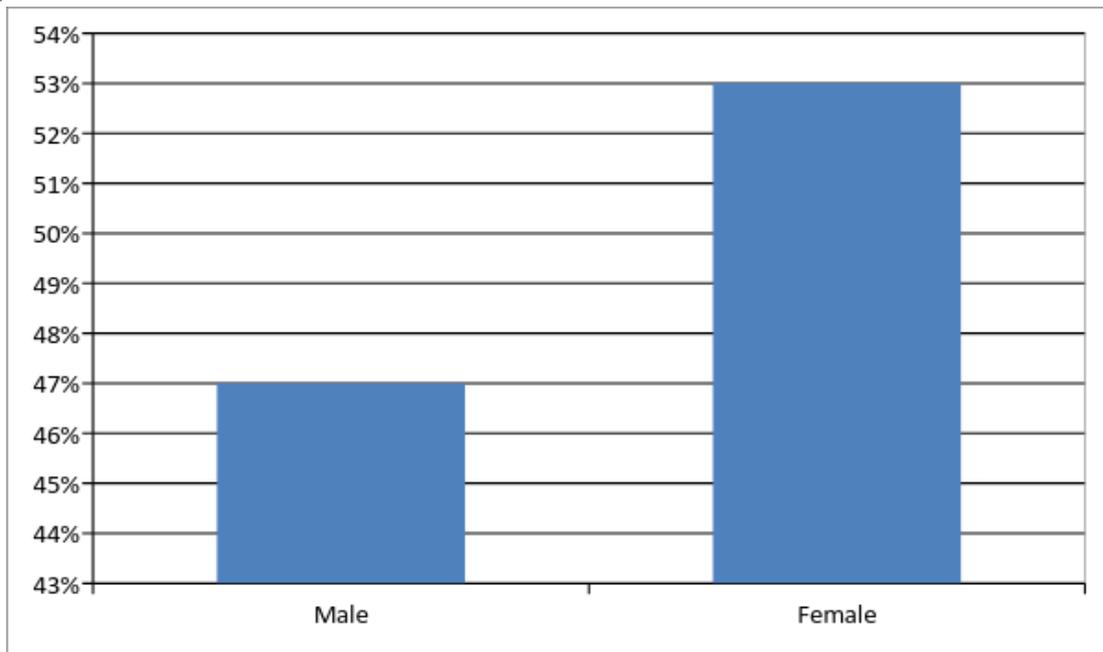
A descriptive cross sectional study was conducted in outpatient departments of different government and private hospitals of Lahore including Jinnah hospital Lahore, Services hospital Lahore, Sheikh Zayed hospital Lahore, Mayo hospital Lahore, Fatima memorial hospital Lahore and Family hospital Lahore. The duration of study was 2 months (June 2017- August 2017). Data of 100 male and female patients within age limit of 20years-80 years who were diagnosed with urinary tract infection was collected. Patients having respiratory disorder (asthma) and liver diseases were excluded. For data collection purpose an extensive form was designed covering the following aspects; patient's demographic information, family history, signs and symptoms, chief complaints, medication history and majorly the prescribing trends in management of urinary tract infection. Form was filled during face to face interview with patients then data was compiled, analyzed and presented in tabular form. Statistical functions were applied to analyze the results and led to their graphical representation.

### **Results:**

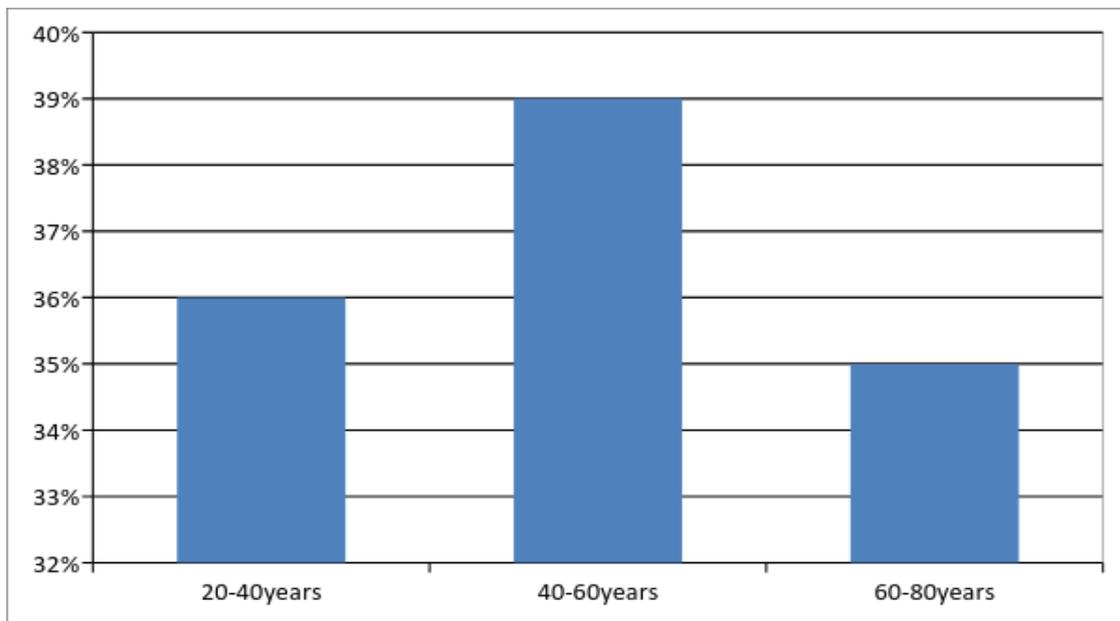
Out of 100 individuals, 47% males and 53% females were suffering from urinary tract infection (figure 1). The age limit of patients observed were 36% in (20 – 40 yrs), 39 % (40-60yrs) and 35% (60- 80yrs) (figure 2).

The major chief complaints shown were 8% fever, 44% flank pain, 14% urinary retention, 16% suprapubic pain, 8% dysuria and 10% frequent urge to urinate (figure 3). The various types of infections seen in patients were cystitis 31%, urethritis 13%, pyelonephritis 32%, urosepsis 4%, chronic kidney disease (CKD) 8%, and lower urinary tract symptoms (LUTs) 12% (figure 4).

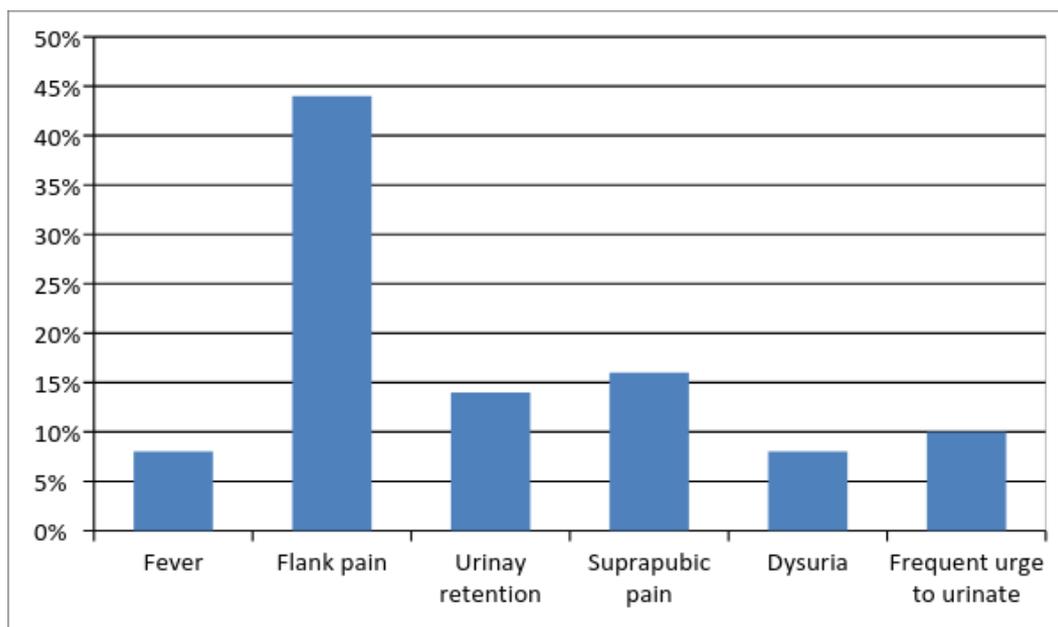
Medicines were not prescribed by their generic names whereas all medications 100% were prescribed by brand names.(figure5). Combination of medicines observed include: antibiotics 90%, analgesics 71%, antacids 27%, proton pump inhibitors 23% and anti-emetics 17% (figure 6). Antibiotics belonging to different classes were prescribed such as quinolones 58%, penicillin 4%, cephalosporin 34%, oxazolidone 2% and pyridopyrimidine 2% (figure 7). Some side effects were seen like (7%) GI irritation, (2%) insomnia, (1%) low blood pressure.( figure8)



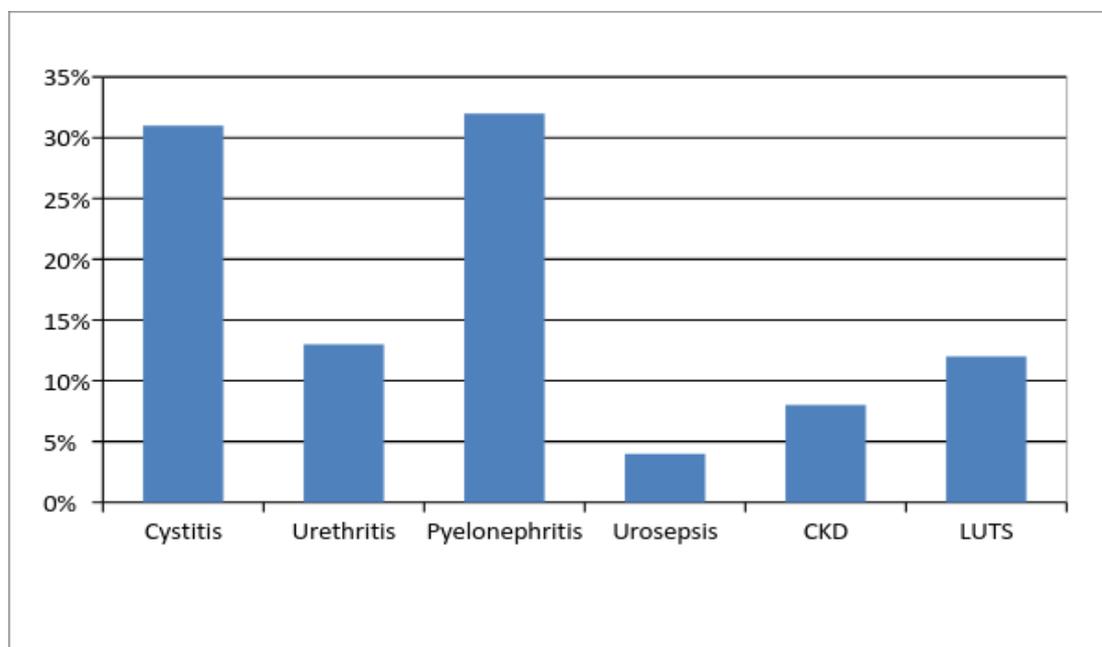
(Figure: 1 Gender distribution)



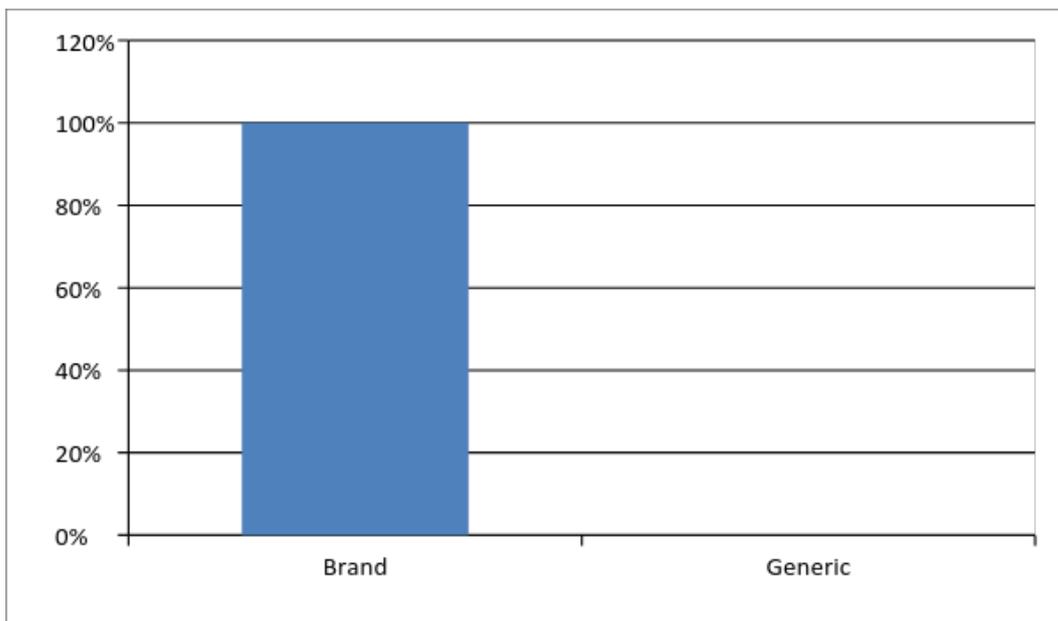
(Figure 2: Age groups)



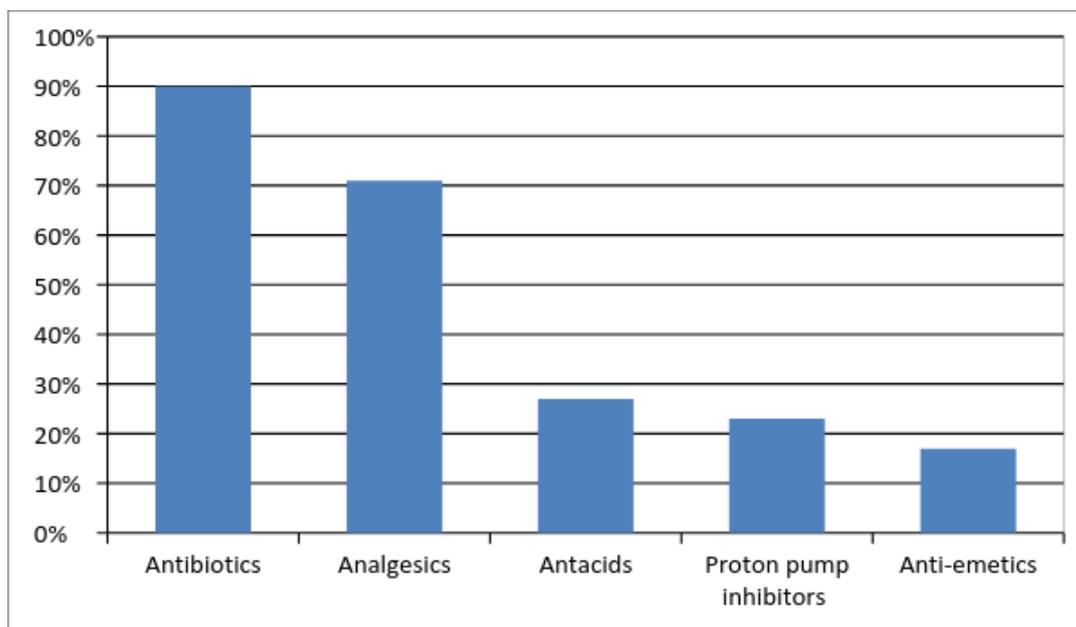
(Figure 3: Chief complaints)



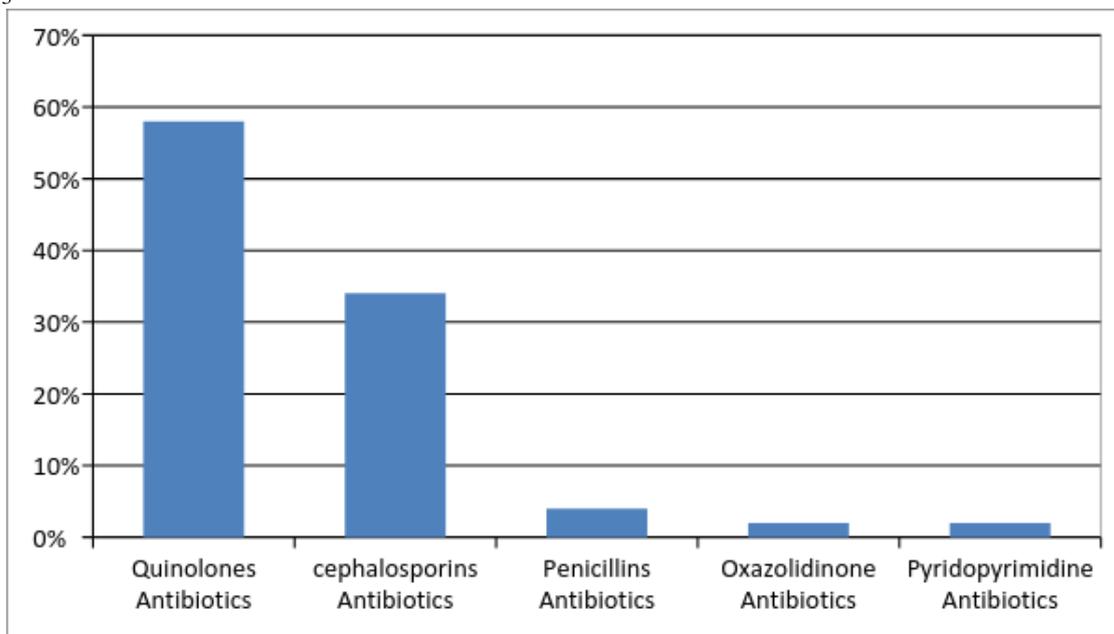
(Figure 4: Type of UTI)



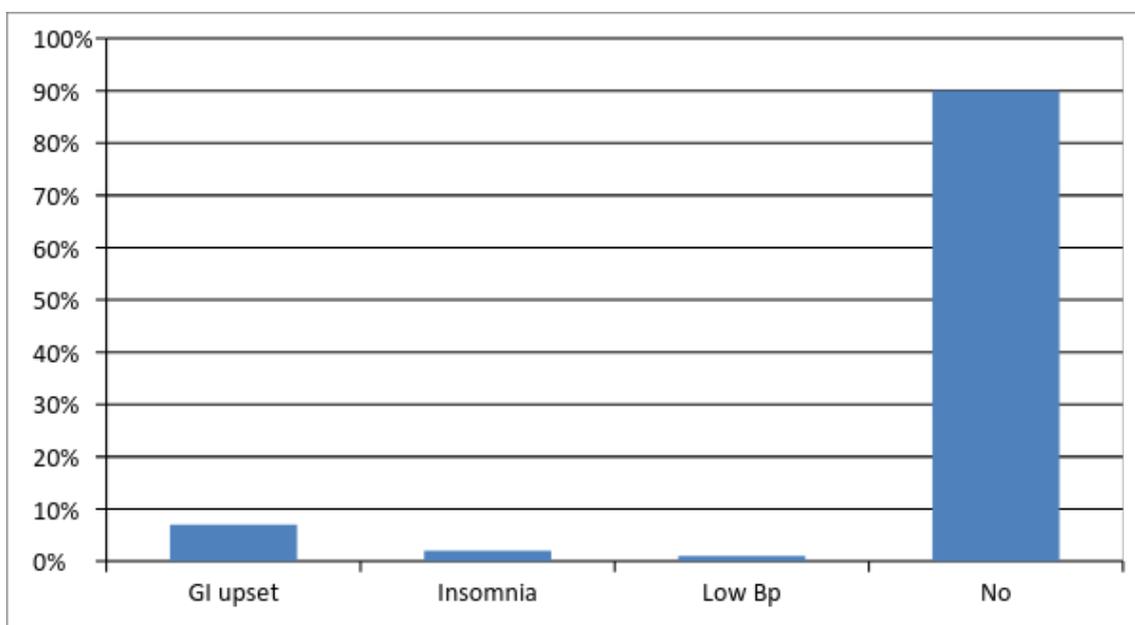
(Figure 5: prescribing pattern)



(Figure 6: combination of medicines)



(Figure 7: Nature of antibiotics)



(Figure 8: Side effects)

Table 1: Gender Distribution

Sex	f	%
Male	47	47%

Female	53	53%
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Table 2: Age Groups

20-40 Years	f	40-60years	F	60-80years	f
62%	62	28%	28	12%	6

Table 3: Chief Complaints

Fever	f	Flank pain	f	Urinary retention	f	Suprapubic pain	f	Dysuria	f	Frequent urge to urinate	f
8%	8	44%	44	14%	14	16%	16	8%	8	10%	10

Table 4: Type of UTI

Cystitis	f	Urethritis	f	Pyelonephritis	f	Urosepsis	f	CKD	f	LUTS	f
31%	31	13%	13	32%	32	4%	4	8%	8	12%	12

Table 5: Prescribing Pattern

Brand	f	Generic	f
100%	100	0%	0

Table 6: Combination of Medicines

Antibiotics	f	Analgesics	f	Antacids	f	Proton pump inhibitors	f	Anti-emetics	f
90%	90	71	71	27	27	23	23	17	17

Table 7: Class of Antibiotic prescribed

Quinolone Antibiotics	f	Penicillin Antibiotics	f	Cephalosporin Antibiotics	f	Oxazolidinone Antibiotics	f	Pyridopyrimidine Antibiotics	f
58%	58	4%	4	34%	34	2%	2	2%	2

Table 8: Side effects

GI upset	f	Insomnia	f	Low Bp	f	No	f
7%	7	2%	2	1%	1	90%	90

Discussion:

Urinary tract infection is an infection of any part of urinary system including kidneys, ureters, bladder and urethra. The incidence of UTI is higher in females than in males due to several clinical factors.. Commonly it is caused by Escherichia coli but can also be occurred by other bacteria and fungi [11].

Urine sample is collected and the results obtained by microscopic examination are evaluated to identify the causative agent responsible for urinary tract infection. For urinary tract infection patient's blood urea nitrogen (BUN), creatinine, sodium and potassium levels are also checked for effective treatment. Our study showed high prevalence rate of UTI in females than in males which is similar to a study conducted in Nigeria. [12]. According to our study 39% of patients with a age limit between 40-60 years were suffering from urinary tract infection this result coincide with the previous study done by Mahesh E. et al in south India where higher incidences were noted in the age group of 40 and above [13].

Mostly 90% of antibiotics were prescribed for UTI .Antibiotic resistance is one of the emerging problem due to inappropriate use of antibiotics. 58% of patients were prescribed with quinolone antibiotics due to its effectiveness but it may also develop resistance in some patients this result relates to the study conducted by Ahmad S in Kashmir [14]. All drugs were prescribed by brand names. Usually generic name help the hospital pharmacy to have better inventory control and drugs are also economical.34% of patients were prescribed with 3<sup>rd</sup> generation cephalosporin's such as ceftriaxone this result of our study is similar to the one conducted by Harish and his colleagues in Kerala [15].

Physicians also advised the patients to make some changes in their lifestyle including dietary habits, water intake and also to practice a good hygiene so that the risk of urinary tract infection may be reduced .This point of our study also correlates with the study of John L Brusck which was conducted for the prevention of urinary tract infection [16].

#### **Conclusion:**

It is apparent from our study that currently antibiotics along with proton pump inhibitors and analgesics were prescribed as a combination therapy for urinary tract infection. Commonly 3<sup>rd</sup> generation cephalosporin such as ceftriaxone and quinolones such as ciprofloxacin and levofloxacin were prescribed. Prescribing by brand names was followed by all practitioners, therefore prescribing by generic names need to be encouraged. Personal hygiene and more water intake can plays an important role in the prevention of urinary tract infection.

#### **Acknowledgment:**

We are grateful to the hospital management and staff for their cooperation and for making the collection of data feasible for us.

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# Evaluation of Triggers, Management and Patient Compliance in Migraine

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**Abstract- Objectives:** The aim of the study was to evaluate the triggers which triggered the migraine attack, management of the migraine and patient compliance towards treatment.

**Methodology:** An observational cross sectional study was conducted for two months in different hospitals of Lahore. A detailed questionnaire was designed and filled by the 100 patients during face to face interview. Collected data was analyzed by statistical method and results was tabulated and represented in the form of tables and graphs.

**Results:** Female patients were found to be more affected as 83% of the females and 17% of males were affected by migraine. Most affected population i.e. 50% fall in age ranges of 20-30 years. Frequently observed triggers were stress (35%) and food (32%) while others were affected by noise and light too (15%, 15%) respectively. Mostly prescribed medicines in migraine were triptans (44%) NSAID's (35%) beta blockers (13%) calcium channel blockers (8%).70% of migraine patients were non-compliant towards their therapy, because of the side effects of medicines. Life style changes also helped in managing migraine attacks.46% patients had family history of migraine. The patients who consulted pharmacist for their therapy were only 3%.

**Conclusion:** Incessant to therapy, life styles changes like exercise, yoga, sleep patterns and by taking preventive measures like take meals at regular intervals and by reducing stress, migraine can be managed efficiently.

**Index Terms-** neurological disorder, triggers, management, Prevention, compliance.

## 1. INTRODUCTION

Migraine is a very complex condition accompanied by the variety of symptoms and is a common, multifactorial, disabling, recurrent, hereditary neurovascular headache disorder. For some people it is only a pain usually in the temporal region but most of the people complain about many symptoms associated with the pain. These symptoms include the sensitivity of light, sound, fragrances, smell and the feeling of sick, nausea and vomiting. Migraine attacks can be very severe and frightening that one can get relief only after lying for several hours without disturbance. It can affect the people of all age groups with a variety of diverse symptoms. It is different from the common headaches and has many types that differ from person to person. It is very difficult to distinguish between these different types of headaches. The patient with migraine may also sometime experience other types of headaches depending upon the condition and situation. [1]

With the progression of science it is now believed that genetically migraine is induced by imbalance of certain chemicals such as serotonin in brain through which pain travel towards brain or by changes in trigeminal nerve pathway(5<sup>th</sup> cranial nerve).[2]

Migraine is the third most prevalent illness in the world, yet the researchers are still in a struggle to determine the exact mechanism that how and why migraines occur. Depending upon the complexity triggers of migraine varies from person to person and intense headache is triggered by number of factors including stress, noise, exertion certain medications or food. [3]

Among the dietary items the most common triggers reported by the patients and addressed by the health care providers are chocolate, coca, caffeine, alcoholic beverages, fatty foods and cheese. Such dietary precipitants in isolation are sufficient to trigger an attack. [4]

Other factors includes sleep (changes in sleep pattern) hormonal (estrogen level changes and fluctuation) environmental (bright lights, odor, pollution, and weather) and visual disturbances. Fruits (papayas,overripe bananas,) vegetables (raw garlic, olives, pickles, onions, snow peas,)bread and grains(freshly bakes yeast bread, doughnuts)meat, fish (canned, processed meat) and desserts (chocolate ice cream, pudding, cookies, cakes).These are the most common triggers that are usually supposed to be the cause of migraine. [5]

Management of the migraine begins with prevention. This includes diagnosis and avoiding the underlying triggers of migraine, however, migraine headaches can be managed by various methods that may include life style changes and therapies. While the choice for an individual patients depends on the severity of the attacks,associated symptoms such as nausea and vomiting and patients

treatment response. Various options are available to stop migraine attacks: acute medications or symptomatic treatment (Pain relieving), Preventive medications, Alternative or non Pharmacological Treatments. [6,7]

Analgesic and anti-nauseatic are the prime choice for the treatment of mild or moderate migraine pains and non-specific treatments these include paracetamol (acetaminophen), ibuprofen and aspirin.[8]

Second class of drug used in treatment of migraine is triptans. Commonly used triptans are sumatriptans, zolmitriptan and almotriptan. Combination of sumatriptan and naproxen sodium has proved more efficacious in terminating migraine than using triptans individually. Favorable benefits of triptans are obtained when they are taken at the beginning of headache, while pain intensity is mild or moderate. However, they are not useful during the aura phase. Ergots are the other group of drug which are used in migraine treatment. Ergotamine are considered effective and appropriate for the treatment of migraine in almost all guidelines. Dihydroergotamine more efficacious and has lesser side effects than ergotamine. Ergotamine are cost effective and also less effective than triptans.[7,9]

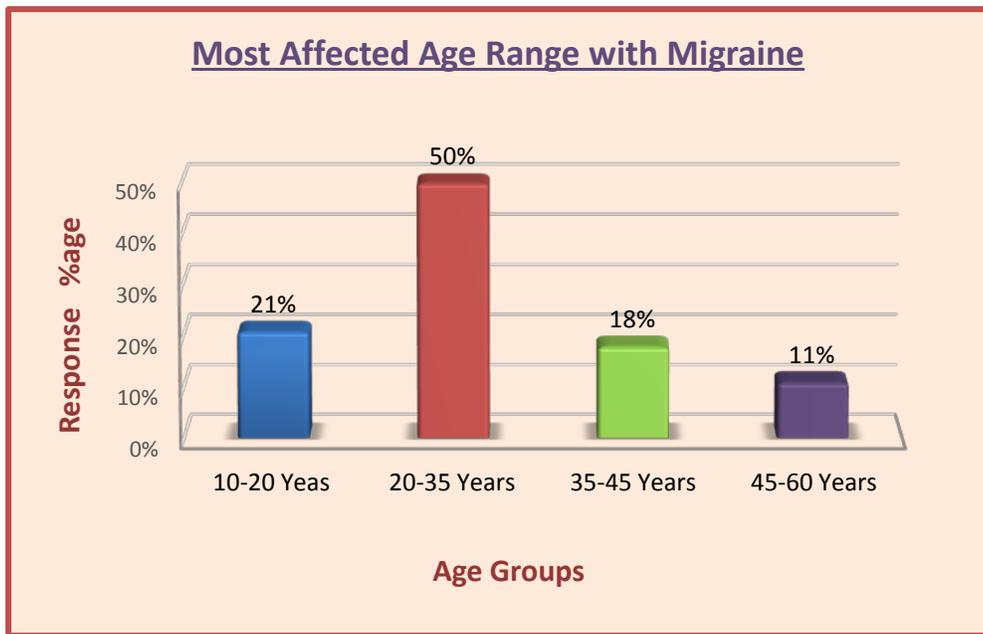
Some guidelines recommend a stepwise treatment of migraine in which initially acute attacks are treated with the safest, least expensive therapies and migraine-specific medication is only used if the initial treatment fails. While other guidelines recommend a stratified approach which is based on severity of illness. Basically this approach recommends migraine specific drugs for severe attacks though these two strategies are equivalent but stratified care result in better clinical outcome than step wise care. Pharmacists can also assist migraine patient to understand the use of non-pharmacological and supportive therapies e.g. providing information regarding foods and medication which may potentiate the migraine and other behavioral factors which include proper sleep patterns and stress reduction. [10]

## 2. MATERIALS AND METHODS

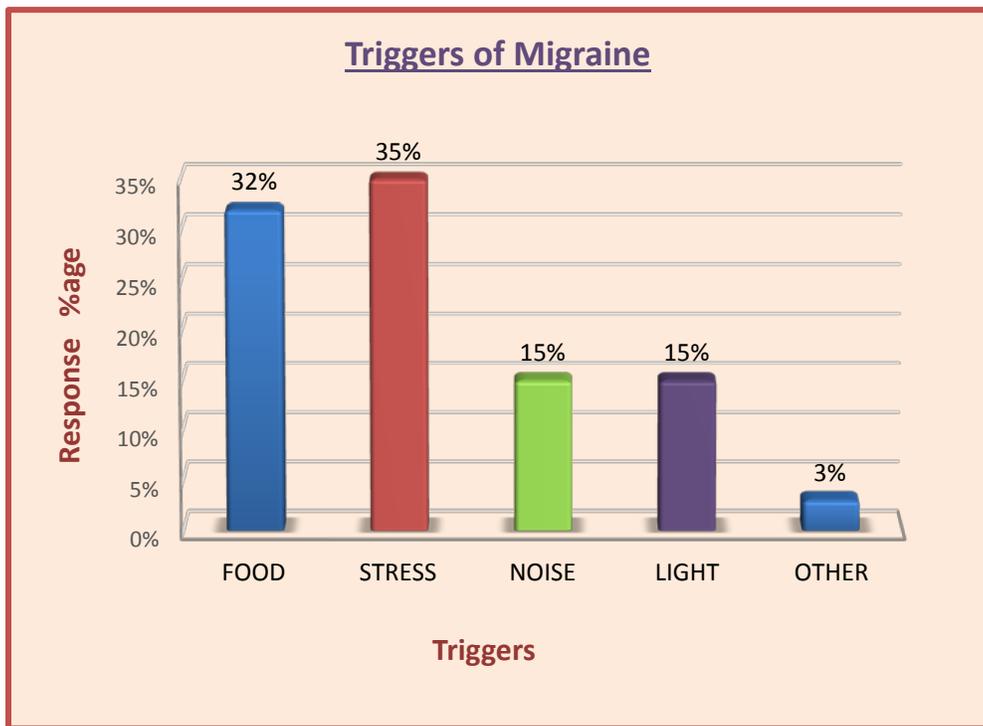
An observational and cross sectional study was conducted at different private and public sectors hospitals of Lahore Pakistan. The duration of study was 2 months and 100 patients of migraine were selected by random sampling technique. A detailed questionnaire was designed related to the evaluation of triggers, management and patient compliance in migraine. The questionnaire was filled by face to face interview with patients both male and female and the collected data was then analyzed statistically and results were shown in form of tables and graphs.

## 3. RESULTS

After conducting survey, on the evaluation of triggers, management and patient compliance in migraine, it was found that the age range which is most likely to be affected by migraine is 20-30 years [Figure 1]. Majority of the triggers that mostly affect the patient were stress (35%) and food (32%) [Figure 2]. In relation to management and treatment, it was found that mostly prescribed medicines were triptans (44%) and NSAID's (35%) [Figure 3]. Frequently used approach for treating migraine were abortive (49%). preventive (34%) and the rest were using the alternating therapies [Figure 4]. However, patient compliance towards treatment was low as 29% only [Figure 5].



**Figure No. 1: Most Affected age range**



**Figure No. 2: Triggers of migraine**

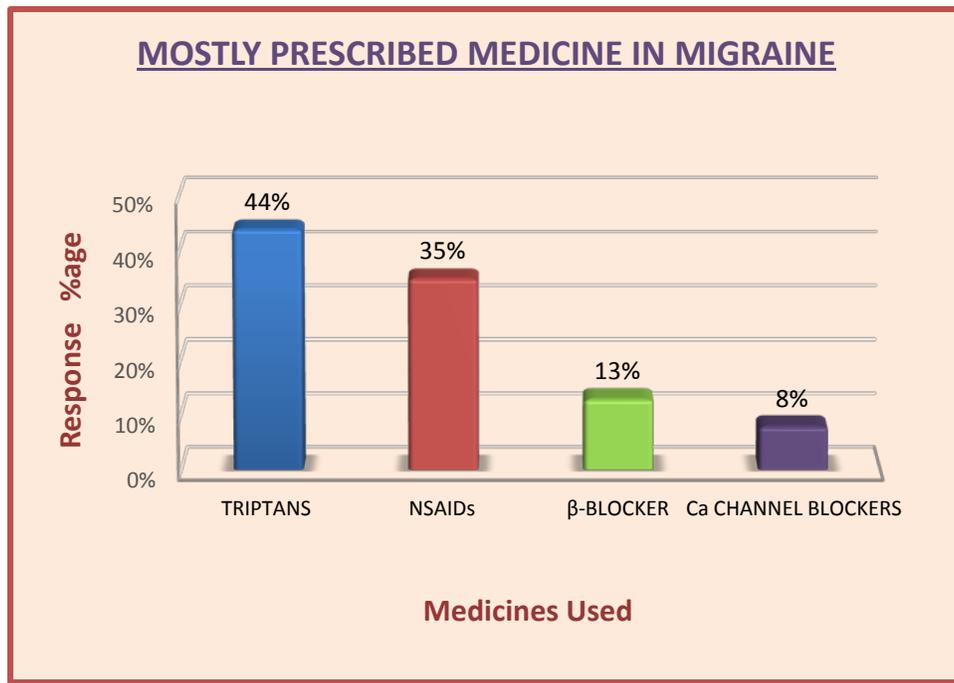


Figure No. 3: Mostly prescribed medications in migraine

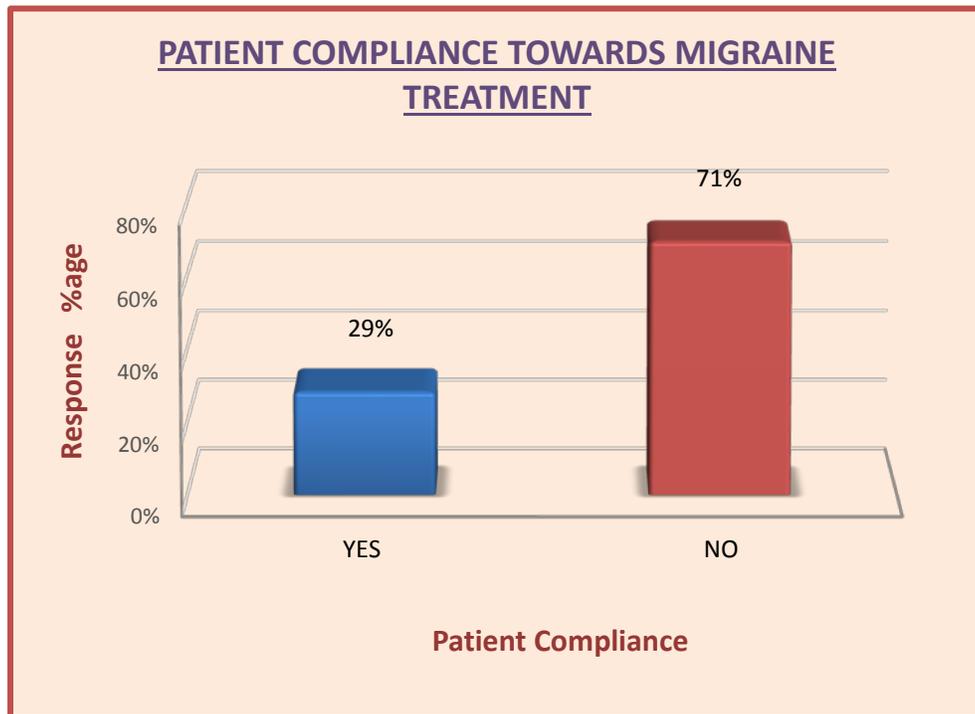


Figure No. 4: Patient compliance towards treatment

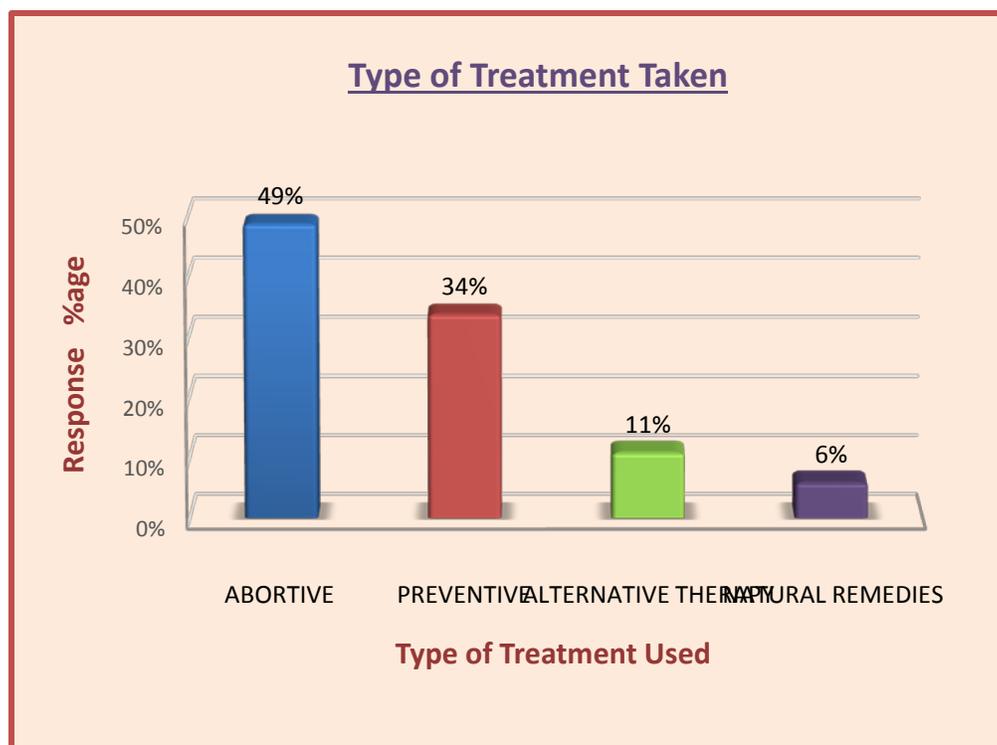


Figure No 5. Type of treatment taken

#### 4. CONCLUSION

Migraine is a neuromuscular disease usually regulated by the flashes of light, sound and fragrances, characterized by the throbbing pain usually at one or both temples or at the back of the head. Frequency of migraine attacks is more common in adult ages. Migraine also follows the trend to run in families. It is usually triggered by environmental factors, food and stress. Although in most of the cases, patients left undiagnosed for a long time, but early diagnosis of the disease can make it treatable. Step care usually follows for the treatment starting with simple analgesics and antiemetic and then step forward to triptans and ergotamine. Pharmacist has the vital role in monitoring the patient's medications therapy regimens.

#### ACKNOWLEDGEMENT

*Challenges are what make life interesting and overcoming them is what makes life meaningful.*

Countless thanks to Almighty Allah, The Merciful, The Beneficent and embracing all knowing who provided us the opportunity, courage and ability to complete this contribution towards knowledge and ever first educator Holy Prophet (PBUH) who is forever a torch of guidance and light of knowledge for mankind and teaches me higher ideas of life. From the formative stages of this report to the final draft, We wish to express my deepest gratitude to HOD **Dr.Saleha Sadeeqa** supervisor **Dr. Bushra Ali Sherazi**, for her guidance, advice and insight throughout the study and finally **Institute of Pharmacy, LCWU**

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# An Empirical Study of Effect of Services and Product Design on Repurchase Behaviour of Consumers of Fast Food Restaurants of Pakistan

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**Abstract:** Nowadays, customer repurchase behaviour is an important matter for organizations. So customer satisfaction have been continually stressed by the researchers and scholars. On the other hand, out of the most important stakeholders customer is top priority for marketers. Without customer organizations undoubtedly cannot be succeed. This study examined the relationship between service design and product design with customer satisfaction and customer's repurchasing behaviour. The current study aimed to fill the research gap by taking data from customers of fast food restaurants. In this study further discussed the theoretical framework, hypothesis, and research design and data analysis to conduct the research work.

**Keywords:** marketing mix, consumer repurchase behaviour, product and process mix.

## Introduction

Globalization is an attractive concept in accordance to which multinational amalgamation is feasible with a different point of view regarding the products, ideas, concepts, values and culture. This diversity in concepts has changed the world significantly (Mittal & Morgan, 1994). Customer's satisfaction is main motive of fast food industry (Stank, Goldsby, & Vickery, 1999). Customer's satisfaction can be attained if demands of customers are considered while making a decision about the products and services. A customer, who is satisfied, has assured repurchases in future and growth in forthcoming sales. Marketing mix offered products and services have influenced on consumer choice to repurchase and revisit for the purpose of shopping (Doorn et al., 2010).

Being the land of varied culture Pakistan has people with diverse eating habits in. Fast food industry is emerging as a leading sector with extraordinary feasting and growth of the industry (Card & Krueger, 1993). Despite ferocious competition, this industry is increasing quickly with intensified prosperous because of young population (Amjad et al., 2007).

## Literature Review

Customer's psychology and approach would be inclined through support of manageable marketing tackles which includes the elements of marketing mix; 4 Ps product, price, place and promotion. These offered products as well as services have influenced

on consumer choice to repurchase and revisit for the purpose of shopping (Akbar & Parvez, 2000). Customer's satisfaction and maximization of profit are like two parallel concepts and the balance between these two concepts is very significant for an organization. The marketing mix tools are required to generate the balance between the concepts. Different managers use these tools differently by keeping in mind the available resources and customers' demands and expectations (P.G. & T., 2003). (Akbar & Parvez, 2000) Explored that out of marketing mix elements the product is the one which fulfil the need of customers. While the price a customer pay for a specific product or service is the price element of marketing mix. While in services industry there are seven P's of marketing mix are prominent (Ishaqa, 2012) which is an addition to traditional model of marketing mix; product, price, place, promotion, process, people, physical environment. Products are of tangible nature while services are intangible. Organizations try to satisfy their customers by fulfilling the requirement of them regarding products (Tung, 2004). Fast food industry deals with both products which are the foods or categories of food provided by them as well as the services along with the products (Prewitt, 2000). The relationship between the quality of products and customer satisfaction is also studied. It has been observed that satisfied customer is the loyal one (Matzler & Hinterhuber, 1998).

The monetary value a customer pay for the product is called price, product's price must be competitive as well. Different strategie has been developed by marketers while setting a price (Lovelock, & Wright, 2002). P of process mix is more relevant in servicing industry because the whole systematic arrangement of execution of services is known as process. Process mix includes number of steps, the nature of activities whether customized or standardized and the level of customer involvement. Customer of fast food industry are educated an d young so the proper execution of services matters a lot in the industry (Abbasi, Akhter, Ali, & Hasan, 2010)

Mittal and Kamakura (2011) It has been observed that repurchase behavior of customer is an outcome of an effective relationship marketing and this repurchase behavior of customer is very significant for the success of business . Only a satisfied customer can repurchase products or services of company so, there is a positive relation between customer satisfaction and repurchase behaviour, confirmed by prior researches as well (Johnson & Fornell, 1991).

Ajzen (1991) explained that Theory of Planned Behaviour assist to control or predict behaviours of people. Theory of Planned Behaviour proposes that behavioural intention is the function of three constructs: attitude, social norms and perceived behavioural control. Repurchase behaviour of customer is important as being the least option for an organization to multiply the profit. A huge amount of profit can be observed if one knows how to use this option (Anderson & Sullivan, 1993). When product's performance is according to the expectation of customer, the customer develops the repurchase behaviour because he feels satisfied. If supposed performance parallels to expectations then customer is satisfied (Anderson, Fornell, & Lehmann, 1994). In fast food industry repurchase behaviour denotes the satisfaction of customer mainly regarding restaurant services (Berry, Seiders, & Grewal, 2002).

(Bakhat & Aziz, 2012) explained that cutthroat competition has been observed in fast food industry globally. In that scene, retention of customer has become globally discussed phenomena. The motive of maximization of shareholder's equity can be only be achieved if only the customer is satisfied as well as retained. Repurchase behaviour or repurchase intention can be measured by loyalty and satisfaction.

Fast food industry has also gained attention in Pakistan because of \$ 1.4 billion sales annually with a growth of 10% on annual basis. According to the world, Population Data Sheet issued by the US Population Reference Bureau (2013) Pakistan has ranked sixth the most populous country of the world. It provides large number of consumers and vast market for food enterprises. Main reasons of this fact includes the ratio of population mix; 42% young population and 34% middle class in the whole population. This is what fast food industry is targeting now precisely.

MacDonald's Pakistan country director stated that *"less than 1% of the population is spending money on fast food in Pakistan regularly and we have \$1.4 billion sales with 10% growth in sales annually. Industry have lot more room for expansion because trend of eating fast food is increasing 20% annually and this is just the beginning."*

(Amzad & Sarker, 2012) were interested to investigate the impact of marketing mix elements on tourists' satisfaction. Conceptual model represents that seven independent variables namely product, promotion, price, people, place, physical environment and process have impact on tourist's satisfaction. The basic aim of the research is to find out the relationship between marketing mix elements and tourists' satisfaction. Research hypotheses stated that all mentioned marketing mix elements are positively related to tourists' satisfaction (Gilbert, Veloutsou, Goode, & Moutinho, 2004). Sample was selected by using convenience-sampling technique and questionnaires were distributed among 132 university students who visited to East Lake China. Results showed that except price, all other six variables have positive and significant relationship with tourists' satisfaction.

(Fen & Lian, 2007) was interested to investigate the impact of service quality and customer satisfaction on re-patronage intentions. Each time when customer visits, the restaurant patterns of service quality change that effects on customer satisfaction and shape their purchasing behaviour towards a particular restaurant. Basic idea to conduct this study is to analyse the relationship among service quality, satisfaction and consumer's repurchase behaviour and determine those factors that have significant effect on re-patronage intention. (Ma'rof, Mat, Rashid, Nasuredin, & Sanita, 2012) studied those factors that influence on consumer purchase behaviour. Purpose of this study was to identify effects and relationship among retail satisfaction, store loyalty, competitive resistance and consumer purchase behaviour. (Mashhadi & Ijaz-Ur-Rehman, 2012) studied the effect of customer satisfaction on word of mouth communication many researchers also focus on the issue of customer satisfaction because it has a dominant role for any organization. Success of business depends on customer satisfaction because customers act as an asset and have significant impact on financial position of the company. (Mhlanga, Hattingh, & Moolman, 2015) examined the impact of restaurant attributes on customers' expectations and experience in formal restaurants located in South Africa basic purpose of the study was to identify important factors that can influence on customers and find out that which one attribute has a strong relationship with customer's satisfaction.

(Taghizadeh, Taghipourian, & Khazaei, 2013) examined the different external factors that have effect on performance of fast food industry. Food is an essential component of human life no one can survive without eating and term fast food refers as readymade food available within few minutes. Basic purpose of this research to find the effects of PEST on performance of fast food restaurants researcher proposed different hypotheses stated that political, economic, socio cultural and technological factors effect on performance of fast food restaurants located in Pakistan. Theoretical framework showed that political, economic, socio cultural and technological factors are selected as independent variables and performance of fast food restaurants taken as

dependent variables. All fast food restaurants taken as target population and pizza delivered outlets located in Islamabad and Rawalpindi selected as sample questionnaire instrument was distributed among managers of respective outlets by using convenience-sampling method. Results indicate that social, economic and technological factors have significant influence on performance of fast food restaurants and technological component is the most significant among all others influencing factors.

Resarchers analysed factors that have impact on brand preference based on literature review many influencing factors have found namely taste and quality, delivery of the product and staff. It is evident that managers should be aware and know about customer's expectation and demands while they are forming marketing strategies. The basic purpose of research is to find out factors that have influence on consumer's preference about KFC and McDonalds. In addition, which factors contribute to brand preference and reduce switching cost? Research hypotheses stated that there is significant difference exist between KFC and McDonalds' customers based on taste and quality, delivery of the product and staff. By using convenience-sampling method, questionnaires were filled by more than three hundred students of undergraduates who are regular consumers of fast food restaurants. Results indicate that McDonalds is performing well and preferable in availability of outlets, friendly staff while KFC has some better traits as compare to McDonalds (Haider, Jan, Jan, & Faheem, 2015)

It is examined that there are numbers of factors that effect on fast food customer's satisfaction. Fast food trend is rapidly growing so many franchises and outlets are going to open in different cities of Pakistan. Customers are integral part of any organisation, success and failure of business depends on them so there is need to understand consumer's expectations, demands and try to fulfil It (Gilbert et al., 2004). The basic aim of this research study is to determine essential elements that cause of customer's satisfaction and loyalty. After in depth study of literature review, researcher enabled to point out some determinants namely promotion, service quality, customer expectation and brand selected all these as independent variables that all have impact on customer satisfaction. Proposed hypotheses stated that all independent variables are positively related to customer satisfaction and purchase decision. All customers of fast food outlets are selected as target population and sample taken from customers of KFC, Pizza hut and Chief Burger through non-probability sampling. Data collected through questionnaire instrument and results indicated that service quality and brand are the most important and significant determinants that effect on customer satisfaction(Nadiri & Hussain, 2008).

Examined the brand equity of different fast food restaurants operating in Karachi. Brand equity refers as name, repute and goodwill of a firm, which a company gets after consistently delivered a valuable products and services to its customers(Brady & J. Joseph Cronin, 2001). Advertising is one of the effective sources of creating brand equity and generating valuable consumers. The basic aim of this research is to measure customer's perception about brand equity of four leading fast food restaurants. After the careful and deep study of the literature researcher found brand awareness, brand usage, brand performance, brand imagery and brand judgement as independent variables while brand equity undertaken as dependent variable(Voss & Voss, 2000). One hundred consumers of different fast food outlets filled a close-ended questionnaire. Results indicated that out of the four leading fast food chains KFC had found a leading position in building a brand image while McDonalds has to improve brand equity(Raza & Jalees, 2005).

It is stated that in Pakistan customer choice about food items is normally analysed by household surveys. Although it is general phenomena that consumer taste and behaviour is continuously changing and it can be measured by time series and cross section data. In this paper twenty years data is calculated by using time series data collection method. The basic purpose of this research is to find out the consumption level of each selected food item, analyzing consumer demand behaviour, and using the generalised axiom of revealed preference (GARP) model for understanding the utility maximization principal. Under the parametric analysis, LA/AIDS method also used to determine change in consumer choice. GARP analysis determines that consumer chooses one product from different available options and that selected product is said to be revealed prefer item. The results show that as income level increase then demand of food items also increased or vice versa ((Burki & Ahmad, 2011).

Based upon literature review, it reveals that no prior study has investigated the impact of services and product design on repurchase behaviour of Pakistani fast food restaurants customers.

### **Research Objectives**

This study is aims

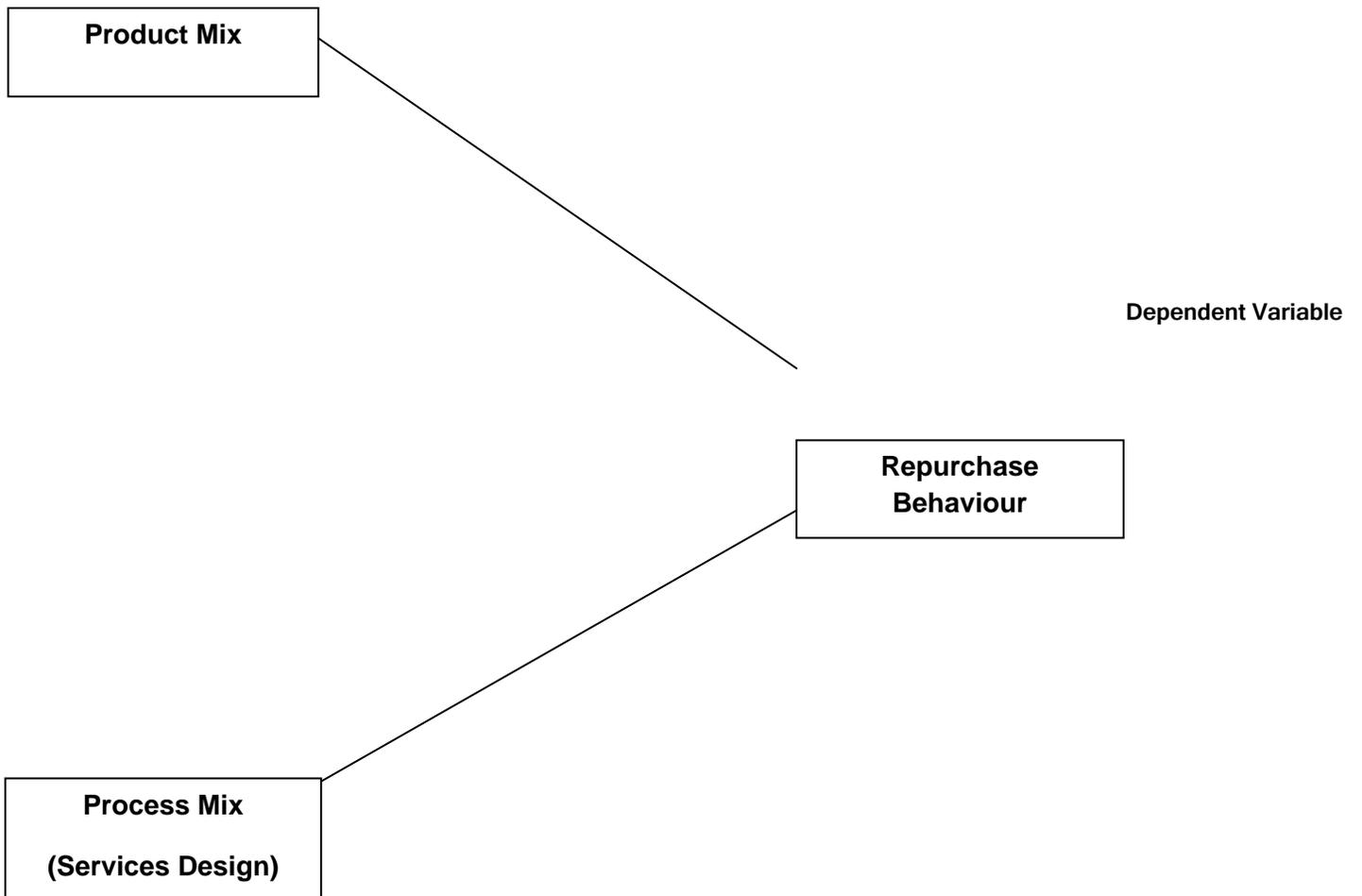
- To examine the significance of repurchase behaviour
- To examine the effect of services design on customer's repurchase behaviour.
- To identify relationship between product design and customer's repurchase behaviour of customers of fast food industry

### Theoretical Framework

A theoretical framework is a logically developed conceptual model that describes the interrelationships among variables, which are relevant to the problem (Sekaran, 2003). All variables and their relationship found after extensive reading of previous research work.

### Comprehensive model

#### Independent Variables



A proposed Theoretical framework determines “An Empirical Study of Effect of Services and Product Design on Repurchase Behaviour of Consumers of Fast Food Restaurants of Pakistan”.

### Variables of the study

The above conceptual framework is drawn for this study and it reveals that marketing mix is influencing on customer repurchase behaviour. According to proposed framework, there are seven independent variables those show some kind of effect on dependent variable moreover it also provides the basis to develop testable hypotheses. Therefore, in this section researcher is interested to develop the hypotheses, discuss the each variable, and try to find the relationship and their impact on dependent variable with reference to previous study.

#### Independent Variable/Exogenous Variable

- Product Mix
- Process Mix

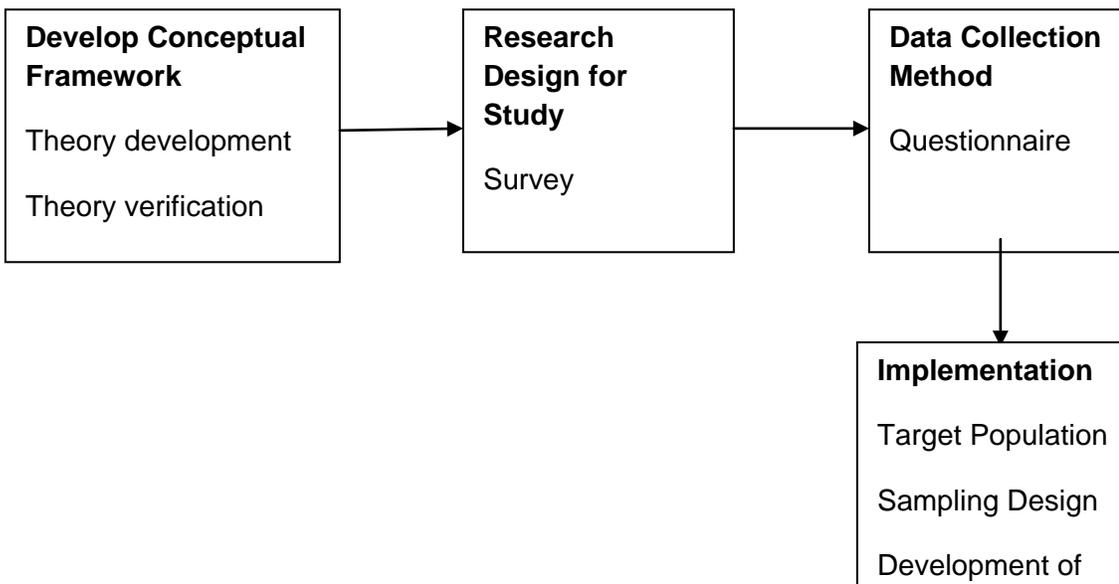
#### Dependent Variable/Endogenous Variable

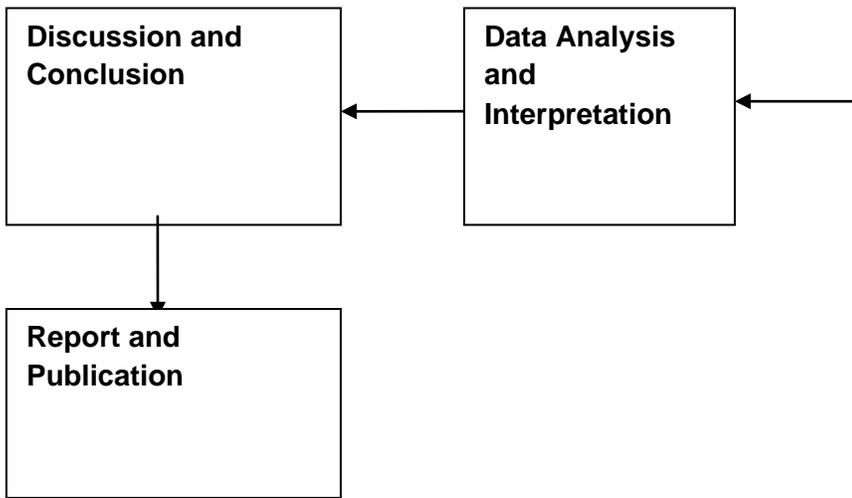
- Repurchase Behaviour

#### Hypotheses of the study

- H1: There is significant positive influence of Product mix on Repurchase behaviour of consumer.
- H2: There is significant positive influence of Process mix on Repurchase behaviour of consumer.

### Research Methodology





## Data Analysis

This research gives the new dimensions to understand the consumer behaviour because it is necessary to know about all those factors that change the user's perception about a product and service. Here, concept of marketing mix does not consist of traditional 4P's but it is a mixture of multiple variables namely product, price, place, promotion, physical environment, people and process. This paper applied the concept of marketing mix over the fast food industry. The basic objective of this research is to determine the impact of marketing mix on the repurchase behaviour of Pakistani consumer of the fast food. Study focuses on all the integral elements of marketing mix because these act as a significant tool to influence consumer buying behaviour. Today consumer is rational towards spending money and he wants to know about the benefits of an offered product and service so that is why marketers and managers are finding the tactics those help for customer retention. In a current era, organizations give highly importance to their valuable customers and try to satisfy by fulfilling their demands. Fast food business is also becoming a flourishing sector of Pakistani economy because of enhancing the population and the food consumption. Many international and local food chains are entering into a Pakistani market because it provides number of potential customers and profitable opportunities to enhance business.

Demographic variables showed that total out of 300 respondents 150 belong to male category and 150 were from female. 181 of them are Graduated or Masters that is the highest proportion. Mostly respondents' visit to fast food restaurant once in a week and 178 respondent's age were in between 20-30 years. Out of 300, 192 respondents like to visit fast food restaurant, 94 go to local restaurant and only 14 respondents like to eat non-branded food. In addition, 111 respondents income are in between Rs. 20,000 – Rs. 40,000.

Another objective of this research is to find the relationship between marketing mixes and repurchase behaviour. In this study, the coefficient of correlation shows that there is positive association between all the elements of marking mix and repurchase behaviour. The results show that positive relationship exist between product and repurchase behaviour as  $p = .000$ ,  $p < .01$ .

Next hypothesis is about a significant positive impact of process mix on repurchase behaviour of customer is proved true.  $P$ -value = 0.002,  $0.002 < 0.05$ , it briefs that trained and skilled employees of the restaurant have influencing factor to determine visitors buying behaviour. Employee's knowledge and communication manners persuade to consumers to revisit the restaurant.

To determine the relationship between products and repurchase behaviour of customer a correlation test is applied. Pearson correlation test shows a positive value  $p = .000$ ,  $p < .01$  for  $N = 300$ . This shows that a positive relation between the two variables. As high correlation is observed because  $p < .01$ . T test also applied showing  $t = .535$ ,  $p = .000$ ,  $p < .01$ .

H1: There is significant positive effect of Product on Repurchase behaviour. Thus it rejects  $H_0$ . Regression analysis results show that the significant value of the product is less than 0.05, as  $p$ -value = 0.001,  $0.001 < 0.05$ , so it can be inferred that product has a positive influence on repurchase behaviour significantly. Further customer's repurchase behaviour is determined by the products offered at restaurant. Consumers like product quality, taste and food menu. Overall, it can conclude that

respondents buying behaviour highly influenced by product attributes and it positively influence to shape consumer's repurchase behaviour.

H2: A significant positive influence of Process mix on repurchase behaviour of customer has been identified, hence it rejects the H0. Regression analysis is showing that the significant value of process is 0.000, which means that  $p\text{-value} < 0.05$ ,  $0.000 < 0.000$ . here it can be identified that process has a significant impact on customer's repurchase behaviour.

Moreover, analysis results of this research imply that marketing mix is a valuable tool to measure consumer's buying behaviour. There is a positive impact of product and process on consumer repurchase behaviour.

### Conclusion

This chapter concludes the research study and provides implications, limitations and directions of the future research related to study. This study is quite useful not only for the managers of fast food industry but also for the researchers as it paves the path for the future research in the domain of consumer behaviour and marketing mix in developing countries like Pakistan.

Pakistan is a developing country where eating habits of the people are being transformed in according with the cultural and social dynamics. Life of common people is getting busier day by day and people now days are more inclined to dine out then to eat at home. In anticipation of this shifting trend, fast food industry in Pakistan has seen considerable growth in the last decade and this growth trend is increasing whereas not only local but also international fast food chains are expanding their businesses in Pakistan. As a result of this expansion competition among these fast food chains and restaurants is increasing day by day and fast food market in big cities like Lahore and Karachi has saturated. This leads to a position where every player in the market is trying to snatch its piece of pie from its competitor. Thus, it is of utmost importance at the moment to study the consumer behaviour in the local market as to locate the factors which induce the consumers to revisit and repurchase from a particular fast food outlet or brand. The most important decision criteria as to how to market the product relates to its marketing mix which relates to the decision relating to the product itself, its pricing, its distribution, its promotion, physical environment of outlet, people operating the business and processes of the fast food outlet. This study tries to find out the importance of these four basic factors in relevance to the repurchase behaviour of the consumers of fast food in Lahore so that marketers of the fast food industry may be able to grasp the phenomenon in a better and more practical manner.

The basic objectives of study were related to assessing the importance and role of repurchase behaviour of consumer in context of business success. It is imperative to note that fast food is not a durable product and consumers may purchase and consume the product immediately and the product could also be purchased and consumed more than once in a day. Thus, the sales of any fast food organization could be increased if it somehow evokes the consumer to repeat purchase of it products more frequently. Thus, this repeat purchase or repurchase behaviour could be the single most important factor which may ensure success of the organization. The organization only has to make sure that its clientage makes frequent repeat purchases from the organization. This repeat purchase factor is more relevant in the environment of strife competition and market saturation where it

is more costly and difficult to attract new clientage than to retain and serve the existing ones. Thus, repurchase behaviour of the consumers is probably the most important criteria of organizational success in the local saturated fast food markets of Pakistan.

The next objective of the study was to investigate the impact of various aspects of marketing mix on repurchase behaviour of the consumers in the fast food industry of Lahore. For this purpose, data was collected from the consumers asking them to respond to a standard questionnaire containing the factors related to the marketing mix and repurchase behaviour of the consumers in fast food industry of Pakistan. A total of 300 responses were generated to find the impact of marketing mix factors on the repurchase behaviour of consumers. Overall, this research finds a positive and significant impact of marketing mix factors relating to product, price, promotion, people and process mix; while factors related to place and physical environment mix were found insignificant with regard to their impact on repurchase behaviour of the consumers in the local market. Processes and product mix were most significant factors with regard to their impact on the repurchase behaviour of the consumers. This implies that consumer value taste and hygiene of the product above all other factors and would prefer to repurchase from the outlet which has more hygienic processes and richer taste. Then come people and promotion mix factors indicating that right marketing effort and behaviour of the employees of the fast food outlet can also have a significant and positive impact on the repurchase behaviour of the consumers. The last significant and important factor is pricing mix indicating that people do consider price of the product in comparison to value of the product but the importance of the price is lower than the product and promotional factors. This indicates that customers of the local fast-food industry may be willing to pay more prices for products of good hygiene and rich taste. Moreover, promotional activities could also be used effectively to retain the old customer and induce them to repeat purchases from a particular fast food outlet or brand.

Overall, the market of local fast food chains is quite concentrated and marketers now need creative way to attract and retain customers and survival in the market is becoming difficult day by day. Marketers should consider more on the product and promotional aspect of their menu and also price the products according to the value provided by their products. Place or distribution is not found important in the study indicating that consumers do not consider location of the outlet important that fast food outlet is located in immediate vicinity or not. Thus, customer himself would approach the outlet if he is interested to consume the products of certain fast food outlet, brand or chain. Apart from that physical environment of the outlet is also not found important with regard to the repeat purchase decision of the consumers. This might be due to the nature of industry where fast food is meant to be consumed immediately and there is 'drive through' concept as well where people do not dine in the outlet rather take delivery in their vehicles. This indicates that dynamics of the industry is a quite important aspect and 7 P's of marketing are not equally applicable to all of the industries; some factors may be more important in one industry and others could be more important for next industry. Thus, relevant factors according to the dynamics of the industry should be overemphasized over irrelevant factors as to save resources and efforts. This study by no means undermines importance of different aspects of the marketing mix; neither has it denied the potential synergies of utilizing these factors in a congruent and combined manner; this study only points out to the fact that there might be different implications of these factors when applied in different industries in different combinations. We just need to find the right combination mix for different industries to be more efficient and effective and in fast food industry of Pakistan this combination is based on the product, processes, promotion,

people and pricing. These factors if combined and applied systematically could prove to be the competitive advantage for the organization as these factors in the fast food industry not only help to retain the old customers but also induce them to make repurchases which could prove to be critical successful factor for the organization in the recent era of competition.

### **Recommendations**

Considering the findings of the studies and local dynamics of the industry; following are the recommendations of the study.

- Fast food brands, outlets and restaurants should focus more on the product development and related hygiene of the products. People in the big cities are quite conscious about their diet habits and also about the quality of their products.
- Integrated promotional activities along with the branding activities should be planned, focused and carefully implemented considering the strategic implications of such initiatives. In hostile competitive scenario, promotional and branding activities could be of much use to provoke the customer to visit and consume products of fast food outlets.
- Various discounts and other loyalty membership schemes could also be utilized in the current scenario to retain customers and provide incentives to the loyal customer base for their repeat purchase.

### **Limitations of the Study**

This study was conducted to see the impact of marketing mix on the customer repurchase behaviour in order to investigate the link between various aspects of marketing mix and customer repurchase behaviour. This was a specific area of investigation and thus, this study has following limitations:

- Only factors of marketing mix were investigated in this study; thus other important aspects of the marketing strategy such like branding, product placement and relationship marketing tactics which might have some impact on the customer repurchase behaviour or excluded from the scope of the study. Other relevant variables such like customer satisfaction, customer loyalty and service quality etc. are also excluded from the scope of the study.
- Due to time and cost constraints, thus study only collects the data from geographical boundaries of Lahore which although is a large city and people consumer much fast food here; might not be a representative of other big cities of Pakistan. Thus, findings of the study might not be generalizable to the other areas of Pakistan.
- The study uses quantitative research design which focuses on the quantification of the phenomenon. Although results obtained from the quantitative design are more generalizable and objective; such design achieve rigor by sacrificing detail and depth. A qualitative research design could also be utilized for grasping the whole situation in detail and by utilizing qualitative research design; one might find additional insight into the phenomenon by listing down all the possible factors relevant in context of customer repurchase behaviour and loyalty.
- Due to survey research, the response of many respondents was not encouraging and some respondents provided incomplete responses and some even refused to respond to the survey. Thus, the systematic mechanism advocated by probability sampling was compromised at certain occasions.

### Managerial Implications

The research found a positive impact of marketing mix on the customer repurchase behaviour in fast food industry of Pakistan. In order to exploit these finding the managers should keep following things in mind.

- Managers should considers the factors of product quality, hygiene, processes, people, promotion and pricing as important decision making criteria in all matters relating to operations, marketing and strategic planning.
- The people aspect should be focused more and employees responsible for cooking and delivering the food should be trained and monitored for their performance.
- The marketing strategy should be revisited and revised regularly in order to incorporate the changing dynamics of the external environment.

### Future Research Prospects

Following are the future research prospects which should be studied in order to fully understand the dynamics of the fast food industry in Pakistan.

- Further studies should incorporate other important variables in the empirical investigation such like brand image, customer satisfaction, customer loyalty and service quality.
- Qualitative research could also be conducted to make an in-depth assessment of important predictors of customer repurchase behaviour.
- Research should also be conducted on other big cities of Pakistan such like Karachi and Islamabad to make generalizations on the bases of demographics of those cities.
- Like predictors of the customer's repurchase behaviour, further study could also be conducted to see the impact of customer repurchase behaviour on organizational outcomes like profitability, sustainability, competitiveness and success.

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# Optimizing the Capability of SQL Queries towards Improving Database Transparency

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**Abstract-** Utilizing previously executed queries contributes in speeding up the performance of database in responding to future queries as it can reduce the number of database queries to be processed and sent back to the user. This technique avoids the re-evaluation and validation of the query being sent to the database. On the testing of the developed algorithm, shows that a one-time access of a certain query to the database was able to reused, respond and served the requirements of seven (7) different requested queries. The number could be higher if the number of fields in a query will be increased. In a scenario where the same information are to be accessed by a substantial number of users, a single access can be possibly cater the needs of the entire users which substantially reduced the amount of request being sent to the database. The process shifted some of the workloads to the application program that is usually processed by the database was achieved in the study which gives partial autonomy to the application program in terms of responding to users' requests in the form of queries. The designed algorithm was able to fetched and reuse previously executed query to respond to future queries executed by the user which applies the principle of prefetching operation. Hence, database transparency is improved.

**Index Terms-** Optimization, Database, Transparency, Reusability, Queries, Result set, Mapping, Prefetching.

## I. INTRODUCTION

Reusing Queries contributes in speeding up the performance of database in responding to future queries as it can reduce the number of database queries to be processed and sent back to the user. Moreover it can also decrease the utilization of database resources according to West [1].

A typical request of information in the database performs some steps before a user able to view the requested information. 1. The user formulates query using the application software. 2. The application software connects to the database and submits the query. 3. The database retrieves data and returns these to the user. 4. The application software receives the incoming data, and presents them to the user. These four steps will be repeated from time to time for every request that will be made [2]. This architecture has placed the bulk of the workloads on information retrieval operation on the database. Unanticipated database problems will prevent the user to request information.

Retrieved data from the database will be profiled and this will be used to respond to future user's queries in order to avoid the re-evaluation of the query by the database as pointed out in

the study of Henrik Hygerth and Michael Hakansson entitled Efficient Web Scrapping and Database Synchronization [3].

The users' machine will play active role in responding future queries by storing and reusing the previously executed query. Every executed query was evaluated and compared to the previously executed queries. Queries that cannot be possibly answered by the previously stored query was profiled while queries that are similar or contains the subset of the previously executed queries then the previously executed query was used in providing the information in response to the requested query [4].

Process of query profiling is by way of assigning a QUERY IDENTIFICATION NUMBER for the particular query. The same QIN will be used to profile its result set. The QUERY IDENTIFICATION NUMBER will serve not only as the association between the query and its result set but also used to map the correct result set to be displayed to the user. The reuse of previous query not only saves time in processing query requested by users but also the evaluation process to be done by the database based on the research conducted in 2013 by Atul Thakare et al.[5]

Organization of stored queries was done to effectively response to the user's request and to facilitate the processing, searching, storing as well as the retrieving information and data. Filing system reduces the amount of resources in processing user's request [6]. File system is a systematic way of organizing files to facilitate the process of searching, storing and retrieving information and data. It guides the user where and how to obtain data it needs. Effective filing system reduces the amount of resources in processing data.

The principle behind in this study that it partakes in the information technology area is "ACCESS ONCE VIEW MANY". One time access of data from the database generates profile of the query which was used repetitively in responding to the future queries to be executed by the user. By utilizing the previously stored query, dependency of the application program to the database will be minimized [7].

The unique contribution of this study is by making the application program active instead of being passive in responding to users request by delegating some of the work to the application program that was usually process by database. The storing, evaluation of queries and reusability of its result set will give partial autonomy to the application program in providing data to the user. [8].

## II. OBJECTIVES

The objectives this study is to developed algorithm that will optimize the capability of SQL Queries Towards Improving Database Transparency. Specifically it aims to;

1. Profile a query and assign particular Query Identification No.
2. Store query and its result set.
3. Reuse and extract future queries and its result set in responding future queries to be executed by the user.
4. Evaluate a query to determine the viability of sourcing out the data either in the previously executed query or in a database.

## III. METHODOLOGY

**Figure 1. The Diagram for query profiling.**

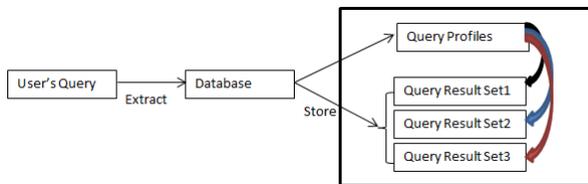


Figure 1, shows the diagram on how to profile a query. The query requested by users will be extracted from the database. The extracted information along with the query will profiled. The query profile will contain QUERY IDENTIFICATION NUMBER which will be concatenated in the query. The QUERY IDENTIFICATION NUMBER and the QUERY will be use for the evaluation and mapping to identify the correct result set to be extracted and to be displayed to the user. It also serves as the key to established association between the Query and to the Result set. Every requested query that could have a major different result such as the fields and table source will be profiled.

**Figure 2. Diagram for extracting data in the local data source for the re-executed query.**

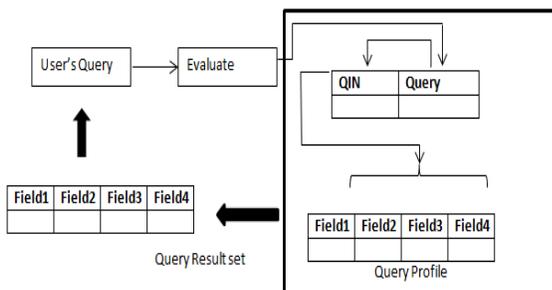


Figure 2, shows the diagram on how to extract and display data. Queries that are evaluated and found to be similar to the previously executed then the query requested will routed to

source out its data to the previously executed and profiled query. The QUERY IDENTIFICATION NUMBER which was profiled in conjunction with the Query will be used to map the correct result set to be displayed to the user.

**Figure 3. Diagram for extracting data in the previously profiled queries with minor difference.**

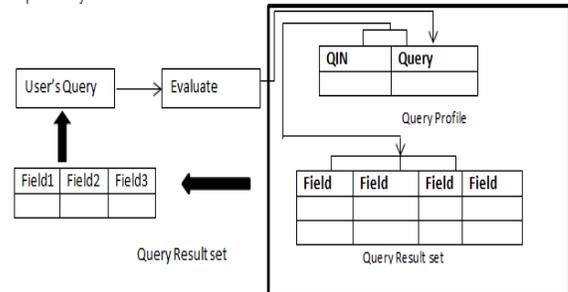


Figure 3, shows the diagram on how query served by the previously executed query. A subset of the query which can be found on the previously executed query can also source out its result set on the previously executed query. When a query will be run, it will be evaluated to the lists of previously executed and profiled query. After evaluation, it will be followed by the population of the result set using the QIN. The next step is to identify the subset of the query followed by the iteration to populate the result set which then displayed to the user.

### Method of REQUESTING QUERY in the database

Query Decomposition was employed in order to enhance its ability to answer future queries to be executed by the user. Query decomposition is a useful mechanism to speed up query evaluation based on the claim. of Athul Thakare et al in their study entitled Query Optimization in OODBMS using Query Decomposition & Query Caching [9]. From the decomposed query, only the Select and From statement will sent to the database for evaluation. The information sent back by the database is the result set of the query. The result set will be profiled and used later as a reference to answer future queries to be executed after determining its viability through evaluation . (Yongjoo Park, Database Learning:Toward a Database that Becomes Smarter Every Time, 2015)[10].

### Method of Displaying Information in response to subsequent query with condition

For subsequent query that will have condition, the query will undergo decomposition process. The condition will be taken out from the query before the evaluation and comparison to the past and profiled queries to determine if the query is capable to be served by the previously executed query. The condition will be organize and used later to filter out the information to be displayed to the user.

If the evaluation found to be positive then the algorithm will mapped the result set of the past query then it will extract and populate. From the populated record, It will choose those field that are present in the query. Every record extracted from the profiled result set must satisfy the condition set (the condition taken out during decomposition will be used) in the query to be

able to be included in the list of result set to be displayed to the user as response to the requested query.

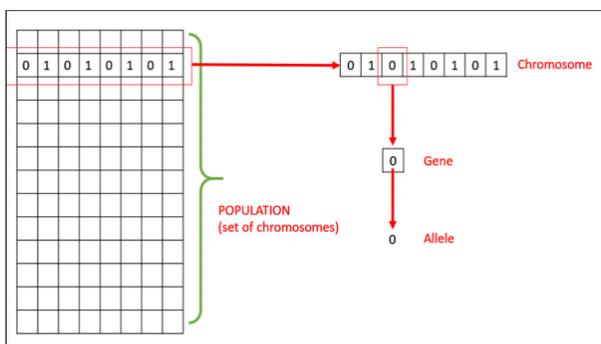
**Process of reusing extracted query result set (partly based on Genetic Algorithm).**

1. Query evaluation will be done to determine which the previously profiled query will be used to provide data for the requested query.
2. Determine the subset to be used (subset of the result set of the previously stored query)
3. Extraction using iteration to populate results that fits on a certain condition set.(Genes> Allele)

6. If the query cannot be serve any of the previously executed query and its result set then.
  - a. Send the query to database.
  - b. Profile the query.
  - c. Profile the result set.
  - d. Do iteration to extract the record one by one and apply the condition to filter the information to be displayed to the user.
  - e. Display the information to the user.

**Figure 5. The flow chart showing the details of how the architecture/design will respond to the user's request**

**Figure 4).Diagram for reusing extracted query result set.**



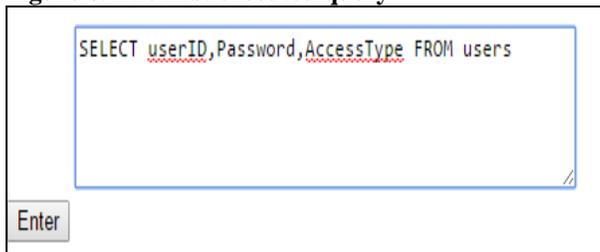
**Design of the Algorithm**

1. Design of the Algorithm

1. Analyze and query.
2. Determine the Select and From statement in the query.
3. Evaluate the query to the previously executed query.
4. If it is possible to source the data from the result set of previously executed query then
  - a. Determine which of the result set of the previously executed queries will be used.
  - b. Evaluate and Determine the qualified subset/field.
  - c. Do iteration to extract the record one by one and apply the condition set.
  - d. Display the information to the user.

**Results and Discussion**

**Figure 6. The first executed query**



**Figure 7. Result set of the first executed query.**



admin	admin	admin
11	11	teacher
22	22	teacher
1	a	stud
2	2	stud
3	3	stud
4	4	stud
5	5	stud
33	33	teacher
44	44	teacher
55	55	teacher
66	66	stud
77	77	stud
88	88	stud

On the first execution of the query **SELECT userID,Password,AccessType FROM users** the algorithm profiled the query and its result set. The query has been routed to the database, processed the query and returned its result set to the user. There are two (2) reasons why the algorithm routed the query to source its result set to the database. 1.) This was done because the query is either the first time to execute. 2.) No previous queries that are executed to be used that fits to the requirement of the executed query. After the profiling process the query is now qualified to be utilized for comparison and for possible fetching of its result set to response to the subsequent queries that will executed.

From the query executed, the following possible queries was answered and their result set fetched-in in the result set of the previously executed query.

1. SELECT userID FROM users
2. SELECT Password FROM users
3. SELECT AccessType FROM users
4. SELECT userID,Password FROM users
5. SEECT userID,AccessType FROM users
6. SELECT Password,AccessType FROM users
7. SELECT userID,Password,AccessType FROM users

The result set of the abovementioned queries are obtained in the previously executed query. Their evaluation and validation by the database are prevented. Therefore the resources of the database needed to respond from these queries are not utilized. With one time execution of the query **SELECT userID,Password,AccessType From users**, this query are capable of responding to the seven (7) possible queries that might be executed by the user. The number of queries to be served by the executed query could be higher if the number of fields or subset will be increased.

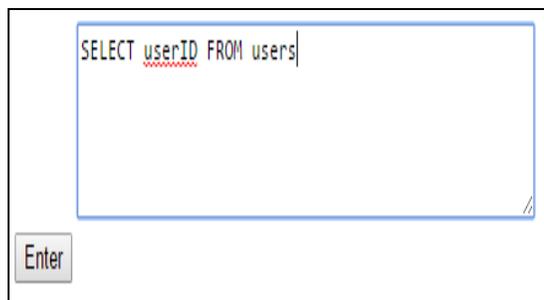
This indicates that the more queries to be executed and profiled the more possible queries to be served even without the support of the database. Therefore in case of databased related issues that may affect the requesting of information; those possible queries are shielded from such problems because the data are now available in the client side and ready for fetching.

In the study, the prefetching process was utilized. Prefetching is done by the extraction of information prior to its utilization. This principle was takes place in the reused of the result set of the previously executed query which was profiled in the application program as a response to the subsequent queries to be formulated and executed by the user.

In a scenario where the same information are to be accessed by a substantial number of users like their individual information, a single access can be possibly cater the needs of the entire users which substantially reduced the amount of request being sent to the database.

**SAMPLE QUERIES AND THEIR RESULT SET WHICH THAT WAS OBTAIN FROM THE PAST QUERY.**

**Figure 8.The second query executed.**



**Figure 9.)The result set of the second query**

admin
11
22
1
2
3
4
5
33
44
55
66
77
88

**Figure 10. The third executed query.**

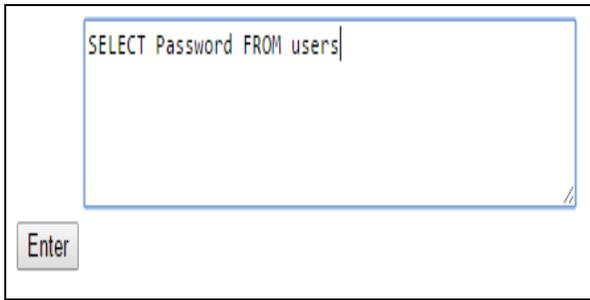


Figure 11. Result set of the third query executed query.

admin
11
22
a
2
3
4
5
33
44
55
66
77
88

Figure 12.)The fourth executed query.



Figure 13.The result set of the fourth query executed.

admin	admin
11	11
22	22
1	a
2	2
3	3
4	4
5	5
33	33
44	44
55	55
66	66
77	77
88	88

Figure 14. The fifth executed query.

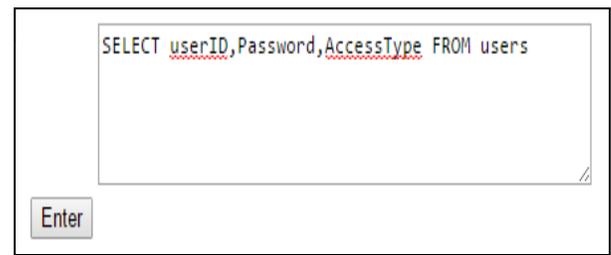


Figure 15.)The result set of the fifth query executed.

admin	admin	admin
11	11	teacher
22	22	teacher
1	a	stud
2	2	stud
3	3	stud
4	4	stud
5	5	stud
33	33	teacher
44	44	teacher
55	55	teacher
66	66	stud
77	77	stud
88	88	stud

#### IV. CONCLUSIONS

It is concluded that in order to lessen the dependency of application programs to the database, every query executed must be profiled and reuse it as a reference to the future queries to be executed. This is one the strategy that can be implemented towards attaining database transparency as well as reducing database workloads. The algorithm was able fetched and reuse

previously executed query as a response to future queries to be executed by a user. By doing this some of the workload of the database was shifted from the application program.

## V. RECOMMENDATION

In order to maintain the integrity of result set of the previously executed query, It must be synchronized to the database

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# Examination of Aerodynamic Flying Wing Configuration

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**Abstract** - This paper presents the examination of Aerodynamics flying wing configuration using Computation fluid dynamics (CFD) techniques. The parameters of aerodynamic such as coefficient of drag, coefficient of lift, moment coefficient and pressure coefficient are calculated by CFD. The aerodynamic parameters are determined for different angles of attack and Mach number so that deviation of salient aerodynamic parameters can be observed and analyzed. In this work, Solution is obtained for all aerodynamic parameters by considering the effect of external flow over flying wing configuration. In this research work parameter are stall speed, stall angle of attack, drag divergence Mach number and critical Mach number. These parameters are obtained for every test case and the comparison is made between tested results and available experimental results.

**Index Terms**- CFD, Stall speed, Stall angle of attack, Critical Mach no and Drag divergence Mach no

## I. INTRODUCTION

An aircraft flying wing has a tailless fixed wing and there is no fixed fuselage, payload, crews and all these equipment is housed inside the prime wing structure. The aerodynamic flying wing concept has come into existence because of its superior payload and range capabilities and it produces less drag than a conventional aircraft. As we know the fuselage and tail can contribute more to drag but in this configuration there is no fixed fuselage and tail section, so large amount of drag is minimized therefore performance is improved and also less amount of fuel is used.

The flying wing configuration is used in unmanned aerial vehicles which is self-piloted or remotely piloted aircrafts. They have the capability to carry cameras, payloads, sensors and other communications equipment. The mini or micro UAVs is not just small version of larger aircrafts but they are highly functional, militarily capable and where a traditional aerodynamic theory does not obey. The UAVs have significant importance in particular fields like in military services and rural search-rescue purposes.

The Computational fluid dynamics technique is used to carry out the analysis of external flow over the flying wing configuration model and the variations of aerodynamic parameters are studied. In this analysis used working fluid is air at sea level conditions and simulation part has been carried out for different Mach numbers and angles of attack. In this research work two solvers are used such as density based and pressure based solvers with suitable turbulence models, which solves Reynolds Averaged Navier Stokes (RANS) equations. In this work the selected turbulence model is Spalart Alamaras turbulence model. The relevant graphs of

aerodynamic parameters are plotted particularly variations of coefficient of drag and coefficient of lift with the change in Mach number shown in preceding section.

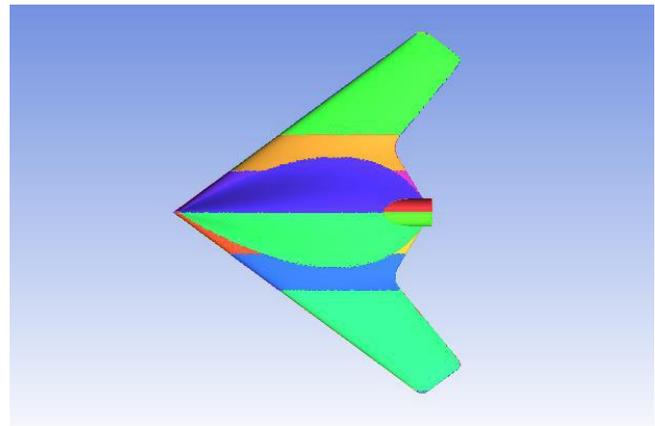


Fig. 1: Flying wing geometry

Fig. 1 shows the geometry of the flying wing configuration which is considered in the present work. The analysis is made half and symmetry part which is attached inside the fluid domain.

## II. MODELLING AND GRID GENERATION:

The geometric model details are given in Table 1, and are created using familiar commercial software CATIA V5. It also includes building of computational fluid domain around the flying wing configuration by considering appropriate sizes at upstream and downstream of the wing configuration. During grid generation process the domain is divided into cells and sub domains. Grid generation process has been carried out by meshing tools like ICEM CFD 14, Point wise and Workbench. Basically there are three different types of grids are possible, structured grids, unstructured grids and hybrid grids. In the present work combined grids are used for CFD analysis.

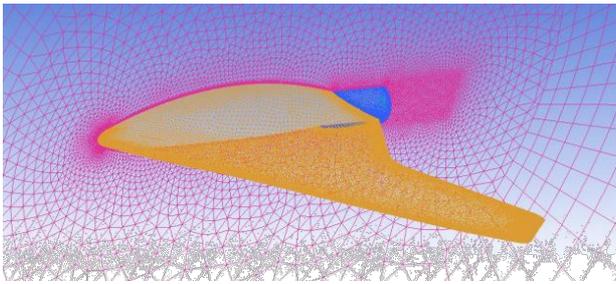


Fig 2: Grid

Moment reference point [X,Y,Z]	[0,0,0] nose of the model
Reference Area	0.087m <sup>2</sup>
Moment reference arm length	0.499m
Mean Aerodynamic Chord(MAC)	0.278m
Root Chord Length	0.499m

Table 1: Geometrical Parameters

Grid independence study is carried out for two grids, one with 2.5 million cells and another with 7.5 million cells at M=0.13 and variation of angles of attack from -40 to 240. This study represents the results for both the grids are almost similar and it can be seen from the figures 3 and 4, which is having lesser elements that grid is considered for further simulation.

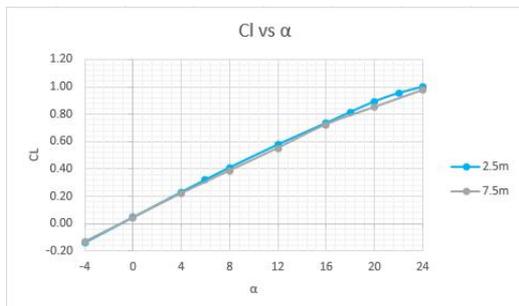


Fig: 3

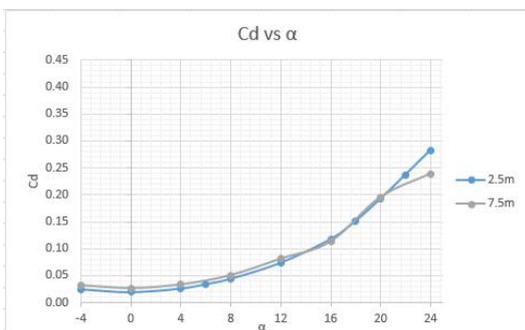


Fig: 4

### III. CFD ANALYSIS:

The aerodynamics parameters are coefficient of lift, pressure coefficient, lift to drag ratio and drag coefficient. These are important parameters for any aircraft. In the analysis these parameters are analyzed by varying and Mach number and angles of attack. Aerodynamic drag and lift are based on normal stress and shear stress. The shear stress is restrained by surface wall roughness.

#### Lift coefficient:

Lift force is an artificial force and it is controlled by Pilot. Lift force is influenced through wings and acts perpendicular to relative wind and wing span. The concept of Center of pressure is the base to the direction and lift force. The lift force on the wings depends on velocity of fluid, planform area density of fluid and also on the lift coefficient value, the equation is given by, [2]

$$L = 0.5 * \rho * v_{\infty}^2 * s * C_l \quad (1)$$

$$C_l = \frac{L}{0.5 * \rho * v_{\infty}^2 * s} \quad (2)$$

Where, L indicates the lift force,  $\rho$  indicates density of air,  $v_{\infty}$  indicates relative velocity of the air flow, s indicates planform area and Cl indicates coefficient of lift.

#### Drag coefficient:

Aerodynamics drag is the natural resistance to the moving aeroplane through air and it is partly controlled by pilot. It acts parallel to flight path and opposite to thrust. Drag coefficient is obtained by arranging drag equation [2].

$$D = 0.5 * \rho * v_{\infty}^2 * C_d * s \quad (3)$$

$$C_d = \frac{D}{0.5 * \rho * v_{\infty}^2 * s} \quad (4)$$

Where D indicates drag force,  $\rho$  indicates density of air,  $v_{\infty}$  indicates velocity of air, s indicates planform area and Cd indicates drag coefficient.

#### Pressure coefficient:

It can be defined by,

$$C_p = \frac{p - p_{\infty}}{0.5 * \rho * v_{\infty}^2} \quad (5)$$

Where P indicates pressure point at which pressure coefficient is evaluated,  $p_{\infty}$  indicates pressure in the freestream (i.e., remote from any disturbance),  $\rho$  indicates density of air at sea level,  $v_{\infty}$  indicates velocity of freestream of the fluid. Cp of zero value indicates freestream pressure and Cp of one indicates the stagnation pressure at stagnation point [2].

In ANSYS Fluent 14.0 there are 2 solvers used, one is pressure based solvers for low speed incompressible flows,  $M < 0.3$  and other one is density based solvers for high speed compressible flows,  $M > 0.3$ . In this present work, above solvers are used as per the given conditions and the viscosity of fluid is considered to CFD simulation in the flow domain. The external flow analysis on working fluid is at sea level condition. The following table shows the properties of air at sea level condition.

Density ( $\rho$ )	1.225 kg/m <sup>3</sup>
Pressure (P)	101325 Pa
Temperature (T)	288.15 k
Gas constant of air (R)	287.057
Dynamic viscosity	1.789*10 <sup>-5</sup> Pa.sec

Table 2: Properties of air at sea level [3].

**Boundary conditions:**

In this problem three boundary locations were identified which are inlet, symmetry and wing wall. The applied boundary conditions for inlet, symmetry and wing wall are pressure far-field boundary conditions, surface symmetry conditions and wing configuration wall conditions respectively. The proper data has to be supplied at each boundary location to get higher impact on the final solution

The mesh file is imported to ANSYS Fluent 14, depending upon Mach number and selected solvers are density based or pressure based solvers. Ideal gas is air material which is selected as pressure far-field conditions are given at inlet. If density based solver is selected then it is helpful to choose implicit formulation method for faster convergence of the final solution. In the initial running stage the oscillations in solutions are more and after some iteration the solution will be become stable then that time courrant number is increased for faster convergence. Many numbers of turbulence models are available in the solver for RANS calculations, but in this work the applied model is Spalart-Alamaras. This model solves one equation at each cell of the fluid domain and these equations are Reynolds Averaged Navier Stokes (RANS) Equations. Further the suitable solution methods are applied to solve RANS equations.

**IV. RESULTS AND DISCUSSION:**

CFD analysis has shown that all the parameters of aerodynamics are predicted adequately. The following graphs are obtained after the simulation. All the graphs are plotted for  $M=0.13$  and different angles of attack.

The very first fig. 5 shows graph of  $C_L$  vs  $\alpha$ , here lift coefficient is determined for different angles of attack from -40 to 240. As the angle of attack increases pressure at the lower side of the wing increases and on upper side it decreases because of the fact that air speed on the upper surface of the wing increases as the air has to travel for longer distance, according to Bernoulli's theorem as the air speed increases pressure at that location decreases gradually. That's why because of this pressure difference lift increases. The fig.6 shows the graph of  $C_D$  vs  $\alpha$ , in this graph as the angle of attack increases the area resists to the flow of air increases therefore drag coefficient increases. The next fig.7 shows the graph of  $C_M$  vs  $\alpha$ , here it's observed that as the angle of attack increases the pitching moment coefficient also increases due to instability during flight takeoff and landing.

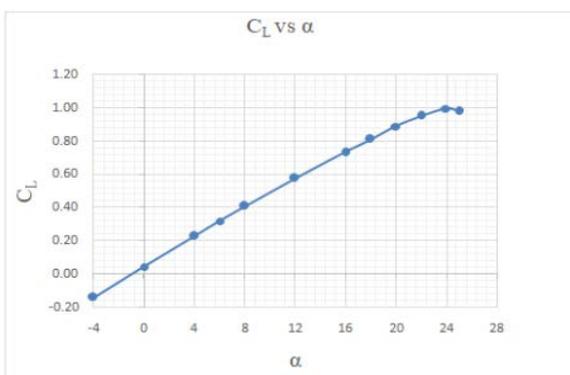


Fig.5

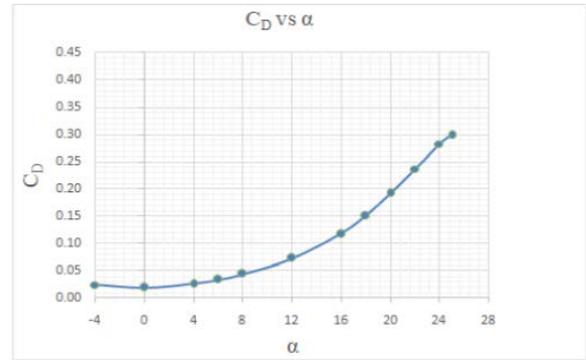


Fig.6

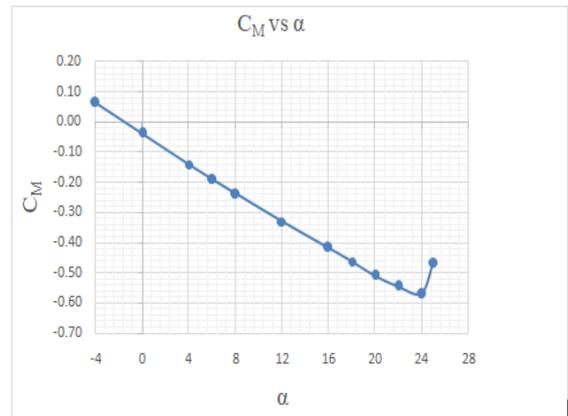


Fig.7

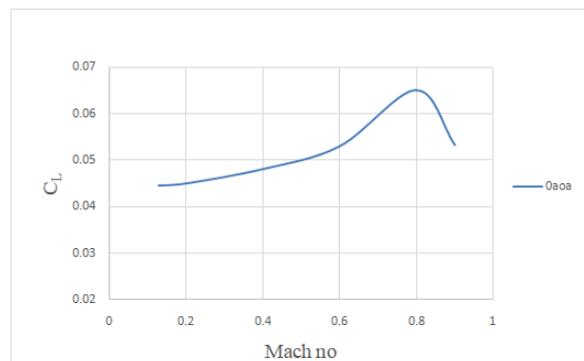


Fig.8

The fig.8 shows  $C_D$  vs Mach number, coefficient of drag increases slightly and it is almost constant up to  $M=0.8$ , after that it suddenly rising up to  $M=1$ . This phenomenon is known as drag divergence and the corresponding Mach number at which drag divergence arise is called drag divergence Mach number.

Further the simulation carried out for different Mach numbers and different angles of attack. In the fig.8 shows that as the Mach number increases the lift coefficient also increases but only up to  $M=0.8$  after that it decreases in the transonic region, because of presence of shock wave interaction with the boundary layer. So the pressure on the upper side of the wing is more and hence less pressure difference is there for lift. That's why  $C_L$  decreases in the transonic region.

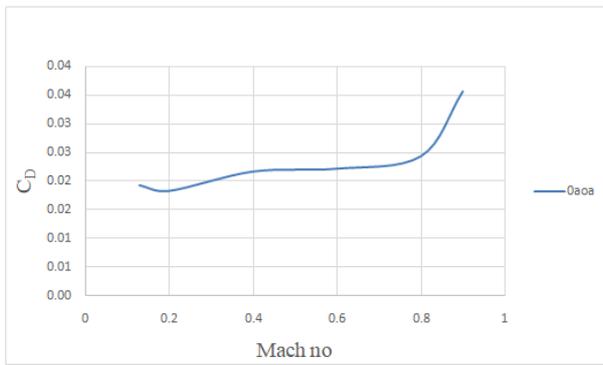


Fig.9

At higher Mach number i.e. in transonic region from 0.8 to 1.2 the shock waves have been observed on the upper side of the wing. In this region flow variables change without prior indication because of flow separation, here sudden decrease in the pressure can be noticed. In the transonic region pressure drag increases and that increases drag coefficient which is shown in the fig 9.

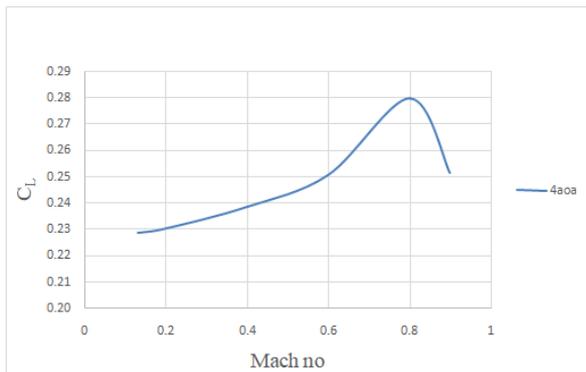


Fig.10

The fig.10 shows that Coefficient of pressure plot At Mach=0.13 and 60 angle of attack. As the angle of attack increase the pressure above the wing surface reduces when compared to the pressure below the wing surface. Pressure difference between the upper side and lower side of wing increases as the angle of attack increases that's why wing displaces in upward direction at larger angles of attack leading to the increase in the coefficient of lift. The wing is placed in XZ plane and section plane is taken in X direction at  $x = 150\text{mm}$  from nose of the aeroplane. At this section the Pressure coefficient values have been noted.

#### V. CONCLUSION:

Based on the CFD analysis of flow over flying wing configuration the following conclusions can be drawn,

1. Stall angle of attack is observed at 250.
2.  $C_L$  increases as angle of attack increases up to stall.
3.  $C_d$  increases as angle of attack increases up to  $M=1$ .
4. Drag divergence Mach number is observed at  $M=0.8$
5. Due to presence of shock wave in the transonic region  $C_L$  reduces.

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# Diversity, Local Distribution and Occurrence of Dragonflies and Damselflies (Odonata: Insecta) In Nalsarovar Bird Sanctuary (Ramsar Site), Gujarat

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**Abstract** - Dragonflies and damselflies are one of the important aquatic insect groups belonged to Order Odonata. Dragonflies and damselflies immature stage (nymphs) are truly aquatic and adult stage are terrestrial. They sometimes also act as a flagship species group being a top predator and environmentally sensitive group. Nalsarovar is an important wetland in terms of its multiple categories designated such as a Birds Sanctuary, Important Bird and Biodiversity Area, a Ramsar Site of Gujarat State. Total area of Nalsarovar Bird Sanctuary (NBS) area is 120 sq km. A study was carried out from February 2015 to February 2017 at Nalsarovar Bird Sanctuary. A species inventory was carried out by Visual Encounter Survey (VES). Fourteen sites were fixed using GPS for the survey. Survey was carried out including all seasons and covering all major habitats. Adult dragonflies and damselflies encountered were recorded. During the entire survey total 30 species of dragonflies and damselflies were encountered that belonged to 5 different families namely Libellulidae, Gomphidae, Aeshnidae, Coenagrionidae and Lestidae. Total 37 Odonate species including both dragonflies and damselflies were encountered depended especially Nalsarovar Bird Sanctuary area combining the past recorded species and species encountered in current research study. Among species encountered during study almost all species belong to Least Concern (LC) category whereas a dragonfly species *Indothemis carnatica* (Fabricius, 1798) is listed under Near Threatened (NT) category under IUCN category. During entire study 14 species of Odonates were encountered at all sites whereas variations in distribution of 16 Odonate species were encountered at specific sites.

**Index terms** - Dragonfly, Damselflies, Nalsarovar Bird Sanctuary, Odonates, Ramsar Site

## I. INTRODUCTION

The order Odonata includes the dragonflies and damselflies, globally 5,952 species of Odonates under 652 genera have been reported (Schorr and Paulson, 2013) <sup>[1]</sup>. India harbors 474 species and 50 subspecies belonging to 142 genera in 18 families (Subramanian, 2014). Dragonflies and damselflies are an important component of aquatic ecosystems; in which they can often be top predators. They sometimes also act as a flagship species group. Their sensitivity to environmental conditions makes Odonate excellent biological indicators of environmental conditions (Brown 1991 <sup>[2]</sup>; Clark & Samways 1996 <sup>[3]</sup>; Samways, *et al.*, 2010) <sup>[4]</sup>. Being an aquatic insect it is often seen to inhabit and associated with wetlands. Nalsarovar Bird Sanctuary is one of the important wetlands of India and Gujarat. It is internationally recognized as a Ramsar Site of Gujarat. It is also a Bird Sanctuary i.e. protected area and an Important Bird and Biodiversity Area (IBA). The entire study was carried out in Nalsarovar Bird Sanctuary.

The basin of Nalsarovar is of elongate undulating saucer type and its overall shape is very gentle, running from east to northwest and northwest to south. Generally, the depth of water does not exceed 3 metres (Acharya, 1965 <sup>[5]</sup>; Johri *et al.*, 1990) <sup>[6]</sup>. There are more than 300 elevated plateaus in the basin locally called 'Bet' or 'Thalias' meaning islets as they remain above the water surface. The natural and seasonal spread of wetland of Nalsarovar is of irregular shape. It is moreover elliptical in shape. It is shallow and in most parts muddy. This depressed portion had come into existence by a tectonic uplift of an estuary as also by increased sedimentation and aeolian infill (Walsten *et al.*, 1989) <sup>[7]</sup>.

Researches on Nalsarovar Bird Sanctuary have been documented in past on various aspects of Nalsarovar Bird Sanctuary. Regular surveys of Birds and other vertebrates are regularly performed in this area. The sanctuary supports more than 216 species of birds that include about 150 species of wetland-dependent species. Apart from these, 72 species of flowering Plants, 48 species of algae, 76 species of zooplanktons and zoo-benthos, 20 species of fish and 13 species of mammals (GEER, 1998) <sup>[8]</sup>. Studies carried out in Nalsarovar so far have mainly focused on the avifauna of the sanctuary and on aspects of diversity of birds in relation to different habitat types. Recently, Oswin D. S. (2004) <sup>[9]</sup> studied on wetland ecosystems and coastal habitat diversity in Gujarat, India including Nalsarovar Lake. Bhavsar *et al.*, (2014) <sup>[10]</sup> studied on Identification of Wetland Vegetation by Supervised Classification of Nalsarovar Area using LISS-III Data. However, limited studies on invertebrates have been performed in Nalsarovar Bird Sanctuary area. Among invertebrates, Odonates (Dragonflies and Damselflies) being an important group it plays an important role both

ecologically by acting as bioindicator of water quality and economically by acting as biocontrol agent of vector borne disease caused by mosquitoes (Chandra *et al.*, 2006<sup>[11]</sup>, Brown 1991<sup>[2]</sup>, Clark & Samways 1996<sup>[3]</sup>, Samways *et al.*, 2010<sup>[4]</sup>, Tiple 2012<sup>[12]</sup>, Thomas *et al.*, 1988<sup>[13]</sup>, Santamarin and Mijares 1986<sup>[14]</sup>, Sebastian *et al.*, 1990)<sup>[15]</sup> are very much required to be studied for regular monitoring wetland in near future.

A comprehensive study focusing on aquatic insects with reference to its diversity and ecology in freshwater wetlands of Gujarat is very limited. Few studies done in past are by Prasad (2004)<sup>[16]</sup>, Sharma (2009)<sup>[17]</sup>, Prasad and Thakur (1984)[18], Kumar (2009)<sup>[19]</sup>, V. B. Rohmare *et al.*, (2015)<sup>[20]</sup>. Although Nalsarovar Bird Sanctuary being one of the largest natural wetland of Gujarat, internationally important wetland (Ramsar site), Important Bird and Biodiversity Area (IBA), and a protected area (Bird Sanctuary) has inadequate information with respect to insect diversity study. Odonate studies at Nalsarovar Bird Sanctuary are very limited even though it being an important wetland. Research studies on Odonates species specifically dependent on Nalsarovar Bird Sanctuary was lacking. Understanding geographical distribution of a species and species' habitat preferences are two very important approaches necessary for the initiation of conservation planning at the species level (Finch *et al.*, 2006)<sup>[21]</sup>. This information would provide baseline information on the current status of the odonates of Nalsarovar Bird Sanctuary that can be a used as a tool by the protected area managers to monitor the health of such an internationally important wetland ecosystem. Considering the same, present study was conducted for developing odonate species inventory specifically dependent on Nalsarovar Bird Sanctuary along with its local distribution of species within Nalsarovar Bird Sanctuary.

## II. RESEARCH METHOD

**Study area** - The entire study was carried out at Nalsarovar wetland. Nalsarovar is located between latitude 22° 78' N to 22° 96' N and longitude 71° 92' E to 72° 64' E. Nalsarovar is located about 65 km from Ahmedabad, Gujarat state. The entire area belongs to two districts - Ahmedabad and Surendranagar. The area includes the semi-arid lands of Ahmedabad and Surendranagar district (Figure 1). Nalsarovar bird Sanctuary is surrounded by 12 villages located at the boundary of the wetland. They are Kayla, Vekaria, Meni, Darji, Digvijaygadh, Shiyal, Paraii, Mulbavla, Ranagadh, Bhagvnpur, Nani-Kathechi and Shahpur village. Biogeographically the area falls in 4B Gujarat-Rajwara biotic Province of semi-arid biogeographical zone, as per the classification zone, as per classification developed by Rodgers & Panwar (1988)<sup>[22]</sup> and Rodgers *et al.*, (2000)<sup>[23]</sup>.

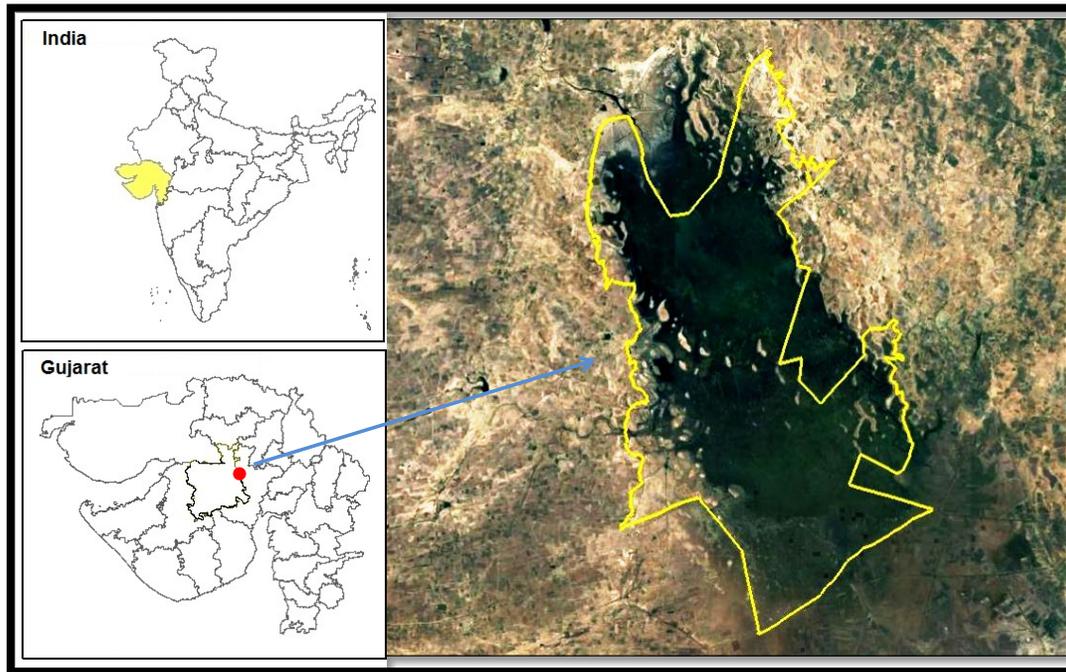


Figure 1: Location of Nalsarovar Bird Sanctuary

Nalsarovar wetland has very unique genesis. Locally, “Nal” is used for canal like protrusion of a creek or river. Prasad *et al.*, (1997)<sup>[24]</sup> study the evolution patterns of the Nal Lake. Prasad *et al.*, (1997)<sup>[24]</sup> have developed a 3 stage model for the evolution of Nal region during late-Quaternary period. In past, a shallow sea linked the Gulf of Kachchh with Gulf of Khambhat. The sea connection broke up around the beginning of marine isotope due to regression of the sea. Subsequently only a land link remained. Later, fluvial sediments from east were episodically deposited in the Nal region in response to westward migration of depositional front of eastern rivers. Later, due to advance of sedimentation front, tectonics and post glacial sea level rise, the elevation of Nalsarovar came to

within few meters of its present elevation when it became a closed basin. The mudflats, present to South of Nalsarovar, present recent sea transgression in the area.

Nalsarovar is a natural, shallow lake with maximum depth of about 1.5-2.0 meters when flooded. Water level/depth remains almost uniform in the wetland. Being a natural lake, the area under the submerged varies, depending upon the rainfall. During the years of good rainfalls, the total area in and around a sanctuary under the submerged may go beyond 350 sq. km. However, the actual water bodies in normal years is less than the legal area of the sanctuary, as 120 sq. km area is notified as the sanctuary under the Wildlife (Protection) Act, 1972. The area receives water mainly from river viz. the Bhradini and the Bhogavo. It also receives water from the surrounding catchment in North, West and east which area having gentle slopes (Kamboj & Tatu, 2016) [25].

The climate of the area is arid to semi-arid type. The temperature rises to a maximum of 45°C in May and minimum of 7°C in January. There appears gentle drainage from north-west to south. The average rainfall in the area is about 580 mm (Kumar 2009) [19]. majorly 6 habitats (A) Deeper Open water habitat (depth more than 2 feet), (B) Shallow Openwater habitat (depth more or equal to 2 feet), (C) Emergent hydrophytic cover (depth less than 2 feet), (D) Muddy habitat (Variable depth), (E) Islands ('bet') (F) Other habitats including shoreland area surrounded near to adjoining Scrubland/Grassland/Agriculture (seasonally variable in water depth) (Kamboj & Tatu, 2016) [25], Tatu 1995) [26]. The most unique features of Nalsarovar Bird Sanctuary are presence of islets. The lake has more than 300 islets, most of which are located on the western boundary. They get exposed when water level recedes. Out of this, 36 islets are having sizable plateau like area while the rest are very small. Nalsarovar Bird Sanctuary is a seasonal wetland. During summer months it becomes almost a dry patch of wetland. The substratum of the lakes is undulated and therefore when water occupies the shallow trough, a number of islands appear above the water level. The changes from fresh water to brackish water and again back to fresh water in next monsoon keep the bio-cycles of organisms rotating. After monsoon, the lake gradually becomes brackish as water recedes or evaporates during dry months. (Kamboj & Tatu, 2016) [25]

The peripheral and surrounding area of this lake is dominated by cropland, fallow land and wasteland. The trees are mostly *Prosopis juliflora* and also *Salvadora*. Nal Sarovar provides adequate depression over a large area for the existence of submerged aquatic vegetation. Moreover, in an around its shallow water near shores and islets it supports and provides habitat for emergent hydrophytic vegetation. Both the submerged and emergent vegetation as well as algae constitute primary producers of this aquatic ecosystem. Besides they support large epiphytic organisms and also provide cover to a variety of organisms (vegetation). (Kamboj & Tatu, 2016) [25]

**Materials and Methods** - A study of odonates was carried out from February 2015 to February 2017 at Nalsarovar Bird Sanctuary. Nalsarovar Bird Sanctuary area is 120 sq Km. Nalsarovar is the one of the largest inland wetland of Gujarat. Studies on odonate diversity were made by visiting various localities in the study area at monthly intervals during the entire study. Entire study area consists of majorly 6 habitats (A) Deeper Open water habitat (depth more than 2 feet), (B) Shallow Openwater habitat (depth more or equal to 2 feet), (C) Emergent hydrophytic cover (depth less than 2 feet), (D) Muddy habitat (Variable depth), (E) Islands ('bet') (F) Other habitats including shoreland area surrounded near to adjoining Scrubland/Grassland/Agriculture (seasonally variable in water depth) (Kamboj & Tatu, 2016) [25]. Survey was carried out covering all seasons and all habitats.

Fourteen sites were fixed using GPS for the survey for the odonate survey within the study area. Survey was carried out including all seasons and covering all major habitats. These sites were named as T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, and T14 (Table 1). These sites were regularly surveyed. Line transects method was followed for study of odonates (Sutherland, 1996) [27]. A species inventory was carried out by Visual Encounter Survey (VES). Observations were made while walking on fixed belt transects of 500 m length and width of 5 m on both side of transect. Each transect was surveyed for half an hour. Adult dragonflies and damselflies encountered were recorded.

Table 1: GPS location of each sites for entire survey at Nalsarovar Bird Sanctuary

Sr. No.	Code	GPS of fixed sites at Nalsarovar Bird Sanctuary
1	T1	22 ° 48' 33.1", 72 ° 03' 07.3"
2	T2	22 ° 47' 17.4", 72 ° 03' 48.0"
3	T3	22 ° 45' 18.3", 72 ° 05' 09.1"
4	T4	22 ° 43' 24.4", 72 ° 06' 30.4"
5	T5	22 ° 49' 10.2", 72 ° 02' 39.9"
6	T6	22 ° 50' 55.6", 71 ° 59' 29.0"

7	T7	22 ° 49' 32.0", 71 ° 58' 52.2"
8	T8	22 ° 46' 41.2", 72 ° 59' 58.8"
9	T9	22 ° 43' 39.1", 72 ° 01' 08.9"
10	T10	22 ° 48' 54.4", 72 ° 01' 12.1"
11	T11	22 ° 49' 34.4", 72 ° 01' 47.0"
12	T12	22 ° 48' 12.0", 72 ° 02' 14.7"
13	T13	22 ° 49' 41.5", 72 ° 01' 56.1"
14	T14	22 ° 51' 39.6", 71 ° 59' 15.4"

Opportunistic observations were made within transect for documenting the adults Odonata for species inventory. Species were photographed in the field. All our identifications at NBS were based on digital photos, allowing for later deliberation and confirmation. All photos were taken by Canon Powershot SX60 HS camera with 16.1 mega pixels, ultrasonic, full HD 65X optical zoom. In certain cases, species were difficult to identify, in such case adults were collected using aerial sweep net and after recording morphological details and photography the individuals were released back in field. Identification was carried out with available standard taxonomic literature Fraser (1933)<sup>[28]</sup>, Fraser (1934)<sup>[29]</sup>, Fraser (1936)<sup>[30]</sup>, Subramanian (2005)<sup>[31]</sup>, Mitra & Babu (2010)<sup>[32]</sup>, Nair (2011)<sup>[33]</sup> and Subramanian (2014)<sup>[34]</sup>.

### III. RESULTS AND DISCUSSIONS

A total of 30 species of dragonflies and damselflies were encountered belonging to 5 families namely Libellulidae, Gomphidae, Aeshnidae, Coenagrionidae and Lestidae were encountered during the entire study (Table 1). Out of these 30 species, 21 species belong to suborder Anisoptera (Dragonflies) and 9 species belong to suborder Zygoptera (Damselflies). Out of total 30 Odonate species encountered during entire study, total 21 species of dragonflies (Suborder – anisoptera) encountered belonged to 16 Genera and 3 families. However, among anisopteras, 18 species are belonged to 13 Genera and family Libellulidae, 1 species belonged to 1 Genera and family Gomphidae, 2 species belonged to 2 Genera and family Aeshnidae. Out of total 30 Odonate species encountered during entire study, total 9 species of zygoptera (damselflies) encountered belonged to 6 Genera and 2 families. However, among zygopterans, 8 species belonged to 6 Genera and family Coenagrionidae, 1 species belongs to 1 Genera and family Lestidae (Table 2). Among Odonates families (5) encountered during studies, the maximum dominance and contribution to the species diversity was accounting to 70% by family Libellulidae followed by Coenagrionidae which contributed 26 % of the total species. Similar observation was also found and recorded by other authors (Adarsh *et al.*, (2015)<sup>[35]</sup>, Das *et al.*, (2013)<sup>[36]</sup>, Rathod *et al.*, (2012)<sup>[37]</sup>, Singh *et al.*, (2017)<sup>[38]</sup>, Tiple *et al.*, (2008)<sup>[39]</sup>. Most of the species are least concern (LC) under the IUCN categories list. A dragonfly species *Indothemis carnatica* (Fabricius, 1798) is listed under Near Threatened (NT) category under IUCN category. These species were encountered during winter seasons within study area majorly observed on/near dry bushes and shrubs.

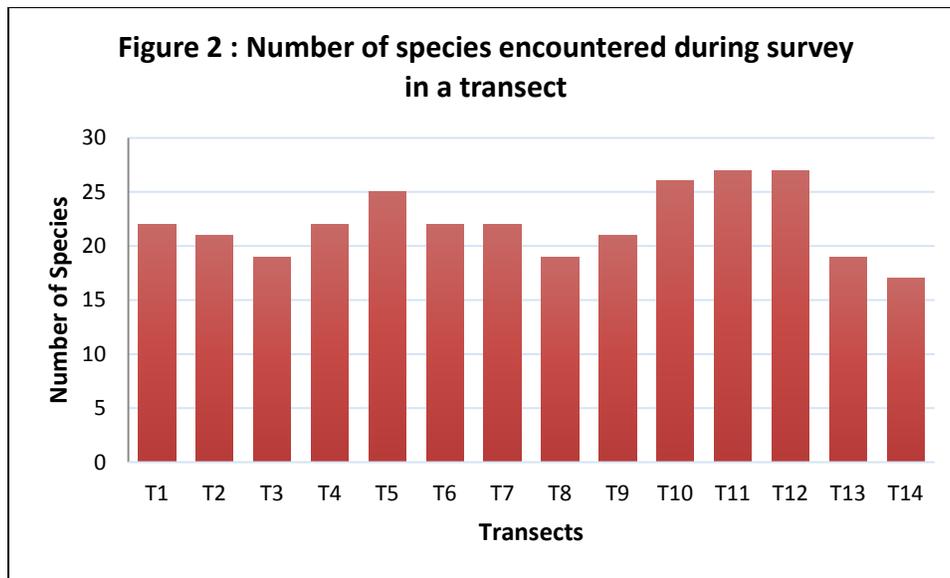
Table 2: Checklist of Odonate encountered within the Nalsarovar Bird Sanctuary during the entire survey

Sr. No.	Species listed	Common name
	<b>Suborder: Anisoptera</b>	
	Family : Libellulidae	
1	<i>Diplacodes lefebvrii</i> (Rambur, 1842)	Black Ground Skimmer
2	<i>Tramea limbata</i> (Desjardins, 1832)	Black Marsh trotter
3	<i>Trithemis festiva</i> (Rambur, 1842)	Black Stream Glider
4	<i>Orthetrum glaucaum</i> (Drury, 1770)	Blue Marsh Hawk
5	<i>Indothemis carnatica</i> (Fabricius, 1798)	Bush skimmer
6	<i>Macrodiplax cora</i> (Brauer, 1867)	Coastal glider /Estuaries skimmer
7	<i>Rhyothemis variegata</i> (Linnaeus, 1763)	Common Picture Wing
8	<i>Brachythemis contaminata</i> (Fabricius, 1793)	Ditch jewels
9	<i>Bradinyopyga geminata</i> (Rambur, 1842)	Granite Ghost
10	<i>Orthetrum sabina</i> (Drury, 1770)	Green Marsh hawk
11	<i>Diplacodes trivialis</i> (Rambur, 1842)	Ground Skimmer

12	<i>Brachydiplax sobrina</i> (Rambur, 1842)	Little blue Marsh Hawk
13	<i>Trithemis pallidinervis</i> (Kirby, 1889)	Long-legged Marsh Glider
14	<i>Trithemis kirbyi</i> (Kirby, 1889)	Orange-Winged Dropwing
15	<i>Tramea basilaris</i> (Rambur, 1842)	Red Marsh Trotter
16	<i>Crocothemis servilia</i> (Drury, 1770)	Ruddy Marsh Skimmer
17	<i>Acisoma panorpoides</i> (Rambur, 1842)	Trumpet tail
18	<i>Pantala flavescens</i> (Fabricius, 1798)	Wandering Glider
	<b>Family: Gomphidae</b>	
19	<i>Ictinogomphus rapax</i> (Rambur, 1842)	Common Clubtail
	<b>Family: Aeshnidae</b>	
20	<i>Hemianax ephippiger</i> (Burmeister, 1839)	Vagrant emperor
21	<i>Anax guttatus</i> (Burmeister, 1839)	Blue-Tailed Green Darner
	<b>Suborder: Zygoptera</b>	
	<b>Family: Coenagrionidae</b>	
22	<i>Pseudagrion microcephalum</i> (Rambur, 1842)	Blue Grass Dartlet
23	<i>Enallagma cyathigerum</i> (Charpentier, 1840)	Common Blue Damselfly
24	<i>Ceriagrion coromandelianum</i> (Fabricius, 1798)	Coromandel marsh dart
25	<i>Ischnura aurora</i> (Brauer, 1865)	Golden Dartlet
26	<i>Rhodischnura nursei</i> (Morton, 1907)	Pixie Dartlet
27	<i>Agriocnemis pygmaea</i> (Rambur, 1842)	Pygmy dartlet
28	<i>Ischnura senegalensis</i> (Rambur, 1842)	Senegal Golden Dartlet
29	<i>Pseudagrion decorum</i> (Rambur, 1842)	Three striped blue dart
	<b>Family: Lestidae</b>	
30	<i>Lestes species</i>	Spread wings

About 13 species were recorded in past (Prasad and Thakur, 1984)<sup>[18]</sup> within/ around sanand District out of which 7 species of Odonata are recorded in Nalsarovar Bird Sanctuary viz. *Pseudagrion decorum* (Rambur), *Ischnura senegalensis* (Rambur), *Rhodischnura nursei* (Morton), *Enallagma cyathigerum cyathigerum* Charpentier, *Agriocnemis pygmaea pygmaea* (Rambur), *Orthetrum sabina sabina* (Drury), *Crocothemis servilia servilia* (Drury). Later, odonate study was reported in Fauna of Nalsarovar, Gujarat, Wetland Ecosystem Series with unidentified odonates (Kumar 2009)<sup>[19]</sup>. Recently, 20 species of Odonates were recorded from entire Ahmedabad District at various selected sites including Nalsarovar as one of the site (V. B. Rohmare *et al.*, 2015)<sup>[20]</sup>. However, compiling the past record of Odonates (dragonflies and damselflies), around 26 species of odonates was recorded in and around Nalsarovar wetland (Table 2). Nalsarovar Bird Sanctuary being a nationally and internationally important wetland. During present study 30 species were encountered depended specifically on Nalsarovar Bird Sanctuary. Combining the past recorded species from Nalsarovar and species encountered in current research study checklist has risen to 37 odonate species including both dragonflies and damselflies depended mainly on the Nalsarovar Bird Sanctuary - Ramsar site and Important Bird Area.

**Local distribution in each site within study area during the entire survey:** During the entire survey, out of total 30 species, 22 species of Odonates were recorded in Transect T1, 21 species were recorded in Transect T2, 19 species were recorded in Transect T3, 22 species were recorded in Transect T4, 25 species were recorded in Transect T5, 22 species were recorded in Transect T6, 22 species were recorded in Transect T7, 19 species were recorded in Transect T8, 21 species were recorded in Transect T9, 26 species were recorded in Transect T10, 27 species were recorded in Transect T11, 27 species were recorded in Transect T12, 19 species were recorded in Transect T13 and 17 species were recorded in Transect T14. During the entire survey highest number of Odonates was observed in T11 and T12 whereas lowest number of species was encountered in T14. This indicates that frequency of occurrence of species was high in T12 and T11 were as lowest in T14 (Figure 2).



**Occurrence of dragonfly and damselfly species at each site:** During the entire study variation in occurrence of odonate species is recorded among different sites during entire study. Out of all 30 species, 21 species of dragonfly and 9 species of damselflies was encountered. Adult odonates presence and their distribution area generally are on the bases of their requirements. They are associated with aquatic habitats, terrestrial landscapes and their associated habitat required for selection of egg laying sites which further leads to future associated process for larval life stage and its characteristic habitat (Corbet 1993, 1999) <sup>[40,41]</sup>. This makes Odonata susceptible to specific types of habitat changes (Corbet 1993 <sup>[40]</sup>, Clark and Samways 1996 <sup>[3]</sup>, Schindler, Fesl, and Chovanec 2003 <sup>[42]</sup>, Foote & Rice Hornung 2005) <sup>[43]</sup>.

Distribution and occurrence of odonates are linked to its associated habitat and landscape different odonate groups are known to associate with different vegetation life-forms and height categories (Balzan 2012) <sup>[44]</sup>. Certain dragonflies and damselflies are encountered at all sites including T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13 and T14 whereas certain species are observed in lesser sites compared to other. Among suborder Anisoptera (Dragonflies), total 9 species of dragonfly such as *Trithemis festiva* (Rambur, 1842), *Macrodiplax cora* (Brauer, 1867), *Rhyothemis variegata* (Linnaeus, 1763), *Brachythemis contaminata* (Fabricius, 1793), *Orthetrum sabina* (Drury, 1770), *Diplacodes trivialis* (Rambur, 1842), *Trithemis pallidinervis* (Kirby, 1889), *Crocothemis servilia* (Drury, 1770), *Pantala flavescens* (Fabricius, 1798) belonging to Libellulidae and *Hemianax ephippiger* (Burmeister, 1839) belonging to Aeshnidae were encountered at all the 14 sites (T1 to T14). However, among suborder Zygoptera (Damsselflies), total 5 species of damselfly such as *Ischnura aurora* (Brauer, 1865), *Pseudagrion decorum* (Rambur, 1842), *Rhodischnura nursei* (Morton, 1907), *Agriocnemis pygmaea* (Rambur, 1842) and *Ischnura senegalensis* (Rambur, 1842) belonging to family Coenagrionidae were encountered at all the 14 sites (T1 to T14) (Table 3).

Among suborder Anisoptera (Dragonflies), certain species were distributed at selected sites such as *Diplacodes lefebvrii* (Rambur, 1842) were encountered at 7 sites (T2 T6 T7 T8 T9 T10 T11), *Tramea limbata* (Desjardins, 1832) were encountered at 9 sites (T4 T6 T7 T9 T10 T11 T12 T13 T14), *Orthetrum glaucaum* (Drury, 1770) were encountered at 4 sites (T1 T5 T10 T12). *Indothemis carnatica* (Fabricius, 1798) were encountered at 3 sites (T3 T6 T7 T11 T12), *Bradinopyga geminata* (Rambur, 1842) were encountered at 2 sites (T2 T5), *Brachydiplax sobrina* (Rambur, 1842) were encountered at 2 sites (T1 T3), *Trithemis kirbyi* (Kirby, 1889) were encountered at 10 sites (T1 T2 T4 T5 T6 T7 T8 T10 T11 T12), *Tramea basilaris* (Rambur, 1842) were encountered at 12 sites (T1 T2 T4 T5 T6 T7 T9 T10 T11 T12 T13 T14), *Acisoma panorpoides* (Rambur, 1842) were encountered at 8 sites (T1 T2 T3 T4 T5 T10 T11 T12) belonging to family Libellulidae, *Ictinogomphus rapax* (Rambur, 1842) were encountered at 6 sites (T1 T4 T5 T10 T11 T12) belonging to family Gomphidae and *Anax guttatus* (Burmeister, 1839) were encountered at 6 sites (T6 T7 T8 T9 T11 T12) belonging to family Aeshnidae. Among suborder Zygoptera (Damsselflies), certain species were distributed at selected sites such as *Pseudagrion microcephalum* (Rambur, 1842) were encountered at 12 sites (T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T12 T13). *Ceriagrion coromandelianum* (Fabricius, 1798) were encountered at 5 sites (T4 T5 T10 T11 T12), *Enallagma cyathigerum* (Charpentier, 1840) were encountered at 6 sites (T1 T5 T9 T10 T11 T12) belonging to family Coenagrionidae and *Lestes* species were encountered at 5 sites (T5 T10 T11 T12 T13) belonging to family Lestidae (Table 3).

Table 3: Occurrence (Presence/Absence) of odonate species at different site during entire study at Nalsarovar Bird Sanctuary

Sr.	Scientific name	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14
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No.															
1	<i>Diplacodes lefebvrii</i> (Rambur, 1842)		+					+	+	+	+	+			
2	<i>Tramea limbata</i> (Desjardins, 1832)				+			+	+		+	+	+	+	+
3	<i>Trithemis festiva</i> (Rambur, 1842)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4	<i>Orthetrum glaucaum</i> (Drury, 1770)	+					+					+		+	
5	<i>Indothemis carnatica</i> (Fabricius, 1798)			+				+	+						
6	<i>Macrodiplax cora</i> (Brauer, 1867)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
7	<i>Rhyothemis variegata</i> (Linnaeus, 1763)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
8	<i>Brachythemis contaminata</i> (Fabricius, 1793)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
9	<i>Bradinopyga geminata</i> (Rambur, 1842)		+				+								
10	<i>Orthetrum sabina</i> (Drury, 1770)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
11	<i>Diplacodes trivialis</i> (Rambur, 1842)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
12	<i>Brachydiplax sobrina</i> (Rambur, 1842)	+		+											
13	<i>Trithemis pallidinervis</i> (Kirby, 1889)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
14	<i>Trithemis kirbyi</i> (Kirby, 1889)	+	+		+	+	+	+	+		+	+	+		
15	<i>Tramea basilaris</i> (Rambur, 1842)	+	+		+	+	+	+	+		+	+	+	+	+
16	<i>Crocothemis servilia</i> (Drury, 1770)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
17	<i>Acisoma panorpoides</i> (Rambur, 1842)	+	+	+	+	+					+	+	+		
18	<i>Pantala flavescens</i> (Fabricius, 1798)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
19	<i>Anax guttatus</i> (Burmeister, 1839)							+	+	+	+		+	+	
20	<i>Hemianax ephippiger</i> (Burmeister, 1839)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
21	<i>Ictinogomphus rapax</i> (Rambur, 1842)	+			+	+					+	+	+		
22	<i>Enallagma cyathigerum</i> (Charpentier, 1840)	+					+				+	+	+	+	
23	<i>Ischnura aurora</i> (Brauer, 1865)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
24	<i>Pseudagrion decorum</i> (Rambur, 1842)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
25	<i>Rhodischnura nursei</i> (Morton, 1907)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
26	<i>Agrionemys pygmaea</i> (Rambur, 1842)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
27	<i>Ischnura senegalensis</i> (Rambur, 1842)	+	+	+	+	+	+	+	+	+	+	+	+	+	+
28	<i>Pseudagrion microcephalum</i> (Rambur, 1842)		+	+	+	+	+	+	+	+	+	+	+	+	

29	<i>Ceriagrion coromandelianum</i> (Fabricius, 1798)				+	+						+	+	+		
30	<i>Lestes</i> species					+						+	+	+	+	

\* Presence of species - '+'



Figure 3 - 1. *Trithemis festiva* (Rambur, 1842), 2. *Crocothemis servilia* (Drury, 1770), 3. *Brachythemis contaminata* (Fabricius, 1793), 4. *Macrodiplax cora* (Brauer, 1867), 5. *Diplacodes trivialis* (Rambur, 1842), 6. *Bradinopyga geminata* (Rambur, 1842), 7. *Trithemis pallidinervis* (Kirby, 1889), 8. *Orthetrum sabina* (Drury, 1770), 9. *Pantala flavescens* (Fabricius, 1798), 10. *Rhyothemis variegata* (Linnaeus, 1763), 11. *Tramea limbata* (Desjardins, 1832), 12. *Tramea basilaris* (Rambur, 1842), 13. *Acisoma panorpoides* (Rambur, 1842), 14. *Orthetrum glaucaum* (Drury, 1770), 15. *Brachydiplax sobrina* (Rambur, 1842)

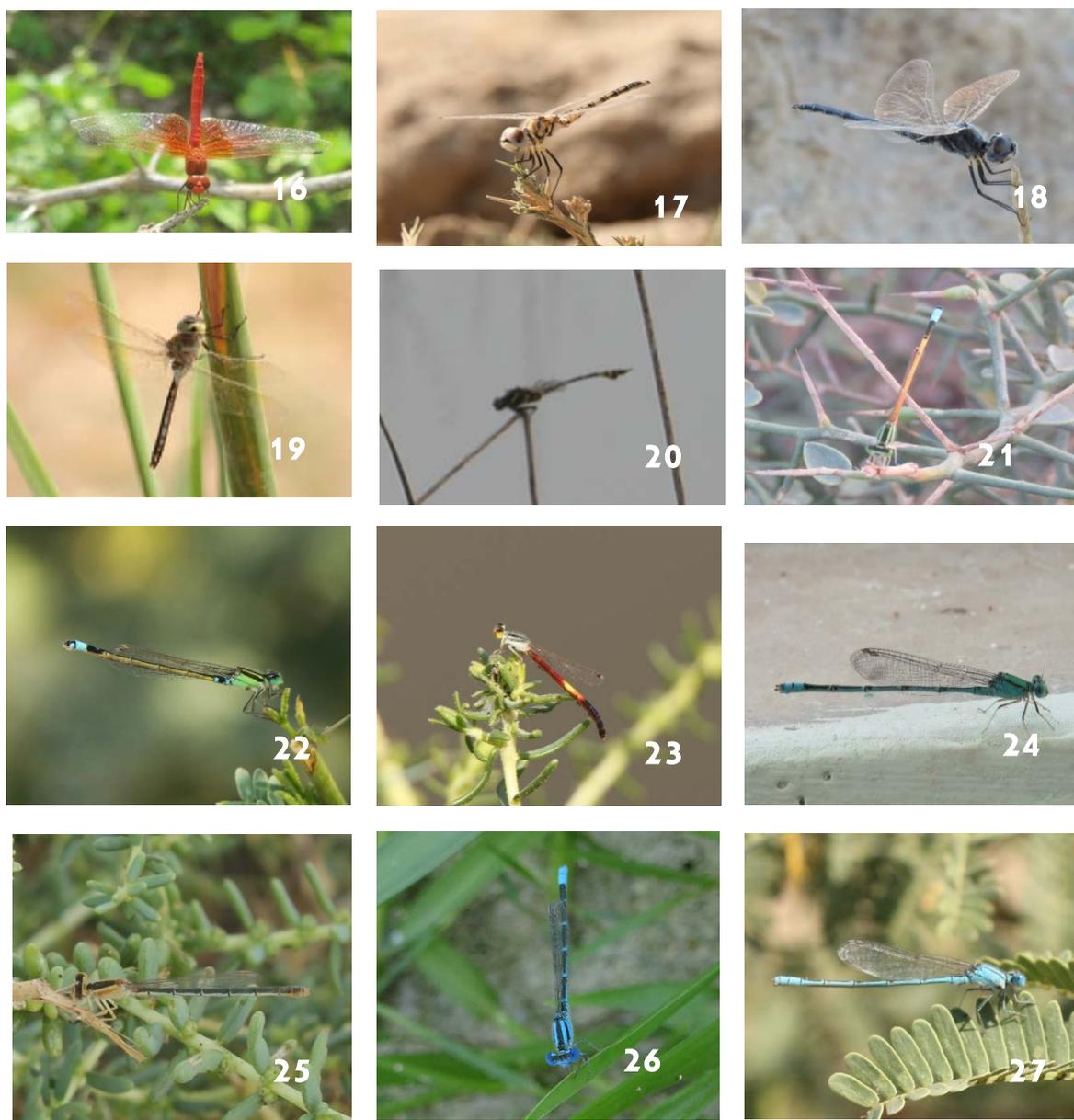


Figure 3 - 16. *Trithemis kirbyi* (Kirby, 1889), 17. *Diplacodes lefebvrii* (Rambur, 1842), 18. *Indothemis carnatica* (Fabricius, 1798), 19. *Hemianax ephippiger* (Burmeister, 1839), 20. *Ictinogomphus rapax* (Rambur, 1842), 21. *Ischnura aurora* (Brauer, 1865), 22. *Ischnura senegalensis* (Rambur, 1842), 23. *Rhodischnura nursei* (Morton, 1907), 24. *Pseudagrion decorum* (Rambur, 1842), 25. *Agriocnemis pygmaea* (Rambur, 1842), 26. *Enallagma cyathigerum* (Charpentier, 1840), 27. *Pseudagrion microcephalum* (Rambur, 1842)

#### IV. CONCLUSION

Dragonflies and damselflies both being an aquatic insect and playing an important role of environmental bio-indicator of water quality this study can be used to evaluate physical and biological conditions in wetlands. Odonates also play very important role as a bio-control agent of mosquitoes i.e. Vector of various vector borne diseases including malaria and dengue. Various studies on mosquito vorous dragonflies include *Bradinopyga geminata*, *Brachythemis contaminata* and *Pantala flavescens*. These three dragonfly species are encountered during this study. This Study can be used for controlling various vectorborne diseases including malaria and dengue in future. The studies can also be used for better management of these species within a protected area like Nalsarovar Bird Sanctuary.

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# Evaluation of Non-Surgical Therapeutic Interventions and Alternatives to Hysterectomy for Uterine Fibroids

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**Abstract- Objectives:** The basic aim and objectives of this study were to assess the non-surgical therapeutic interventions, evaluation of alternatives to hysterectomy for uterine fibroids and the role of pharmacist regarding management of uterine fibroids.

**Methodology:** The survey was conducted in different government and private hospitals of Lahore. A detailed data collection form was designed and was filled in a face to face interview with patients and also by reviewing their prescriptions.

**Results:** 70% of the females experienced severe pelvic pain and heavy bleeding for which tranexamic acid was commonly prescribed. NSAIDs 95% were used by the patients prior to the treatment of its symptoms. 75% patients opted uterine fibroid embolization because of their desire of future pregnancy. 65% patients showed quick recovery after undergoing the procedure. Only 30% patients had communication with pharmacist at the time of taking medicine from hospital.

**Conclusion:** Early detection and physical examination by the health care provider can help in early diagnosis. Instead of undergoing the painful surgery procedure, patients should be given suitable medication by the pharmacist or the health care provider. Also, pharmacist should also counsel the patient about the correct drug and its use-age to overcome the disease.

**Index terms:** Evaluation, non-surgical therapeutic interventions, alternatives to hysterectomy.

## 1. INTRODUCTION

Fibroids are the most frequently seen tumors of the female reproductive system. Fibroids, also known as uterine myomas, leiomyomas or fibromas are firm, compact tumors that are mainly made up of smooth muscle cells and fibrous connective tissue that develop in the uterus. According to an approximation, between 20 to 50 percent of women of reproductive age have fibroids, although not all are identified. The origins of uterine fibroids is not exactly known, but the factors like genetic abnormalities, alterations in the growth factor (proteins formed in the body that direct the rate and extent of cell proliferation) expression, abnormalities in the blood vessel (vascular system) and tissue response to injury have all been proposed to play a role in the growth of these fibroids. Fibroids usually shrink after menopause and do not show indications anymore. Early pregnancy decreases the possibility that fibroids will develop. [1]

A prominent feature of uterine fibroids is their dependency on the ovarian steroids estrogen and progesterone. Ovarian activity is essential for fibroid growth and most fibroids shrink after menopause. The sharp elevations and declines in the production of progesterone and estrogen that are related with early pregnancy and the postpartum period have a dramatic outcome on fibroid growth. [2]

The symptoms of uterine fibroids fluctuate from mild to severe troublesome symptoms. Some women may have no symptoms at all. However, abnormal uterine bleeding is the most shared symptom of a fibroid. Patients may also experience symptoms like pelvic pain and frequent urination and a sense of urgency to urinate and hardly an inability to urinate, pressure on the rectum resulting in constipation, pelvic pressure in the lower abdomen, pain during intercourse, infertility and/or a pelvic mass exposed by a health care practitioner during a physical examination. [3]

Uterine fibroids can be spotted during a routine pelvic examination. This may indicate a firm, uneven pelvic mass. In addition to a complete medical history and physical examination, diagnostic procedures may include X-ray, transvaginal ultrasound, MRI, hysteroscopy, endometrial biopsy and blood test to check for the iron deficiency anemia if heavy bleeding is caused by the tumor. [4]

Management of a patient with uterine fibroids is greatly dependent on the presentation and patient requirements. Management options are affected by the indications, age, desire to conceive etc. The treatment options for fibroids vary. Since most fibroids stop developing or may even shrink as a woman reaches menopause. 'Watchful waiting' may be advised by the health care provider. [5]

Numerous approaches are available for the treatment of uterine fibroids. These include pharmacologic choices, such as hormonal therapies and gonadotropin-releasing hormone agonists. Hysterectomy is the most common surgical procedure. Non-steroidal anti-inflammatory drugs (NSAIDs) and anti-fibrinolytics are the non-hormonal alternatives used for treatment of uterine fibroids. Tranexamic acid stops tissue plasminogen activator, which exerts fibrinolytic activity and exacerbates clots; the result is anti-fibrinolysis. Earlier, combined oral contraceptives were considered a hazard for fibroid growth, but today the risk has been reduced to 17% in modern users. Medical treatments may provide only temporary break from the symptoms of fibroids. Once the treatment is stopped, fibroids repeatedly grow back and symptoms arrive. However, these are safe to use but can have side effects which can be severe too. [6]

Alternatives to hysterectomy are present for the treatment of uterine fibroids. Uterine Fibroid Embolization is one of the procedures. It stops the blood supply to the fibroid. The fibroid then shrinks and collapse. Pregnancy is not common after this method yet it preserves the uterus. So it is not recommended to women who want to become pregnant. Uterine fibroid embolization is completed under local anaesthesia. Another treatment used to destroy fibroids without surgery is MRI guided focused ultrasound. This treatment uses high-intensity ultrasound waves to break down the fibroids. Studies indicate that this treatment is safe and works fine at releasing symptoms. Endometrial ablation is a procedure used to ablate the uterine lining. This is used to treat abnormal uterine bleeding. A lighted viewing instrument hysteroscope is used to see inside of the uterus. The endometrium heals by damaging, which typically reduces or prevents uterine bleeding. [7]

Another non-surgical therapeutic intervention for uterine fibroids are Aromatase Inhibitors which offer probably reduced side effects. Anastrozole and Letrozole are the drugs related with reduction in fibroid size. They also cause the thinning of blood and stoppage of bleeding. [8]

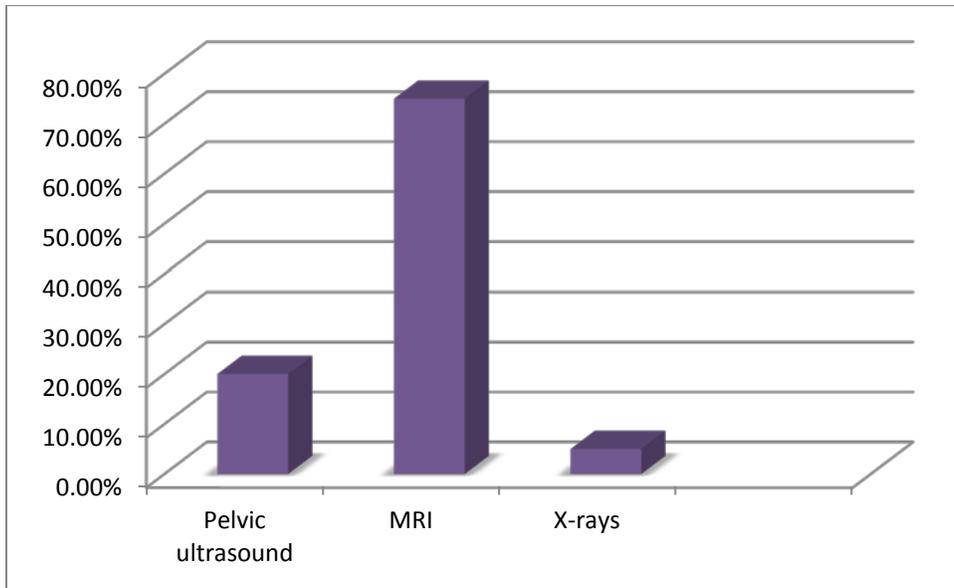
Pharmacist should counsel the patient prior to hysterectomy about medications. To best help the patients, a pharmacist should realise the use of antiemetic and pain control medications. He can also advice the patients about the type of the treatment for uterine fibroids. They should counsel patients about this disease in order to deliver an effective prevention strategy, improve early discovery to slow the growth of fibroids, develop better treatment modalities, reduce reappearances after treatment and assessment of long-term results. [9]

## 2. MATERIALS AND METHODS :

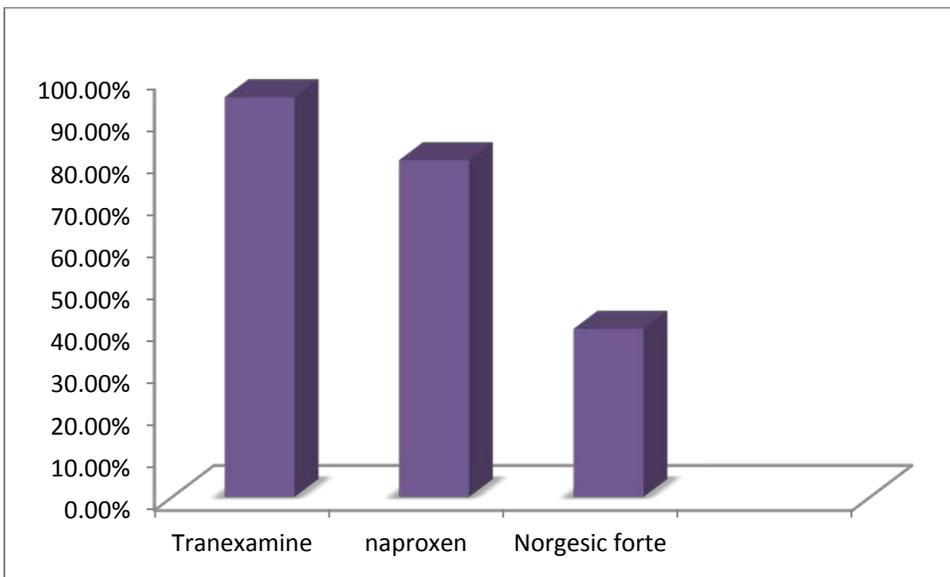
An observational and cross sectional study was conducted at different private and public sectors hospitals of Lahore, Pakistan. The duration of the study was 2 months and 100 patients of uterine fibroids were selected randomly. A data collection form was designed to get patient information which included patient's demographics along with the evaluation of non-surgical intervention of Uterine Fibroids, alternatives to hysterectomy and different medical treatments prior to surgery. The collected data was then analysed and results were shown in the form of graphs.

## 3. RESULTS

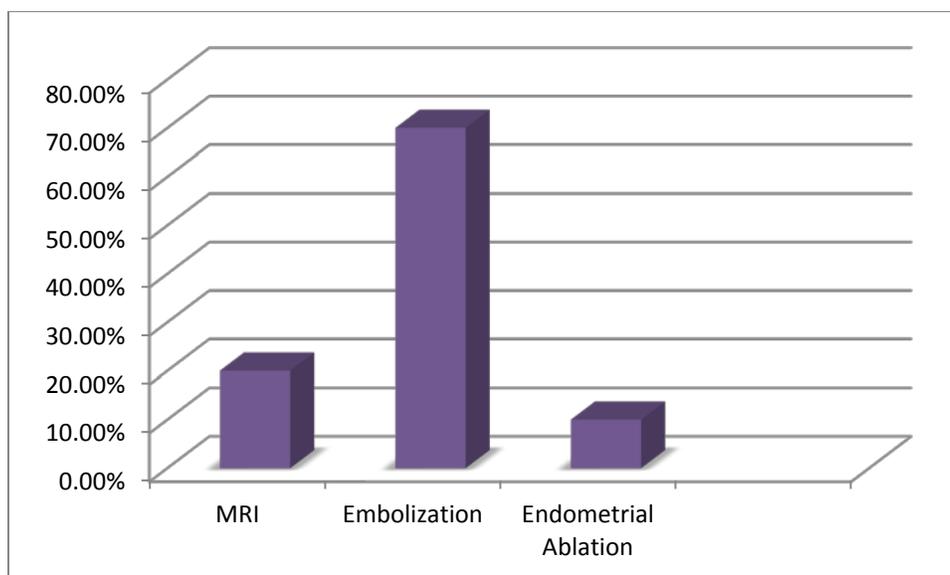
After the evaluation of non-surgical therapeutic interventions and alternatives to hysterectomy for uterine fibroids in different hospitals, it was found that medications and some non-surgical procedures can be helpful in getting rid of the disease. 75% patients had undergone the procedure of MRI and it was the most preferred method for the diagnosis of disease. (fig.1) NSAIDs were mostly used by the patients as prior treatment of symptoms. The most common drugs used were tranexamine as it stops heavy bleeding. 95% patients were prescribed tranexamine. To 80% females, naproxen was prescribed to relieve the pelvic pain and as an anti-fibrinolytic, norgesic forte was given. (fig.3) Uterine fibroid embolization was prescribed to 70% of the females who did not wanted pregnancy in future yet it preserves the uterus. Only 30% patients had interaction with pharmacist at the time of taking medication from hospital's pharmacy. (fig.4).



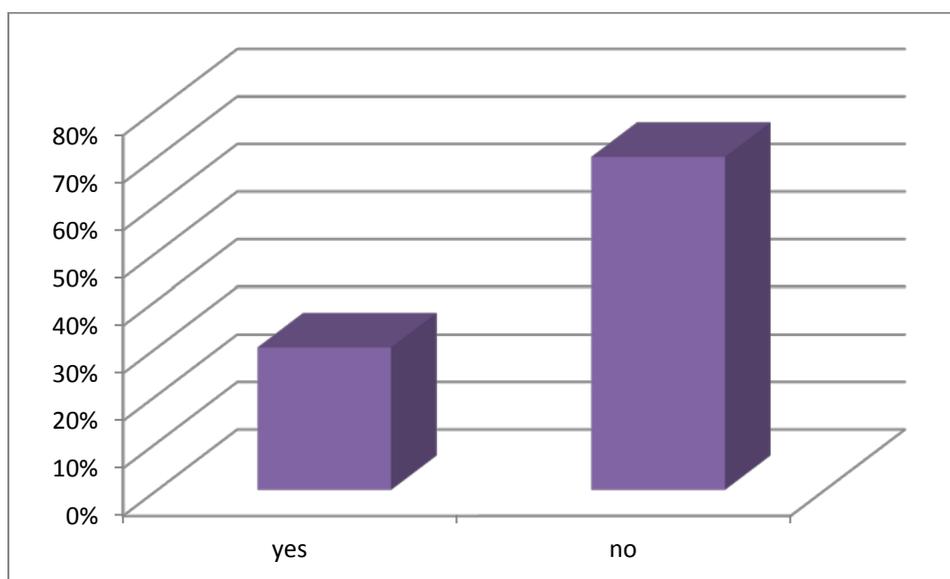
**Figure 1: Most common diagnostic procedure**



**Figure 2: Most used medication**



**Figure 3: Most preferred non-surgical procedure**



**Figure \$: Interaction with Pharmacist**

#### 4. CONCLUSION

Uterine fibroids being a muscular tumour that nurture in the wall of uterus characterized by heavy bleeding and pain in pelvic region. Symptoms may vary from mild to severe. Prior treatment of symptoms included NSAIDs. Medications like anti-fibrinolytics and analgesics are mostly prescribed to avoid any surgical procedure. Endometrial ablation, uterine fibroid embolization and MRI are few non-surgical methods for the treatment of uterine fibroids. Need of the hour is to aware people to avoid hysterectomy and opt non-surgical processes as an alternative and involvement of pharmacist to improve patient's quality of life.

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# Formulation of Learning Strategies Using Bigg's (R-SPQ-2F) Thru Attitudinal Studies of Selected Nursing Students in Higher Education Institution in Metro Manila

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**Abstract-** This study was conducted in order to formulate learning strategies using Biggs' (R-SPQ-2F) thru attitudinal studies of selected nursing students in Higher Education Institution in Metro Manila. The respondents of this study are three hundred fourteen randomly selected students from two Higher Education Institution in Metro Manila, Philippines. A survey was conducted using a standardized questionnaire for gathering of information about respondents profile and their attitudes towards learning. Frequency, Percentage, Ranking, Weighted Mean, Likert Scale, Standard t-test and ANOVA were applied to investigate the differences in the answers of the respondents to the formulation of learning strategies towards their attitudes to learning. The results revealed that there is significant differences concerning the attitudinal studies of the selected nursing students in terms of Surface Approach and deep approach. The motivation of the nursing students using Bigg's (R-SPQ-2F) manifested that their extent of attitudinal studies are well-equipped through academic awareness. There are twelve motivational Approaches of the nursing students that are correlated to the Bigg's (R-SPQ-2F) and eight, which are not correlated under deep approach and surface approach. Thru evident findings, the Learning Strategies that are formulated are based on the Extent of Motivational Approach of the nursing students through their attitudinal Studies using the Bigg's (R-SPQ-2F).

**Index Terms-** Attitude, Deep Approach, Motivation, Learning Strategies, Surface Approach

## I. INTRODUCTION

The attitudinal studies and motivational approach are significant factors affecting the quality of student learning. It is also identified that the impact of student's approaches to learning and ultimately quality of learning outcomes varies in the differences in motivation and study processes.

Recognizing student attitude towards their studies is a vital step in formulation of strategies and their motivation towards learning in Higher Education Institutions. It is essential to have some understanding of the method they used in learning in order to form an appropriate atmosphere for teaching which helps students to attain their full potential (L. Smith, 2005, p.535). According to Biggs (1979,p.381), an approach and processes used by a student in the course of learning are related to the quality of his or her studying, this paper seek the purpose to find the 'what' and 'how' students learn (Ramsden, 1992, p.40).

It is increasingly recognized that the learning strategies is associated with students' motivation to study. Teachers are key actors who shape the learning environment (Eccles and Roeser 2011) and one of their most important tasks is to create a learning environment that enhances and sustains students' motivation and engages students in learning. It seems accepted that learning requires the availability and use of precise strategies. This availability necessarily involves motivation, it also involves the learning concept the student maintains, as well as how he addresses it (learning approaches) (Salim, R. 2006).

A student is driven to work on a certain task if there is a motivation to do such. This includes learning styles and their motivation to learn. The term "learning styles" indicates that each student learns differently. Technically, an individual's learning style refers to the preferential way in which the student absorbs, processes, comprehends and retains information. In order to maintain the attitude towards learning, students must sustain a task-oriented outlook in studying, which is linked with deep-level learning.

Two wide approaches to learning, 'deep' and 'surface', have reliably arise in the field of research, with a deep approach apparently leading to a better results, thus, this measured the needed approach for students. It is important for teachers to identify the student approaches to learning since they are not permanent and is predisposed to external influences, particularly the learning atmosphere. Therefore, as claimed by Biggs, Kember and Leung, "an approach to learning describes the nature of the relationship between, student, context and task" (2001, p.137). Having the familiarity of their students' approaches to learning, teachers can apply strategies that encourage deep learning.

It is through understanding learning styles and their motivation that an educator could simplify, construct, and validate effective learning for all students (Guild and Garger 1998). When teachers taught students using their preferred learning styles, they demonstrate increased academic achievement, improved attitudes toward instruction and better discipline as compared when they are taught using their non-preferred styles (Dunn and Griggs, 1992).

Therefore, teachers must be able to identify their students' learning styles in an effective manner to create benefits and improved content knowledge. After these learners have been identified, teachers will be able to teach the students' styles, and students' learning will reflect on their academic performance.

There is increase recognition in education theory and classroom management strategy about the concept of individualized learning styles. Individual learning styles vary on cognitive, emotional and environmental factors, as well as one's prior experience. It is essential for educationalists to recognize the differences in their students' learning styles in order to apply best practice strategies into their daily activities, curriculum and assessments.

Furthermore, the researcher intends to determine whether the selected nursing students has extent of motivation that possess and demonstrated in their attitudinal studies using Bigg's (R-SPQ-2F). On this view, thru evident findings, there will be conceptualized Learning Strategies in a better transition of the learning capability of the students through teaching-learning process.

## II.

### III. RESEARCH ELABORATIONS

The present study is anchored to the following theories: a. Theories of Attitude Change (Hovland, Janis, Kelly, 1953), b. Balance Theory of Attitude Change (Heider 1958), c. Cognitive Consistency (Abelson 1968), d. Consistency Theory Approach (Simonson, 1977), e. Cognitive Dissonance Theory (Festinger, 1957), f. Functionalist Theory of Attitudes (Katz) and Social Development (Vygotsky, 1960).

Hovland, Janis, & Kelly (1953) provided one of the first major theories of attitude change, developed in the framework of Hull's learning theory and oriented towards the effects of persuasive communication. According to the Hovland et al theory, changes in opinions can result in attitude change depending upon the presence or absence of rewards. The learning of new attitudes is no different in nature than any other verbal or motor skill, except that opinions relate to a single proposition whereas other skills involve a series of propositions. The acceptance of a new opinion (and hence attitude formation) is dependent upon the incentives that are offered in the communication.

It is true that the present study allocate the changes of transformational category of the nurses through their capability and ability in studying. Moreover, it generate a academic support which intends to the researchers criterion in conceptualizing new learning strategies.

Heider (1958) developed a balance theory of attitude change that was influenced by Gestalt principles. In Heider's theory, when beliefs are unbalanced, stress is created and there is pressure to change attitudes. The two main factors affecting balance are the sentiment (e.g., liking, approving, admiring) and unity (e.g., similarity, proximity, membership) qualities of beliefs. Balance exists if the sentiment or unity between beliefs about events or people is equally positive or negative; imbalance occurs when they are dissimilar in nature.

Indeed, this theory encompasses the nursing students academic tract of changing their styles in studying through academic beliefs that support scholastic balances of studying medical fields.

Abelson (1968) and others developed theories of cognitive consistency. Cognitive consistency suggests that people will try to maintain consistency among their beliefs and make changes (i.e., accept or reject ideas) when this does not occur. For example, if a college student who wants to live in a coed dormitory and also wants to get good grades is presented with the fact that students who live in coed dorms get poor grades, the student will either reject this proposition or change his attitudes about coed dorms or good grades.

As such, the researcher will be able to assess if the selected nursing students are consistent in their studies in the medical allied subjects. For instances, it is the researchers belief that there are individual differences in allocating students' progress of study. Moreover, the transition of the present study gives more evident processes, mechanisms, and scope and that lead to give priority with regards to scholastic consistency using the BIGGS (R-SPQ-2F).

An example of research of the classical type that demonstrated a consistency theory approach was Simonson's (1977) study of dissonance theory principles. In this study, cognitive dissonance theory (Festinger, 1957) assumptions, one of the most influential consistency theories, were used in a formal program of attitude change in order to improve student attitude toward an instructional activity. Student achievement in this instructional activity was then measured to determine if achievement was influenced by a change in student attitude toward instruction.

Festinger's theory of cognitive dissonance is one of the best-known and most researched frameworks pertaining to attitude change. According to this theory, attitude change is caused by conflict among beliefs. A number of factors determine the strength of the dissonance and hence how much effort is required to change attitudes. By manipulating these factors, attitude change can be facilitated or inhibited.

Daniel Katz (2015) proposed a functionalist theory of attitudes. He takes the view that attitudes are determined by the functions they serve for us. People hold given attitudes because these attitudes help them achieve their basic goals. Katz distinguishes four types of psychological functions that attitudes meet such as (a) Instrumental - we develop favorable attitudes towards things that aid or reward us. We want to maximize rewards and minimize penalties. Katz says we develop attitudes that help us meet this goal, (b) Knowledge - attitudes provide meaningful, structured environment. In life we seek some degree of order, clarity, and stability in our personal frame of reference. Attitudes help supply us with standards of evaluation. Via such attitudes as stereotypes, we can bring order and clarity to the complexities of human life (c) Value-expressive - Express basic values reinforce self-image. If you view yourself as a Catholic, you can reinforce that image by adopting Catholic beliefs and values. We may have a self-image of ourselves as an enlightened conservative or a militant radical, and we therefore cultivate attitudes that we believe indicate such a core value, and (d) *Ego-defensive* - Some attitudes serve to protect us from acknowledging basic truths about ourselves or the harsh realities of life. They serve as defense mechanisms. Those with feelings of inferiority may develop attitude of superiority.

Katz's functionalist theory also offers an explanation as to why attitudes change. According to Katz, an attitude changes when it no longer serves its function and the individual feels blocked or frustrated. That is, according to Katz, attitude change is achieved not so much by changing a person's information or perception about an object, but rather by changing the person's underlying motivational and personality needs.

Learning theories are an organized set of principles explaining how individuals acquire, retain and recall knowledge. By studying and knowing the different learning theories, we can better understand how learning occurs. The principles of the theories can be used as guidelines to help select instructional tools, techniques and strategies that promote learning.

Behaviorism is a worldview that assumes a learner is essentially passive, responding to environmental stimuli. The learner starts off as a clean slate (i.e. tabula rasa) and behavior is shaped through positive reinforcement or negative reinforcement. Both positive reinforcement and negative reinforcement increase the probability that the antecedent behavior will happen again. In contrast, punishment (both positive and negative) decreases the likelihood that the antecedent behavior will happen again. Positive indicates the application of a stimulus; Negative indicates the withholding of a stimulus. Learning is therefore defined as a change in behavior in the learner. The cognitivist revolution replaced behaviorism in 1960s as the dominant paradigm. Cognitivism focuses on the inner mental activities – opening the “black box” of the human mind is valuable and necessary for understanding how people learn. Mental processes such, as thinking, memory, knowing, and problem solving need to be explored. Knowledge can be seen as schema or symbolic mental constructions. Learning is defined as change in a learner's schemata.

A response to behaviorism, people are not “programmed animals” that merely respond to environmental stimuli; people are rational beings that require active participation in order to learn, and whose actions are a consequence of thinking. Changes in behavior are observed, but only as an indication of what is occurring in the learner's head. Cognitivism uses the metaphor of the mind as computer: information comes in, is being processed, and leads to certain outcomes.

A reaction to didactic approaches such as behaviorism and programmed instruction, constructivism states that learning is an active, contextualized process of constructing knowledge rather than acquiring it. Knowledge is constructed based on personal experiences and hypotheses of the environment. Learners continuously test these hypotheses through social negotiation. Each person has a different interpretation and construction of knowledge process. The learner is not a blank slate (tabula rasa) but brings past experiences and cultural factors to a situation.

A common misunderstanding regarding constructivism is that instructors should never tell students anything directly but, instead, should always allow them to construct knowledge for themselves. This is actually confusing a theory of pedagogy (teaching) with a theory of knowing. Constructivism assumes that all knowledge is constructed from the learner's previous knowledge, regardless of how one is taught. Thus, even listening to a lecture involves active attempts to construct new knowledge.

Vygotsky's social development theory is one of the foundations for constructivism.

Humanism, a paradigm that emerged in the 1960s, focuses on the human freedom, dignity, and potential. A central assumption of humanism, according to Huit (2001), is that people act with intentionality and values. This is in contrast to the behaviorist notion of operant conditioning (which argues that all behavior is the result of the application of consequences) and the cognitive psychologist belief that the discovering knowledge or constructing meaning is central to learning. Humanists also believe that it is necessary to study the person as a whole, especially as an individual grows and develops over the lifespan. It follows that the study of the self, motivation, and goals are areas of particular interest.

Key proponents of humanism include Carl Rogers and Abraham Maslow. A primary purpose of humanism could be described as the development of self-actualized, autonomous people. In humanism, learning is student centered and personalized, and the educator's role is that of a facilitator. Affective and cognitive needs are key, and the goal is to develop self-actualized people in a cooperative, supportive environment.

#### IV.

### V. RESEARCH METHODS

#### Research Design

The study will take the form of a descriptive-evaluative research. The descriptive-evaluative occur in this study through the manifestation of answering the Bigg's (R-SPQ-2F) rendered by the selected nursing students of selected Higher Educational Institutions in Metro Manila. If so, the answers of the respondents will be evaluated using the actual formulation of the standardize test propagated by John Bigg's, whether it is satisfying or not. Apparently, the researcher will be able to formulate new learning strategies.

According to purpose combination of quantitative and qualitative research will also utilize, the study will also take the form of an applied type of research because its results will be utilized to enhance how teachers of nursing college teach students, consequently helping low-achieving nursing students perform better in the subject. The response of the study will be interpreted using the statistical tools and treatments numerically then, interpreted in a well-organized discussion through better citations using literatures and studies that are inter-related to the present study.

After the assessment of the students, the data will be processed and will be utilized to generate two reports: (1) a class profile report showing the study approaches of the nursing students; and (2) individual feedback report to students that explains the characteristics of their approach, the outcomes and strategies on how to move to a deep-achieving approach.

#### Population and Sampling Scheme

The study will be conducted in the College of Nursing of School A, and School B. The target respondents were the nursing students who were enrolled during the first semester of the school year 2017-2018 from first year to fourth year of the abovementioned schools.

The study will use purposive sampling, (also known as judgment, selective or subjective sampling), in this regard, the selected Higher Educational Institutions were used purposively as an apparent response of allocating the reliable and valid respondents. Because the selected institutions offering a Bachelor of Science in Nursing (BSN)

In addition, the study will also apply the simple stratified random sampling, it is a variation of simple random sampling in which the population is partitioned into relatively homogeneous groups called strata and a simple random sample is selected from each stratum. The results from the strata are then aggregated to make inferences about the population. A side benefit of this method is that inferences about the subpopulation represented by each stratum can also be made.

#### Description of the Respondents

Nursing students from first level to fourth level who are enrolled in the first semester of school year 2017-2018 will become the subject of the study.

Moreover, there are three hundred fourteen (314) selected nursing students in the selected higher education institutions in metro manila, which is the main subject of this research study.

#### Research Instrument

The researcher will distribute a checklist to the respondents in gathering of data. Further, the study will utilize a standardize survey question using Biggs' Revised Study Process Questionnaire (SPQ)-2 Factors, herein referred to as R-SPQ-2F. The R-SPQ-2F is a 20-item questionnaire to identify tertiary students' metacognitive approaches to learning in a classroom or research setting. It has two scales: Deep Approach and Surface Approach, as well as four subscales: Deep Motive, Deep Strategy, Surface Motive, and Surface Strategy. Student-respondents respond to the questionnaire items using a 5-point Likert scale with the following verbal responses that range from never or only rarely true of me to always or almost always true of me. Raw scores are computed by summing the mean score for items identified for each subscale. Scores for Deep Approach and Surface Approach are the sums of the corresponding subscales. The length and ease of administration is a plus for this instrument. A clear disadvantage is the time required to score this measure. In sum, this measure has promise in the field of healthcare education, but requires additional validation with individuals at all levels of healthcare education. This had been used in a number of studies concerned with campus-based education, and it has been shown to be sensitive to differences between individual students related to their age, year of study and academic discipline (Biggs, 2007). Permission from the instrument's author, John Biggs at [Johnbiggs.com.au](http://Johnbiggs.com.au) will be sought so that it may be utilized in this study without infringing on the author's intellectual property rights.

#### Statistical Treatment of Data

The following statistical tools for the interpretation of results according to sub-problems were used.

*Percentage.* This was used to determine the frequencies of the respondents in terms of actual number of respondents of the study.

The formula is  $P = \frac{f}{n} \times 100$

where:

P = percentage of distribution

f = frequency of an item of response

n = total number of students

*Ranking.* This was used to get the average rank of the responses in each sub problems.

*Weighted Mean.* This was used to get the average frequency of the responses in each weighted item of the specific problem number 2 and 4.

Formula:

$$WM = \frac{(f_5 \times 5) + (f_4 \times 4) + (f_3 \times 3) + (f_2 \times 2) + (f_1 \times 1)}{N}$$

*Likert Scale A.* This was used to determine the acceptability of the multi-factorial dimensions of employees productivity, to answer specific problem no. 2, the 5-point Likert scale will be used and its interpretation will be as follows:

Scale Range	Verbal Interpretation
5 – (4.50 – 5.00)	Always or Almost always true of me (AATM)
4 – (3.50 – 4.49)	Frequently true of me (FTM)
3 – (2.50 – 3.49)	True of me about half the time (TMAHT)
2 – (1.50 – 2.49)	Sometimes true of me (STM)

– (1.00 – 1.49) Never or only rarely true of me (RTM)

*Likert Scale B. this was used to determine extent of motivations of the selected nursing students thru demonstration of their attitudinal studies using Bigg's (R-SPQ-2F) that integrated to the specific problem no. 4 the 5-point Likert scale will be used and its interpretation will be as follows:*

Scale Range	Verbal Interpretation
5 – (4.50 – 5.00)	Personal Understanding (PU)
4 – (3.50 – 4.49)	Vocational Relevance (VR)
3 – (2.50 – 3.49)	Interest in the Subject (ItS)
2 – (1.50 – 2.49)	Desire to Complete their course study (DCCS)
1 – (1.00 – 1.49)	Fear of Failure (FoF)

5. F-test. This will be used to compare the assessments of the group of respondents according to the demographic profile.

## VI. RESULTS AND FINDINGS

Sub-problem No. 1. There are three hundred fourteen selected nursing students were used in these study in which one hundred eight (108) under ages below 19 years old, eighty-five (85) between ages 20 to 22, forty-seven (47) at ages 23 to 25, thirty (30) between 26-28 and forty-four to the ages 29 and above. Moreover, the highest frequency percentage of the respondents of this study as to gender are female ranging two hundred thirty-five (235) responses or 74.84% followed by male garnering a frequency percentage of seventy-nine (79) or 25.16%.

Indeed, majority of the respondents as to year level belong to third year and fourth year nursing students ranging a frequency percentage of ninety-nine (99) or 31.53% followed by second year and first year nursing students having a frequency of fifty-two (52) and sixty-four (64) respectively.

Sub-problem No.2. The Attitudinal Studies of Selected Nursing Students in Higher Education Institutions using Bigg's (R-SPQ-2F) in terms of surface approach reached TMaHT which means that all set criterion are true to them about half the time ranging a computed mean value of 3.00. While on the other hand, the nursing students possessed FTM or frequently true of them those sub-variables that incorporated the Bigg's (R-SPQ-2F) as to deep approach ranging a computed mean value of 3.62.

Sub-problem No. 3 There is significant differences with regards to the attitudinal studies of the selected nursing students in terms of Surface Approach as to age and year level garnering a computed f-value of 61.258 and 61.258. Furthermore, there is also significant difference with regards to the attitudinal studies of selected nursing students according deep approach in terms of age and year level having a computed f-value of 16.5532 and 16.553 respectively.

Sub-problem No. 4 The Extent of motivation of the nursing students through demonstrating attitudinal studies using Bigg's (R-SPQ-2F) inclined interest in the subject (ItS) ranging a computed mean value of 3.19 manifested that their extent of attitudinal studies are well-equipped through academic awareness.

Sub-problem No. 5

There are twelve (12) motivational Approach of the nursing students that are correlated to the Bigg's (R-SPQ-2F) and eight (8) which are not correlated under deep approach and surface approach. The correlated criteria are (1) I find that at times studying gives me a feeling of deep personal satisfaction. (*Nabatid kong ang paglalaan ng oras at panahon sa pag-aaral ay nakapagbibigay ng malalim at kasiyahang personal.*); (2) To be satisfied, I should study hard to make a conclusion of my work. (*Kailangan kong mag-aral ng mabuti para makagawa ng sariling konklusyon ukol sa aking gawain upang maabot ko ang aking minimithi.*); (3) I feel that virtually any topic can be highly interesting once I get into it. (*Nararamdaman kong ang kahalagahan at epekto ng lahat ng paksa ay may mataas na interest habang nasisiyahan ako dito.*); (4) I find most topics interesting and often spend extra time trying to obtain more information about them. (*Mas pinaglalaanan ko ng karagdagang oras ang pagtuklas sa mga interesadong paksa upang makuha ang karagdagang impormasyon.*); (5) I find that studying academic topics can at times be as exciting as a good novel or movie. (*Mas pinagtutuunan ko ng pag-aaral ang mga pang-akademikong paksa kaysa sa pagbabasa ng nobela at panunuod.*); (6) I test myself on important topics until I understand them completely. (*Sinusubukan kong pag-aralan ang aking sarili ukol sa mahalagang paksa hanggang maunawaan ko ang kabuuan nito.*); (7) I work hard at my studies because I find the material interesting. (*Pinagsisikapin ko ang aking pag-aaral sapagkat natuklasan ko na ito'y isang bagay na dapat pagtuunan ng pansin.*); and (8) I spend a lot of my free time finding out more about interesting topics, which has been discussed in different classes. (*Pinaglalaan ko ng karagdagang oras ang paghahanap ng mga interesadong paksa na tinatalakay sa ibang klase.*); (9) I come to most classes with questions in mind that I want answering. (*Marami akong katanungan sa loob ng klase na nais kong mabigyan ng kasagutan.*); (10) I make a point of looking at most of the suggested reading that go with the lectures. (*Pinaglalaan ko ng panahon ang mga ibinigay na babasahin na may kaakibat na interes sa talakayan.*).

Sub-problem No.6. Thru evident findings, the Learning Strategies that are formulated are based on the Extent of Motivational Approach of the nursing students through their attitudinal Studies using the Bigg's (R-SPQ-2F) pertaining to (1) Deep Learning thru Relation of Evident Personal Ideas, (2) Deep Learning thru Evident Educational Work, (3) Deep Learning thru Evident Extra-Scholastic Work, (4) Deep Learning thru Evident Integrated Course Curriculum, (5) Deep Learning thru Evident Educational Satisfaction, (6) Deep Learning thru Evident Interested Topics, (7) Deep Learning thru Evident Course task-centered, (8) Deep Learning thru Evident Mind task-orientation, (9) Deep Learning thru Evident Academic Self-Centered Relation, (10) Deep Learning thru Evident Academic Self-Test Criterion, (11) Deep Learning thru Evident Topical Analysis, (12) Deep Learning thru Evident academic Scope Restrictions, (13) Deep Learning thru Evident Academic-Centered Criterion, (14) Deep Learning thru Evident Academic Devotion, (15) Deep Learning thru Evident Academic Standard with Depth-range, (16) Deep Learning thru Evident Scholastic Resource Material, (17) Deep Learning thru Evident Art of Scholastic Solution to academic natures, (18) Deep Learning thru Evident empowerment of Educational Tools, (19) Deep Learning thru Evident Academic Engagement to educational resources, and (20) Deep Learning thru Evident Test Retention with Comprehensive –Analysis.

## VII. CONCLUSION

From the salient findings summarized on this part of the paper, the researcher concludes:

**Sub-problem No. 1.** There are three hundred fourteen selected nursing students in which majority came to ages below 19 years old that are female that belong to third year and fourth year level.

**Sub-problem No.2.** The Attitudinal Studies of Selected Nursing Students in Higher Education Institutions using Bigg's (R-SPQ-2F) in terms of surface approach reached (TMaHT) which means that all set criterion are true to them about half the time while FTM or frequently true of them as to deep approach.

**Sub-problem No. 3** There is significant differences concerning the attitudinal studies of the selected nursing students in terms of Surface Approach and Deep Approach as to age and year level.

**Sub-problem No. 4** The Extent of motivation of the nursing students through demonstrating attitudinal studies using Bigg's (R-SPQ-2F) inclined interest in the subject (ItS) that determine as well-equipped through academic awareness.

**Sub-problem No. 5** There are twelve (12) motivational Approach of the nursing students that are correlated to the Bigg's (R-SPQ-2F) and eight (8) which are not correlated under deep approach and surface approach.

**Sub-problem No.6.** The Learning Strategies that are formulated which is based on the Extent of Motivational Approach of the nursing students through their attitudinal Studies using the Bigg's (R-SPQ-2F) are considered as Deep Approach Personal Ideas, Educational Work, Extra-Scholastic Work, Integrated Course Curriculum, Educational Satisfaction, Interested Topics, Course task-centered, Mind task-orientation, Academic Self-Centered Relation, Academic Self-Test Criterion, Topical Analysis, academic Scope Restrictions, Academic-Centered Criterion, Academic Devotion, Academic Standard with Depth-range, Scholastic Resource Material, Art of Scholastic Solution to academic natures, empowerment of Educational Tools, Academic Engagement to educational resources, and Test Retention with Comprehensive –Analysis.

## APPENDIX

### Survey Questionnaire

**“FORMULATION OF LEARNING STRATEGIES USING BIGG’S (R-SPQ-2F) THRU ATTITUDINAL STUDIES OF SELECTED**

**NURSING STUDENTS IN HIGHER EDUCATION INSTITUTIONS IN METRO MANILA”**

### THE SURVEY QUESTIONNAIRE

#### PART 1. Socio-Demographic Profile of the Respondents

Name:(Optional)\_\_\_\_\_ Gender: Male:\_\_\_ Female:\_\_\_

#### Age Range: (Please check)

- Below 19 years old
- 20-22 years old
- 23-25 years old
- 26-28 years old
- 29 and above years old

#### Civil Status: ( Please Check)

- Single
- Married
- Widow/Widowed
- Others, pls. specify  
\_\_\_\_\_

#### Year Level ( Please check)

- 1<sup>st</sup> year level
- 2<sup>nd</sup> year level
- 3<sup>rd</sup> year level
- 4<sup>th</sup> year level

#### Name of University/Institution

- School A
- School B

Part II- What is the attitudinal studies of selected Nursing students in Higher Education Institutions using Bigg's (R-SPQ-2F) in terms of:

- 2.1 Surface Approach
- 2.2 Deep Approach

**Biggs' Revised study Process Questionnaire (R-SPQ-2F)**

This questionnaire has a number of questions about your attitudes towards your studies and your usual way of studying.

There is no right way of studying. It depends on what suits your own style and the course you are studying. It is accordingly important you answer each question as honestly as you can.

Please put a ( √ ) mark in the appropriate space alongside the question number on the General Purpose Survey/ Answer Sheet. Please choose the one most appropriate response to each question. **Do not spend a long time on each item: your first reaction is probably the best one. Please answer each item. Do not worry about projecting a good image. Your answers are CONFIDENTIAL.**

5	4	3	2	1
Always or almost always true of me (AATM)	Frequently true of me (FTM)	True of me about half the time (TMaHT)	Sometimes true of me (STM)	Never or only rarely true of me (RTM)

**A. SURFACE APPROACH**

QUESTION	1 (RTM)	2 (STM)	3 (TMaHT)	4 (FTM)	5 (AATM)
1. My aim is to pass the course while doing as little work as possible. ( <i>Nais kong pumasa sa aking kurso habang may karagdagang gawaing pang-edukasyon.</i> )					

<p>2. I only study seriously what's given out in class or in the course outline. (<i>Pinag-aralan ko ng seryoso ang ibinigay sa klase gabay ang kurikulum at pagkakasunod-sunod na paksa sa aking kurso.</i>)</p>					
<p>3. I don't find my course very interesting so I keep my work to the minimum. (<i>Hindi ko nakikitaang may halaga ang aking kurso kaya ginagawa ko lamang ang aking makakaya.</i>)</p>					
<p>4. I learn some things by rote, going over and over them until I know them by heart even if I don't understand them. (<i>Patuloy kong pinagsisikapang matutunan ang mga bagay-bagay na balakid sa aking pag-aaral.</i>)</p>					
<p>5. I find I can get by in most assessment by memorizing key sections rather than trying to understand them. (<i>Nakukuha ko ang mga aralin sa pamamagitan ng pagsasaulo ng mga mahahalagang detalye kaysa subukang unawain ang mga ito.</i>)</p>					
<p>6. I generally restrict my study to what is specifically set as I think is unnecessary to do anything extra. (<i>Ang aking pag-aaral ay restriktado sa mga espisipikong kaalaman na hindi na kailangan pa ng</i></p>					

<i>ibang karagdang gawain.)</i>					
<p>7. I find its not helpful to study topics in depth. It confuses and wastes time, when all you need is a passing acquaintance with topics. (<i>Natuklasan kong hindi nakatutulong ang pag-aaral ng napakalalim sa bawat paksa ng aralin. Nakapagbibigay ito ng pagkalito at pag-aaksaya ng panahon, sapagkat kailangan lamang daanan ang mga piling paksang pag-aaralan.</i>)</p>					
<p>8. I believe that lecturers shouldn't expect students to spend significant amount of time studying material everyone knows won't be examined. (<i>Naniniwala akong ang mga tagapagdaloy ng aralin ay hindi dapat maglaan ng ekspektasyon sa mga mag-aaral sa mahabang oras at panahon sa mga kagamitang panturo na hindi pa nasusuri.</i>)</p>					
<p>9. I see no point in learning material, which is not likely to be in the examination. (<i>Nakikita kong walang kaugnayan sa pag-aral ang mga kagamitang panturo na hindi nakapaloob sa pagsusulit.</i>)</p>					
<p>10. I find the best way to pass examinations is to try to remember</p>					

answers to likely questions. ( <i>Nabatid ko na ang mabisang paraan sa pagpasa sa isang pagsusulit ay ang pagsubok na matandaan ang mga sagot sa mga kahalintulad na katanungan.</i> )					
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**B. DEEP APPROACH**

QUESTION	1 (RTM)	2 (STM)	3 (TMaHT)	4 (FTM)	5 (AATM)
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<p>1. I find that at times studying gives me a feeling of deep personal satisfaction.</p> <p><i>(Nabatid kong ang paglalaan ng oras at panahon sa pag-aaral ay nakapagbibigay ng malalim at kasiyahang personal.)</i></p>					
<p>2. To be satisfied, I should study hard to make a conclusion of my work.</p> <p><i>(Kailangan kong mag-aral ng mabuti para makagawa ng sariling konklusyon ukol sa aking gawain upang maabot ko ang aking minimithi.)</i></p>					
<p>3. I feel that virtually any topic can be highly interesting once I get into it.</p> <p><i>(Nararamdaman kong ang kahalagahan at epekto ng lahat ng paksa ay may mataas na interest habang nasisiyahan ako dito.)</i></p>					
<p>4. I find most topics interesting and often spend extra time trying to obtain more information about them.</p> <p><i>(Mas pinaglalaanan ko ng karagdagang oras ang pagtuklas sa mga interesadong paksa upang makuha ang karagdagang impormasyon.)</i></p>					
<p>5. I find that studying academic topics can at times be as exciting as a good novel or movie.</p> <p><i>(Mas pinagtutuunan ko ng pag-aaral ang mga pang-</i></p>					

<p><i>akademikong paksa kaysa sa pagbabasa ng nobela at panunuod.)</i></p>					
<p>6. I test myself on important topics until I understand them completely.  <i>(Sinusubukan kong pag-aralan ang aking sarili ukol sa mahalagang paksa hanggang maunawaan ko ang kabuuan nito.)</i></p>					
<p>7. I work hard at my studies because I find the material interesting.  <i>(Pinagsisikapan ko ang aking pag-aaral sapagkat natuklasan ko na ito'y isang bagay na dapat pagtuunan ng pansin.)</i></p>					
<p>8. I spend a lot of my free time finding out more about interesting topics, which has been discussed in different classes.  <i>(Pinaglalaan ko ng karagdagang oras ang paghahanap ng mga interesadong paksa na tinatalakay sa ibang klase.)</i></p>					
<p>9. I come to most classes with questions in mind that I want answering.  <i>(Marami akong katanungan sa loob ng klase na nais kong mabigyan ng kasagutan.)</i></p>					
<p>10. I make a point of looking at most of the suggested reading that go with the lectures. <i>(Pinaglalaanan ko ng panahon ang mga ibinigay na babasahin na may</i></p>					

<i>kaakibat na interes sa talakayan.)</i>					
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Part III- What is the extent of motivation does the respondents demonstrate in their attitudinal studies using Bigg's (R-SPQ-2F)?

<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Personal Understanding <b>(PU)</b>	Vocational Relevance <b>(VR)</b>	Interest in the subject <b>(Its)</b>	Desire to complete their course study <b>(DCCS)</b>	Fear of failure <b>(FoF)</b>

QUESTION	1 (FoF)	2 (DCCS)	3 (Its)	4 (VR)	5 (PU)
1. I find that at times studying gives me a feeling of deep personal satisfaction. <i>(Nabatid kong ang paglalaan ng oras at panahon sa pag-aaral ay nakapagbibigay ng malalim at kasiyahang personal.)</i>					
2. To be satisfied, I should study hard to make a conclusion of my work. <i>(Kailangan kong mag-aral ng mabuti para makagawa ng sariling konklusyon ukol sa aking gawain upang maabot ko ang aking minimithi.)</i>					
3. My aim is to pass the course while doing as little work as possible. <i>(Nais kong pumasa sa aking kurso habang may karagdagang gawaing pang-edukasyon.)</i>					

<p>4. I only study seriously what's given out in class or in the course outline. <i>(Pinag-aralan ko ng seryoso ang ibinigay sa klase gabay ang kurikulum at pagkakasunod-sunod na paksa sa aking kurso.)</i></p>					
<p>5. I feel that virtually any topic can be highly interesting once I get into it. <i>(Nararamdaman kong ang kahalagahan at epekto ng lahat ng paksa ay may mataas na interest habang nasisiyahan ako dito.)</i></p>					
<p>6. I find most topics interesting and often spend extra time trying to obtain more information about them. <i>(Mas pinaglalaanan ko ng karagdagang oras ang pagtuklas sa mga interesadong paksa upang makuha ang karagdagang impormasyon.)</i></p>					
<p>7. I don't find my course very interesting so I keep my work to the minimum. <i>(Hindi ko nakikitaang may halaga ang aking kurso kaya ginagawa ko lamang ang aking makakaya.)</i></p>					
<p>8. I learn some things by rote, going over and over them until I know them by heart even if I don't understand them. <i>(Patuloy kong pinagsisikapang matutunan ang mga bagay-bagay na balakid sa aking</i></p>					

<i>pag-aaral.)</i>					
9. I find that studying academic topics can at times be as exciting as a good novel or movie. <i>(Mas pinagtutuunan ko ng pag-aaral ang mga pang-akademikong paksa kaysa sa pagbabasa ng nobela at panunuod.)</i>					
10. I test myself on important topics until I understand them completely. <i>(Sinusubukan kong pag-aralan ang aking sarili ukol sa mahalagang paksa hanggang maunawaan ko ang kabuuan nito.)</i>					
11. I find I can get by in most assessment by memorizing key sections rather than trying to understand them. <i>(Nakukuha ko ang mga aralin sa pamamagitan ng pagsasaulo ng mga mahahalagang detalye kaysa subukang unawain ang mga ito.)</i>					
12. I generally restrict my study to what is specifically set as I think is unnecessary to do anything extra. <i>(Ang aking pag-aaral ay restriktado sa mga espisipikong kaalaman na hindi na kailangan pa ng ibang karagdagang gawain.)</i>					
13. I work hard at my studies because I find the material interesting.					

<p><i>(Pinagsisikapan ko ang aking pag-aaral sapagkat natuklasan ko na ito'y isang bagay na dapat pagtuunan ng pansin.)</i></p>					
<p>14. I spend a lot of my free time finding out more about interesting topics, which has been discussed in different classes.  <i>(Pinaglalaan ko ng karagdagang oras ang paghahanap ng mga interesadong paksa na tinatalakay sa ibang klase.)</i></p>					
<p>15. I find it's not helpful to study topics in depth. It confuses and wastes time, when all you need is a passing acquaintance with topics. <i>(Natuklasan kong hindi nakatutulong ang pag-aaral ng napakalalim sa bawat paksa ng aralin. Nakapagbibigay ito ng pagkalito at pag-aaksaya ng panahon, sapagkat kailangan lamang daanan ang mga piling paksang pag-aaralan.)</i></p>					
<p>16. I believe that lecturers shouldn't expect students to spend significant amount of time studying material everyone knows won't be examined.  <i>(Naniniwala akong ang mga tagapagdaloy ng aralin ay hindi dapat maglaan ng ekspektasyon sa mga mag-aaral sa mahabang oras at panahon sa mga kagamitang panturo na hindi pa nasusuri)</i></p>					

<p>17. I come to most classes with questions in mind that I want answering. <i>(Marami akong katanungan sa loob ng klase na nais kong mabigyan ng kasagutan.)</i></p>					
<p>18. I make a point of looking at most of the suggested reading that go with the lectures. <i>(Pinaglalaanan ko ng panahon ang mga ibinigay na babasahin na may kaakibat na interes sa talakayan.)</i></p>					
<p>19. I see no point in learning material, which is not likely to be in the examination. <i>(Nakikita kong walang kaugnayan sa pag-aral ang mga kagamitang panturo na hindi nakapaloob sa pagsusulit.)</i></p>					
<p>20. I find the best way to pass examinations is to try to remember answers to likely questions. <i>(Nabatid ko na ang mabisang paraan sa pagpasa sa isang pagsusulit ay ang pagsubok na matandaan ang mga sagot sa mga kahalintulad na katanungan.)</i></p>					

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# Analysis of Budgetary Control Practices and the Management of Micro and Small Enterprises at Kangemi Town in Kenya

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**ABSTRACT:** This study sought to assess the effect of budgetary control practices in the management of micro and small enterprises at Kangemi town in Kenya. The theory of budgeting, accounting theory and budgetary control theory were reviewed under the theoretical framework. Determinants of budgetary control were examined after which an empirical review of the study variables was done both globally and locally. A descriptive survey design was adopted to capture categorical description of attitudes of the study population. The population of the study consisted of 160 respondents from the 160 registered micro and small enterprises in Kangemi, Kenya. The sample size constituted 75 respondents who were derived from the Kothari's formula for cases when the target population is less than 10,000. The questionnaires consisted of both closed and open questions. Secondary data sources were used to supplement the data received from questionnaires. Validity and reliability were determined. Data was analysed to establish the measures of central tendency that include the mean, mode, and median highlighting the key findings. Inferential statistics was used to establish the relationship between the variables of the study and qualitatively by content analysis. Analysis of variance (ANOVA) was used to determine the significance relationship of the variables. The study established that the management of micro and small enterprises is positively related to the budgetary control practices. In establishing the time period covered by budgets, the study found that majority (65.15%) of micro and small enterprises review budget after 1 to 5 years. On the approximate annual budget revenue, the study found that budgets have clear goals and objectives and when budgeting, outcomes, goals and objectives are linked to programs and school activities. On the Impact of evaluation on budgetary control practices in management of micro and small enterprises, the study further established that the enterprises engages its stakeholders in making key budget decisions and that the management of these enterprises review the budget periodically. The study recommended that budget review and control should be done as frequently as possible to achieve greater results.

**Key Words:** Budgetary control practices, management, micro and small enterprises

## 1. INTRODUCTION

### 1.1 Background of the Study

Many companies make use of budgets mainly as an internal control tool for efficient and effective resource allocation. Budgets help organizations compare between the actual and intended performance for effective inference and evaluations. Hokal and Shaw (2002) assert that, ideal budgets are a base for performance management and standard setting. According to Kimani (2014), budgeting entails the establishment of predetermined goals, reporting of actual performance results and evaluation of such performance in terms of predetermined goals.

The systems of budgetary control have been identified to be universal and have been considered as an essential tool for financial planning. Churchill (2001) argues that, the main role of budgetary control is to provide a projection incomes and expenses. According to Blumentritt (2006), budgeting is defined as the process of allocating an organization's financial resources to its units, activities and investments while on the other hand, Horngren et al. (2004) sees budgets as the quantitative expression of a proposed plan of action by management for a specified period and an aid to coordinating what needs to be done to implement that plan. In general, a budget is a financial or quantitative statement, containing the plans and policies to be pursued during a specific time period (typically a year).

Riley (2012) asserts that budgets are a source of income control used to establish priorities and set targets in order to provide direction and co-ordination, so that business objectives can be turned into practical reality, to assign responsibilities to budget holders (managers) and allocate resources, to communicate targets from management to employees, to motivate staff, to improve efficiency and to monitor performance.

According to Uyar and Bilgin (2011), budgets are used to aid longer planning, co-ordinate the operation, control expenses, profitability, aid short-term planning, evaluate performance, motivate managers, motivate employees and communicate plans with employees. Organizations should have both recurrent and capital budgets in order to control and plan for both short term and long term cash flows.

Dunk (2009) defines budgetary control as the process of developing a spending plan and periodically comparing actual expenditures against that plan to determine if it or the spending patterns need adjustment to stay on track. The process of budgetary control is necessary in ensuring that spending is controlled to meet various financial goals. Firms should rely more on budgetary control in order for them to control intra-firm spending activities. This technique is applicable both for the private and public sector institutions as well as individuals who want to make sure they live within their means.

The process of budgetary control is a management control process in which the actual income and spending are controlled viz a viz the planned income and spending so that the firm can make decisions if plans are being followed and if those plans need to be changed in order to make a profit. Organizations according to Epstein and McFerlan (2011) should use budgetary control in projection in order to plan for the future.

Firms usually implement budgetary control techniques to prevent losses resulting from theft, fraud and technological malfunction. These techniques also help management to ensure that expenses remain within budgetary limits. The advantage of budgetary control is that it can be even implemented by three departments within the firm in order to enhance efficiency and effectiveness. Some of these departments within the firm entail: accounting department, statistical department and management department. Suberu (2009) adds further that the management departments make use of both accounting and statistical departments' services to estimate the expenditures and revenue of business under the normal conditions of business.

Mohamed *et al.* (2015) recommends that management in various organizations should put in place measures to solve the budgetary control system problems such as enhancing better understanding of budgetary control techniques, their behavior and institutional dynamics among the staff, developing strong financial integration with performance management, quarterly revision of financial plan to redirect resources at frequent intervals and better engagement between organizational leaders, managers and finance staff with proper timing of the financial plan.

Carr and Joseph (2000) ascertain that, budgetary controls help management teams in making future plans through implementation of short term plans and monitoring activities aimed at conforming to the plans. The authors further argue that effective implementation of budgetary control techniques is a guarantee for the effective implementation of budget in the firm. Effective management is crucial for managers in helping them perform major routine functions. Ineffective management and improperly conceived budgeting procedures, can however be frustrating to managers and they often result to very stringent outcomes such as downsizing, retrenchments, company buy-outs due to insolvency and possible business failure due to continued mismanagement and hence the need for a closure.

The effectiveness of resources is dependent on how enterprises use resources and not just on whether they are present in the first place. It is important to recognize however that the effects of spending on firm performance are difficult to isolate. If resources have a clear and consistent effect on firm performance, then policy-making and budgeting would likely be straightforward as well. Mwaura (2010) asserts that participation in the budgetary process affects the return on capital employed and return on assets as well. Gacheru (2012) also finds that, the process of budget preparation, control of budgeting process and implementation of budgets substantially influences possible budget variances.

It is extremely difficult in most education settings to link spending to outcomes. Micro and Small enterprises in many towns have limited ability, if any, to change their use of resources thereby resulting to difficulties in sustaining new strategies and the lack of appropriate accountability. Furthermore, many small and micro enterprises do make decisions that are based more on political considerations rather than on mutual participation of involved stakeholders as well as on organizational effectiveness.

The lack of proper budgeting in micro and small enterprises has been the cause of the reduced service delivery which has been demonstrated by increased low quality, customer dissatisfaction, low growth prospects and closure on some of the young and newly incorporated firms. While many local and international studies have concentrated on budgetary control techniques and how budgeting affects organizational performance both at the public and private sectors, the role of budgetary control in management of educational institutions has been neglected despite its importance thereby leaving this area of study grey. This study sought to fill this gap by surveying budgetary control practices in management of micro and small enterprises in Kangemi town in Kenya.

## **2. LITERATURE REVIEW**

### **2.1 Theoretical framework**

This section explains the theories that form the emphasis of this study, that try to explain the research question and articulate the already published arguments for verification and critique following the results that were realized from this research.

#### **2.1.1 The Theory of Budgeting**

Budgets are used by most firms and projects as future financial performance tools which enable in the evaluation of their financial viability. Organizations can prepare both long-term and short term budgets in different timeliness such as monthly, quarterly, semi annually, annually and over a wide range of years. Usually, short term budget cover a period of within a year while long term budgets cover more than three years, in some instances an organization can have a medium term budget which covers 1-3

years. Budgets have been defined by Silva and Jayamaha (2012) as a mere collection of plans and forecasts. Budgetary control enables an organization to compare between actual and expected outcomes as regards to budgeting.

Budgetary control techniques reflect financial implications of business plans as well as identifies the amount, quantity and timing of resource needed (Shields & Young, 1993). Budget and budgetary procedures' as well as the establishment of short to long-term objectives provide estimates of future sales revenues and expenses, to provide short and long-term firm goals. Sharma (2012) further details that the management benchmarks and task controls are computed by comparing between the actual results and the budgeted plans so as to take corrective actions where necessary. Budgets influence the behavior and decisions of employees by translating business objectives and providing targets against which performance can be assessed.

According to Scott (2005), budgeting and budgetary control processes allow for a subsequent comparison of actual results with the expected results. According to Selznick (2008), budgets play a number of roles which include coding, learning, making goals explicit, contracting with external parties as well as facilitating control.

### **2.1.2 Accounting Theory**

Accounting theory aims at the provision of a coherent set of logical principles that form the general frame of reference for evaluation and development of sound policy development and accounting practices (Kaplan & Norton, 1996). Otley and Pollanen (2000) exemplify further to explain that the main purpose in developing a theory of accounting is to establish standards for judging acceptability of accounting techniques. In the accounting practice, procedures that meet the given standards should be employed.

Based on the accounting theory, Horvath (2009) argues that the accounting methods that do not meet the set standards ought to be rejected. Accounting helps in explaining and guiding management actions into identifying and locating vital information for use in budget preparation. The accounting money measurement technique has contributed greatly in providing yardstick for quantifying, conversion and translating various inputs in relation to materials, and machines required in the preparation of budget (Horvath & Seiter, 2009).

Accounting principles are an impetus to the general philosophy of budget itself as a tool for effective management (Hornrgren, Forster & Dater, 1997). Budgets make use of several accounting concepts to a greater extent. It's under the accounting theory that financial standards can be set to guide a firm towards achieving its financial goals. Budgeting provides a feedback mechanism to the management of an organization on how well financial assets are managed as determined by the match between the plans and the actual status upon implementation of budgets. Financial statements are prepared by use of historical data which helps in forecasting of future financial plans. The matching concept in accounting as per Hopwood (1976) is used as a point of reference in budget analysis.

### **2.1.3 Budgetary Control Theory**

According to Robinson and Last (2009), budgeting is used by firms as a framework for spending and revenue allocation. Organizations should come up with effective budgeting systems in order to ensure that their firm's resources are not wasted. Budgeting systems help in ensuring that the outputs produced and services delivered achieve their set objectives.

Financial viability is determined by the level of income a firm is able to maintain in any given time (Robinson, 2009). The firm has to put clear controls that ensure that the budget is well maintained and allocated as required and strictly followed so that variances can be explained and mitigated as much as possible. Robin and Last (2009) assert that, if a firm has lesser income however, it might have to find a way to fund its estimated budget by borrowing and tax restructuring.

According to Sawhill and Williamson (2001), budgets can be used as indicators of measuring ruling governments' performances. Budgets are a statement of whether these governments are competent in administering their national goals through good resource use. It is therefore very crucial that an organization should understand its budgeting systems as well as giving priority to urgent matters that require attention to firm's control tools.

## **2.2 Determinants of Budgetary Control**

There are numerous determinants that influence the effective implementation of budgets among organizations. Those determinants, according to Srinivasan (2005), include: availability of financial resources, skilled human resource, and participation of both staff and other stakeholders in the budgeting process, effective planning, evaluation, staff motivation, monitoring and control of the budget process.

### **2.2.1 Adequate Availability of Financial Resources**

Despite the adequate availability of financial resources, firms are expected to allocate adequate financial resources and other structures efficiently so as to ensure effective implementation of projects and other activities within the firm such as adequate allocation of funds to facilitate effective budget implementation. An organization must ensure that it has adequate access to

financial resources in order to finance its projects and to carry out its activities. According to Dunk (2001), the management team should plan and come up with budgeted estimates before implementing organizational projects.

### **2.2.2 Competence of Human Resource**

Firms are expected to be well equipped with knowledgeable and skilled employees who are well conversant with budgetary control measures to effectively implement the budgetary control processes and allocation as well as having the relevant industry experience. According to Horngren (2002), in order to successfully execute firms' activities, firms must ensure that they have competent human resource with technical knowhow on efficient and effective means of budgetary control processes and procedures.

### **2.2.3 Participation of both Staff and other Stakeholders**

During budgetary formulation, all staff and other stakeholders responsible for achieving results should be consulted. Budgetary control systems prosper only when they compact a mutual understanding of superiors and subordinates. Firms should communicate budget decisional outcomes with all the relevant personnel. To ensure that the process of implementing the budget is successful, management and employees must work together to ensure that all stakeholders' interests are fully represented when making key decisions involving budgetary allocations in key projects. Budgets play an important part in the communication of objectives, targets and responsibilities throughout the organization. Full participation in budget and budgetary control process assures full co-operation and commitment for making budgets successful which makes budgets realistic and workable (Simiyu, 2002).

### **2.2.4 Proper Planning**

The budgetary period duration is usually one year. The plan should to be in line with the long term development strategy of the firm, although in the shorter term of a budget year, conditions may prevail which could filter this aim. It is important that feedback is made available to the managers responsible for budget operations through monthly budget reports. These reports have comparisons between the budget and the actual position and they draw differences which are known technically as variances. The management team ought to define these patterns of expenditure and revenue over the life of the project or the activity that the firm is undertaking.

A predetermined budget of possible costs that was incurred carrying out the activities planned in a project should be made. A realistic planning of finances is vital to the implementation of a project or programme (Joshi & Abdulla, 1996). The budget plans must be properly coordinated in order to remove all possible bottlenecks. Individual budgets should be coordinated with one another to ensure that the implementation process is conducted properly in order to save time and costs (Horngren, Forster & Dater, 1997). Thus, before formulating the budgets, the policy to be pursued during the forthcoming trading period should be established (Dunk *et al.*, 2001).

### **2.2.5 Evaluation**

Simiyu (2002) states evaluation as the process of developing a plan in cooperation with an evaluation workgroup of stakeholders who foster common objective for effective budgetary control. Hancock (2009) says to enhance effectiveness and transparency the management requires to be involved in both monitoring and evaluation.

### **2.2.6 Monitoring and Control of Budget Process**

Once the budgets have been implemented they need to be monitored and controlled to ensure effectiveness in aligning budgets over a given period of time (Horngren *et al.*, 1997). An open and professional approach to budget planning boost investors, development financial partners and national or international donors to make financial resources available (Otley & Van der Stede, 2003). This is achieved through ensuring that the estimated budget does not deviate from the actual outcome in order to make necessary adjustment from any variance noted.

### **2.2.7 Staff Motivation**

Challenging but realistic targets in budgeting can play a significant part in motivating management. Hansen *et al.* (2003) In addition says that targets must be measurable and easier to achieve, while managers should be involved in setting own budgets. The budget acts as parameter for top management to measure performance of their teams. It should be noted, that adherence to the budget alone may not measure all aspects of management's performance. Hansen *et al.* (2003) asserts, for an effective budget implementation, the budget plan should be more clear and accurate, the financial resources readily available and sufficient, while actively involved staff in the budget making should be motivated to facilitate successful implementation of the budget process.

## **2.3 Empirical Studies**

In Kenya, most of the public and privately owned firms have shifted focus to budgetary control as a way of enhancing effectiveness in their services. The recognition of budgetary control role has gained attention which has led some firms to establish departments for effective implementation. This has placed the budget monitoring and project implementation committees as an integral part of the administrations to most private organizations in Africa (NGO's, 2013). This section reviews the empirical studies which have been advanced on budgetary control practices and how that affects the management of schools both globally and locally:

Badu (2011) researched on budgeting practices in Ernest Chemist, a pharmaceutical company based in Ghana with an aim of identifying the perception of budgeting experts in the Ernest Chemist. Self-designed interview questionnaires were sent to members of staff in the companies to seek their views on the problems and concerns regarding budgeting and budgetary control in the firms. The results of the study indicated that appropriate systems of budgeting and budgetary control had been adopted and used to prepare the pharmacy's budgets but there were a few problems associated with ethical issues which were also revealed.

In their study, Nickson and Mears (2012) examined the relationship between budgetary control and performance of state ministries in Boston Massachusetts. A sample of 5 ministries was examined to test the relationship between budgetary control and performance of state ministries, secondary data was used and a review of 10 years was used. A regression model was used for data analysis. The study found a statistical positive relationship between budgetary control and performance of state ministries. The results of the regression analysis concluded that proper budgetary control measures led to increased performance of state ministries.

Kabiru et al. (2013)'s study sought to determine the relevance of variance analysis in managerial cost control within the context of Nigeria. The study intended to review and analyze literature to find out what constitutes efficient standard in a manufacturing organization with a view to disclosing realistic variance for management cost control and based on the review and analysis to assess the extent to which costs variance analysis can adequately be useful in controlling costs to provide for improved profit. The study recommended that the realistic standards should be put in place through participation of the operators and top management with a view to achieving optimal results. The study also recommended that the variances falling within the pre-defined boundary should be investigated and the report be adequately and properly implemented at once to guide against future variance.

Aruomoaghe and Agbo (2013) investigated on the application of a variance analysis as a tool for performance evaluation with a particular focus on the cost and benefit associated with its utilization as a performance evaluation tool. The objectives of the study were to ensure that the departmental managers don't deviate from the budgeted standards put in place in the organization as whole, to ensure that the objectives of the organization are achieved through the budgetary techniques. The researchers employed both financial and non-financial measures and found that the use of variance analysis for performance evaluation has its cost and benefits to the organization as a whole. The study established that it was reasonable for managers to exercise caution in the use of variance analysis so that the correct decisions will be made. The study recommended for managers to exercise considerable care in their use of a standard cost system and it was particularly important that managers go out of their way to focus on the positive, rather than just on the negative, and to be aware of possible unintended consequences of the choices they make on their organizational objectives.

Ekanem (2014) sought to investigate the application of zero-based budgeting (ZBB) as a management tool for effective university budget implementation in University of Calabar, Nigeria, to determine the level of effectiveness in the application of ZBB for university budget implementation, to find out the factors which inhibit effective ZBB application for university budget implementation and to ascertain the difference between academic and non-academic staff in the application of ZBB for university budget implementation. Using a stratified random sampling technique, 250 members of senior staff was drawn from the staff population. Data was analyzed using mean and independent t-test statistics. Results revealed that the application of Zero Based Budgeting for university budget implementation was effective; some factors inhibited the application of Zero Based Budgeting while the application of Zero Based Budgeting was dependent on university senior staff for university budget implementation. The researcher concluded that zero-based budgeting was credible and rewarding to the university budget implementation in University of Calabar.

Nawaiseh et al. (2014) carried out an empirical assessment of measuring the extent of implementing responsibility accounting rudiments in Jordanian Industrial Companies listed at Amman Stock Exchange. The objectives of the study were to identify the extent the Jordanian Industrial Companies fully implement responsibility accounting, to disclose the obstacles that may abstain of full implementation of responsibility accounting rudiments. The study established that there was an available background for the implementation of responsibility accounting with percentage of 69.40%. The percentage of the obstacles that might deter this applicability was found to be 74.80%, which was a very high percentage. The study recommended the necessity for public shareholding companies to give generally more interest to managerial accounting, specifically for responsibility accounting by recruiting professionals in accounting departments.

Mohamed *et al.* (2015) examined how budgetary control can impact on the performance of Dara-salaam Bank in Somaliland. The study objectives were: to determine how responsibility accounting influences organizational performance, to investigate whether variance cost analysis affects organizational performance and to establish how zero based budgeting affects organizational performance. The study used both descriptive and retrospective research designs. A census study of the 70 staff of Dara-salaam Bank in Hargeisa Somaliland was done. Data was analyzed by SPSS version v and presented in form of frequency tables and charts. The study findings revealed that responsibility accounting, variance analysis and zero based budgeting enhanced budget control and improved efficiency and productively. The study recommended for accounting staff needs to acquire relevant training in accounting skills so as to enhance process business decisions and improve efficiency and productivity of the accounting profession.

Deal et al. (2015) analyzed the relationship between teacher experience and its effect on marginalized categories of the school budget and on student-teacher ratios at the district level. Panel data analysis was done covering the years 2000-2014 across approximately 200 Oregon public school districts was used. The study used logarithmic variations of the Ordinary Least Squares empirical models. They study established that an increase in teacher experience resulted to a decrease in the percentage of the budget allocated to athletics, the arts, physical education, and extracurricular activities. Thus a positive relationship between years of teacher experience and student-teacher ratios, an effect that was statistically significant at the one-percent level.

Mwaura (2010) investigated into the effect of participatory budget setting on budget commitment as a factor that affects performance of the NSE listed companies. This study used a causal research design to identify cause-effect relationship. The population of interest comprised of 55 listed companies listed. Data was both quantitative and qualitative hence both descriptive and content analysis techniques were employed. The descriptive statistical tools helped the researcher to describe the data and determine the extent used. The study found that budgetary participation affects return on capital employed and return on assets to a great extent. It was further established that budgetary participation affects return on investment and budget commitment to moderate extents.

Meliano (2011) researched on management perception and the usefulness of zero based budgeting with evidence from the non-governmental organizations in Kenya. The objective was to establish the managerial perception on the usefulness of Zero Based Budgeting among nongovernmental organizations in Kenya. This study adopted a descriptive survey design. The population of the study constituted of all Non-governmental Organizations (NGOs). A sample of 300 Non-Governmental Organizations (NGOs) was drawn for this study. Data was collected using questionnaires while the analysis was done by generating descriptive statistics. The study findings revealed that the zero based budgeting technique is a very useful technique in Kenyan NGOs given that its flexible, communicated corporate goals, minimized cost and encouraged knowledge sharing. Further, it was established that bases of budgeting we the most vital factors affecting managements' perception and effectiveness of Zero Based Budgeting in NGOs followed by organization structure. The researcher therefore recommended for a further study on other stakeholders' perceptions on the usefulness of zero based budgeting.

Karanja (2011) examined the effect of budgetary control process in Saccos with specific reference to SACCOs in Nyeri County. This study used descriptive research design to generalize the findings to a larger population. The population of this study was the 120 finance officers of Nyeri County SACCOs. Stratified random sampling technique was used where a stratum of 30% was selected using simple random sampling method. Primary data was collected by use of questionnaires. The study established that the finance and administration departments participated in budgetary control processes. The study further established that budgetary control processes were not intimately linked with considerations of labor controls.

**3. RESEARCH METHODOLOGY**

A descriptive survey design was adopted to capture the categorical description of attitudes of the study population. According to Sekeran (2003), descriptive studies often result in formulation of principles of knowledge and solution to significant problems. Sekeran (2003) further details that the descriptive studies are designed to obtain current phenomenon and whenever possible to draw varied conclusions from facts that are discussed. Sekeran (2003) asserts that a descriptive research design is easy to understand as it attempts to collect data from population members and describes existing phenomenon with reference to budgeting controls.

Lumley (2004) defines a population as a larger collection of all subjects from where a sample is drawn. Sekeran (2003) define target population as the population in which the researcher wants to generalize the study results. The population of the study consisted of 160 micro and small enterprises registered with Kangemi Township in

Since the population of the study was 160 micro and small enterprises which were less than 10,000, Kothari (2004)'s formula was used in order to draw the required sample size from the targeted school population:

$$n = \frac{Z^2 * p * q + ME^2}{ME^2 + \frac{Z^2 * p * q}{N}}$$

- Where:** n = desired sample size  
 z = standard normal variable at the required confidence level.  
 P = estimated characteristic of target population  
 q = 1- p  
 ME = level of statistical significance sets/margin of error  
 N = total target population

**Given that:**

N = 160, z = 1.96/95%, p = 0.9, q = 0.1, ME = 0.05/5%

$$n = \frac{((1.96)^2 (0.9) (0.1) + (0.05)^2)}{(0.05)^2 + \frac{(1.96)^2 (0.9) (0.1)}{160}} = \frac{0.345744 + 0.0025}{0.0025 + \frac{0.345744}{160}} = \frac{0.348244}{0.0046609} = 74.716$$

**n= 74.716**

Therefore, the sample size constituted 75 micro and small enterprises in Kangemi town. The respondents were picked by simple random sampling technique, one respondent per registered institution. Sekeran (2003) argues that the advantage of sampling is that it saves time and resources.

Both primary and secondary data techniques were used. Primary data was collected by use of semi-structured questionnaires. The questionnaires consisted of both closed and open questions. The structured questionnaires were administered through a drop and pick later method at an agreed time with the researcher. To achieve the objective of the study, the dependent variable was measured using performance indicators from the recent annual reports. Secondary data sources were used to supplement the data received from questionnaires.

The independent variables consisted of budgetary control which involves planning, monitoring, control and evaluation. These variables were used in measuring the extent of budget control. The data on the budget control was obtained using structured questionnaires by use of a likert scale.

The participants were briefed early in advance by the researcher on the need and importance of the study and permission was sought for their participation in order to have their full support. Guidance on how to answer the questionnaire was made available from the researcher. This was done to ensure high completion rates and accuracy of the information provided. Sekeran (2003) contends that for the purpose of ascertaining content validity of a measure, a professional expert in a particular field should be used.

Data was analysed to establish the measures of central tendency that include the mean, mode, and median highlighting the key findings. Inferential statistics was used to establish the relationship between the variables of the study and qualitatively by content analysis. Analysis of variance (ANOVA) was used to determine the significance relationship of the variables. The study used regression analysis to determine the extent to which budgetary control affects management of micro and small enterprises at Kangemi town in Kenya.

The study adopted a linear regression model to test the relationship between the variables in budgetary control as the independent variables and management of micro and small enterprises as the dependent variable. The empirical model was thus:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$$

Where:

Y = management of small and micro enterprises in Kangemi

$\beta_0$  = Intercept

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$  = coefficients

X1 = Planning, this was evaluated by use of a questionnaire by defining the patterns of expenditure and revenue for a project or an activity.

X2 = Monitoring and Control was evaluated using a questionnaire by reviewing reports are prepared frequently and taking appropriate actions where necessary.

X3 = Evaluation was evaluated using a questionnaire by determining the comparisons between the budget allocated and the actual position from budget reports

X4 = Adequate availability of financial resources was determined using the questionnaire by determining the amount of financial resources committed to a particular project or activity.

X5 = Cost Reduction was evaluated using the percentage of cost reduction in projects.

X6 = Performance was evaluated using a questionnaire by determining the time spend in a certain project and the budgetary costs allocation for the project.

$\varepsilon$  = error term

All the variables in the present study were measured by interval and ratio scales. The study used management of micro and small enterprises in Kangemi town. Independent variables that were used to measure budgetary control of micro and small enterprises in Kangemi town included planning, monitoring, control and evaluation. To achieve the objective of this study, the independent variables were measured using the frequency at which budgetary control is implemented in order to achieve effectiveness of Kangemi Township. Mean and Standard Deviation within a range of five points was used to measure all the independent variables.

Whereby Y is the dependent variable management of micro and small enterprises in Kangemi town,  $\beta_0$  is the regression constant or Y intercepts  $\beta_1, \dots, \beta_6$  are the coefficients of the regression model. The basis of the model is to help in determining whether micro and small enterprises in Kangemi town adhere to proper budgetary control measures in order to achieve effectiveness and efficiency in their procedures. This was measured using the three key independent variables that are planning, monitoring and control and evaluation. Information will be obtained by the use of structured questionnaires. The test of significance was the ANOVA test.

#### 4. SUMMARY OF FINDINGS, RECOMMENDATIONS AND AREAS FOR FURTHER RESEARCH

#### 4.1 Summary of Findings

The study sought to find out how evaluation of budgetary control practices affects management of Kangemi Township Micro and Small enterprises. It was revealed that the firms engage their stakeholders in making key budget decisions and the management of the organizations review of the budget as the respondents strongly agreed at 28% and 24% respectively.

On the other hand, the respondents agreed that the firms review the process of budget allocation at 61% and the study respondents (57.3%) acknowledged also that lack of budget review is the leading factor that affect the budgetary control practices in management of Kangemi Township Micro and Small enterprises; followed by the firm not engaging its stakeholders in making key budget decisions while the firms put priorities for the coming annual budget conference and committees constitute the least percentage. This implies that budget allocation review is mandatory for budgetary control practices in management of Kangemi Township Micro and Small enterprises. It therefore calls that the budget review committee should be competent. Whereas budget preparation is an important activity, it is necessary to involve all stakeholders to make it more acceptable and realizable. Failure to involve stakeholders will lead to deficiencies in the budget where some areas will not be catered for.

The management of Kangemi Township Micro and Small enterprises is positively related to budgetary control practices. These budgetary control practices influences management in the following order: Cost reduction measures, Monitoring and control of budgets, evaluation of budgetary process, performance of budgetary process, planning for budgetary allocations and availability of financial resources. The researcher established that all these factors are positively related to the management of Kangemi Township Micro and small enterprises and they can be used to determine the level of management of a certain enterprise.

In establishing the time period covered by budgets, the study found that majority (65.15%) of Kangemi Township Micro and Small enterprises review budget after 1 to 5 years. This figure was evidenced by the fact that budget review increases the level of understanding and evaluating major projects to be given priority, also increase reliability and accountability as it makes the owners more knowledgeable on various policies and current trends in management and that it gives one the capacity to handle financial aspects.

On the approximate annual budget revenue, none of the Kangemi Township Micro and Small enterprises' budget holders' disagreed that budgets have clear goals and objectives and when budgeting, outcomes, goals and objectives are linked to programs and firm activities. This means firms should plan for budgetary practices in order to control practices in management of micro and small enterprises. This was examined by the extent to which budget control members of the micro and small enterprises agreed on that the firms should have long term and short term budget plans, the budgets have clear goals and objectives, when budgeting, outcomes, goals and objectives are linked to programs and school activities, the enterprises put priorities for the coming annual budget conference and committees and that educational departments prepare budget plans prior to the budget year.

On the Impact of evaluation on budgetary control practices in management of Kangemi Township Micro and Small enterprises, the study found that the firms engages their stakeholders in making key budget decisions and the management of the organization review the budget as the respondents strongly agreed at 44% respectively. On the other hand, the respondents agreed that the firms review the process of budget allocation at 61% and that the firm management should review the budget at 57.3%. These were the leading factors that affect the budgetary control practices in management of Kangemi Township Micro and Small enterprises.

In establishing the influence of monitoring and control on budgetary control practices in management of Kangemi Township Micro and Small enterprises, the study found that the program efficiency as a percentage of program expenses divided by total expenses in the past year was recorded as 0-5% (16%) for most firms. It was also evidence from the study that less than half (48%) of the firms execute their projects within the stipulated deadline and the estimated percentage of costs reduction by the firm is majorly 0-3% (25.3%).

#### 4.2 Recommendations

In light of the findings of this study, the following recommendations to improve and ensure effective budget control and monitoring are suggested: there is need to review and harmonize existing policies on strategic planning in schools. Policies should work towards strengthening of local participation in service delivery. To better control budget of the Kangemi Township Micro and Small enterprises, there is need for a comprehensive in-service training for all relevant firm participants. The training should isolate components of financial management, and in this case budget management, monitoring and control would facilitate correct procedures and would eliminate most of the challenges found in this study. For instance, training in the budgeting process would result in realistic budgets that can be implemented properly.

There is need to actively involve all stakeholders in strategic planning as successful level change will only occur if supported by all stakeholders. Firm management should seek collaboration with other stakeholders such as NGO, civil society, government and other development agencies that are good at resource mobilization. Both internal and external evaluations should be done regularly to ensure firm finances are properly spent towards the achievement of the firm specific objectives. The government should put in place relevant legislation compelling preparation of budgets so as to ensure all firms despite their firm size adhere to preparation of budgets which in the long run is good for their survival.

### 4.3 Areas for Further Studies

A study is recommended to evaluate the adoption of technology use and advanced accounting systems in the management of finances in micro and small enterprises. Further studies are also encouraged on the effect of involvement of internal and external controls on the effective management of micro and small enterprises not only in Kangemi Township but also in the rest of Kenya.

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**REFERENCE TABLES AND CHARTS**

**Table 4.1: Classification of Variables**

Dependent variable Y is a measure of management of Kangemi Township Micro and Small Enterprises	Represented by answers to question 11, 16, 20, 21 and 26
X1 measured by Planning activities and expenditures	Represented by question 1, 4, 5 and 24 in the questionnaire
X2 Measured by activities and expenditures undertaken in monitoring and control	Represented by questions 2, 9, 10, 13, 14, 21, and 22.
X3 measured by the set of activities undertaken in evaluation of budget process and activities	Represented by question 6, 10 and 12 of the questionnaire.
X4 measured by availability of financial resources	The variable was answered by question 3 of the questionnaire.
X5 measured by activities undertaken to curb costs for budgetary process	The variable was represented by question 15, 18 and 25.
X6 Measured by performance evaluation activities determined by time spent and allocation on budgetary tools and process	The variable was represented by question 7, 8, 17, 19 and 23.

**Table 4.2: Descriptive Statistics Table**

	Y	X1	X2	X3	X4	X5	X6
Mean	8.603448276	9.267241	16.28448	6.568966	1.517241	5.560345	11.67241
Standard Error	0.664463047	0.535313	1.159525	0.357659	0.259304	0.488133	0.660718
Median	6	10	17	7	1	6	11
Mode	8	10	36	7	1	2	9
Standard Deviation	7.156486034	5.765501	12.48847	3.852101	2.792794	5.257357	7.116149
Sample Variance	51.21529235	33.241	155.9618	14.83868	7.7997	27.63981	50.63958
Kurtosis	-0.984312562	-0.56913	0.155924	0.871504	0.829398	0.186286	18.89026
Skewness	0.40735613	-0.32576	-0.50189	-0.59165	-0.84485	-0.21706	2.938246
Range	25	21	53	20	10	25	62
Minimum	-4	-3	-17	-5	-5	-10	-1
Maximum	21	18	36	15	5	15	61
Sum	998	1075	1889	762	176	645	1354
Count	116	116	116	116	116	116	116
Largest(1)	21	18	36	15	5	15	61
Smallest(1)	-4	-3	-17	-5	-5	-10	-1
Confidence Level(95.0%)	1.316173371	1.060353	2.296796	0.708453	0.513632	0.966898	1.308755

**Table 4.3: How often is the budget reviewed?**

		Total	
		1-5 years	Percentage
How often is the budget reviewed?	Annually	89	67.47
	Monthly	3	2.27
	None	5	3.78
	Quarterly	35	26.43
Total		132	138

**Table 4.4: Budget Planning and Budgetary Control Practices**

Responses	Strongly agree		Agree		Disagree		Strongly Disagree		Not sure	
	f	%	F	%	F	%	F	%	f	%
The firm has a long term and short term budget plans	19	13.77	81	58.69	10	7.25	2	1.45	20	14.49
The budgets have clear goals and objectives	33	23.9	58	42.03	5	3.6	3	2.17	39	28.26
When budgeting, outcomes, goals and objectives are linked to programs and school activities	26	18.84	67	48.55	9	6.5	34	24.63	2	1.45
The firm put priorities for the coming annual budget conference and Committees	16	11.6	68	49.3	41	29.7	8	5.8	5	3.6
Firm departments prepare budget plans prior to the budget year	21	15.2	62	44.9	8	5.70	39	28.3	8	5.8

**Table 4.5: Impact of Evaluation on Budgetary Control Practices**

Response	Strongly agree		Agree		Disagree		Strongly Disagree		Not sure	
	F	%	F	%	F	%	f	%	f	%
The management of the organization review the budget	18	24.0	25	33.3	0	0	1	1.3	31	41.3
The firm review the process of budget allocation	13	17.3	33	44.0	5	6.7	0	0	22	32.0
The firm puts priorities for the coming annual budget conference and Committees	8	10.7	27	36.0	5	6.7	3	4.0	32	42.7
The firm engages its stakeholders in making key budget decisions	21	28.0	18	24.0	8	10.7	5	6.7	23	30.7
The management of the organization review the budget	11	14.7	22	29.3	9	12.0	3	4.0	30	40.0

**Table 4.6: Monitoring and Control Impact on Budgetary Control Practices**

Response	Strongly agree		Agree		Disagree		Strongly disagree		Not sure	
	F	%	F	%	F	%	f	%	f	%
There exist a budgeting committee that holds budget conferences and meetings to review performance	29	17.3	36	26.7	15	10.7	24	17.3	29	21.3
The firm has budget policies that monitors budget spending	17	12.0	48	34.7	18	13.3	17	12.0	38	28.0
Control of the budget activities is done by the departmental heads	31	22.7	46	33.3	15	10.7	9	6.7	36	26.7
The firm puts priorities for the coming annual budget Committees	17	12.0	50	36.0	11	8.0	0	0	60	44
The costs of activities and functions of the firm are constantly reviewed by the budgeting committee	25	18.7	39	28.0	18	13.3	15	10.7	54	39.3
The firm's budget performance evaluation reports are prepared	11	8.0	71	52	17	12.0	4	2.7	35	25.3
The firm's budget deviations are reported to budget committees	18	13.3	50	36.0	22	16.0	9	6.7	37	28
Firm owners always take timely corrective actions when adverse variances are reported	17	12.0	42	30.7	15	10.7	9	6.7	55	40
There is a regular follow up on budget plans by the budget committee and departmental heads	11	14.7	20	26.7	11	14.7	3	4.0	30	40

**Table 4.7: Regression Summary**

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.874992974
R Square	0.765612704
Adjusted R Square	0.752710651
Standard Error	3.558791412
Observations	116

**Table 4.8: ANOVA TABLE**

ANOVA	Df	SS	MS	F	Significance F
Regression	6	4509.274023	751.5457	59.34038	4.26115E-32
Residual	109	1380.484598	12.665		
Total	115	5889.758621			

**Table 4.9: Regression Matrix**

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.494184621	0.793014605	0.623172	0.534473	-1.077544497	2.065914	-1.07754	2.065914
X1	-0.2675339	0.098534436	-2.71513	0.007705	-0.46282594	-0.07224	-0.46283	-0.07224
X2	0.218041617	0.062358271	3.496595	0.000683	0.094449555	0.341634	0.09445	0.341634
X3	0.207100478	0.16533018	1.252648	0.213015	-0.120578554	0.53478	-0.12058	0.53478
X4	0.107518463	0.152513602	0.704976	0.482329	-0.194758528	0.409795	-0.19476	0.409795
X5	0.637119952	0.110856878	5.74723	8.35E-08	0.41740523	0.856835	0.417405	0.856835

X6	0.168919295	0.05728991	2.9485	0.003907	0.055372558	0.282466	0.055373	0.282466
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**Table 4.10 Correlation Matrix**

	<i>Y</i>	<i>X1</i>	<i>X2</i>	<i>X3</i>	<i>X4</i>	<i>X5</i>	<i>X6</i>
<i>Y</i>	1						
<i>X1</i>	0.554963555	1					
<i>X2</i>	0.788394544	0.783934235	1				
<i>X3</i>	0.720814742	0.716645624	0.81706255	1			
<i>X4</i>	0.475011063	0.542181798	0.50535085	0.589937979	1		
<i>X5</i>	0.828970511	0.613526204	0.80385742	0.720499106	0.49770393	1	
<i>X6</i>	0.577289416	0.490682022	0.52590957	0.541372852	0.350756523	0.5125733	1

# Objective Assessment of Lower Urinary Tract Symptoms (LUTS) in Patients with Inguinal Hernia (IH)

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**Abstract-** If the LUTS are not treated before the hernial repair, there is a high recurrence rate. Patients with IH are questioned about LUTS and Benign prostatic hyperplasia BOO which does not include evaluation with IPSS. The objective of the study was to assess the LUTS with IPSS and urine flow rate in male patients with IH with who does not complain of LUTS. The patients were assessed by IPSS and uroflowmetry. The most severe symptom of LUTS among Hernia patients was weak stream. Out of the sample 35% of them had mild LUTS, 50.83% of them had moderate LUTS and 14.16% of them had severe LUTS. Most of the patients did complain of a weak stream, but only very few complained of straining. Majority of patients had moderate LUTS. Assessing the LUTS with IPSS and urine flow rate help to identify patients with BOO in asymptomatic patients with IH.

**Index Terms-** LUTS, Inguinal Hernia, uroflowmetry, Benign prostatic hyperplasia, weak stream

## I. INTRODUCTION

Benign prostatic hyperplasia (BPH) is macroscopically characterized by an enlargement of the prostate gland. It results in bladder outlet obstruction (BOO) and leads to the complications including Inguinal Hernia (IH) and Lower urinary Tract Symptoms (LUTS).<sup>(1)</sup>

Lower urinary tract symptoms (LUTS) are prevalent among aging men. Multiple etiological factors have been described with the genesis of urinary symptoms, including the effect of aging on the nervous system and bladder, metabolic changes, changes in fluid regulations obstruction and autonomic over activity.<sup>(1)</sup>

The incidence of inguinal hernias (IH) also increases with age. A variety of factors are responsible for development of Inguinal hernia such as obesity, cough, constipation, benign prostatic hypertrophy, pregnancy and heavy lifting.(Rodolfo) Including obesity and work related physical activity are contributory to development of IH. It is not uncommon for urologists to face patients presenting with LUTS associated to IH.<sup>(2)</sup>

A significant number of elderly men with symptoms of BPH have inguinal hernia at the same time. Simultaneous pre peritoneal inguinal hernia repair with other pelvic surgeries has been described, but it was not popular among urologists and general surgeons mainly because of high rate of infections and recurrence.<sup>(3)</sup>

Traditionally, the diagnostic evaluation of patients with lower urinary tract symptoms (LUTS) suggestive of bladder

outlet obstruction (BOO) includes symptomatic evaluation. IPSS symptom scoring system has proved to be a useful tool to quantify clinical symptoms.<sup>(1)</sup>

LUTS was quantified using the 7 questions of International Prostate Symptom Score (IPSS) and the patients were classified as having mild, moderate and severe symptoms. The role of IPSS as a clinical tool in the evaluation of patients with Inguinal Hernia and BPH.<sup>(2)</sup>

The Teaching Hospital Peradeniya was the second largest Teaching Hospital in Sri Lanka which consists of professorial units of University of Peradeniya and it is a tertiary referral center with many surgical specialties. The objectives of this study were to assess the LUTS with IPSS and urine flow rate in male patients with Inguinal Hernias (IH) who are asymptomatic regarding LUTS, to evaluate the IPSS and the flow rate in Patients having Inguinal Hernia (IH) without LUTS and to evaluate the intensity of LUTS using the above parameters.

## II. PATIENTS AND METHOD

A prospective study was undertaken in order to verify the correlation between the presence of IH and the intensity of LUTS assessed with IPSS and uroflowmetry in asymptomatic male patients. The study was carried out in the surgical wards at Teaching Hospital Peradeniya. The study population included all male patients booked for IH repair at Teaching Hospital Peradeniya who did not complain about LUTS and other precipitating factors for the development of IH. Patients with urinary tract infections, recent History of Abdominal Surgery (< 1 Year,) pervious therapy for voiding Dysfunction (during last 3 months) were excluded from the study.

The total sample of subjects who match the inclusion and exclusion criteria within the study period were selected. There were 120 male patients during a ten month period. The mean age was 65.69±13.01. The patients were assessed by IPSS and uroflowmetry. Before the uroflowmetry was done, they were reloaded with the same quantity of oral fluids.

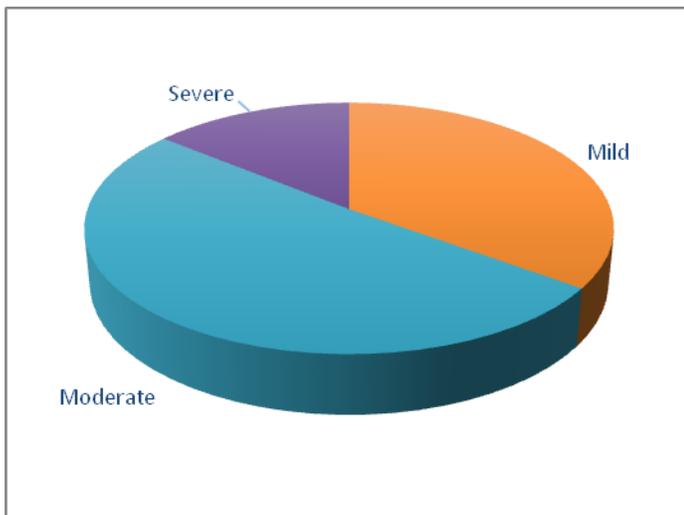
Data collection and analysis was conducted by an interviewer according to IPSS questionnaire. LUTS was quantified using 7 questions of IPSS and the patients were classified as having mild, moderate and severe symptoms.

The informed written consent was obtained from all subjects. The privacy and confidentially was assured throughout the research. The ethical clearance was obtained from the ethical review committee of Faculty of Medicine, University of Peradeniya.

The collected data was categorized and entered in to MS Excel software. Then statistical significance was obtained by SPSS software.

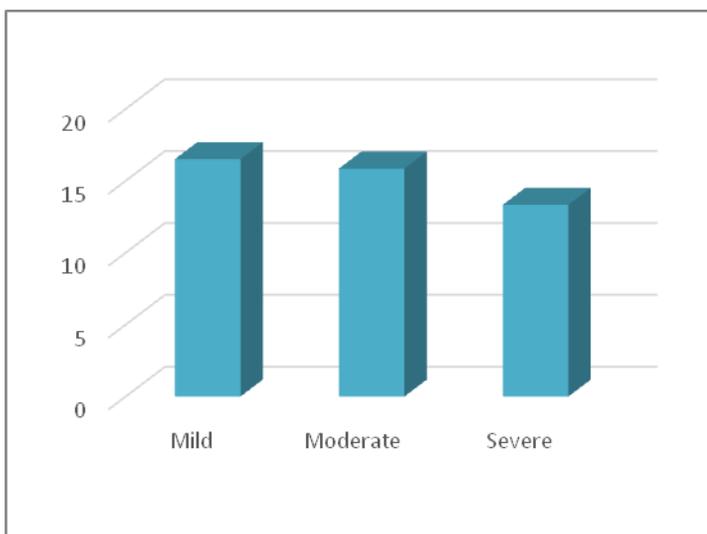
### III. RESULTS

The most severe symptom of LUTS among Hernia patients was weak stream ( $2.75 \pm 2.63$ ) and the average values for other symptoms were; intermittency  $2.59 \pm 1.93$ , urgency  $2.56 \pm 2.06$ , frequency  $2.49 \pm 1.68$ , nocturia  $2.10 \pm 1.48$ , incomplete emptying  $2.19 \pm 1.90$  and straining  $0.96 \pm 1.37$ . Out of the sample 35% of them had mild LUTS, 50.83% of them had moderate LUTS and 14.16% of them had severe LUTS.



**Figure 1: Severity of LUTS**

The mean maximum flow rates for mild, moderate and severe LUTS were  $16.51 \pm 14.86$ ,  $15.85 \pm 8.49$  and  $13.33 \pm 4.9$  respectively.



**Figure 2: Distribution of maximum flow rate among LUTS groups**

### IV. DISCUSSION

Straining at micturition is one of the causes for development of IH. Most of the patients complained of a weak stream, but only very few complained of straining. It is a possibility that our patients do strain to pass urine but they do not appreciate that. Another possibility is that when they have a weak stream they eventually do strain to pass urine even though they do not realize it. Therefore if we do not assess the LUTS objectively patients will continue to strain and there will be a high recurrence rate of hernia.

### V. CONCLUSION

The most severe symptom of LUTS among Hernia patients was weak stream. Majority of patients had moderate LUTS. Assessing the LUTS with IPSS and urine flow rate helps to identify patients with BOO in asymptomatic patients with IH.

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# Factors Affecting Effectiveness of the Existing Performance Appraisal System for Academic Staff of General Sir John Kotelawala Defence University

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**Abstract-** Performance appraisal systems (PAS) are required to be effective in order to improve and sustain the employee performance of an organization. Academic staff is considered as the most important stakeholders of a university. Their general objective is to generate knowledge and skills and disseminate them. They hold a very important place in modern society as they directly influence the personal development of the present and successive generations. Evaluation and improvement of PAS for academic staff is a must because success of a university depends on its academia. The main objective of this study is to identify the factors affecting the effectiveness of the existing performance appraisal system for academic staff of General Sir John Kotelawala Defence University (KDU). The main factors used in the study were factors related to users, factors related to the system and factors related to perceived fairness. The study was conducted using quantitative methodology and was conducted at the KDU. The research approach was deductive. The population was entire academic staff in 2016 at KDU which was 166. The sample size was 118. Stratified random sampling was used to choose the sample. Data was collected using a structured questionnaire. The reliability was checked using Chronbach's alpha. Data were analyzed using statistical methods of correlation and regressions with SPSS. Factors related to users ; such as raters' training was significantly affected the effectiveness on the PAS. However rator's motivation did not. Factors related to perceived fairness; distributive justice, procedural justice and performance feed back were significantly affecting the effectiveness of PAS. Further, all factors related to system such as employee participation, instrument validity, goal setting and rating technique were significantly affecting the effectiveness of PAS. Among all the factors, procedural justice is most significant positively related factor for the effectiveness of PAS. Hence, the finding recommends focusing mainly on procedural justice for the improvement of the effectiveness of the existing performance appraisal system for academic staff of KDU.

**Index Terms-** Performance appraisal systems, Academic staff, effectiveness

## I. INTRODUCTION

General Sir John Kotelawala Defence University (KDU) was established in 1981. It is a state university directly governed by the Ministry of Defence. It is engaged in offering both undergraduate and postgraduate degrees to cadet officers and

civil students on a payment basis. The KDU is also involved in Research and Development activities as well. The work force consists of civilian and military staff.

There are four categories of civilian staff, namely, Academic, Academic support, Administrative and Non Academic staff. Academic staff is directly involved in teaching and research activities. The total number of civilian staff is 905. Among them 166 is academic staff.

Being the only defence university in Sri Lanka, it has a unique nature in administration and other work norms compared to other state universities. It adopts circulars and regulations of the University Grants Commission in relations to recruitment and compensation of civilian staff.

The university aims to be the best defence university in South East Asia. Therefore, it concerns on quality of the degree programmes. There is a high demand for academic positions at KDU. However, only the qualified staff is recruited on permanent basis. Further, it attracts qualified academia from state universities in order to develop the KDU in par with other state universities.

The performance evaluation of academic staff at KDU is carried out by means of a format called "Annual Increment Form" which is completed by the raters only. This evaluation is carried out for the sole purpose of granting the annual increment. However, it does not actually taking in to consideration of an individual staff member's performance progress during the period being evaluated. This format is distributed to the raters by the University administration in a confidential cover.

The components of the annual increment form are listed below;

Section I –General information (name, division, date of birth, age, personal file number, designation, grade, date of appointment, salary scale, date of increment, increment rate, etc)  
Section II- E Bar and language proficiency requirement, details of last increment.

Section III- Leave particulars during the incremental year

Section IV – Report of the Head of the Department based on following criteria

a) Punctuality and attendance ,b) Work, c) Conduct, d) Application to work and industriousness, e) Output and quality of work, f) Reliability without supervision, g) Relationship with colleagues, h) Dealing with staff and public, i)Willingness to accept responsibility, j) Commendations/punishments in the incremental year

Section V– Recommendation and approval of the increment

The above criteria mentioned in section IV, is common to all academic, academic support, administrative, clerical and minor grade employees. There is no demarcation between the criteria of academia and that of other staff. In addition, specific criteria such as number of lectures conducted, number of practical classes conducted, extra activities and research components are not included. Hence, the rating has become more vague and problematic. Further there is no measurement scale for the criteria. Hence rating errors like halo effect, contrast errors, recency bias, leniency bias, severity bias, self-serving bias is evident in many occasions. As a result both poor performers and high performers are rewarded in a similar manner. There is no effective link between the reward and the appraisal. Therefore, the existing PAS has unclear performance criteria and the format is identified as an ineffective rating instrument.

According to Opatha (2004) appraisal should focus on administration and development of the employee concerned. However, such achievements are not made in this appraisal system.

The process of performance appraisal lacks a proper structure and consistency with respect to organizational goals. Therefore, the higher management of KDU is in search of an effective PAS for the academic members of KDU. Therefore the aim of this study is to investigate the factors affecting the effectiveness of the current PAS. Thereby, it is expected to achieve academic excellence not only in the performance of the academia but also the KDU as a whole.

## II. METHODOLOGY AND EXPERIMENTAL DESIGN

The author considers the whole population of civil Academic Members of KDU in the year 2015. The total number of academic members is 166, ranging from Lecturer (Probationary), to Senior Lecturer Grade I from the population of the study. Assistant and Senior Assistant Librarians too are taken as academics as defined by the University Grants Commission.

The sample in this research was civilian academic staff members of General Sir John Kotelawala Defence University with the number of 118 academia Sample size was determined using Krejcie and Morgan (1970) method. Stratified random sampling method was used and a computer based random number generator was used to select the academic members at each level.

The study involved both qualitative and quantitative methods to collect data by means of a structured pre tested questionnaire. Before the actual study was conducted, a pilot study was carried out to test the validity and reliability of instrument used. For the actual study, the quantitative data was collected by distributing the questionnaire to the academic staff of KDU.

The items on the questionnaire are responded to using a 5-point Likert scale ranging from absolute disagreement, through disagree, neutral, agree, and ending in absolute agreement. Numerical ratings for the responses can be obtained by using values ranging from one point for “absolute disagreement” to five points for “absolute agreement”. The response scale is clearly ordinal. However the responses were assigned the values 1, 2, 3, 4, 5 and averages were computed during the analysis.

The questionnaire consists of 58 questions. It measures the level of effectiveness of the PAS by the means of independent variables, user’s characteristics, perceived fairness and system characteristics.

## III. METHODS OF DATA ANALYSIS

Data was analyzed using SPSS (Statistical Packages for the Social Scientist) statistical package which was set at the 0.05 significance level. The level of effectiveness of the existing PAS will be determined using the results of questionnaires in terms of user’s characteristics, perceived fairness and system characteristics.

All independent variables were given marks between one to five (1-5) for the analysis purpose. Allocation of marks for the respondent’s answers is as follows.

**Table 01**  
**Allocation of Marks**

Answer	Marks
Absolute Disagreement	01
Disagreement	02
Neutral	03
Agree	04
Absolute Agreement	05

All data was analyzed by using mean value of the factors. Those mean values are interpreted as follows.

**Table 02**  
**Interpretation of Mean Values**

Mean Value	Level of Effectiveness
Mean value between 4-5	Highly effective
Mean value between 3- 3.999	Effective
Mean value between 2 -2.999	Ineffective
Mean value below 2	Highly Ineffective

The level of effectiveness for each factor of the questionnaire was analyzed using mean and standard deviation. The relationship of effectiveness of PAS and the variables; user’s characteristics, perceived fairness and systems characteristics were analyzed using Pearson’s correlation and coefficient. The statistically significant factors that affect effectiveness of PAS were determined by Analysis of variance test.

Statistical tests were carried out with the assumption that the population (N=166) was normally distributed. The response rate was 52.5%. The reliability test of Cronbach’s Alpha was used to determine the consistency. The alpha coefficient for the 58 items of the questionnaire was 0.986, suggesting that the items have very high internal consistency.

An assumption was made that all the survey participants answered the questions truthfully. Secondly, it is assumed that participant voluntarily expressed their views for the questionnaire. Thirdly, it is assumed that the responses collected

during the relevant study period have provided a valid measure of the effectiveness of the existing PAS.

**IV. RESULTS**

**The Level of Effectiveness of the Existing PAS in Terms of User’s Characteristics, Perceived Fairness and System’s Characteristics.**

Table 03 Descriptive Statistics of Perceived Level of effectiveness of PAS in Terms of User’s Characteristics, Perceived Fairness and System’s Characteristics. (N =62)

Variable	Mean	Std. Deviation	Level of Effectiveness
User’s Characteristics	2.6163	.39940	Ineffective
Perceived Fairness	2.0735	1.01076	Ineffective
System Characteristics	1.8696	.73387	Highly Ineffective
<b>Factors</b>			
Employee Participation	2.2194	.93648	Ineffective
Instrument Validity	2.1237	.95525	Ineffective
Goal Setting	2.1129	.99670	Ineffective
Rating Technique	1.8450	.82407	Highly Ineffective
Distributive Justice	1.9960	1.03275	Highly Ineffective
Procedural Justice	2.1355	1.06926	Ineffective
Performance Feedback	2.0258	1.10882	Ineffective
Rater’s Motivation	3.8198	.48282	Effective
Rater’s Training	1.4128	.77514	Highly Ineffective
Rating Accuracy	1.7267	.84834	Highly Ineffective
Intended Purpose	1.6150	.91089	Highly Ineffective

**Correlation Analysis between Independent and Dependent Variables.**

Table 04 Correlation Analysis between Overall Effectiveness of PAS and Independent Variables (User’s Characteristics, Perceived Fairness and Systems Characteristics)

Variable	Effectiveness of PAS	
	Pearson Correlation	Sig. (2tailed)
Effectiveness of PAS	1	
User’s Characteristics	.596**	.000
Perceived Fairness	.875**	.000
System Characteristics	.876**	.000

\*\* . Correlation is significant at the 0.01 level (2-tailed)

Table 05 Correlation between Effectiveness of PAS and Different Independent Variables that Impact Effectiveness of PAS.

Variable	Pearson Correlation	Sig. (2-tailed)
Effectiveness of PAS	1	
Employee Participation	.761**	.000
Instrument Validity	.798**	.000
Goal Setting	.747**	.000
Rating Techniques	.838**	.000
Distributive Justice	.802**	.000
Procedural Justice	.849**	.000
Performance Feedback	.830**	.000
Rater’s Motivation	-.298	.052
Rater’s Training	.799**	.000
Intended purpose	.949**	.000
Rating Accuracy	.941**	.000

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

**Multiple Regression Analysis between Independent Variables Related to Effectiveness of PAS.**

Table 06 Regression Analysis between Independent Variables and Effectiveness of PAS (Model Summary)

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.928 <sup>a</sup>	.862	.824	.34861

a. Predictors: (Constant), rater’s training, rater’s motivation, employee participation, instrument validity, procedural justice, distributive justice, goal setting, rating technique, performance feedback.

Table 07 Regression Analysis between Independent Variables and Effectiveness of PAS (Coefficients).

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.392	.514		.762	.452
Employee participation	.166	.135	.160	1.226	.229
Instrument validity	.150	.128	.144	1.175	.248
Goal setting	-.126	.142	-.128	-.887	.381
Rating technique	.240	.143	.238	1.685	.101
Distributive justice	.022	.120	.025	.183	.856
Procedural justice	.319	.117	.359	2.729	.010
Performance feedback	.054	.155	.062	.350	.728
Raters motivation	-.126	.126	-.073	-.998	.326
Ratter’s training	.165	.124	.154	1.330	.193

<sup>a</sup>. Dependent Variable: Effectiveness PAS

**V. DISCUSSION**

The total mean for user’s characteristics was 2.6163, which indicates that the respondents perceived that the existing PAS is ineffective in terms of user’s characteristics. Rater’s motivation and rater’s training factors showed mean of 3.8198 and 1.4128 respectively. Only the factor rater’s motivation has scored a mean value closer to 4 which denote that the existing PAS is effective in terms of this factor.

Descriptive statistics has revealed that the total mean for perceived fairness was 2.0735 with a standard deviation of 1.010. This indicates that the respondents have perceived the existing PAS is ineffective where procedural justice (M=2.1355) and

performance feedback (M=2.0258) were rated as ineffective and distributive justice (M=1.9960) as highly ineffective.

The total mean score for the dependent variable systems characteristics was 1.8696 which reveals that the existing PAS is perceived as highly ineffective. The factors employee participation, instrument validity and goal setting have scored mean value closer to 2. However the factor rating technique, having a mean of 1.8450 is perceived as highly ineffective. The factor rating accuracy and intended purpose had mean values of 1.7267 and 1.6150, which indicates that the existing PAS is highly ineffective in terms of the said factors. There is a significant positive linear relationship of effectiveness of PAS and user’s characteristics, perceived fairness and systems characteristics. Perceived fairness and systems characteristics have a very high positive linear relationship with the independent variable.

Among all factors, rater’s motivation has a correlation coefficient of-.298. It explains a negative and weak correlation with the dependent variable. Employee participation, instrument validity, goal setting rater’s training, rating techniques, distributive justice, procedural justice performance feedback, raters training have a high positive correlation. Intended purpose and rating accuracy have a very high positive correlation as the correlation coefficient is very much closer to +1.

Model summary shows that the value of R-square for the model is 0.862. This means that 86.2 percent of the variation in the effectiveness of PAS (dependent variable) can be explained from the eleven independent variables. The adjusted R-square for the model is 0.824, which indicates only a slight overestimate with the model. The standard error of the estimate is only 0.34861

Regression coefficients represent the mean change in the response variable for one unit of change in the predictor variable while holding other predictors in the model constant. A low p-value (< 0.05) of variables indicates that the changes in the independent variables were related to changes in response variable, effectiveness of PAS. Conversely, a larger (insignificant) p value suggests that changes in the predictor are not associated with changes in the response. Therefore, the analysis demonstrated that the most significant positively related factor was the procedural justice. It has scored a p value of 0.010 and Beta value of 0.359. It denotes that change of procedural justice by one item may affect the effectiveness by 35.9%.

The fairness of PAS needs to be increased in terms of distributive justice, procedural justice and performance feedback. The fairness of granting rewards to academia should be increased by making the appraisal unbiased, increased communication between supervisor and subordinate, output related rewards and design the PAS leading to better performance and better work quality.

The PAS should highly focus on procedural justice. Objective measures should be designed to appraisal. The standards should be clearly defined to evaluate the performance. Clear instructions should be given to a both raters and ratees. The standards should be simple and clear. The ratings should be available for review as well. They should be able to discuss problems in relation to their performance evaluation with the supervisor. A follow up system should be incorporated to PAS to

monitor whether the raters follow the said standards properly in case of a particular individual as well as in the equal manner for others.

The component of giving feedback should be focused on the new PAS. Feedback of an individual may lead to denial, venting of emotions, and behavioral and mental disengagement. Designing of PAS should address above issues. It should be strictly confidential, constructive and should lead the academia towards achieving expected goals. In this regard the PAS can identify future training needs of the ratees. Student feedback and peer review should also be included in the appraisal form.

The instrument for appraisal, the performance appraisal format in most cases, should include measures that evaluate most important job behaviors and the output. In the case of academia it is teaching and research. However, due to the unique nature of administration and day today activities, it is recommended to incorporate extra activities carried out by academic staff. Eg. contribution for establishment of the KDU hospital. For the last five years it was observed that academic staff who have contributed towards the rapid development of KDU are not being evaluated fairly. This shortcoming can be rectified by incorporating valid measures including appropriate terminology.

#### ACKNOWLEDGMENT

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# General Guidance for Planning and Design of Harbors

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**Abstract-** The planning and design of harbor is an important engineering phenomenon with both major commercial and social implications. The literature suggests that various approaches for harbors design of harbors such as fishing, commercial and refugee harbors. The aim of this paper is to present a general guidance for the planning and design of harbors. There are a number of general requirements which has to be fulfilled while designing the harbors but also there are some specific requirements for each of them. Furthermore, the different types of foundations such as shallow water foundations, deep water foundations and pile foundations, as well as breakwaters such as permanent breakwaters and temporary breakwaters, and finally caissons are submitted for the design of harbors. The equations, formulae and specifications for the design of the essential components of harbors are also given.

**Index Terms-** Harbor, Design, Breakwater, Caisson, Pile

## I. INTRODUCTION

Due to the incremental growth in the world population and the current trend of globalization, there is a significant interest for harbor development whether this includes constructing new harbors or existing ports that need to improve or grow their ability.

A harbor is a position of security and solace, a little bay or other shielded piece of a zone of water, generally very much ensured against high waves and solid streams, and sufficiently profound to give dock to ships and other specialty. It is likewise a place where port facilities are given such as convenience for ships and cargo dealing facilities.

Harbor construction activities include installing anchor piles, constructing jetty, mooring and berthing dolphins which are designed to safely moor vessels alongside offshore structures and quay wall renovation which might be required to reinforce existing quay walls to enable heavier materials and equipment to be handled.

Harbors can be classified into three categories which are natural, semi-natural and artificial harbors (Yuvaraja, 2013):

- Normal formations bearing safe release facilities for ships on ocean coasts, in the type of brooks and bowls, are called Natural harbors. With the quick advancement of naval forces drew in either in trade or war, made great strides on settlement and on facilities for repairs, stockpiling of freight and associated conveniences are given in natural harbors. The dimensions and draft of current ships have caused the works improvement for natural harbors. The variables, for example, local geographical conditions, increment in population and

also improvement of the area have made them enormous and alluring.

- Semi-natural harbors are preserved on sides by headlands protection and it needs artificial protection only at the entrance.
- In Artificial harbors native facilities are not accessible. Countries having a coastline had to form or construct such refuges making use of engineering knowledge and methods.

## II. CONTEXT AND SCOPE

The scope of the research is the design analysis of the harbors. Harbor types, construction sequences and design parameters and techniques are investigated. Harbor types (refugee, commercial and fishing) are reviewed. The requirements for each type of harbors are examined and key areas highlighted. Different types of foundations are identified and examined such as piling and caisson. Formulae and figures are provided for the calculations along with the design of foundations, caissons and breakwaters.

## III. RESEARCH METHODOLOGY AND FINDINGS

Research answers three main questions which are given below:

- How many types of harbors are existing? (see Section 3.1)
- What are the design requirements of these harbors? (see Section 3.2)
- What are the formulae needed for the calculations? (see Section 3.3)

Search period of the literature databases is between 1979 and 2016. Some of the literature databases used for the research are listed below:

- “www.sciencedirect.com”
- “https://scholar.google.com”
- The Near East University library

### 3.1. Major Types of Harbors

Considering their benefit and situation, harbors are separated into three types as refugee harbors including naval bases, commercial harbors connected with ports and fishery harbors (Pritchard, 2013).

#### 3.1.1. Harbors of Refugee Including Naval Base

A harbor of refugee is a secured water region utilized exclusively as a sanctuary for ships in a tempest or a part of a commercial harbor with satisfactory space for a different dock

zone that does not meddle with the commercial traffic. The basic characteristics of a decent harbor of refuge are protected access from the ocean or sea during bad weather and a decent holding base for the ship's anchors. An outstanding harbor of refuge is the mouth of Delaware Bay near Cape May, N. J. Dover, England, has a combined harbor of refuge and commercial harbor. A military harbor is a naval base for servicing naval vessels. Pearl Harbor, Hawaii, is a well-known naval base (Quinn, 2007).

### 3.1.2. Commercial Harbors Connected With Ports

A commercial harbor is one that has docking facilities comprising of piers, wharves, or dolphins at which ships berth while loading or unloading cargo. Huge numbers of extensive commercial harbors in urban communities are municipal, or government-controlled, harbors operated by port authorities. New York, Los Angeles, and London harbors can be given as cases. Some commercial harbors are owned and operated by private industry; for example, Taconite Harbor, in Minnesota.

### 3.1.3. Fishing Harbors

A fishing harbor contains multifunctional facilities that provide sufficient requirements for the capture of fish and its consumption. Large fishing vessels and huge number of fish creates a demand for well-bred maintenance and repair facilities not only for the vessels but also for the equipment as well. An all-inclusive fishing harbor should include fish processing facilities, refrigerators, ice plants and bureaucratic offices and some other utilities inclusive of roads, parking areas for private and commercial vehicles, sufficient space for loading and unloading and also areas for future expansion. As the activities in the fishing harbor cause contamination, wastes must be properly examined and managed.

## 3.2. Design Requirements for Harbors

Before designing a harbor, there are two major activities which have to be done. These activities are 'Collecting the necessary information' and 'Identifying the area required'.

### 3.2.1. Collection of the Necessary Information

To carry out the planning of a harbor, the first step is that the collection of necessary information of the existing properties of the suggested site. The following important facts should be investigated first:

- To perform a complete investigation of the neighborhood including the foreshore and depths of water in the vicinity
- To study the nature of the harbor (if it is refuge or not)
- To study the existence of sea insects which could give damage the foundation
- To study the problem of silting or erosion of coastline
- To ascertain the character of the ground borings and to take the soundings
- To identify the probable surface conditions on land and borings on land
- To study the natural metrological phenomenon at site with respect to frequency of storms, rainfall, range of tides, maximum and minimum temperatures, direction

and intensity of winds, humidity and also direction and velocity of currents

### 3.2.2. Identify the Area Required

The area of the harbor depends upon the following factors:

- Size and number of ships to be accommodated in the harbor at a time
- Length and width needed for movement of ships to and from berths
- Type of cargo carried

### 3.2.3. General Requirements of a Harbor

To build a more valuable and useful harbor for working and dispatching, the water depth in the entrance of the harbor, approach channel and harbor basin is needed to be kept sufficient even at the low water spring tide. Other than the water depth, to provide an easier maneuverability, the location and alignment of the entrance, approach channel, turning basin, breakwater, wharves, jetties and docks should be carefully positioned. The main aim of a harbor is to provide a safe and appropriate accommodation to the supplies, vessels, repairs, refuge, refueling or transfer of cargo and passengers.

Following are the requirements of a good harbor:

- The ship channels should have sufficient depth for the draft of the visiting vessels to the harbor
- The bottom of the harbor should provide secured anchorage to hold the ships against the force of strong winds
- The land masses or breakwater must be provided to protect against the destructive wave action
- The entrance of the harbor should be wide enough to provide the ready passage for shipping and at the same time it should be narrow enough to restrict the transmission of excessive amount of wave energy in time of storms.

### 3.2.3.1 Requirements of a Harbor of Refuge Including Naval Base

Following are the requirements of a harbor of refuge:

- Facilities which obtain repairs and supplies
- Safe and convenient anchorage against the sea
- Ready accessibility from the high seas
- Spacious accommodation as damaged ships will need immediate shelter and quick repairs
- Accommodation for naval vessels

### 3.2.3.2 Requirements of a Commercial Harbor

Following are the requirements of a commercial harbor (Yuvaraja, 2013):

- Storage sheds for cargo,
- Good and quick repair facilities to avoid any delay,
- Long and large quays to make loading and unloading of cargo and facilities for transporting easier and quicker,
- Sufficient accommodation for the commercial marine,
- Large accommodation for the commercial marine,
- Well and enough sheltered conditions for loading and unloading.

### 3.2.3.2 Requirements of a Fishing Harbor

Following are the requirements of a fishing harbor:

- The harbor should be continuously available for arrival and departure of fishing ships
- Loading and unloading facilities along with quick dispatch facilities for the perishable fish catch such as railway sidings and roads should be there,
- Freezing compartment stores with sufficient storing space for keeping the fish safe.

### 3.3. Analysis of Harbors

To analyze harbors it is preferable to use dynamic numerical models during analyzing process. Furthermore, as it is crucial to consider structure and properties of the waves such as frequency and amplitude, wave deviation, wave shear and wave rotation should be investigated and then modeled according to the site it is being planned to build a harbor. The spectral changes while the waves approaching the shore must be analyzed and modeled as well. Next step is choosing, designing and modeling the breakwaters. Turbulences inside the harbor should be tested under irregular wave series. Beside waves, water level changes should be observed under the effect of different conditions such as atmospheric changes, wind or waves. Finally, solid matter transport and morphological modeling are needed to be done.

#### 3.3.1. Shallow Water Foundations

There are five well-known types of foundation used when the water depth is shallow. These are:

- Spud cans
- Piles
- Gravity base structures (GBS)
- Concrete caissons
- Steel Buckets

The correct foundation type is selected by considering the seabed soil conditions. Some foundations cause high settlements than the others.

#### 3.3.2. Deep Water Foundations

In deep water depth, it is crucial to create solutions with a balance not only considering reliability but also the economy. As it is not realistic to build jackets or gravity based structures when the depths are deep, different foundation types are used such as anchors. There are eight types of anchors as listed below under

two main types (Randolph and House, 2002).

- Gravity anchor types include:
- Boxes
  - Grillage and Berm
- Embedded anchor types include:
- Anchor piles
  - Suction caissons
  - Drag anchors (fixed fluke)
  - Vertically loaded drag anchors (VLA)
  - Suction embedded plate anchors (SEPLA)
  - Dynamically penetrated anchors (DPA)

#### 3.3.3. Pile Foundations

Piles are strong materials with long cylindrical shapes which are placed into the ground to support structures constructed on it. They are generally made of concrete. Piles are used if there is a weak soil layer on the surface or when the structure is too heavy. They are mostly needed when the structure is subjected to horizontal forces from waves or the impact of berthing ships. There are two types of pile foundations which are grouted piles and driven piles (Simoes De Abreu, 2014).

#### 3.3.4. Pile Resistance

The determination of the soil resistance can be made applying current offshore guidelines, e.g. API RP2A and ISO 19902 or CPT- based methods. The latter's advantage is that it takes account of the detailed stress history of the soil around the pile (Randolph et al., 2005; Dean, 2009).

#### Unit

#### Parameters

Table 1 summarizes the unit parameters recommended by API RP2A and ISO 19902.

The equation used for shaft friction is expressed as,

$$q_{bu} = Nq\sigma'_{v0} \leq q_{bu-max} \quad (1)$$

Where  $N_q$  ranges from 12 to 50 according to the grain size and relative density of the material. All parameters needed to determine pile resistance in sand are given in Table below.

**Table 1. Design parameters for steel piles in siliceous sands in ISO 19902: 2004**

Soil description	Soil density	$D_r$ (%)	$\delta'$ (°)	$T_{s-max}$ (kPa)	$N_q$	$q_{bu}$ (MPa)
Sand	Loose	15-35 %	20	65	12	3
	Medium	35-65 %	25	80	20	5
	Dense	65-85 %	30	95	40	10
	Very dense	85-100 %	35	115	50	12
Silty sand	Loose, Med	15-65 %	20	65	12	3
Clayey sand	Dense	65-85 %	25	80	20	5
	Very dense	85-100 %	30	95	40	10
Sandy silt	Loose	15-35 %	15	45	8	2

Med dense	35-85 %	20	65	12	3
Very dense	85-100 %	25	80	20	5

**3.3.5. Analysis of Breakwater**

Breakwater is a part of the harbor that is constructed for protecting the harbor against to waves. Therefore, they keep ships and cargos in safe. Natural rock and concrete are mainly used materials for construction of breakwaters. There are two types of breakwaters which are permanent breakwaters and temporary breakwaters (Abdelhamid, 2013).

**3.3.5.1 Permanent Breakwaters**

- Rubble Mound Breakwater
- Vertical Wall Breakwater
- Vertical Composite Type

**3.3.5.2 Temporary Breakwaters**

- Pneumatic and Hydraulic breakwater
- Floating Breakwater

The economic life of harbors should be taken into account while designing breakwater according to their importance and usage purpose (Abdelhamid, 2013).

- Very important Marine Structures 100 years
- Important Marine Structures 50 years
- Normal Marine Structures 25 years
- Temporary Marine Structure 1-2 years
- 

**3.3.5.3. Wave Height Design**

**3.3.5.3.1 Non-Breaking Wave Condition,  $H_d$**

- Normal Marine Structures  $H_{1/3}$
- Temporary Marine Structures  $H_m$

**3.3.5.3.2 Breaking Wave Condition,  $H_b$**

$H_b = 0.78d$  (2)

Where:  
d represents the water depth.

**3.3.5.4 Design of Armor of Breakwater**

**3.3.5.4.1 Weight of Individual Armor "Hudson Formula"**

Hudson formula is used for calculation of the minimum size of riprap required to obtain enough stability characteristics for rubble structures as breakwaters under wave attack. The Hudson formula is same as shown below (Abdelhamid, 2013):

$W_{50} = \gamma_a H^3 / \{K_D (S_a - 1)^3 \cot \theta\}$  (3)

Where:

$W_{50}$ : Weight of individual armor unit

$H$ : Design wave height

$\gamma_a$ : Unit weight of armor unit material

$\gamma_w$ : Unit weight of water

$S_a$ : Specific gravity of armor material,  $\gamma_a / \gamma_w$

$\theta$ : Angle between seaward structure slope and horizontal,

$\cot \theta = t$

$K_D$ : Armor unit stability coefficient

**3.3.5.4.2 Thickness of Armor Layer**

Armor layer is a kind of layer that is made to protect the breakwaters and seawalls. Thickness of armor layer formula is shown below:

$D_{50} = \{W_{50} / \gamma_{rock}\}^{1/3}$  (4)

$t\alpha = 2K_0 D_{50}$  (5)

$D_{max} = 4.000 D_{50}$  (6)

$D_{85} = 1.960 D_{50}$  (7)

$D_{15} = 0.400 D_{50}$  (8)

$D_{min} = 0.125 D_{50}$  (9)

D is the nominal size (equivalent cube of the stone).

**Table 2.  $K_D$  No-Damage Criteria and Minor Overtopping**

Armor unit	n	Placement	Structure trunk (Break wave) $K_D$	Structure trunk (Non-break wave) $K_D$	Structure head (Break wave) $K_D$	Structure head (Non-break wave) $K_D$	Slope (cot)
Quarry stone (rough)	2	random	3.5	4	2.9	3.2	1.5
Rough angular	2	random	3.5	4	2.5	2.8	2.0
Quadripod	2	random	7.2	8.3	5.9	6.5	1.5
Tetrapod	2	random	7.2	8.3	5.5	5.1	2.0
Dolos	2	random	22.0	25	15.0	16.5	2.5
Modified Cube	2	random	6.8	7.3	-	5.0	-

**Table 3. Layer coefficient and porosity**

Armor unit	<i>n</i>	<i>Placement</i>	<i>Layer coefficient</i>	<i>Porosity</i>
Quarry stone (rough)	2	random	1.15	31%
Cube (modified)	2	random	1.10	47%
Tetrapod	2	random	1.04	50%
Quadripod	2	random	0.95	49%
Dolos	2	random	1.00	63%

**3.3.5.4.3 Placement Density**

Placement density formula is shown below;

$$N_r = A \cdot n \cdot K_{\Delta} [1 - P\%/100] \cdot [\gamma_w/W]^{2/3} \tag{10}$$

Where:

*N<sub>r</sub>*: Number of units for a given surface area

*A*: Surface area

*P*%: Percentage of average porosity of layer

**3.3.5.5 Design Secondary (underlayer) of Breakwater**

**3.3.5.5.1 Weight of Under Layer *W<sub>s</sub>***

Weight of underlayer formula is shown below;

$$W_{50} = W_{armor}/10 - W_{armor}/15 \tag{11}$$

$$D_{50} = \{W_{50}/\gamma_{rock}\}^{1/3} \tag{12}$$

$$D_{max} = 4.000 D_{50} \tag{13}$$

$$D_{85} = 1.960 D_{50} \tag{14}$$

$$D_{15} = 0.400 D_{50} \tag{15}$$

$$D_{min} = 0.125 D_{50} \tag{16}$$

Filter Criteria:

$$(D_{15})_{armor} / (D_{85})_{secondary} \leq 5 \tag{17}$$

**3.3.5.5.2 Thickness of Under Layer (*t<sub>s</sub>*)**

Thickness of underlayer formula is shown below:

$$(t_s = n K_{\Delta} [W_{rock}/\gamma_{rock}]^{1/2} \tag{18}$$

Where:

*t<sub>s</sub>*: Total thickness of layer

*n*: number of layers of protection units

*K<sub>Δ</sub>*: Layer coefficient

*γ<sub>rock</sub>*: Unit weight of material

*W<sub>rock</sub>*: Weight of individual protection unit in layer

**3.3.5.6 Core Design**

Core design formula is shown below:

$$W_{50} = W_{armor} / 200 \text{ to } W_{armor} / 6000 \tag{19}$$

With:

$$D_{50} = \{W_{50}/\gamma_{rock}\}^{1/3} \tag{20}$$

$$D_{max} = 4.000 D_{50} \tag{21}$$

$$D_{85} = 1.960 D_{50} \tag{22}$$

$$D_{15} = 0.400 D_{50} \tag{23}$$

$$D_{min} = 0.125 D_{50} \tag{24}$$

Filter Criteria:

$$(D_{15})_{secondary} / (D_{85})_{core} \leq 5 \tag{25}$$

**3.3.5.7 Design of Crest Width and Level**

**3.3.5.7.1 Crest Width**

$$B \geq 3 K_{\Delta} [W/\gamma_w]^{1/3} \tag{26}$$

Where:

*B*: crest width

**3.3.5.7.2 Crest Level**

$$CL = DWL + R \tag{27}$$

Where:

*CL*: Crest Level of Breakwater

*DWL*: Design Water Level

*R*: Wave Run-Up

**3.3.6. Analysis of Caisson**

When caisson foundations system is used, the resistance is supplied by a combination of concrete self-weight and the contact between seabed and caisson (Randolph et al., 2005). The weight of concrete foundation is used to calculate the average static tension. Forces and loads caused by cyclic waves and wind are transferred to the soil by skirt friction and suction under the top cap (Stove et al., 1992).

The concrete caisson installation procedure is explained below:

- Releasing the concrete caisson on the seabed.
- Evacuating the water from the inside of the caisson with the help of pumps. Caisson settles to the soil due to suction.
- Then, the ballast covers the top of the foundation to increase the weight.
- Connecting and tensioning is made.

When calculating the resistance for the skirts of the caisson;

- Depending on the material chosen, adhesion coefficient  $\alpha$  is taken between the values 0.15 and 0.30 (Randolph et al., 2005).
- Allowable resistance due to suction is analyzed on site as soil characteristics and play a big role.
- As the cyclic tension loads increases, bigger suctions will develop.

Generally, suction anchors are closed at the top and open at the bottom. They are usually big in diameter which means more than 5 meters in diameter. Their length varies between 20 to 30 meters. The ratio of length to diameter (L/d) is between 3 and 6. On the other hand, diameter to wall thickness ratios of the cylinders (d/t) is much larger and varies from 100 to 250. This ratio combined with the horizontal loads exerted by moorings creates structural buckling problem while installation which could be solved by using internal stiffeners. An anchor line, which optimizes the holding capacity, is attached to the side of the caisson to apply mooring loads. The line of action of the load passes at depth of about 65 % of the deep-seated depth.

### 3.3.7. Wave analysis and further information

For additional information on the environmental data together with necessary formulas and the data needed for design and analysis of such structures, the instructions, data and recommendations given by (Kaiser et al., 2013), (DNV Technical Report, 1996), (Jerman, 2015), (API, 2010), (Sadeghi, 1989, 2001, 2004, 2007a, 2007b, 2008 and 2013), (US Army Coastal Engineering Research Center, 1980), (US Army Corps of Engineers, 2002), Muiyiwa and Sadeghi, 2007), (Sadeghi and Aleali, 2008) (Nouban and Sadeghi, 2013 and 2014), (US Army Corps of Engineers, 2011), (Nouban, 2016), (Nouban et al., 2016) and (Nouban et al., 2017) can be used.

## IV. CONCLUSIONS

The aim of the report is discussing the information required for the planning and design a harbor. To plan and design a harbor it is required to collect necessary information of the existing properties of the suggested site. This information includes a complete survey of depth, nature of the harbor, the

existing of any sea insects, the probability of silting or erosion, the character of ground borings, surface conditions, the frequency of natural events such as storms, the direction of waves, rainfalls or changing temperature. The size of the harbor is identified by considering the number and size of the ships.

Three major types of harbors; harbor of refuge, commercial harbor and fishing harbor, they all require some common properties such as providing sufficient depth, secured anchorage, breakwaters and a wide entrance. However, there are some requirements which create the difference between each of these harbor types.

A harbor of refuge must provide the facilities which obtain repairs and supplies, ready accessibility from the high sea, large accommodation as damaged ships will need immediate shelter and quick repairs and also accommodation for naval vessels. On the other hand, a commercial harbor must provide, storage sheds for cargo, good and quick repair facilities to avoid any delay, long and large quays to make loading and unloading of cargo and facilities for transporting easier and quicker, sufficient accommodation for the commercial marine and also enough sheltered conditions for loading and unloading.

Finally, a fishing harbor must be continuously available for arrival and departure of ships. A fishing harbor also must provide loading and unloading facilities along with quick dispatch facilities for the perishable fish catch such as railway sidings and roads. Finally one of the most important requirements that a fishing harbor must provide is freezing compartment stores with sufficient storing space for keeping the fish fresh and safe.

Analysis and design of the harbors are done in three major steps. One of them is the designing of foundations which are classified as shallow water foundations, deep water foundations and pile foundations. The other is designing the breakwater which is classified as permanent breakwaters and temporary breakwaters. The last step is the designing the caisson. The specifications, equations and formulae are discussed in detail.

Also, it is found that the breakwaters play a major role when building a harbor.

On the other hand, there are several limitations to this paper.

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# Mediating Role of Distributive Justice Between Personality and Teachers Affective Organizational Commitment

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**Abstract-** This research is aimed at finding out the mediating role of distributive justice between personality and teachers affective organizational commitment (AOC). Were teachers AOC affected directly or indirectly by personality and distributive justice was the problem of this research. A causal survey method has been applied by involving 135 junior school teachers. There were three valid and reliable instruments have been developed for measuring those three variables. Correlation and path analysis have been used to analyze data. Research results showed that (1) There was a direct positive effect of personality on affective organizational commitment; (2) There was a direct positive effect of distributive justice on affective organizational commitment; (3) There was a direct positive effect of personality on distributive justice; (4) There was an indirect effect personality on affective organizational commitment through distributive justice. Therefore the role of distributive justice as a mediator could not be neglected.

**Index Terms-** Affective Organizational Commitment, Personality, and Distributive Justice

## I. INTRODUCTION

Human resource is one of factor which determines success of Indonesia's development. Provision of quality of education is a prerequisite for the creation of human resources improvement. Education occupies a strategic and central position in development because it is oriented on improving quality of human resources. Therefore, teacher's performance becomes very important as the spearhead in educating the nation's children in the future.

Implementation of the national education system must constantly pay attention and adjust to the demands of education in the current era of globalization. The educators as the main actors in the effort to achieve national education goals that have been designed by the government. Thus the educator must be able to perform roles, duties and responsibilities better for improving the quality of education.

The affective organizational commitment is an attitude that reflects the teacher's loyalty to the school organization, it is marked by a strong conviction of the acceptance of goals, the willingness to work hard for the achievement of a particular goal and the strong will to keep it in school. This attitude should be owned by all teachers.

It is related to the relationship between organizational commitment and the five factors of the personality model. In

achieving goals of established school organization, each teacher is required to have a high commitment; this is a manifestation of responsibility for his work. According to Neha and Nishat (2013: 24) , "an affective commitment is an employee's emotional attachment to, identification with and involvement in an organization. It influences personal characteristics, structural characteristics, and work experiences."

Affective commitment is an employee's emotional attachment to identification and involvement in an organization. This affects structural characteristics, and work experience. The role of affective commitment must be in the teacher's life satisfaction. Life satisfaction is a manifestation of global judgment about the life of a person taken as a whole a person who has a high responsibility and devotion to his work can be indicated to have a commitment. Erdheim and Zickar (2006: 959) stated that, "the model is consists of five fairly independent dimensions, which are extraversion, neuroticism, agreeableness, conscientiousness, and openness to experience."

Distributive justice in the wage or salary can also affect the worker's commitment in it, in this case the teacher. According to Akanbi, Paul, Ofoegbu, and Onyema (2013:207), "Organizational Justice Is a key factor associated with the success of every organization. In order to keep employees satisfied, committed, and loyal to the organization, the organization needs to be fair in its system regarding distributive justice, procedural justice, and interactional justice."

Organizational justice is a key factor associated with the success of any organization. In order employees to remain satisfied, committed, and loyal to the organization, the organization must be fair in its system of distributive justice, procedural justice, and interactional justice. Justice in an institution that can develop self-potential teachers so that they will be satisfied in work and with a strong commitment allows them to improve teacher work performance that ultimately is expected to improve student achievement. Treating teachers fairly influences teacher commitment.

Kitchard dan Strawser (2001: 221), explained that "satisfied employees develop high affective commitment for their firm."

The existence of teachers as professions, as well as other professions that refer to jobs or positions that require one's expertise, responsibility and loyalty. Professions can not be done by people who are not trained or prepared for it. The profession generally develops from the work that is then supported by three things such as competence, skill, and commitment that in turn, those form an equilateral triangle amidst professionalism.

Based on some of the things described above, researchers realize that it is important to examine more deeply the influence of personality and distributive justice on the affective organizational commitment of teachers. In order to manage and develop human resources in achieving school goals.

## II. LITERATURE REVIEW

Organizational commitment is an important behavioral dimension that can be used to assess employees' propensity to survive as members of an organization. Organizational commitment is the identification and involvement of someone who is relatively strong against the organization. Organizational commitment is the desire of members of the organization and willing to strive for the achievement of organizational goals. The dimension of organizational commitment consists of three. According to Hartmann and Bambacas (2005: 89), "Organizational commitment is conceptualized in three ways: affective commitment, normative commitment, and continuance commitment." Then Tan and Akhtar (2005: 310) stated that, "Affective commitment is a sense of attachment and a feeling of belonging to the organization."

According to Colquitt, Lepine and Wesson (2011: 65), "affective commitment defined as a desire to remain a member of an organization due to an emotional attachment to, and involvement with, that organization." and "affective commitment reflects an emotional bond to the organization, it's only natural that the emotional bond among coworkers influence it." Visagie and Steyn (2011: 98) says, "Affective commitment is the strength of employee's emotional attachment to, identification with and the degree of his/her involvement in the organization"

The affective organizational commitment can be a significant competitive advantage. Loyal employees tend to stop working and do not attend work. They also have a higher work motivation and organizational citizenship, and a rather high work performance.

Quick & Nelson (2013: 116) stated that, "Affective commitment is an employee's intention to remain in an organization because of a strong desire to do so. It consists of three factors: (1) a belief in the goals and values of the organization; (2) a willingness to put forth effort on behalf of the organization; (3) a desire to remain a member of the organization."

Colquitt, Lepine and Wesson (2011: 66) "affective commitment one way to understand the differences among the three types of commitment is to ask yourself what you would feel if you left the organization."

The affective organizational commitment is the one way to understand the difference between three types of commitment that is to ask yourself what you feel if you leave the organization. When a manager sees an employee and says "he is committed" or "he is faithful," the manager usually refers to the expression of the affective organizational commitment behavior.

Personality is a relatively fixed individual behavior that reflects how the individual's behavior in seeing, thinking, feeling and acting against the pressures or problems it faces. Also each individual is certainly very different in his actions, Stephen P. Robbins and Timothy A (2007: 155) explained, "an early debate

in personality research centered on whether an individual's personality is the result of heredity or environment." According to Richard (2013: 4), "A person's personality tends to be stable throughout life, and it often grows more pronounced over time. In fact, research suggests that as much as half of a person's personality is driven by their genetic makeup; it is biological."

In general, the personality refers to a dynamic concept that describes the growth and development of the entire psychological system of a person. Robbins and Judge (2007: 154) defined, personality is "the sum total of ways in which an individual reacts to and interacts with others." In other words, the individual personality guides and gives direction to the whole behavior of the individual concerned.

According to Schermerhorn (2013: 383), "personality is the profile of characteristics making a person unique from others." Personality is a relatively fixed pattern of how people think, and behave as Stephen and Judge (2007: 154), "personality is the dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to his environment." Davis dan Damary (2012: 184) stated that, "personality trait is the most predictive of job performance at followed by openness to experience, agreeableness, extraversion and emotional stability."

Lepine & Wesson (2011: 294), said that, "personality refers to the structures and propensities inside people that explain their characteristic patterns of thought, emotion, and behavior." Personality also refers to a relatively stable pattern of internal behavior and consistency that explains the tendency of one's behavior. There are various initial researchs on the structure of personality. Robbins and Judge identify the five dimensions of personality.

According to U.W.M.R. Sampath Kappagoda (2012: 82), Personality trait is openness to experience which refers to personality attributes as effect of personality on performance: the relationship of creative, sensitive, curious, cultivated and independent personality and performance is full of controversies".

The dimensions of MBTI according to Robbin and Judge (2007: 154) are: "(1) Extraverted (E) versus Introverted (I). Extraverted individuals are out going, sociable, and assertive. Introverts are quiet and shy. (2) Sensing (S) versus Intuitive (N). Sensing types are practical and prefer routine and order. They focus on details. Intuitives rely on unconscious processes and look at the "big picture". (3) Thinking (T) versus Feeling (F). Thinking types use reason and logic to handle problems. Feeling types rely on their personal values and emotions. (4) Judging (J) versus Perceiving (P). Judging types want control and prefer order and structure. Perceiving types are flexible and spontaneous." Robbins and Judge (2007: 154) also identified five dimensions of personality there are:

"Extraversion : the extraversion dimension captures our comfort level with relationships. Extraverts tend to be gregarious, assertive, and sociable. Introverts tend to be reserved, timid and quiet."

"Agreeableness : the agreeableness dimension refers to an individual's propensity to defer to others. Highly agreeable people are cooperative, warm, and trusting. People who score low an agreeableness are cold, disagreeable, and antagonistic."

“Conscientiousness : the dimension is a measure of reliability. A highly conscientious person is responsible, organized, dependable, and persistent. Those who score low on this dimension are easily distracted, disorganized, and unreliable.”

“Emotional stability : the emotional stability dimension often labeled by is converse, neuroticism – taps a person’s ability to withstand stress. People who positive emotional stability tend to be calm, self-confident, and secure. Those with high negative scores tend to be nervous, anxious, depressed, and insecure.”

“Openness to experience : the openness to experience dimension addresses range of interests and fascination with novelty. Extremely open people are creative, curious, and artistically sensitive. Those at the other end of the category are conventional and find comfort in the familiar.”

Some experts’ opinions about organizational justice. Nyaribo (2012: 67) says, “organization justice in two major dimensions. There are distributive justice and procedural justice. Distributed justice is the perceived fairness in distributing rewards in the organization while procedural justice is fairness in the procedure used in making decisions in the distribution of rewards.

Gilani and Abdessoboli (2011: 43) stated that, “distributive justice could be defined as receipts perceived of fairness of a person in social exchanges.” and according to Moshref and Dalvi (2006: 15) “Distributive justice is also fair observed in the interest and proficiency that a person received from organization.”

Colquitt, Lepine and Wesson (2011: 208) stated that, “distributive justice reflects the perceived fairness of decision making outcomes.” Distributive justice reflects fairness of perceived decision results. The argument explains that distributive justice refers to the perception of the results we derive based on our contribution by comparing with the results obtained by others based on their contribution.

Stephen & Judge (2007: 234) stated that, “distributive Justice is concerned with the fairness of the outcomes, such as pay and recognition, that employees receive.” According to Shafinah (2003: 2), “distributive justice as the fair allocation of resources, ranging from rights, privileges, liabilities, rewards and punishments based on the principles agreed by the society as a whole and approved by the State.”

According to Colquitt, Lepine Wesson (2011: 208), “Employees gauge distributive justice by asking whether decision outcomes, such as pay, rewards, evaluations, promotions, and work assignments, are allocated using proper norm. In most business situations, the proper norm is equity, with more outcomes allocated to those who contribute more inputs.”

Cropanzano and Chen (2007: 324) stated that, “three allocation rules that can lead to distributive justice if they are applied appropriately: equality (to each the same), equity (to each in accordance with contributions), and need (to each in accordance with the most urgency). Distributive justice is concerned with the reality that not all workers are treated alike; the allocation of outcome is differentiated in workplace.”

### III. METHODOLOGY

This research uses survey method with quantitative-causal approach by using path analysis. This approach is chosen to analyze the relationship patterns between variables with the aim to know the direct or indirect effect of a set of exogenous variables (independent variables) and endogenous variables (dependent variable). In this study, the variables that will be researched are personality, distributive justice and affective organizational commitment. Endogenous variables in this study are affective organizational commitment and exogenous variables that is personality and endogenous variable that is distributive justice.

Sample amount of 130 of elementary school teachers has been selected randomly. A causal survey method has been applied. There were three valid and reliable instruments have been developed for measuring those three variables. Path analysis has also been implemented.

### IV. RESEARCH FINDINGS

Based on calculation, correlation coefficient between personality with the Affective Organization Commitment (AOC) has been found in the regression equation model which generates the direction of regression coefficients and constants  $b = .699 = 44.65$ . To determine the degree of significance (level of significance). The F was subsequently tested, as shown at the following table 1.

**Table 1. ANOVA table for Regression  $\hat{X} = 44.65 + .699X_1$**

Source of Variances	degrees of freedom (df)	Sum of Square (SS)	Means Square (MS)	F <sub>cal.</sub>	F <sub>table</sub>	
					.05	.01
Total (T)	130	1920053				
Coefficient (a)	1	1897768.07				
Regression (b/a)	1	8479.84	8479.84	78.62**	3.92	6.84

Residual	128	13805.09	107.85			
Deviation from linearity	49	5824.68	118.87	1.18 <sup>ns</sup>	1.51	1.80
Error	79	7980.42	101.02			

\*\*P < .01 <sup>ns</sup> = Non Significant

According to the table above, it shows that, the resulting regression equation was significant with a regression model  $X = 44.65 + .699X_1$ . Therefore there was a positive relationship between personality with the Affective

Organization Commitment (AOC) which was very significant. Next a large correlation coefficient between personality with the Affective Organization Commitment (AOC) was found, as shown at the following table 2.

**Table 2. Test of Correlation**

Sample (n)	Correlation Coefficient	t <sub>cal</sub>	t <sub>table</sub>	
			α=.05	α=.01
Between X <sub>1</sub> , X <sub>3</sub>	.439	6.188**	3.86	2.62

\* \* \* p < .01

There was positive and significant correlation coefficient between personality with the Affective Organization Commitment (AOC). The variation of Affective Organization Commitment (AOC) is determined by 19% of the personality through the regression model  $X = 44.65 + .699X_1$ .

The correlation between distributive justice with the Affective Organization Commitment

(AOC) could be seen in the regression equation which generates the direction of regression coefficients and constants  $b = .851 = 62.97$ . To determine the degree of significance (level of significance). The F was subsequently tested, as shown at the following table 3.

**Table 3. ANOVA for Regression Model of  $\hat{X} = 62.97 + .851X_2$**

Source of Variances	degrees of freedom (df)	Sum of Square (SS)	Means Square (MS)	F <sub>cal.</sub>	F <sub>table</sub>	
					.05	.01
Total (T)	130	1920053				
Coefficient (a)	1	1897768.07				
Regression (b/a)	1	7719.30	7719.30	67.84**	3.92	6.837
Residual	128	14565.63	113.79			

Deviation from linearity	49	6860.58	140.01	1.44 <sup>ns</sup>	1.51	1.80
Error	79	7705.05	97.53			

\*\*P < .01 <sup>ns</sup> = Non Significant

According to the table above, it shows that, the resulting regression equation was significant with a regression model  $X = 62.97 + .851X_2$ . Therefore there was a positive relationship between distributive justice with the Affective Organization Commitment

(AOC) which was very significant. Next a large correlation coefficient between distributive justice with the Affective Organization Commitment (AOC) was found, as shown at the following table 4.

**Table 4. Test of Correlation**

Sample (n)	Correlation Coeficient	t <sub>cal</sub>	t <sub>table</sub>	
			α=.05	α=.01
Between X <sub>2</sub> , X <sub>3</sub>	.386	5.466**	1.98	2.62

\*\* p < .01

There was highly significant correlation coefficient between distributive justices with the Affective Organization Commitment (AOC). The variation of Affective Organization Commitment (AOC) is determined by 14% of the personality. Correlation between personality with the distributive justice was based on regression

linear model which generates the direction of regression coefficients and constants  $b = .529 = 41.80$ . To determines the degree of significance (level of significance). The F was subsequently tested, as shown at the following table 5.

**Table 5. ANOVA for Regression Model of  $\hat{X}_2 = 41.80 + .529X_1$**

Source of Variances	degrees of freedom (df)	Sum of Square (SS)	Means Square (MS)	Fcal.	Ftable	
					.05	.01
Total (T)	130	1310273				
Coefficient (a)	1	1287430.53				
Regression (b/a)	1	4868.19	4868.19	34.67**	3.92	6.837
Residual	128	17974.28	140.42			

Deviation from linearity	49	7348.41	149.97	1.11 <sup>ns</sup>	1.51	1.797
Error	79	10625.87	134.50			

\*\* $P < .01$  <sup>ns</sup> = Non Significant

According to the table above, it shows that, the resulting regression equation was significant with a regression model  $X = 41.80 + .529X_1$ . Therefore there was a positive relationship between personality with the

distributive justice which was very significant. Next a large correlation coefficient between personality with the distributive justice was found, as shown at the following table 6.

**Table 6. Test of Correlation**

Sample (n)	Correlation Coefficient	$t_{cal}$	$t_{table}$	
			$\alpha = .05$	$\alpha = .01$
Between $X_1, X_2$	.462	5.783**	1.98	2.62

\*\*  $p < .01$

There was highly significant correlation coefficient between personality with the distributive justice. The variation of Affective Organization Commitment (AOC) is determined by 21% of the personality through the regression model  $X = 41.80 + .529X_1$ . Results of testing the first hypothesis, suggested that personality was positively related to the Affective Organization Commitment (AOC). The shape of the positive relationship indicated by the regression equation  $X = 44.65 + .699X_1$  with  $t_{cal} > t_{table}$  and the strength of the relationship  $r_{xy} = .439$  with a coefficient of determination of 6.188. Results of testing the second hypothesis, suggested that distributive justice was

positively related to the Affective Organization Commitment (AOC). The shape of the positive relationship indicated by the regression equation  $X = 62.97 + .851X_2$  with  $t_{cal} > t_{table}$  and the strength of the relationship  $r_{xy} = .386$  with a coefficient of determination of 5.466.

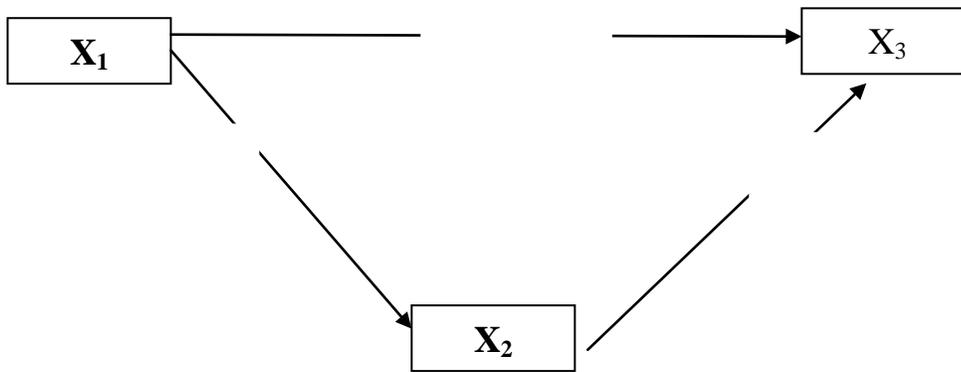
Results of testing the third hypothesis, suggested that personality was positively related to the distributive justice. The shape of the positive relationship indicated by the regression equation  $X = 41.80 + .529X_1$  with  $t_{cal} > t_{table}$  and the strength of the relationship  $r_{xy} = .462$  with a coefficient of determination of 5.783.

## V. DISCUSSION

From the calculation of path analysis, the value of  $\rho_{x3x1}$  path coefficient of .463 and  $t_{count}$  of 6.18  $t_{table}$  value for  $\alpha = .01$  of 2.62. value  $\rho_{x3x1}$  path coefficient of .386 and  $t_{count}$  value of 5.44.

The  $t_{table}$  value for  $\alpha = .01$  is 2.62. and the value of  $\rho_{x3x1}$  path coefficient of .462 and the  $t_{count}$  of 5.78  $t_{table}$  value for  $\alpha = .01$  of 2.62.

Since the value of  $t_{count}$  is greater than  $t_{table}$  then  $H_0$  is rejected and  $H_1$  is accepted.



**Fig 1. Path Empirical Model**

Based on test of first hypothesis could be interpreted that there was a direct personality to affective organization commitment with the value of correlation coefficient of .617 and the path coefficient of .439. It gives the personality has a direct positive effect on Affective Organizational Commitment.

Related to this result was relevant to Schermerhorn statement (2013: 383) that “personality is the profile of characteristics build a unique person from the others.” Everyone has a different reaction to the action from outside himself. Living within the organization, the organization's effectiveness emphasizes as a result of individual outcomes in the form of work behavior, performance, job satisfaction, organizational citizenship behavior and organizational commitment.

According to Beer dan Brooks (2011: 175), “Personality has been considered as an important factor in the personality related studies specifically for predicting the job performance. It is a behaviour which differentiates one person from another.” In other words, the personality in an organization will affect the teacher's commitment in doing his job. If the teacher has a good personality, they will be better in their performance too.

From the results of the second hypothesis test can be concluded that there is a direct positive distributive justice influence on affective organizational commitment with the value of correlation coefficient of .869 and the path coefficient of .386. It implies that distributive justice has a positive direct effect on the affective organizational commitment. Treating teachers fairly influences teacher commitment.

According to McShane and Von Glinow (2008: 159), “procedural justice is as important as distributive justice, and it influences organizational commitment, trust, and various withdrawal and aggression behavior”. And Kitchard and Strawser (2001: 221) explained, “satisfied employees develop high affective commitment for their firm.”

If there is no procedural fairness perceived by members of the organization, then organizational commitment will be low, it can be seen in the resignation from both physically and psychologically to other aggressive actions that harm the institution. According to Herman (2013:97) et.al., “Distributive justice is concerned with the reality that not all people are treated alike; the allocation of outcome is almost differentiated in workplace.”

From the results of the third hypothesis test can be concluded that there is a direct positive influence of personality to the distributive justice with the value of correlation coefficient of .462 and the path coefficient of .462. It implies that personality has a direct positive effect on distributive justice.

Based on this consideration, teachers can rationalize their desire to stop by finding 'evidence' that illustrates how rewards are unfairly distributed. Distributive justice seems to play an important role for people in evaluating organizational commitment, teachers will be more attached to school if they can benefit equally with others. It is generally agreed that teacher commitment develops when a teacher is treated fairly.

Related to this result was relevant to Hellriegel and Slocum statement (2011: 46) that, “Individuals who have high moral intelligence are likely to find it natural to implement the interactional justice criteria when striving to implement both procedural justice and distributive justice in their leadership roles. According to Jansen (2010: 787) et.al., “Distributive justice may be perceived differently by employees working in the similar organizational settings for the reason that they assess their own inputs and output in a different way, or match the ratio of their own inputs and outcomes with that of other employees in a dissimilar environment.” Based on the above explanation, the personality of a teacher affects the distributive justice through the act of justice.

From the results of the fourth hypothesis test can be concluded that there is a positive indirect effect of personality on the affective organization's commitment through distributive justice with the value of correlation coefficient of .272 and the path coefficient of .183. This implies that personality has a direct positive effect on distributive justice.

The results of this study are consistent with the opinions of some experts such as those disclosed by Tyler (2003: 283), “distributive fairness is linked to cooperation between the individuals of a society.” In society, justice is very important because it affects a person's disposition to collaborate with others, Fair treatment allows people to link legitimacy with the authorities and to build obligations to fit the norm.

Justice is when a teacher performs his duty then he is entitled to earn sufficient income, a clear career path and promotions that are tailored to the achievement. Fair treatment

reduces the feeling of anger that makes it possible to break the law.

Personality affects the affective organizational commitment and also through distributive justice that associated with the allocation of resources if it is not distributed equally.

In addition to justice or distributive justice there are also individual characteristics as a factor of personality that also will form a person's psychological condition that can affect his attitude toward life in the future development of the organization that creates commitment in a person.

A person with a good, capable, skilled, and reliable personality in many situations will be a good human resource potential that in turn will achieve a positive impact on organizational performance and commitment.

According to McElroy (2007:809), "people who score high on agreeableness are sympathetic, good natured, cooperative and forgiving. They help others and expect help in return." Justice in an organization will create a good teacher personality.

## VI. CONCLUSION

The conclusion of the research can be formulated as follows:

First, there was a direct effect of personality on affective organizational commitment; The results of this study indicate that the commitment of affective organizations will increase if supported by the personality. Some attempts to improve the personality include the superiority of the boss or principal to the subordinates or subordinates, the assessment of the employee's contribution, and the organization's commitment to the employee.

Second, there was a direct effect of distributive justice on affective organizational commitment; The commitment of affective organizations refers to the actions of trust reflected in consistent behavior on work commitment, honesty, expected ability, building cooperation and openness.

Third, there was a direct effect of personality on distributive justice. Variation of distributive justice could be explained by personality. This refers to a positive assessment of the organization in the effort to increase business in work, the respect (honor), carrying (caring), and tangible benefits such as salaries and health benefits, feelings appreciated by the organization to help meet employees' needs for approval (approval), esteem (rewards) and affiliation (membership).

Finally, there was an indirect effect personality on affective organizational commitment through distributive justice; The results of this study indicated that the commitment of affective organizations will increase if supported by personality and distributive justice. Some efforts to increase the commitment of affective organizations such as principals to pay attention to the well-being of teachers, create a sense of care and mutual respect among others so that the creation of a good person and foster a sense of attachment to the school.

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# Stereoselective synthesis of bicyclic $\alpha$ -hydroxy acid derivatives by Pauson-Khand reaction of $\alpha,\alpha$ -dialkylated glycolic acid derivatives

Vajira P. Bulugahapitiya

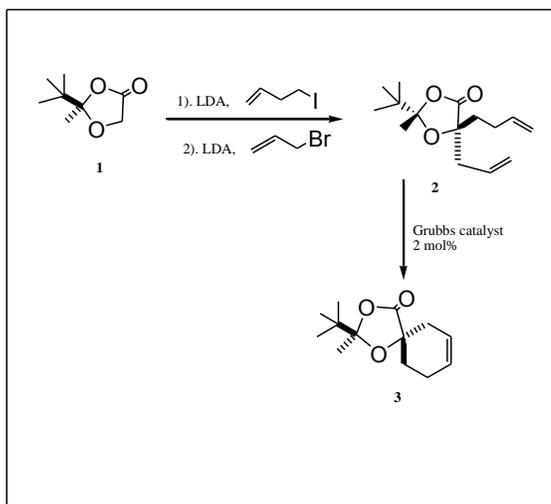
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**Abstract-** Asymmetric cyclic  $\alpha$ -hydroxy acids (1-hydroxycycloalkane-1-carboxylic acids) are important constituents in biologically active natural products and also important precursor molecules for the synthesis of pharmacologically active compounds. This paper presents highly stereoselective synthesis of polysubstituted bicyclic  $\alpha$ -hydroxy acid derivatives from  $\alpha,\alpha$ -dialkylated 1,3-dioxolan-4-one (**9**). The synthesis was based on the  $\alpha$ -propagation of 2-(*tert*-butyl)-5-(1-ethenylprop-2-enyl)-1,3-dioxolan-4-one (*trans*-**7**) via its enolate, followed by intramolecular Pauson-Khand cyclization. The reaction was highly stereoselective and afforded two isomers (**10a** and **10b**) in 4:1 ratio out of four possible diastereoisomers of bicyclic  $\alpha$ -hydroxy acid (bicyclic 1-hydroxycarboxylic acid) derivatives. This method opens a new avenue to prepare synthetically useful asymmetric polysubstituted bicyclic  $\alpha$ -hydroxy acids using a convenient and very effective method.

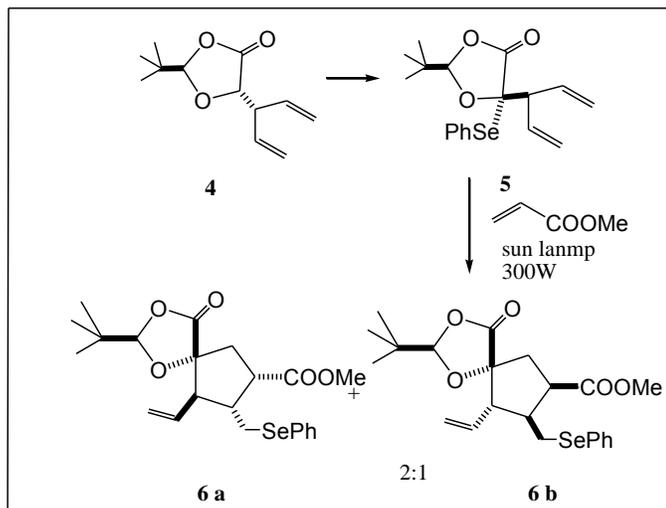
**Index Terms-** Stereoselective synthesis, glycolic acids, bicyclic  $\alpha$ -hydroxy acids, Pauson - Khand reaction,

## I. INTRODUCTION

Cyclic  $\alpha$ -hydroxy carboxylic acids are important constituents in pharmacological active natural products and also they are important synthetic building units for the preparation of various biologically active natural products (Barcho et al, 1997). Although the research has mainly focused on the development of potential synthetic strategies for the synthesis of acyclic  $\alpha$ -hydroxy acids (Dochnahl M et al, 2009), less attention has been paid on the development of methods for the preparation of cyclic  $\alpha$ -hydroxy acids. Glycolic acids is an easily available, important  $\alpha$ -hydroxy acid which can be easily converted into the asymmetric acetals, and it can then serve as chiral auxiliaries in selective induction of its  $\alpha$ -position leading to the preparation of asymmetric 1-hydroxycycloalkane-1-carboxylic acid derivatives (Abazi et al, 1999). In our previous work, we reported stereoselective preparation of 1-hydroxycyclopentene-1-carboxylic acid derivatives (**3**, **Figure -1**) using chiral equivalent of glycolate derivatives via metathesis (Rapado et al, 2000). This method has been successfully applied in the synthesis of natural product, (-)-quinic acid. In another method, we have demonstrated synthesis of polysubstituted 1-hydroxycyclopentane-1-carboxylic acid derivatives (**6a** and **6b**, **Figure-2**) using chiral equivalent of glycolate derivatives via a group selective radical annulations procedure (Bulugahapitiya et al, 2001)



**Figure-1:** Synthesis of 1-hydroxycycloalkene-1-carboxylic acid by Metathesis

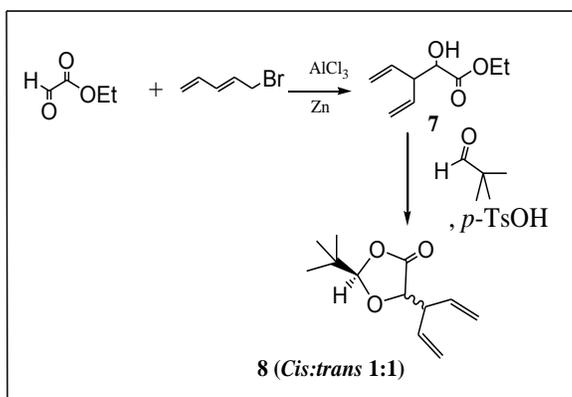


**Figure-2:** Synthesis of 1-hydroxycycloalkene-1-carboxylic acid via radical annulation

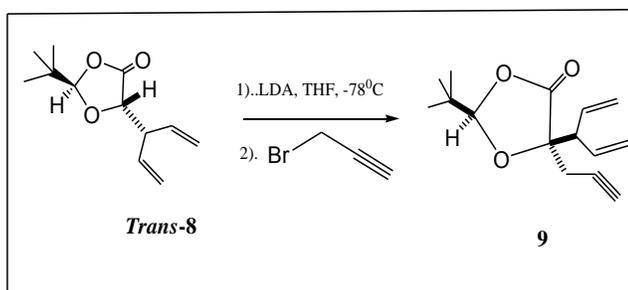
Development of synthetic strategies for the preparation of asymmetric bicyclic  $\alpha$ -hydroxy acids is important. Pauson-Khand reaction has emerged as a convenient tool for the synthesis of five-membered rings, cyclopentenones, from alkynes and alkene with the mediation of Cobalt carbonyl compounds (Pauson, 1985). In this reaction, the alkyne first reacts with  $\text{Co}(\text{CO})_8$  to form alkyne- $\text{Co}_2(\text{CO})_6$  complex and then it reacts with alkene to form cyclopentenones. We have planned a synthetic route to bicyclic 1-hydroxycarboxylic acid derivatives based on intramolecular Pauson-Khand cyclization of  $\alpha,\alpha$ -dialkylated glycolic acid derivatives. As a demonstration of the proposed method, we explain here the synthesis of asymmetric polysubstituted bicyclic 1-hydroxycarboxylic acid derivatives (**10a** and **10b**, **Figure-5**) from a derivative of glycolic acid.

## II. MATERIAL AND METHOD

The starting compound for the preparation of precursor molecule for the Pauson-Khand reaction, ethyl 3-ethenyl-2-hydroxy-pent-4-enoate (**7**) was prepared by the reaction of 5-bromo-1,3-pentadiene with ethyl glyoxylate in the presence of Zn powder and anhydrous  $\text{AlCl}_3$  (**Figure-3**) (Hook, 1984; Jung et al, 1996). This compound was then reacted with pivalaldehyde to form 2-(*tert*-butyl)-5-(1-ethenyl prop-2-enyl)-1,3-dioxolane-4-one (**8**) (**Figure-3**) (Bulugahapitiya et al, 2000). The *trans* isomer of **8** ( $\alpha$ -mono substituted cyclic acetal of glycolate) was deprotonated with LDA in THF at  $-78^\circ\text{C}$  and then alkylated with propargyl bromide to obtain  $\alpha$ -disubstituted cyclic acetal of glycolate (**9**), which was the substrate for the Pauson-Khand cyclization (**Figure -4**).

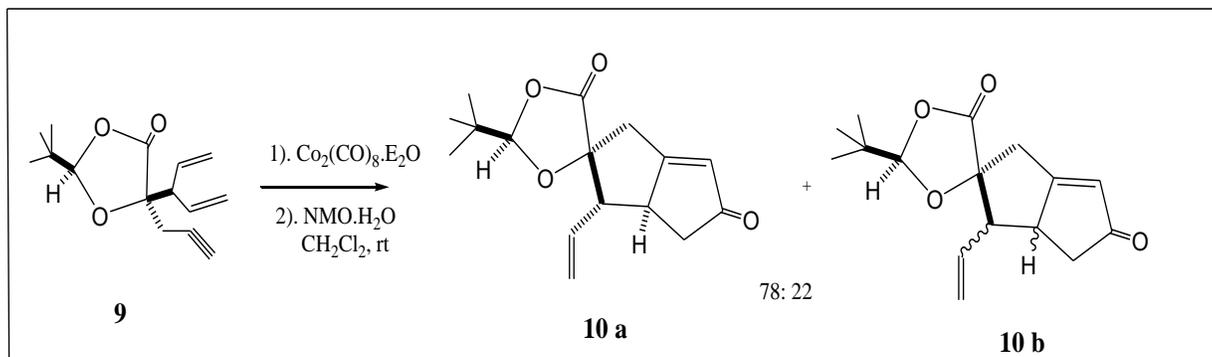


**Figure-3:** Preparation of  $\alpha$ -monosubstituted cyclic acetal, 2-(*tert*-butyl)-5-(1-ethenyl prop-2-enyl)-1,3-dioxolane-4-one



**Figure-4:** Preparation of  $\alpha$ -disubstituted cyclic acetal, 2-(*tert*-butyl)-5-(2-propynyl)-5-(1-vinyl-2-propenyl)-1,3-dioxolane-4-one

Then, the compound **9** (2-*tert*-butyl-5-(2-propenyl)-5-(1-vinyl-2-propenyl)-1,3-dioxolane-4-one) was subjected to intramolecular Pauson-Khand cyclization by reacting first with cobalt carbonyl,  $\text{Co}_2(\text{CO})_8$  at room temperature followed by separation of the formed alkyne- $\text{Co}_2(\text{CO})_6$  complex using flash chromatography and then treating it with  $\text{NMO} \cdot \text{H}_2\text{O}$  in  $\text{CH}_2\text{Cl}_2$  at room temperature to afford the desired bicyclic 1-hydroxycyclohexanecarboxylic acid derivatives (**10a** and **10b**, **Figure-5**) (Tormo et al, 1997).

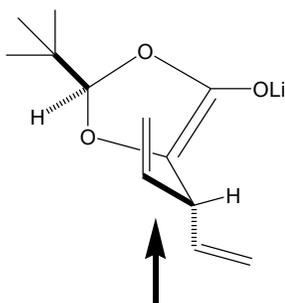


**Figure-5:** Intramolecular Pauson-Khand reaction to prepare bicyclic  $\alpha$ -hydroxyl acid derivatives

The stereoselectivity of the formed mixture of bicyclic 1-hydroxycarboxylic acid derivatives was analyzed with the help of gas chromatography and NMR spectroscopy. The mixture of the isomers was separated using preparative HPLC and the structures and the relative stereochemistry of the diastereomers were determined by NMR studies (NOE difference spectra).

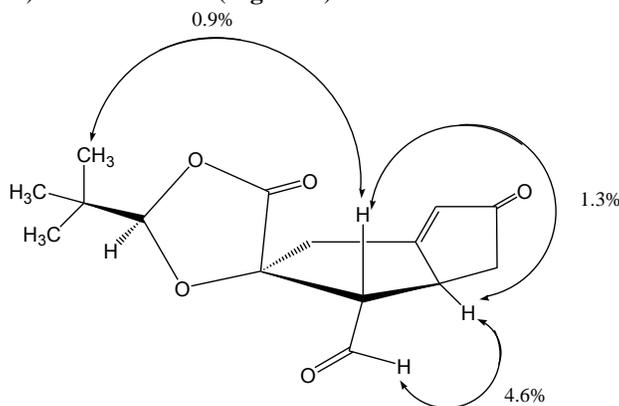
### III. RESULTS AND DISCUSSION

The formation of ethyl 3-ethenyl-2-hydroxypent-4-enoate (**7**) was not stereoselective and it was formed as a racemic mixture in 52% yield in the reaction of nucleophilic addition of 5-bromo-1,3-pentadine to aldehyde carbonyl of ethyl glyoxylate in the presence of  $\text{AlCl}_3$  (**Figure-3**). The cyclic acetal, (**8**), 2-(*tert*-butyl)-5-(1-ethenyl prop-2-enyl)-1,3-dioxolane-4-one was formed as a separable 1:1 (*cis:trans*) mixture in 65% yield (**Figure-3**). The alkylation of *trans* isomer of cyclic acetal, **8** with propargyl bromide was totally selective and afforded 2-(*tert*-butyl)-5-(2-propynyl)-5-(1-vinyl-2-propenyl)-1,3-dioxolane-4-one (**9**) in 65% yield. The total stereoselectivity in propargylation can be explained using the model given below (**Figure 6**). The enolate derived from **8** should be in the preferable conformation as depicted in the Figure-6. According to this, two vinyl groups are oriented in the way shielding of the two faces of the enolate equally and the alkylation (propargylation) is taken place *anti* to the *tert*-butyl group forming exclusively **9** (Seebach et al, 1984, Rapado et al, 2000). All the efforts made to alkylate the *cis* isomer was failed giving still no clear reasons.



**Figure -6:** Stereochemical model for the alkylation of Li-enolate derived from *trans*-**8**.

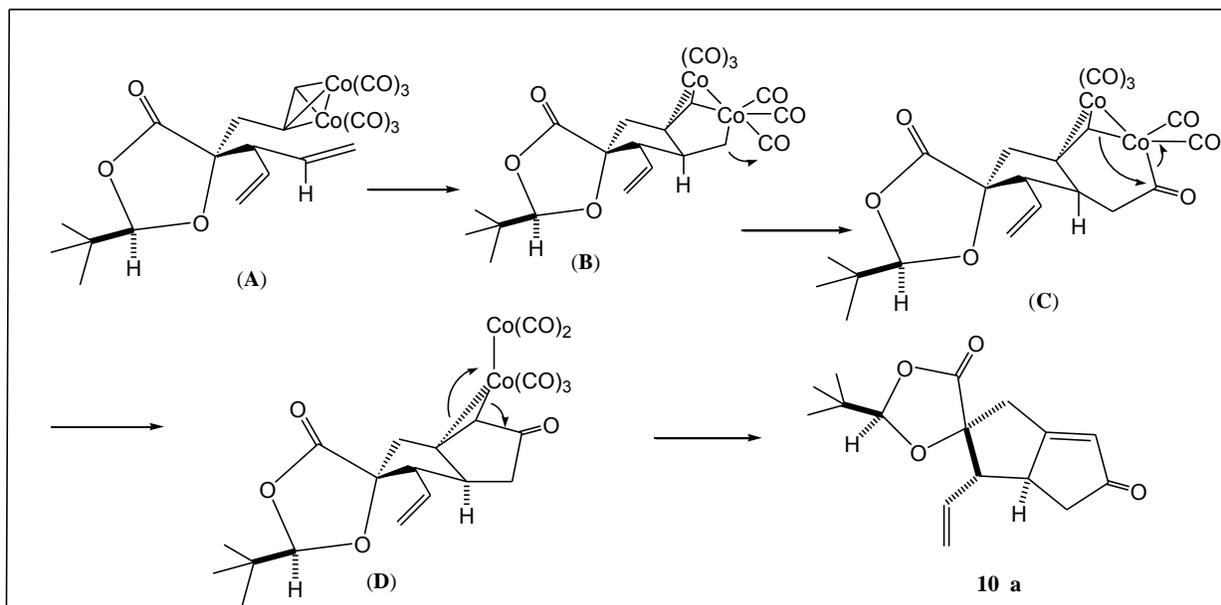
Pauson-Khand cyclization of the substrate, 2-(*tert*-butyl)-5-(2-propynyl)-5-(1-vinyl-2-propenyl)-1,3-dioxolane-4-one (**9**) was highly selective and the desired bicyclic 1-hydroxycarboxylic acid derivatives (**10a** and **10b**) were formed as a mixture of two diastereomers (4:1) out of four possible diastereomers. This isomeric mixture could be separable only in preparative HPLC. The NOE different spectra supported to determine the relative stereochemistry of the major isomer, 7-[2-*tert*-butyl]-6-vinyl-1,3'-dioxolan-4-noyl]-bicyclo[3.3.0]oct-1-en-3-one (**10a**) as shown below (**Figure-7**).



**Figure -7:** NOE's of major isomer, **10 a**

The proposed mechanism for the intramolecular cyclization is given below (**Figure-8**). The stereochemical outcome of the intramolecular Pauson-Khand cyclization could be rationalized by the formation of pseudo chair conformation of Co-alkyne complex (**A**) with the orientation of one vinyl group at the equatorial position. The cyclization is mainly controlled by steric factors of *tert*-butyl group and *cis*-fused conformation is dominated with minimizing steric interactions between vinyl group and *tert*-butyl group in the intermediate. The metalocycle, **B** then undergo carbonyl insertion to form the intermediate **C** which is set up to migrate C-Co bond to

the adjacent electrophilic carbonyl carbon to form **D**. The reductive elimination of cobalt carbonyl residue ( $\text{Co}_2(\text{CO})_5$ ) of **D** leads to form major diastereoisomer of **10a**.



**Figure-8:** Proposed mechanism for intramolecular Pauson-Khand reaction

#### IV. CONCLUSION

We have documented here highly stereoselective and an efficient synthesis of bicyclic 1- hydroxycarboxylic acid derivatives based on Pauson-Khand cyclization. As 1-hydroxycycloalkane-1carboxylic acids serve as important starting compounds for the preparation of biologically active molecules, this method can be applied in the synthesis of wide range of biologically relevant molecules.

#### Appendix

##### Experimental General:

THF was freshly distilled in the presence of K under  $\text{N}_2$ ,  $\text{CH}_2\text{Cl}_2$  was distilled in the presence of  $\text{CaH}_2$  under  $\text{N}_2$ . Other reagents were obtained from commercial sources. For Flash column chromatography ; Merck silica gel 60( 70-230 mesh) and for TLC ; Merck silica gel 25  $F_{254}$ , analytical plates were used. Detection either by UV,  $\text{I}_2$  or by spraying with phosphomolybdic acid solution, Diastereoselectivity was determined by GC ; column Machenery-Nagel-OPTIMA – 1701. Mp was determined by Reicher Thermovar Kofler. IR spectra ; Perkin-Elmermattson Unicam 50016PC FT-IR NMR spectra; Varian Gemini 200 ( $^1\text{H}$ =200 MHz,  $^{13}\text{C}$ -50.3 MHz) Bruker AM 360 ( $^1\text{H}$ =360 MHz,  $^{13}\text{C}$ = 90.5 MHz), Bruker Advance DRX 500 ( $^1\text{H}$ =500.13 MHz,  $^{13}\text{C}$ =125.8 MHz), chemical shift in ppm, TMS (d=ppm),  $\text{CDCl}_3$  used, Mass; Vacuum Generators Micromass VG70/70E, DS 11-250; EI (70eV 0., m/z (o%), FAB in 2-nitrobenzylalcohol with Ar at 8KV, IR in  $\text{cm}^{-1}$ .

##### Preparation of compounds and Spectral Data:

**Ethyl 3-ethenyl-2-hydroxypent-4-enoate (7):** A solution of 5-bromopenta-1,3-diene (2.0 g, 13.6 mmol) in THF (5 ml) was added to a suspension of Zn (890 mg, 13.6 mmol) and  $\text{AlCl}_3$  (1.8 g, 13.6 mmol) in THF (32 ml) at room temperature under  $\text{N}_2$ . After stirring for 15 min, a solution of ethyl glyoxylate (1.38 g, 13.86 mmol) in THF (5.0 ml) was added and the mixture was stirred for 8 h until all starting compound was consumed. Then the mixture was poured into sat.  $\text{NH}_4\text{Cl}$  solution (10.0 ml) and extracted with  $\text{Et}_2\text{O}$  (3 x 40 ml). The combined organic phase was washed with brine, dried with  $\text{MgSO}_4$  and evaporated, and crude product was purified by FC (hexane/ $\text{AcOEt}$  4:1); compound **7** afforded pale yellow oil, 1.20 g, 52% yield. IR (Film): 3501, 3080, 2982, 2937, 2936, 1737, 1250, 1109.  $^1\text{H}$ -NMR (360 MHz): 5.87-5.78 (m,  $2\text{CH}=\text{CH}_2$ ); 5.18-5.11 ( $2\text{CH}=\text{CH}_2$ ); 4.2(m,  $\text{CHOH}$ ,  $\text{MeCH}_2\text{O}$ ); 3.18-3.17(m,  $\text{CH}(\text{CH}-\text{CH}_2)_2$ ); 2.85(d, OH); 1.27(t,  $\text{MeCH}_2\text{O}$ ).  $^{13}\text{C}$ -NMR(50.3MHz); 173.42(s); 136.48(s); 134.7(s); 11.91(s); 73.54(s); 61.59(s); 14.2(s). CI-MS: 171(4,  $\{\text{M}+1\}^+$ , 170(36,  $\text{M}^+$ ), 152(11), 151(5), 142(3), 124(14), 123(8), 122(5), 106(10), 102(6), 96(35), 80(12), 78(30), 77(7), 68(27), 67(54), 66(100), 54(24), Anal. Cal. for  $\text{C}_9\text{H}_{14}\text{O}_3$ (170.21): C 63.51, H 8.29; Found C 62.95, H 7.99.

**2-(tert-butyl)-5-(1-ethenylprop-2-enyl)-1,3-dioxolane-4-one (8):** A mixture of **7** (2.0 g, 11.6 mmol), 2,2-dimethylpropanal (4.0 g, 94.08 mmol),  $\text{TsOH}$  950 mg), and 1 drop of conc.  $\text{H}_2\text{SO}_4$  in pentane (20 ml) was heated under reflux with azeotropic removal of

H<sub>2</sub>O. After completion of the reaction, the solution was washed with H<sub>2</sub>O, dried with MgSO<sub>4</sub> and evaporated under *vacuum*. The crude product was purified by FC (pentane:Et<sub>2</sub>O 20:1) gave *cis:trans* mixture of **8** in 1:1 (1.60 g, 65%). IR (Film): 3583, 3084, 2976, 2910, 2876, 1788, 1485, 1363, 1201, 1103. CI-MS: 211(42, [M+1]<sup>+</sup>), 194(7), 193(57), 189(4), 183(9), 175(8), 171(19), 167(7), 166(27), 152(25). HR-MS: 211.1326 (C<sub>12</sub>H<sub>19</sub>O<sub>3</sub><sup>+</sup>, [M+1]<sup>+</sup>; calc. 211.1328.

**Trans-8**: <sup>1</sup>H-NMR (500 MHz): 5.97-5.83(*m*, 2 CH=CH<sub>2</sub>); 5.27-5.25(*m*, H-C(2), 2 CH=CH<sub>2</sub>); 4.45-4.44(*dd*, J=3.35, 1.6 H-C(5)); 3.31-3.25(*m*, CH(CH=CH<sub>2</sub>)<sub>2</sub>); 0.94(*s*, *t*-Bu). <sup>13</sup>C-NMR (126.76 MHz): 172(*s*); 135.4(*s*); 132.4(*s*); 119.2 (*s*); 118.1(*s*); 111.4(*s*); 78.1(*s*); 50.3(*s*); 23.1(*s*).

**2-tert-butyl-5-(2-propenyl)-5(1-vinyl-2-propenyl)-1,3-dioxolan-4-one (9)**: To a solution of LDA (4.2 ml, 4.2 mmol) at -78<sup>o</sup>C. a solution of *trans-8* (740 mg, 3.52 mmol) in THF (2.0 ml) was added slowly and stirred for 5 min. A solution of propargyl bromide (2.096 g, 17.6 mmol) in THF (2.0 ml) was added and the solution was allowed to warm up to room temperature. After about 2 hrs, saturated solution of NH<sub>4</sub>Cl was added and the solution was extracted with Et<sub>2</sub>O (3 x 20 ml). combined organic phases was washed with brine and dried over MgSO<sub>4</sub>. After evaporation of the solvent the crude was purified by FC (hexane/EtOAc, 20:1), **9** afforded as pale yellow oil and as single isomer, 560.00 mg, 65%. IR (Film): 3620; 3296; 3084; 2976; 2876; 2360; 1797; 1485; 1410; 1195. <sup>1</sup>H-NMR(500 MHz): 5.92-5.79(*m*, 2H, 2 CH=CH<sub>2</sub>); 5.9 (*s*, 1H, HC-*t*-Bu); 5.28-5.12(*m*, 4H, 2CH=CHH); 3.2(*m*, 1H, CH(CH=CH<sub>2</sub>)<sub>2</sub>); 2.75-2.7(*dd*, 1H, J=17.13, 2.67, HHC-CCH); 2.69-2.59 (*dd*, 1H, J=17.63, 2.67, HHC-CCH); 2.09 (*t*, 1H, J=2.74 CH<sub>2</sub>CCH); 1.0 (*s*, 9H, *t*-Bu). <sup>13</sup>C-NMR(125.7 MHz): 173.06(*s*), 134.9(*s*), 133.9(*s*), 120.15(*s*), 119.2(*s*), 109.83(*s*), 83.7(*s*), 78.3(*s*), 72.3(*s*), 53.7(*s*), 34.9(*s*), 24.7(*s*), 24.27(*s*). CI-MS: 249(8, [M+1]<sup>+</sup>), 209(5), 202(6), 190 (7), 180 (9), 162 (19), 152 (7), 137 (13), 136 (100), 134 (22), 118 (8), 116 (6), 108 (23), 106 (17), 94 (19), 80 (27), 66 (44), 56 (13). Anal. calc. for C<sub>15</sub>H<sub>20</sub>O<sub>3</sub>(248.322): C 72.55, H 8.12: Found C 72.63, H 8.00.

**7-[2-tert-butyl-6-vinyl-1,3'-dioxolan-4-onyl]-bicyclo[3.3.0]oct-1-en-3-one (10 a)**: To a solution of **9** (120 mg, 0.48 mmol) in Et<sub>2</sub>O (2.0 ml), dicobaltoctacarbonyl (198 mg, 0.58 mmol) was added and stirred at room temperature. After completion of the complex (about 2hrs), Et<sub>2</sub>O was evaporated and pure alkyne-cobalt complex (220 mg, 77% ) was obtained after FC( hexane: EtOAc, 20:1). To this cobalt complex in CH<sub>2</sub>Cl<sub>2</sub> (10 ml), NMO.H<sub>2</sub>O (654 mg, 4.8 mmol) was added and stirred for 5 hrs at rt. The solution was dried with MgSO<sub>4</sub> and followed by filtration, and the crude product obtained was purified using FC (hexane: EtOAc. 2:1) to afford mixture of products, **10 a** and **10 b** ( 76% *ds*, GC). The two diastereomers in the mixture was separated by preparative HPLC. Major (**10 a**); <sup>1</sup>H-NMR(360 MHz); 6.0 (*m*, 1H, HC=CCH<sub>2</sub>); 5.9-5.8(*m*, 1H, HC=CH<sub>2</sub>); 5.29-5.23(*m*, 2H, CH=CHH); 5.1(*s*, 1H, HC-*t*-Bu); 3.4(*m*, 1H, CH-*HC*-CH<sub>2</sub>); 3.2(*d*, 1H, J=18.31, HHC-C=CH); 2.9(*d*, 1H, J= 18.31, HHC-C=CH); 2.6 (*dd*, J= 18.31, 6.72, HHC-CO); 2.5 (*dd*, 1H, J= 12.51, 8.24, HC-*HC*=CH<sub>2</sub>); 2.1 (*dd*, 1H, J= 18.3, 3.05, HHC-CO) 1.0 (*s*, 9H, *t*-Bu). <sup>13</sup>C-NMR (125,7 MHz): 208.8(*s*); 181.5 (*s*); 174.0(*s*); 133.2 (*s*); 126.9 (*s*); 121.1 (*s*); 106.9 (*s*); 87.8 (*s*); 66.1 (*s*); 57.1 (*s*), 48.5 (*s*), 34.7 (*s*), 32.1(*s*); 25.9 (*s*). IR (KBr): 2949; 2948; 2897; 2348; 2344; 2281; 1776; 1685; 1641; 1640; 1529; 1210; 1111; 1110; 962; 970. CI-MS: 278 (21 [M+1]<sup>+</sup>); 277 (91); 259 (9); 241 (3); 230 (6); 219 (20); 204(3); 191 (9); 190 (100); 189 (16); 188 (4); 172 (3); 162 (55); 161 (7); 144 (9); 86 (6). Anal calc. for C<sub>16</sub>H<sub>20</sub>O<sub>4</sub> (276.33) C 69.55, H 7.30: Found C 69.65, H 7.33.

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- **Abstract:** *The government of India took a bold decision of Demonetization on 08/11/2016. In this research I have utilized the opinions of general public and few economists and rational people. This study will help us to understand the thinking of the public about the Demonetization and to understand the positive and negative Impact of Demonetization in India it will also give some insight about some less discussed issues related to the impact of demonetization.*

- **Keywords:** Demonetization, Black money, Government, Cashless system, Financial strategy.

## 1. Introduction:

### 1.1 Rationale of research

- In order to know whether the Indians are in favor of this decision of the currently ruling government or not.
- In order to know the conditions of all the classes of people of India during the period of demonetization and how did it affect the daily routine of Indian people and related functioning.
- In order to know the positive and negative impact of demonetization on Indian economy and business.
- In order to know the opinions and reactions of Indian businessmen, economists, politicians and financial experts.

### 1.2 Scope of Research:

- Demonetization is one of the biggest and the most critical steps taken by any ruling governments of India ever to recover black money.
- The research has been conducted to understand the actual effect of the demonetization through which one will able to know the overall effect on people and economy of the India.
- This research will help the Indian citizens and businessmen of small enterprise to know the basic impact on their daily transactions so that they can plan accordingly about their budget for any given period of time in future.
- This research will give the idea about the changes in the financial functioning of the India including the various sectors like Banking Sector, Revenue Department, Direct and Indirect Taxes Department (CBDT & CBEC) etc.

## 2. Literature Survey:

### 2.1 Definitions of demonetization:

- Demonetization means Withdrawal of a particular form of currency from circulation. (Businessdictionary, 2017)
- Demonetization is the act of stripping a currency unit of its status as legal tender. It occurs whenever there is a change of national currency. (Investopedia, 2017)

- Demonetization refers to an economic policy where a certain currency unit ceases to be recognized or used as a form of legal tender. In other words, a currency unit still loses its legal tender status as a new one comes into circulation. (ImportantIndia, 2017)

### 2.2 Meaning of Demonetization:

- The governments of the respective countries formulate the financial strategies and policies for the economic growth of the country. Most of the times when a lot of black money circulates in the economy of the country which is unaccounted for because the sources of income are not known to the government. It can be money generated through illegal trade or unauthorized funding. To remove this money out of circulation, the government can take the steps like demonetization so that the money holders are forced to deposit the cash with the banks or lose their wealth. It is a strategy that has worked effectively in few countries.
- Demonetization can also be referred to as the process of moving people from a cash-based system to a cashless system (digital system). (ImportantIndia.com, 2017). The cashless system (digital system) can be achieved with the help of technologies like electronic and mobile payment methods.
- By keeping hard cash people can easily evade taxes, which is a harmful practice for an economy of any country. Keeping cash out of the bank accounts also reduces the deposits with the banks and financial institutions. It means that the government has to borrow the funds from external sources like World Bank & IMF etc. which leads to increase the national debt. The economic impacts of which are many and severe. Moving people to a cashless system is, therefore, a favorable economic policy for any country.
- The management of process demonetization is very important. If it managed well it can be beneficial in terms of economically as well as socially, like it can reduce inflation, improve the economy, and result in financial behavior change among citizens. However, if not managed well, it may cause a lot of economic trouble to the people.
- How the process is managed in the best way determines its effects on the economy of a country.

### 2.3 Brief history of Demonetization in India:

- The India has already gone through the situation of demonetization twice before Nov.8, 2016. Firstly in the year of 1946 and secondly in the year of 1978.
- The first was when Rs1,000, Rs5,000, and Rs10,000 notes were taken out of circulation in January 1946, a year and a half before the country won independence from the British. The Rs10,000 notes were the largest currency denomination ever printed by the Reserve Bank of India, introduced for the first time in 1938.
- All three notes were reintroduced in 1954.
- In the early '70s, the Wanchoo committee, a direct tax inquiry committee set up by the government, suggested demonetization as a measure to abolish the existence of black money.
- Then, in 1977, the Janata Party coalition government came into power. A year into the government's term, party leader Morarji Desai was more bullish about cracking down on counterfeits and black money. The High Denomination Bank Notes (Demonetization) Act, instated by the ruling party on Jan. 16, 1978, deemed the Rs. 1000, Rs 5000 and Rs10,000 notes illegal for the second time.

#### 2.4 Other studies on the 'Demonetization'

##### ▪ Article # 1 - The Demonetized Indian

"Indians are a resilient lot. By nature, we Indians, maybe have it in our blood to bounce back from shocks-natural and man-made and get on with things. On 9th of November, when the citizens of India- were told that the 500 and 1000 INR currency notes in their pockets will no longer continue to be legal tender, the entire country was in stun. The next few days that followed were long queues outside ATM's (banks were suddenly the most 'in demand' commodity); wage earners requested their bosses for short leave to tend to the same. The prime minister promised the citizens that the pain would last a few days and this was a bold move to tackle black money, corruption as well as counterfeit notes that terrorists use to cause mayhem in our country. The citizens were hopeful; people cooperated and stood outside banks in lines. Even those, the vast majority in villages, travelled miles to find a functioning ATM's. Many a times, when their turn would come, after hours of patiently waiting, the opportunity cost of a job they could be at, the ATM's would run out of " (Sahgal, V.,2017)

##### ▪ Article # 2 - 'Demonetization was a despotic act' said Amartya Sen (Nobel prize winner Indian Economist)

"The demonetization of currency was a despotic act as the government broke the promise of compensation that comes with a promissory note." "Demonetization goes against trust. It undermines the trust of entire economy,"

"Only an authoritarian government can calmly cause such misery to the people - with millions of innocent people being deprived of their money and being subjected to suffering, inconvenience and indignity in trying to get their own money back." (Sen, A., 2016)

##### ▪ Article # 3 - 'Useful step for flushing out black money' said Arvind Virmani (Economist and former Indian representative to the IMF)

"The manner in which it was implemented is not surprising - such actions are always secret till announced, so that insiders do not take advantage of the information at the cost of the outsiders," The Wire quoted Virmani as saying. Speaking on its short-term impact on business community, Virmani said: "How it will affect requires a deeper study, but the first thing one knows is when you demonitize such a large proportion of currency, the immediate effect is a collapse of retail trade in goods and services. He further said the currency needed for everyday transactions has to be replaced quickly. "The longer that is delayed, the more the negative effect," (Virmani, A., 2016)

##### ▪ Article # 4 - "The biggest wild card in all of this, of course, is demonetization." Said Kartik Hosanagar (A professor in Wharton's department of operations, information and decisions)

The year 2017 has overall been "a good year" for India. But the biggest wild card is Demonetization. It is unclear how it will play out. But any impact on economic activity and GDP will be temporary, and the long term benefits such as an increase in cashless activity will be more permanent. (Hosanagar, K., 2017)

##### ▪ Article # 5 - Impact of Demonetization on Indian Society

"We shall see a great impact of this move of the Central Govt. on Indian Society and Economy. The first impact shall be that people will have lower expenditure power. With that they will not be able to purchase luxurious things.

There shall be no ostentatious expenditures on marriages and other ceremonies. So the society will grow lesser materialistic and people more prudent. With the fake money destroyed, Indian economy will see a big boom and the so-far-booming-real-estate-sector shall fall on the ground.

The things may be cheaper. Indian Currency may get respect at the international market. There may be a great check on the terror-related funding and therefore on terrorist activities. Corruption shall be down to a great extent as people will stop the tendency of accumulating money using wrong means.

This big move will certainly abridge the gap between the haves and the have-nots. However, there may be some difficulties for a couple of months. But this inconvenience shall be temporary and for short-term." (Gupta, V., 2016)

### 3. Problem Definition:

- The Problems need to be concerned upon identified as follow:
- The research has been made till now on the topic of demonetization in India most of the respected researchers and paper presenters focused on the economic and the financial aspects of the phenomena. To some extent the discussion concerning the effects on the society as a whole has been made as well.
- But the questions raised in my mind:
  - What about the people died directly or indirectly due to demonetization in India?
  - What cost will be determined of each person who died?
  - What is the potential economic loss to the country due to the death of approximately 90 people which includes 7 to 10 boys and girls aged less than 20 years?
  - What monetary compensation is appropriate to fill the emotional gap of the family members of the diseased people?
- And many others this kind of question can be raised to the government and the rational people of India.
- It can be possible that the young persons who died in the phase of demonetization could have been the potential successful businessman, political leaders, economist etc. that we never know. So that the loss of those people ultimately the future economic loss to the country.
- Few of the people died because of delay in medical attention in private hospitals because their relative had old currency notes to pay, and few of those people died due to standing in long queues without any basic facilities around.

### 4. Research Methodology:

- This is an Exploratory Research to gain the further insight in the subject of demonetization impact in India and its various effects in various areas.

#### 4.1 Sources of Information:

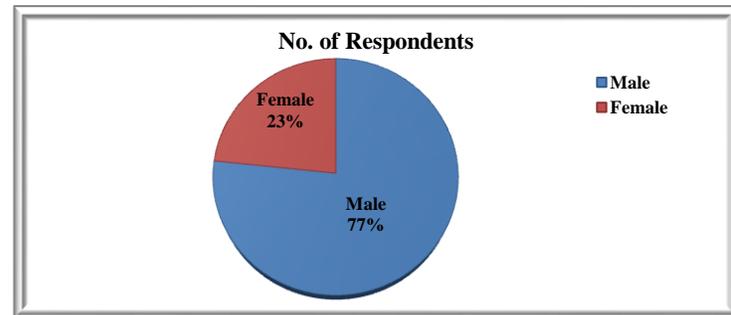
- **Primary Source:** Sample Survey.
- **Secondary Sources:** Online articles, Interviews, Opinions of rational people working in the related area of study.
- **Sample size of Survey:** 30 Persons.
- **Sampling Unit:** State of Gujarat
- **Sampling Technique:** Convenient Sampling.

### 5. Analysis of the Research (Based on the Survey)

- The survey has been conducted on 30 persons (100%) the following analysis are in the proportion of the same:

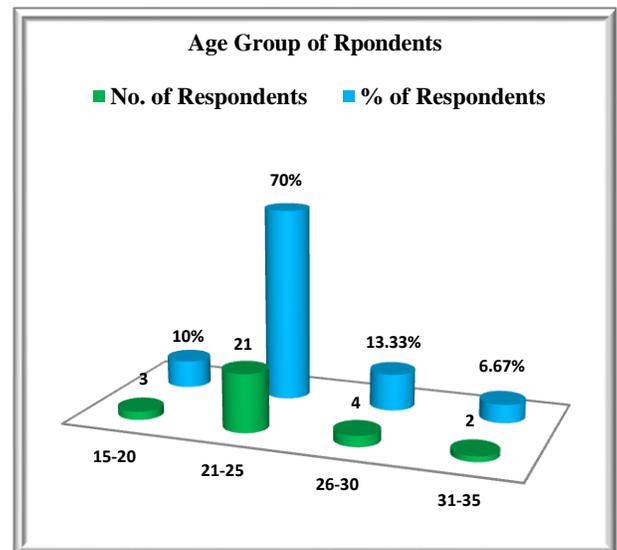
#### 5.1 Demographical Analysis:

##### a) Gender



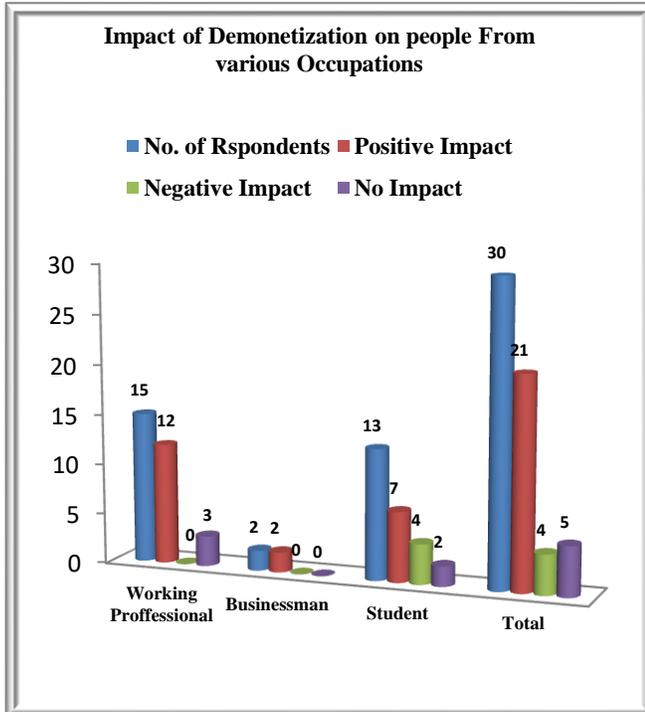
- The most important demographic element is gender.
- In this survey total no. of samples (respondents) are 30, amongst which 23 are male and 7 are female.
- Which are in terms of percentage 77% and 23% respectively.

##### b) Age Group



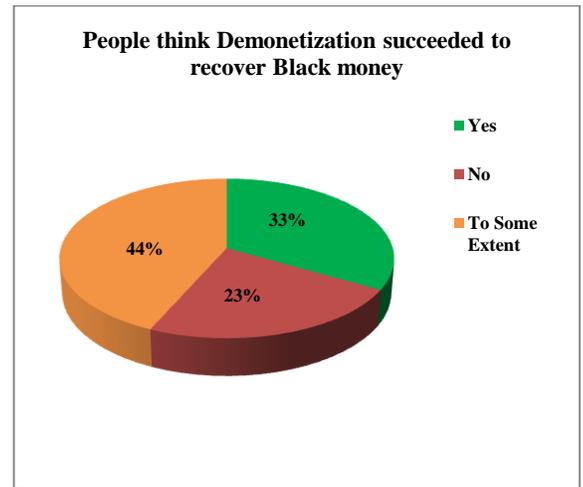
- Age group is another demographic element for this survey.
- The classes of age groups are divided into 15-20 years, 21-25 years, 26-30 years and 31-35 years.
- The highest no. of respondents are in the age group of 21-25 years which is 70% and the lowest no. of respondents are in 31-35 years which is 6.67% it shows that the age group of 21-25 years are more interested to give their opinion in this survey.

### 5.2 Impact of Demonetization on People From various Occupations:



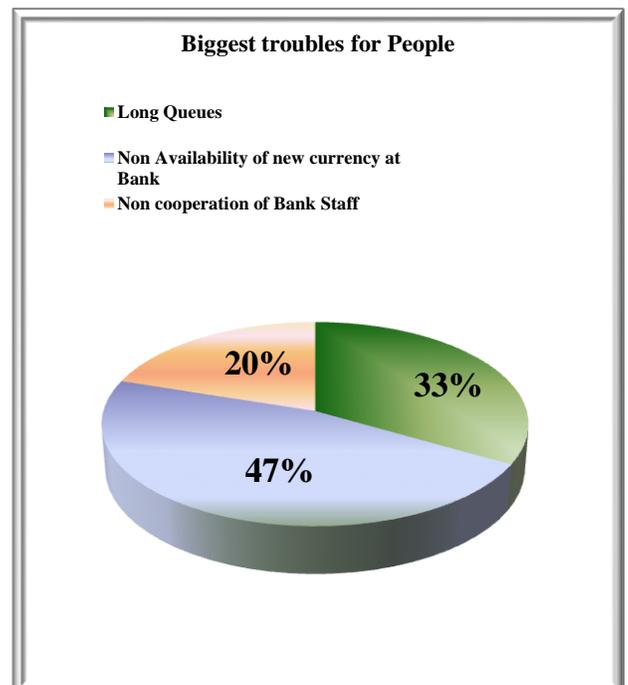
- In this survey I have asked tow questions (1) what is your Occupation? And (2) what is the Impact of Demonetization on your daily financial transactions? To know that the impact of demonetization on the financial transactions of people from various occupations.
- From the above chart we can conclude that out of 15 working professionals 12 thinks that the impact is positive and only two thinks that it has no impact on their financial transactions.
- If we see the total analysis of survey we can conclude that out of 30 people 21 people thinks that demonetization has positive impact, 4 people thinks that it has negative impact and rest 5 people thinks that it has no impact on their financial transactions.

### 5.3 People thinks Demonetization has succeeded to recover Black money:



- From the above pie chart we can see that 33% of people think that Demonetization has succeeded to recover black money.
- 44% of people think that the black money has been recovered to some extent, and only 23% of people think that it has not succeeded to recover black money.
- From this we can conclude that people believes that the black money has been recovered due to demonetization.
- And the initiative of the government to recover the black money is being favored by people.

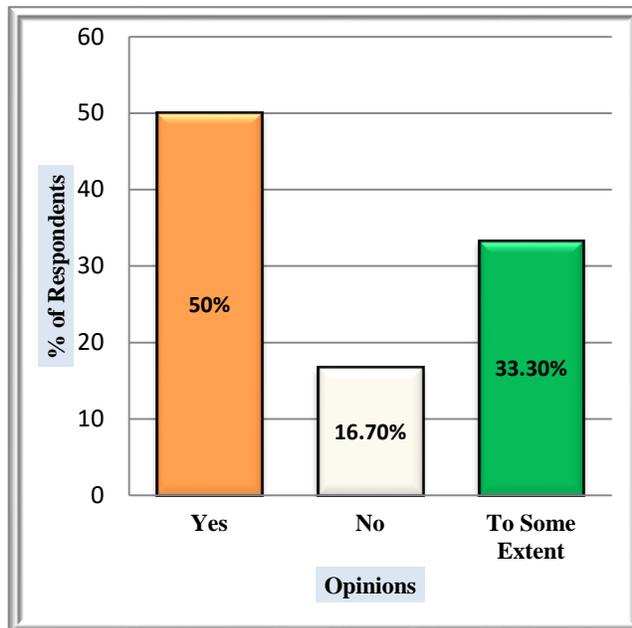
### 5.4 Biggest troubles they had faced during Demonetization:



- From the above pie chart we can see that there are several major troubles were prevailing like long queues in front of Banks, Non availability of new currency at bank, and Non cooperation of bank staff.

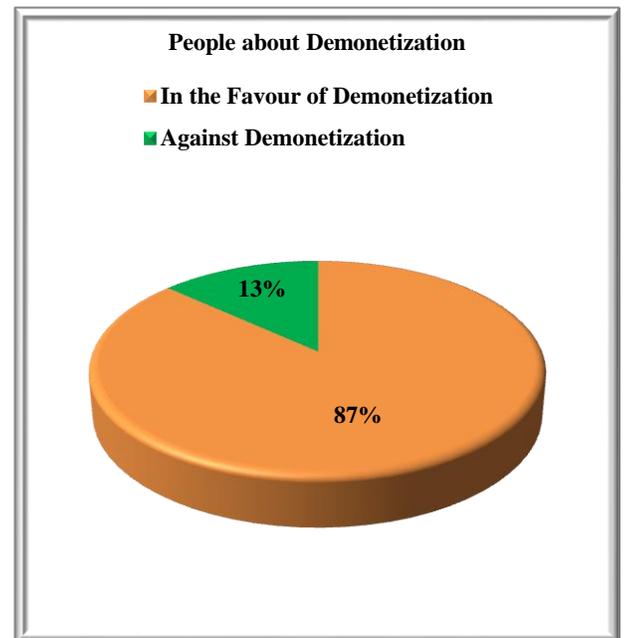
- The responses pertaining to that reflect that most of the people i.e. 47% suffered from non availability of cash at bank.
- 20% and 33% people respond that the biggest troubles for them were non cooperation of bank staff and long queues in front of banks respectively.
- From these responses we can conclude that the non availability of new currency with banks was the biggest trouble for the people.

### 5.5 People think Indian Economy Improved due to various decisions of the current government:



- The above bar chart shows the responses to the question “Do you think Indian Economy has improved due to the various decisions of the contemporary government?”
- 50% of the respondents replied that the Indian Economy has improved due to the decisions of the current government
- And 33.30% respondents think that the Indian economy improved to some extent and 16.70% respondents replied that the Indian economy has not improved.
- But the positive replies are far more in comparison to the negative one.

### 5.6 People in the favor of Demonetization:



- The most important and most precise question of my survey to the respondents is “Do you in the favor of Demonetization?”
- The above pie chart gives the answer to my question that 87% of the respondents are in the favor of Demonetization and 13% of the respondents are against of Demonetization.
- From the above responses we can conclude that the numbers of optimistic people are far more than the pessimistic people about Demonetization.

## 6. Findings of the Research:

- From this research it has been found out that people are more interested in the growth of India as a whole apart from their personal growth.
- People think that demonetization is an effective step taken by the contemporary government to strike out the existence of Black money from circulation of Indian economy.
- All the rational people and thinkers are more focused and concerned about the financial and economical impact of demonetization only but forgetting the social and socio economical impact of the same.
- Socio economical impact hereby mean the people died due to the demonetization include young boys and girls who could have been the potential tax payers of India and they could have been contributed in the GDP of the country if they were alive.
- People nowadays are fond of Electronic transactions rather than physical one. They find the electronic mode more convenient and time saving.
- Despite facing troubles like long queues in front of banks, non availability if new currency at bank, non cooperation of bank staff etc. during the period of Demonetization, most of the people still in the favor of Demonetization.
- It was found that initially when the Demonetization was being put in to application i.e from 9th November, 2016 (It was announced on 8th November, 2016 at IST 20:15) to until the old currency notes was being exchanged by the people with the new one i.e till 30th December, 2016 people suffered from

trouble by the time it comes to the routine as far as the general public is concerned.

## 7. Conclusion of Research:

- From this research it has been concluded that Indians are more tolerant in terms of the application of any new event by the government of India. During demonetization people had initially protested demonetization but by the time of 10 to 15 days they had accepted the fact that they had to comply with the decision of the government to take a chance to contribute to the Corruption and Black money free economy of India.
- If we refer the opinions of some well known Indian economists according to them the demonetization is the biggest blunder of the BJP government even though it does not seem like, one of the initiatives of demonetization was cashless transactions which is being achieved to the very great extent and as far as the recovery of black money is concerned it also recovered to the fine extent i.e. approximately 15 Lac crores in old currency notes have been deposited even though it is not known how much of these currency are black money still it is a very large amount that has been deposited by Indians ever in the history of India.
- Whatever the success and black money has recovered with the help of Demonetization in India is the collective effort and patient Indian people, Bank staff and the government; no one can give credit to the BJP government only.

## 8. Recommendations:

- The Demonetization in India was not for the first time in the history of India as discussed earlier (Demonetization in 1946 & 1978) so it is not rational to troll the current government for that.
- The Indian government took the initiative of Demonetization for the welfare of the Indians and Indian economy. It is very convenient reason to appreciate the efforts of the government and as it would not have been possible without the cooperation of general public so that the government should obey their promise that they have made to the public.
- The critics of Demonetization should stop criticizing and blaming the government about their decision rather they should give suggestions to fix the problems they think that has arisen due to Demonetization.
- The government should formulate the policies to help the diseased persons that lost their lives due to Demonetization directly or indirectly.
- The government should make effective planning to handle the effects of these kinds of decision implementations for that they should formulate the special committee consist of experts from various sectors.
- The government should publish the data regarding the Demonetization to make aware the general public about the progress by way of general circulars, advertisements, hoardings etc. of the Demonetization.

## 9. Limitations during Research:

- The Geographical area of investigation is the state of Gujarat only.
- The sample size of survey is only 30 people, so that the charts and analysis is showing the responses given by the samples by filling up the survey form.
- The survey has been done through electronic way and not by personal conversation with respondents.
- The sampling technique used for the survey is convenient sampling which is the non-probability sampling technique.

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## Author's Profile



**Sagar Burse** received the BBA degree specialized in marketing from K.S School of Business Management, Gujarat University in 2016. Pursuing MBA in K.S School of Business Management, Gujarat University itself. Also cleared CA-CPT & CA-IPCC (Group-I) in June-2013 and May-2015 respectively. He completed 2 years of training at a Chartered Accountancy firm in Ahmedabad, Gujarat.

# Diversity of microorganisms associated with pristine and extreme environment of mud volcanoes

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**Abstract-** Microbial diversity of pristine habitats is studied owing to two main reasons: contributing to the taxonomic literature and exploration of microbes for their potential to produce novel industrially important biomolecules. These biomolecules generally have better potential to survive under harsher conditions like pH, temperature and salt concentration. Traditionally, diversity analysis was based on cultivation dependent methods and hence was biased towards the labweeds or culturable microbes. Chances of accounting for the complete biodiversity were comparatively lower. With the advances in cultivation independent methods, a vast majority of yet uncultured bacteria and archaea have been detected. Mud volcanoes are points of release of pressure from deep layers of earth. They generally coincide with the tectonic plate boundaries. Heat that is generated due to movement of tectonic plates is released by these vents. Microorganisms from various depths of earth might get mobilized along with the flowing mud. Being an unexplored habitat with no chances of human intervention, such habitats may offer a unique source of unexplored microbes.

**Index Terms-** Mud volcano, microbial diversity, bacteria, archaea, hypervariable regions of 16S rRNA gene.

## I. INTRODUCTION

### Microbial Diversity

It is rightly said that we live on a “microbial planet” (Woese, 1999) in the “age of bacteria” (Gould, 1996). Microorganisms were active for more than 3 billion years before the development of multicellular life forms. Microbes evolved in microhabitats presented by abiotic world. Microorganisms are ubiquitous in nature including extreme environments where they behave as catalysts during the course of biogeochemical cycling. They progressively altered geochemical conditions leading to development of new environmental conditions and habitats. This led to continuing evolution of distinct microbial types and higher forms of life. Over a period of time, the release of oxygen led to gradual change in earth’s atmosphere from reducing to oxidizing. Thus energetically more efficient aerobic organisms were favored in evolution. This is probably the reason for extraordinary diversity and habitat range of microbes. At least  $10^{30}$  microbial genomes are estimated to be present in the biosphere (Whitman, 1998). Microorganisms encompass an extraordinary diversity in their ecological functions as well as taxonomy (Dunlap, 2001).

Various habitats harboring microbes are common in nature, like mud or other sediments, marshes, water logged soils, intestinal tract, sewage, sludge, deep subsurface of earth, etc. Such habitats can be extreme with respect to pH, temperature, salinity and other environmental conditions. The prokaryotes that thrive in these habitats are termed ‘Extremophiles’.

Historic perspective on identification of microbes was based on morphological characterization. In order to account for all groups of organisms, various techniques like most probable number (MPN) were performed and then selective enrichments at various conditions like pH, salinity and temperature were used for enrichments. Later on the focus was on biochemical characterization. But in both the cases, clear cut distinction for identification purpose was difficult and hence, the focus shifted to molecular methods. Though, culture dependent and biochemical methods are accurate, inexpensive and fast, various biases compel the user to supplement the studies by cultivation independent methods. Now days, Polyphasic approach is commonly used.

## II. METHODS FOR INVESTIGATING MICROBIAL DIVERSITY

### Cultivation dependent diversity analysis

Bacteria in soil play pivotal role in various biogeochemical cycles and are responsible for cycling of organic molecules (Molin, 1997). As only 1% of soil bacteria can be cultured, there is a continuing need for reliable and accurate mechanisms for studying the complete diversity of microbes in soil (Watve, 2000, Alain, 2009). Innate heterogeneity of soil and spatial distribution of microbes add up to the problem (Trevors, 1998). Counting microorganisms and identifying individual species is neither practical nor feasible, as morphological variations may not be distinct enough to reflect species diversity. Hence, there is a continuing need for reliable and accurate methods for understanding the complete diversity of organisms in soil.

### Cultivation independent diversity analysis

Comparing primary structure of macromolecules became easier after improvements in molecular sequencing techniques to deduce phylogenetic history (Zuckerandl and Pauling, 1965). Cytochromes and ferredoxins were the first molecules to be analyzed for this purpose (Fitch and Margulias 1967). Woese *et al.* demonstrated usefulness of SSU rRNA as universal phylogenetic marker (Fox et al., 1977). SSU rRNAs, molecules are characterized by the evolutionary preservation of a common

core of secondary or higher order structure. Functional pressures dictate the evolutionary preservation of such structure (Bergeys Manual of Systematic Bacteriology). Besides functional constancy, adequate size, ubiquitous distribution, genes coding for SSU have both evolutionarily conserved regions and highly variable structural elements. Varying degree of sequence conservation allows reconstruction of phylogeny for a broad range of relationships (Stackebrandt and Goebel, 1994). Even though large subunit (LSU) would provide twice the phylogenetic information than SSU, the average rate of sequence change is faster significantly than that of 16S. Thus for closer relationships, analysis of larger molecule can be quite valuable (Olsen, 1993). Genes like RNA polymerases, elongation factor G (EF-G), EFTu/1 $\alpha$ , RecA, hsp 60, proton translocating ATPase may also be targeted.

### Hypervariable regions of 16S rRNA genes and difference in diversity observed on targeting different hypervariable regions

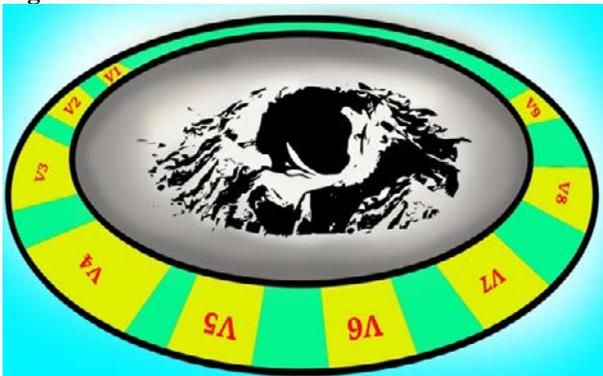


Fig 1: Mud Volcanoes and hypervariable regions of the 16S rRNA gene

### Limitations of Molecular Methods

PCR based molecular techniques are generally used to overcome the limitations of culture based methods. However, numerous biases and limitations have to be taken care of, like efficiency of cell lysis, method of DNA-RNA extraction, primer based PCR bias, preferential amplification of low G+C content DNA etc. If gentle methods are used for genomic DNA extraction gram negative cells lyse easily, but gram positives do not. If the method is too harsh, there are chances of shearing of DNA (Wintzingerode, 1997). If purification method for extraction of nucleic acid is not appropriate, co-precipitation of PCR inhibitors like humic acid may result in their further interference in subsequent PCR analysis. Additional purification steps can lead to loss of DNA, again introducing a bias in molecular diversity analysis (Kirk, 2004). The primers used for PCR amplifications, though universal have proven to have different affinities to templates. Different copy numbers of target genes also complicates the problem. Sequences with low G+C contents separates more efficiently in denaturing steps of PCR and therefore could be preferentially amplified (Wintzingerode, 1997).

### Diversity analysis in the metagenomic era

To take care of the deviations from conserved regions, commonly used primers have been modified with degenerate

positions to account for higher number of organisms (Baker and Cowan, 2004). In this case also, the primer designing is based on known cultured representatives' sequences. So, divergent 16S genes have lesser chances of being amplified (J. Rajendhran, 2011). A promising alternative to these obstacles appears to be 16S based metagenomic analysis using high throughput sequencer. The most recent and powerful method of analysis is metagenomic analysis. The metagenomic analysis analyzes huge numbers of relatively short DNA sequences (100-500 bp). The raw material is generated by high throughput next generation sequencers. This is potentially the most powerful technique used (Wommack, 2008). The validity of metagenomic analysis depends on ability to obtain representative community DNA sample (Chandler *et al.*, 1998).

### Archaea and bacteria

Archaea and bacteria are prokaryotes with very diverse phenotypes, nutritional modes and physiology. While the study of fascinating micro-organisms needs no special justification, these prokaryotes provide unique opportunity to gain insight into a number of fundamental conundrums in biology. Earlier view about archaea being relict organisms has now changed radically. Most of the archaea exhibit unique features like methanogenesis, hyperthermophily, halophily, capacity to reduce sulphates etc. Archaea being most ancient lineage of living organisms, set a

boundary for evolutionary diversity. Archaea also share a few characteristics with eukarya like some tRNA genes contain introns, the DNA dependant RNA polymerases are multicomponent enzymes, etc. On the basis of SSU rRNA gene analysis, the archaea consist of three phylogenetically-distinct groups: Crenarchaeota, Euryarchaeota and Korarchaeota. The diversity of prokaryotes is also of great applied importance in bioremediation and bioprospecting (Demirjian, 2001).

### Mud volcanoes

Mud volcanoes are the geologic structures formed as a result of emission of gases (predominantly methane), water and clay-based material at the earth's surface or seafloor. A composite mixture of water and gas along with mud is forcefully ejected through long, narrow openings or fissures in crust resulting in out-flowing mass of mud breccias on the surface. Mud volcanoes are irregularly clustered in separated areas forming belts that coincide with the tectonic plate boundaries. The geological factors responsible for the formation of volcanoes include abnormally high pore fluid pressures (caused due to rapid sedimentation and density inversion), in situ gas generation and strong lateral or vertical compressions which allow deep lying sediments to move upward. Mud volcanoes are believed to originate from a few meters to several kilometers depth (Kopf, 2000). Pore fluid chemistry and fluid rock interaction suggest that aqueous fluids are released at mantle depth (Mottl, 1992). The phenomenon of mud volcanism is global and approximate 1950 individual volcanoes worldwide of which 60 to 65 erupt every year (Dimitrov, 2003).

As reported in literature, temperature of earth below the surface increases. So, presence of thermophilic organisms can be anticipated in the flowing mud. The water that is mobilized might have its origin in the ocean. So, presence of halophiles can be anticipated as well. Enzymes from organisms present at such locations are stable at high temperatures with optimal activity at temperatures above 70°C. They are also resistant to harsher environmental conditions. Some of these enzymes are active at temperatures as high as 110°C and above. Various strategies are used by organisms growing in such habitats to modify their proteins to confer higher thermal stability, enhanced rigidity and resistance to chemical denaturation etc.

### Classification of mud volcanoes

Classification of mud volcanoes was initially based on morphological characteristics, style of eruption, size, tectonic settings and chemical composition of volcanic products (Hone, 2007). On a broader scale classification of mud volcanoes is done into three types:

**Lokbatan type:** Volcanoes with strong explosive nature, commonly with ignition of emitted gases. The period of activity is short, separated by long periods of inactivity. The name derives from location of such type of volcano in Lokbatan on Aspherson peninsula, Azerbaijan on 25<sup>th</sup> October 2001.

**Chikishlyar type:** Volcanoes characterized by continuous, calm and relatively weak activity. Commonest feature of this type of volcanoes is having numerous vents ejecting water, gas and mud in small quantities.

**Schugin type:** The volcanoes whose activity is transitional between Lokbatan and Chikishlyar type are classified under Schugin type of mud volcanoes (Kalinko, 1964).

### Microbial diversity of mud volcanoes round the globe and bioprospecting

#### Terrestrial mud volcanoes:

Terrestrial zones with mud volcanoes are hydrocarbon rich indicating a relationship between hydrocarbon generation and mud volcanic eruption. A total of 5.06 Tg CH<sub>4</sub> or 4.98 Tg carbon, half of which is fossil, and is emitted to the atmosphere by quiescent and eruptive mud volcano activity every year (Dimitrov, 2003).

#### Mud volcanoes of Andaman

The Andaman islands (92°-94°E, 6°-14°N) have experienced eruption of mud volcano previously in 1843, 1879, 1907, 1983 and 2003 in Baratang (Vignesh A, 2016). The major catastrophe caused by the magnitude 9.3 mega thrust earthquake and tsunami on 26 December 2004 resulted in shaking the oceans interior and re eruption of the mud volcano (Malik, 2006). Like all other microbial populations of mud volcanoes reported, microbial community of these mud volcanoes is dominated by members of *Proteobacteria*, *Cytophaga / Flavobacter*, *Archaea*, *methanogens*, methanotrophs, halophiles and sulfate reducing bacteria. Presence of many novel bacterial and archaeal lineages is indicated in DGGE. Moreover, many of the isolates show lesser sequence homologies to known sequences. The phylogenetic approach to study the microbial community of mud volcanoes showed presence of rare microbes which are potential source for new bioactive molecules like enzymes, biosurfactants, antimicrobial compounds, exopolysaccharide and polyhydroxyalkonates. A novel Gram-negative, oval-shaped, motile bacterium was isolated from the mud containing polar lipids diphosphatidylglycerol, phosphatidylglycerol, phosphatidylethanolamine, three unidentified lipids, one unidentified phospholipid and one unidentified aminolipid. 16S rRNA gene sequence analysis showed that strain was related most closely to the type strains of *Tepidamorphus gemmatus*, *Bauldia consociata* (P. Anil Kumar, 2012).

#### Paclele Mici mud volcanoes in Carpathian Mountains, Romania:

Among the terrestrial volcanoes in Carpathian Mountains in Romania, Paclele Mici has been extensively studied for microbial diversity. At the site, thermal alteration leads to release of methane along with higher hydrocarbons and petroleum compounds.  $\delta^{13}\text{C}$  value of released methane indicates a thermogenic and likely kerogenic origin (Whiticar, 1999). Considering hydrocarbons as utilizable bacterial substrate, presence of bacteria was anticipated. 16S rRNA gene based diversity analysis was performed. Bacteria were found to be abundant than archaea. Respective abundances of bacteria and archaea were estimated to be 3.4-6.1 x 10<sup>8</sup> and 0.25-1.6 x 10<sup>6</sup> cells/gm dry weights. Presence of members of order *Methanosarcinales* was confirmed. Bacterial diversity was relatively larger comprising of members of *Deltaproteobacteria*, *Gammaproteobacteria* and *Bacteroides-Cytophaga* group. The presence of sulphate reducing population is likely to confirm the

presumed marine origin of the volcanic fluid (Karine, 2006). Contribution to aerobic methanotrophy / methylotrophy and methanogenesis to the carbon cycle is significant at the site.

#### **Mud volcanoes near Tianshan Mountains in Usu city of Xinjiang, China:**

Largest group of terrestrial mud volcanoes in China is located near Tianshan mountains in the arid / semi arid regions, comprising of 40 volcanoes, of which 36 volcanoes are active. Clone libraries targeting the 16S rRNA gene were constructed and on sequencing the representative clones, 11 bacterial and 7 archaeal phylotypes were detected. Population of *Proteobacteria* dominated being 79% of the bacterial counts (mostly *Deltaproteobacteria*). *Actinobacteria* constituted 15% followed by *Fusobacteria* (6%). Relatives of uncultivated species of archaea were also detected followed by *Methanosarcinales* and *Halobacteriales* from *Euryarchaeota* (88%) group and others from *Crenarchaeota* group (12%) ( Yang, 2012).

#### **Mud volcanoes at Dushanzi and Baiyanggou in Junggar Basin in Xinjiang, China**

The first comparative analysis of the diversity of microbes of Dushanzi (DSZ) and Baiyanggou (BYG) mud volcanoes was done using 16S rRNA gene analysis. Phylogenetic analysis showed that the bacterial and archaeal community structure was remarkably different between the DSZ and BYG mud volcanoes. At BYG mud volcano, bacterial community diversity was higher than that of the DSZ mud volcano. Archaeal community diversity of BYG mud volcano was lower than that of the DSZ mud volcano. Most of the archaea recovered from DSZ identified in these mud volcanoes are anaerobic or highly thermophilic. Microbes recovered from BYG media were identified as halobacteria consistent with their particular geographical nature. Many bacterial and archaeal genera, such as *Methanomicrobia*, sulfur-oxidizing symbiont bacterium and *Alcanivorax sp.* have been detected in these two mud volcanoes (Zhiyong et al., 2016).

#### **Mud volcanoes in San Biagio-Belpasso, Mount Etna, Italy:**

Restriction fragment length polymorphism (RFLP) analysis of the bacterial clones clustered microbes into Eubacterial group. 77% affiliated to *Proteobacteria*, 19% affiliated to *Actinobacteria* and 4% affiliated to *Flexibacter-Cytophaga-Bacteroides* division. Thus major constituents of microbial communities of saline volcanic mud were autotrophic methane oxidizers and heterotrophic hydrocarbon degraders (belonging to gamma subclass of *Proteobacteria*). Overall the community structure of San Biagio mud volcano resembles compositions of marine microbial communities (Yakimov, 2002).

#### **Mud Volcanoes in Salse di Nirano, Northern Apennines, Italy:**

Anaerobically maintained fluid samples from the Nirano mud volcano field located in the foreland of the Northern Apennines were used for microscopy. The mud was found to contain low numbers of bacterial cells. Media was devised based on composition of volcanic mud and anaerobic enrichments were set up. Enrichment of *Desulfovibrio* and *Clostridial* strains were successful. Two isolates of *Clostridium thiosulfatireducens*- and

*Desulfovibrio psychrotolerans*-related strains were isolated from enrichment cultures. Bacterial biomass, extracellular polysaccharides and a mineral matrix was also isolated from aggregates of sulfate reducers. The Nirano mud volcano fluids contain culturable bacteria related to organisms typical for other sediments of saline systems and/or oil reservoirs (Sebastian, 2015).

#### **Mud Volcanoes of Tang and Pirgal, Iran:**

Analysis and evaluation of bio-emulsifier and bio-demulsifier activities of Capnophilic bacteria (microorganisms that thrive in the presence of high concentrations of carbon dioxide) isolated from volcanic mud was done. Organisms identified were various species of *Bacillus viz. B. megatarium, B. firmus, B. brevis, B. laterosporus, B. cereus*), *Enterobacter, Pseudomonas, Enterobacteriaceae* (Yasaman, 2017).

#### **Submerged mud volcanoes and hydrothermal vents:**

Digenetic processes occurring in deep sea continental margins result from three main microbial processes: sulphate reduction, methane generation and methane oxidation. Microbially mediated anaerobic methane oxidation is capable of consuming sulphate and requires a supply of methane. Microorganisms, however, are capable of providing these processes (Borowski, 1996).

#### **Haakon Mosby Mud Volcano (HMMV):**

HMMV is an unusual example of cold, methane venting seep because of its Arctic location, lack of association with salt tectonics or plate subduction and development within glacial marine sediment (characterized by high rate of accumulation). Microbiological studies using radioisotope showed that contemporary process of anaerobic methane oxidation occurs in sediment beginning at a depth of 80 cm and below (Pimenov, 1999). At active volcano centre (diameter of 500 meters), the main methane consuming process was bacterial aerobic oxidation. Aerobic methanotrophs belonging to *Methylobacter* and *Methylophaga* accounted for 56 % of total cells. In sediments below *Beggiatoa* mats encircling the center of HMMV, methanotrophic archaea of ANME-3 (aggregates associated with SRB of *Desulfobulbus* branch) clades dominated zone of anaerobic methane oxidation. ANME-3/DBB aggregates accounted for 94% of total biomass. Outer rim of mud volcano was colonized by tubeworms *Siboglinidae*. Here both aerobic and anaerobic methane oxidizers were detected (Losekann, 2007). Thus, high methane availability and various fluid flow regimes provide distinct niches for aerobic and anaerobic methanotrophs (Niemann, 2006).

#### **Mud volcanoes in Amsterdam, Eastern Mediterranean sea**

The Amsterdam mud volcano in the Anaximander Mountains (south of Turkey), is characterized by intense active methane seepage, produced partly by methanogens. <sup>14</sup>C-radiotracer measurements have showed that substrates like methylamines/methanol; H<sub>2</sub>/CO<sub>2</sub> and acetate were used for methanogenesis. Methylotrophic methanogenesis was measured using archaeal 16S PCR-DGGE and *mcrA* gene libraries, and *Methanosarcinales* affiliated sequences were detected.

Enrichments of methanogens showed the presence of *Methanococoides* (Cassandre, 2012).

#### Hydrothermal mud vent underneath deep sea anoxic brine Lake Urania:

The deep sea hydrothermal mud vent of Urania can be considered to be most hostile environment for microbial growth owing to its depth (>3.3 meters beneath sea surface) and hypersalinity (5 to 10 times more salinity than seawater) along with deficiency of oxygen (due to lower penetration and temperature nearly equal to 45°C). Great genetic diversity was observed based on rRNA gene clone library analysis. The population was mostly dominated by members of yet uncultured organisms. Among the cultured representatives epsilon-*Proteobacteria* dominated followed by 18% population of delta-*Proteobacteria* (suggesting sulfate reduction as dominant process). Representatives of alpha-*Proteobacteria*, beta-*Proteobacteria*, *Actinobacteria*, *Bacteriodes*, *Deinococcus-Thermus* group were also detected.

Lower abundance of archaea was also noted of which dominating members belonged to Euryarchaeotes. MSBL-1 candidate (Mediterranean Sea Brine Lake Candidate division 1 of Euryarchaeotes) found to be 96%. DHVE-1 (Deep Sea Hydrothermal Vent group 1 of Euryarchaeotes) and ANME-1 were found to be as single colony representatives. Possibility of presence of novel microbes also exists. Diverse metabolic processes like aerobic / anaerobic heterotrophy, sulphide and methane dependent chemotrophy along with anaerobic oxidation of methane, sulphate and metal reduction were found to be active (Yakimov, 2007).

#### Hydrothermal mud vent underneath deep sea Mid-Atlantic Ridge (MAR):

Molecular investigation of microbial flora of an active black smoker at the Mid-Atlantic Ridge (MAR), in the rainbow field at 2275 meters depth was carried out. Microbial diversity detected using DGGE targeting the 16S rRNA gene showed presence of *Pyrococcus*, *Marinitoga*, *Bacillus*, *Thermococcus*, gamma-*Proteobacteria* and epsilon-*Proteobacteria*. The anaerobic bioreactor operating at temperature 90°C, pH 6.5 and sulphur as terminal electron acceptor was used. Of the detected diversity only *Thermococcus* could be cultivated (Postec, 2005).

#### Hydrothermal mud vents off Panarea Island, Italy

Total bacterial and archaeal population abundance at two shallow hydrothermal vents off Panarea island, Eolian Islands in Italy was found to be 10<sup>5</sup> cells/ml. Presence of sulfur oxidizing bacteria was detected by PCR-DGGE analysis and cultivation dependent techniques. Phototrophs and chemolithotrophs were also detected. *Bacillus* and *Geobacillus* dominated the community. Members of epsilon-*Proteobacteria* like *Sulfurimonas denitrificans*, gamma-*Proteobacteria* like *Pseudomonas* and alpha-*Proteobacteria* like *Caulobacter* were detected. Members belonging to unculturable were found to be present in larger numbers (Maugeri 2009).

#### Hydrothermal mud vents at Castro Seamount, Azores, Portugal

Bacterial diversity from shallow vents of D. Joao de Castro Seamount (DJCS) was studied using 16S rRNA gene analysis, FAME and RFLP. Presence of groups of bacteria like *Bacillus*, *Staphylococcus*, *Micrococcus*, *Halomonas*, *Pseudoalteromonas*, *Alcaligenes* and *Brevibacterium* was noted. Biomolecules produced by isolates showed optimum activity at higher temperatures nearly 70°C. Adaptive mechanisms to detoxify metals by H<sub>2</sub>S production, catalase and oxidase production for decomposition of H<sub>2</sub>O<sub>2</sub> and O<sub>2</sub> and capacity to survive in unfavorable conditions by sporulation was observed (Mohandass, 2012).

#### Hydrothermal mud vents at Loihi Seamount, Hawaii

The SSU rRNA genes were targeted for investigating the bacterial diversity associated with microbial mats in Pele's vents. Cluster of phylogenetically related OTUs related to *Thiovulum* species within the epsilon sub class of *Proteobacteria* accounted for 60.5%. A second cluster from gamma subclass of *Proteobacteria* affiliated to *Xanthomonas* sp. accounted for 27.1%. *Alteromonas* group and *Thiothrix* group accounted for 2.1% with endosymbiotic bacteria from *Bathymodiolus thermophilus* and *Calyptogena magnifica*. Members of *Myxobacterium* group were also detected (Moyer, 1995).

#### Subseafloor alkaline serpentine mud volcano of Mariana Forearc

In the ocean drilling programme at the serpentine mud volcano, south Chamorro seamount in Mariana Forearc, a novel alkalophilic, mesophilic bacteria was isolated. Growth temperature range of the isolates was 10°C to 50°C, pH 6.5 to 11.4, NaCl concentration of 0 to 21 % was noted. Facultative anaerobic growth, utilizing various complex substrates such as, hydrocarbons, carbohydrates, amino acids and organic acids was observed. The G+C contents was 57.5 mol% and phylogenetically the isolate belonging to *Marinobacter* genus and was named as *Marinobacter alkaliphilus* (Takai, 2005).

#### Submarine Volcano at Kolumbo, Hellenic Volcanic Arc, Greece

Illumina sequencing of bacterial and archaeal communities on active and inactive sulfide chimneys collected from the Kolumbo hydrothermal field was performed. A total of 56 bacterial and 3 archaeal phyla, 133 bacterial and 16 archaeal classes were detected. Thermophilic members of *Epsilonproteobacteria*, *Aquificae* and *Deltaproteobacteria* were dominant in active chimney communities. Inactive chimney communities were dominated by an OTU closely related to the archaeon *Nitrosopumilus* sp., and by members of *Gammaproteobacteria*, *Deltaproteobacteria*, *Planctomycetes* and *Bacteroidetes*. Overall, the inactive sulfide chimneys showed highly diverse and uniform microbial communities, in contrast to the active chimney communities (Christos A. Christakis, 2017).

#### Bacterial diversity of mud volcanoes around the globe

No	Mud volcano	Reported diversity	Reference
1	Kolumbo submarine volcano,	<i>Nitrosopumilus</i> sp., <i>Gammaproteobacteria</i> , <i>Deltaproteobacteria</i> ,	Christos A. Christakis, 2017

	South Aegean Sea, Greece	<i>Planctomycetes</i> and <i>Bacteroidetes</i> .				<i>MSBL1</i> , <i>Deinococcus-Thermus</i> <i>Deltaproteobacteria</i> .	
2	Tang and Pirgal mud volcano, Iran	<i>Bacillus</i> ( <i>megatarium</i> , <i>firmus</i> , <i>brevis</i> , <i>laterosporus</i> , <i>cereus</i> ), <i>Enterobacter</i> , <i>Pseudomonas</i> , <i>Enterobacteriaceae</i> .	Yasaman, 2017	12	Paclele Mici Mud Volcano, Romania	<i>Bacteroides-Cytophaga</i> group, <i>Deltaproteobacteria</i> , <i>Gammaproteobacteria</i> , <i>Methanosarcinales</i> .	Karine ,2006
3	Dushanzi and Baiyanggou in Junggar Basin, Xinjiang, China	<i>Halobacteria</i> , <i>Methanomicrobia</i> , <i>Alcanivorax sp.</i>	Zhiyong ,2016	13	Hydrothermal mud vent at Mid Atlantic ridge, Iceland	<i>Bacillus</i> , <i>Epsilonproteobacteria</i> , <i>Gammaproteobacteria</i> , <i>Marinitoga</i> , <i>Pyrococcus</i> , <i>Thermococcus</i> .	Postec, 2005
4	Salse di Nirano, Northern Apennines, Italy	<i>Clostridium</i> , <i>Desulfovibrio</i> .	Sebastian Kokoschka, 2015	14	Alkaline serpentine MV of Mariana Forearc	<i>Marinobacter</i> .	Takai, 2005
5	Xinjiang , China	<i>Actinobacteria</i> , <i>Crenarchaeotes</i> <i>Deltaproteobacteria</i> , <i>Euryarchaeotes</i> <i>Fusobacteria</i> , <i>Halobacteriales</i> <i>Methanosarcinales</i> .	Yang,2012	15	San Baigio – Belpasso, Italy	<i>Actinobacteria</i> , <i>Flexibacter-Cytophaga-Bacteroides</i> , <i>Gammaproteobacteria</i> .	Yakimov, 2002
6	Baratang Island, Andaman, India	<i>Lutibaculum baratangense</i> .	P. Anil Kumar, 2012	16	Hydrothermal mud vents at Loihi Seamount , Hawaii	<i>Alteromonas</i> , <i>Bathymodiolus</i> , <i>Calyptogena</i> , <i>Epsilonproteobacteria</i> , <i>Gammaproteobacteria</i> , <i>Myxobacteria</i> , <i>Thiovulum</i> .	Moyer, 1995
7	Mud volcanoes in Amsterdam, Eastern Mediterranean sea, Europe	<i>Methanosarcinales</i> , <i>Methanococoides</i> .	Cassandre,2012	DHVE: Deep Sea Hydrothermal Vent group 1; MSBL: Mediterranean Sea brine Lake Candidate division 1.			
8	Hydrothermal mud vents at Castro Seamount , Portugal	<i>Alcaligenes</i> , <i>Bacillus</i> , <i>Brevibacterium</i> <i>Halomonas</i> , <i>Micrococcus</i> , <i>Pseudoalteromonas</i> , <i>Staphylococcus</i> .	Mohandass, 2012				
9	Hydrothermal mud vents off Panaria islands , Italy	<i>Alphaproteobacteria</i> , <i>Bacillus</i> , <i>Epsilonproteobacteria</i> , <i>Gammaproteobacteria</i> , <i>Geobacillus</i> .	Maugeri , 2009				
10	Haakon Mosby mud volcano, Barents sea, Norway and Russia (Basin countries)	Aerobic and Anaerobic methane oxidizers, <i>Beggiatoa</i> , <i>Desulphobulbus</i> , <i>Methylophaga</i> .	Losekann, 2007				
11	Anoxic brine mud vent, Urania	<i>ANME</i> 1, <i>Alphaproteobacteria</i> <i>Actinobacteria</i> , <i>Bacteroids</i> , <i>DHVE</i> 1,	Yakimov, 2007				

### III. CONCLUSION

Over the last decade or so the speed of detection of microbes has increased drastically, as the focus has shifted from traditional cultivation based approach to cultivation independent approach. The advent of next generation sequencing technology has further revolutionised the biodiversity studies. Unique ecosystems like mud volcanoes which were difficult to study previously have now been studied to a greater extent. New groups of bacteria and archaea are being detected and tried to cultivate. Coexistence of obligate anaerobes like methanogens with microaerophilic microbes like *Pseudomonads*, autotrophic organisms like *Thiobacillus* with heterotrophs like *Bacillus* definitely makes the ecosystem a unique location. This coexistence in nature may exist in micro-environmental form. Further investigation on these lines is essential to completely understand the complex interactions amongst these microbes.

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# Stabilization of weak subgrade soil for road construction using fly ash and rice husk ash - Mahokanda, Sri Lanka.

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**Abstract:** Roads construction projects require large quantities of suitable soils as a filling material. However, in urban areas, when roads are constructed, suitable filling soils have to be hired with enormous costs. Thus main objective of this research was to stabilize weak subgrade soils mixing with fly ash and rice husk ash. Weak sub-grade soil was obtained from Mahokanda construction site in Matara, Sri Lanka. Fly ash and rice husk ash were obtained from Lakvijaya power plant in Puttalam and rice mills in study area, respectively. Forty-eight weak subgrade soil samples were mixed with stabilizers (fly ash and rice husk ash) in different ratio and then 16 specimens were cured for 7 days while other 32 (2×16) samples were cured for 14 and 28 days, respectively. In order to find out maximum strength of each soil sample, different soil tests viz Atterberg Limits, Proctor Compaction, Swell Index (SI) and California Bearing Ratio (CBR) were carried out. Results revealed that maximum CBR value (36.01%) was obtained, when 70% of soil blends with 20% of fly ash and 10% of rice husk ash at 28 days curing period. Reason for the increment of CBR may be due to formation of cementitious compound in the mixture is due to chemical reactions of SiO<sub>2</sub> in stabilizers and CaOH present in soils. Based on results, policy implications are discussed in relation to need of stabilizers in road construction projects in order to improve stabilizing weak subgrades while decreasing project cost and utilizing waste materials.

**Keywords:** California Bearing Ratio, Fly Ash, Rice Husk Ash, Soil Stabilization.

## 1. Introduction

A roadway section consists of a complete pavement system (Figure 01) including its associated base course, sub-base course, sub-grade, and required system drainage components. The construction of long lasting, economical flexible pavement structures requires sub-grade materials with good engineering properties. The sub-grade should possess desirable properties to extend the service life of the roadway section and to reduce the required thickness of the flexible pavement structure. These desirable properties include strength, drainage, ease and permanency of compaction, and permanency of strength. (Yadav R.K. May 2014)

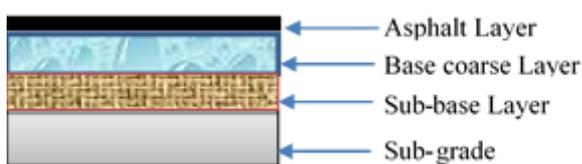


Figure 01: Road way cross section

A land-based structure of any type is only as strong as its foundation. For that reason, soil is a critical element

influencing the success of a construction project. Soil is either part of the foundation or one of the raw materials used in the construction process. Therefore, understanding the engineering properties of soil is crucial to obtain strength and economic permanence. Geotechnical properties of problematic soils such as soft fine-grained and expansive soils are improved by various methods. Generally problematic soil is removed and replaced by a good quality material. In urban areas, borrow earth is not easily available which has to be hauled from a long distance. (Gandhi S.R. 2000)

Stabilization soils by using fly ash and mixture of lime or cement and fly ash is gaining more importance in recent times since it has widespread availability. This method is inexpensive and takes less time than other stabilization methods. Fly ash may be mixed with soil during excavation right in the field. Fly ash is a by-product produced during the combustion of pulverized coal in electric power plants. Coal ash contains 70 to 80 percent of fly ash and remainder is the bottom ash. Fly ash does not have any strength properties but together with water possess some cementation characteristics. The main minerals that can be found in fly ash are silica, alumina and secondary oxides of calcium, magnesium, iron and sulfur. Average diameter of particles is about 7 microns and is called as “pelerospheres”. Fly ash is similar to silt and has no plasticity properties. (Gaciarz R. May 2012)

An effective method for evaluating fly ash stabilization is to determine the moisture-density and moisture-strength relationship for the fly ash treated materials. This is accomplished by adapting American Society of Testing Materials (ASTM) C-593 (Standard specification for fly ash and other pozzolans for use with Lime). Stabilization of cohesive soils used for pavement sub-grades with self-cementing ashes can increase the California Bearing Ratio (CBR) by up to 20 times and increase the unconfined compressive strength by 3 to 12 times the untreated material. The increase in unconfined strength is influenced by the length of compaction delay and the hydration characteristics of the specific ash use for stabilization. ( Nikil D. 2005)

The present investigation has been carried out with agricultural waste materials like Raw Rice Husk (RRH) and Rice Husk Ash (RHA) individually mixed with soil and also in combination with different percentage of hydrated lime with several mix proportions to study improvement of weak road subgrade. 5,10,15 and 20 percentages of RHA were mixed with soil stabilized with 3,6,9,12 and 15 percentage of lime in different combinations and also 2,3,4,5 and 6 percentages of RRH were mixed with soil stabilized with 6,9 and 12 percentage lime in several combinations and compacted at a water content of OMC+5% and tested for California Bearing Ratio(CBR) and Unconfined Compressive Strength(UCS) tests. The results show marked improvement in CBR & UCS values of the mixed soils in comparison with that of the original soil. The high percentage of siliceous materials present in RHA promises it to be used as a potential ground stabilizing/improving materials. The effect of curing of specimens was also investigated. It has been found that with increase in curing period UCS values as well as CBR value of lime RHA stabilized soil as well as lime RRH stabilized soil are increasing remarkably. (Biswas G. 2003)

Rice husk ash and Fly ash can be successfully used for stabilizing clayey peat soil. Fly ash and rice husk ash, which are waste materials comes from combustion of solid waste and rice husk. Rice husk ash attains good cushioning property when it is blend with fly ash and soil. Solid waste is generally defined as non-soluble material that is discarded in a solid or semi-solid form. This includes garbage, refuse, sludge and other discarded domestic materials, as well as waste from industrial, commercial, agricultural and mining operations and it has potential economic value. (Brooks R.M. December 2009)

Infrastructure projects such as highways, railways, etc. requires earth material in very large quantity. Laterite soil which is the product of borrow pit excavation is used as a sub-base and base course for construction of roads. In urban areas, borrow earth is not easily available which has to be hauled from a long distance. Quite often, large areas are covered with highly plastic and expansive soil, which is not suitable for such purpose. Soil stabilization is one of most important for the construction which improves the engineering properties of soil. Conventional method of concrete road construction consumes the natural resources like stone metal, sand, etc. and hence causes ecological imbalance.

The use of fly ash and rice husk ash (RHA) in concrete road

construction will save such resources. Using fly ash and RHA, infrastructure development can be completed at lesser cost and will also help for environmental protection of our country. Thus main objective of this research was identify the best Soil:Fly-ash:Rice Husk Ash proportion to upgrade the bearing capacity of weak sub grade soil while other specific Objectives Reduce the construction cost of roads, Increase the durability of roads and reduce the maintenance cost, Reduce quantity of solid waste and reduce the environmental pollution.

## 2. Materials and Methods

### Materials used in the research

#### *Soil*

Locally available sub-grade soil was used in the current study. Natural sub-grade soil was obtained from Mahokanda, the construction site which is located near to Matara, Sri Lanka. Soil was classified as fat clay (CH) according to the Unified Soil Classification System (USCS). The soil has approximately 52% particles passing the U.S. No. 200 sieve. It exhibits high plasticity. Plasticity Index of soil is 36.57. On visual inspection it was found to be grey clayey soil.

#### *Fly Ash*

The fly ash used in this study was high calcium Class C fly ash (12% CaO) obtained from Lakvijaya power Plant in Puttalam, Sri Lanka. The fly ash had a grayish color, and a carbon content of 6-8%.

#### *Rice husk Ash (RHA)*

Rice Husk Ash (RHA) is obtained from the burning of rice husk. The husk is a byproduct of the rice milling industry. By weight, 10% of the rice grain is rice husk. On burning the rice husk, about 20% becomes RHA.

### Sample preparation and Testing method

Forty-eight (48) soil samples were prepared. Each soil samples were sieved according to ASTM D 2216 over a #40 sieve to remove the larger particles. Weight of each sieved soil samples were 25 kg. In order to investigate the effect of fly ash and rice husk ash on engineering parameters of sub-grade clay soil, it was mixed with fly ash and rice husk ash in different ratio. For tests of specimens of mixed/stabilized soils, specimens were prepared by thoroughly mixing the required quantity of soil and stabilizers (Rice husk ash and Fly ash) in pre-selected proportion in dry state. All specimens were kept in desecrator after putting the specimens in sealed plastic bag for 7 days, 14 days and 28 days at room temperature before testing to investigate the effect of curing.

To study the plasticity of soil and fly ash mixes Liquid Limit and Plastic limit tests were made on Soil-Fly ash-RHA mixes as per ASTM D 4318-2009.

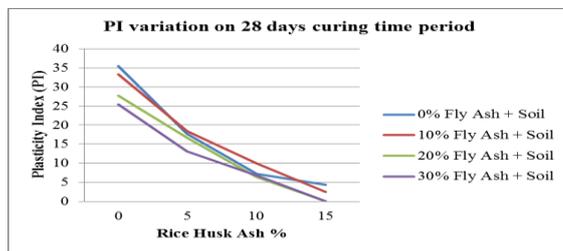
The compaction characteristics of soil-RHA-fly ash mixtures were studied using Standard Proctor Tests (ASTM D 698-2009). Standard compaction test uses a mold of volume 1/30 ft<sup>3</sup> (945 ml) and the soil is compacted in 3 layers and

each layer receiving 25 blows from a hammer of weight 5.5lbs (2.5 kg) with a free fall of 12 inches (305 mm).

The compaction characteristics of soil-RHA-fly ash mixtures were studied using Standard Proctor Tests (ASTM D 698-2009). Standard compaction test uses a mold of volume 1/30 ft<sup>3</sup> (945 ml) and the soil is compacted in 3 layers and each layer receiving 25 blows from a hammer of weight 5.5lbs (2.5 kg) with a free fall of 12 inches (305 mm).

### 3. Results and Discussion

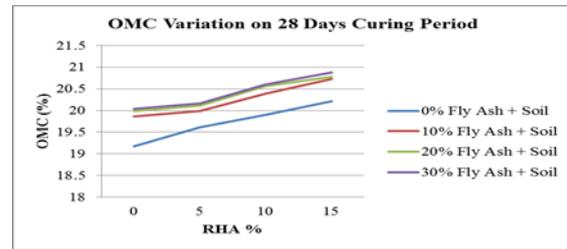
The Liquid Limit (LL), Plastic Limit (PL), and Plasticity Index (PI) of the untreated natural soil were 58.43%, 22.06% and 36.37% respectively. This shows that the soil is high plastic in nature. Whitlow states that if the LL of a soil sample is less than 35% it is a low plastic soil, between 50% and 70% high plastic soil, between 70% and 90% very high plastic soil, while greater than 90% is an extremely high plastic soil. According to the tabulated test results and the figures, on increasing Rice Husk Ash percentage in soil the Liquid Limit tends to decrease gradually. Lowest LL is 36.01%. It reported at 28 days curing period and corresponding Fly Ash:RHA:Soil ratio is 30:15:55. On increasing fly-ash and RHA percentage, the Plastic Limit tends to increase. The same follows when RHA content is on increasing with respect to certain percentage of Fly Ash. Highest PL is 39.83%. It reported at 28 days curing period and corresponding Fly Ash:RHA:Soil ratio is 30:15:55



**Figure 2:** Plasticity Index (PI) variation on 28 days curing time period

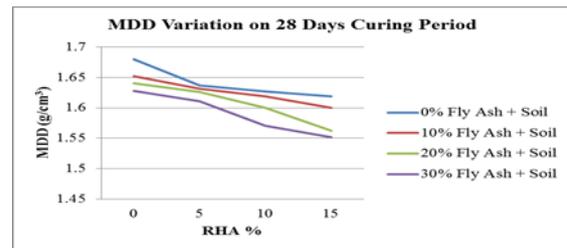
On increasing Fly Ash percentage in soil, the Plasticity Index tends to decrease. Also on increasing RHA content, Plasticity Index tends to decrease gradually. The same follows when RHA content is on increasing with respect to certain percentage of Fly Ash. Lowest PI reported as 7.91% at 28 days curing period. Both 15 and 16 treatments indicate non-plastic behavior in 28 days curing period and corresponding Fly Ash:RHA:Soil ratios are 20:15:65 and 30:15:55. Soil plasticity is a field indicator of slope stability. The engineering concept of soil plasticity has evolved to explain why some soils are more failure prone than others. Plastic soils exhibit clay-like behavior. Adding even modest quantities of water to such soils may cause unusually large and frequent slope failures. Naturally occurring tension and cracks have similar effects. At a high percentage of ash content, the soil lost most of its plasticity. Also by adding RHA soil lost its plasticity. This means that the soil behaves like a non-plastic material. This is undesirable since higher percentage of fly ash failed to render the Clayey soil the required binding properties. The fines present in the natural soil were non-plastic. However, it is well

known that plastic fines play a major role in defining the strength of soil. Previous research indicated that the strength of fly ash-stabilized soil decreases with increasing plasticity index (PI), and Fly Ash is generally considered as a good activator when used for stabilization of granular soils.



**Figure 3:** Optimum Moisture Content (OMC) variation on 28 days curing

The optimum moisture content (OMC) and the maximum dry density (MDD) of the untreated natural soil were 19.776% and 1.6802 g/cm<sup>3</sup> respectively. The pure soil sample has the highest maximum dry density (1.6802 g/cm<sup>3</sup>) at the lowest optimum moisture content (19.776%). The soil sample with highest fly ash content and highest RHA content exhibits the lowest maximum dry density (1.5201g/cm<sup>3</sup>) and highest optimum moisture content (21.384%).

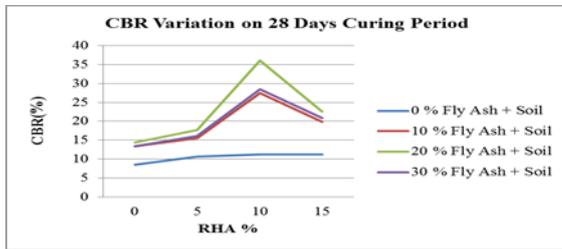


**Figure 4:** Maximum Dry Density (MDD) variation on 28 days curing time

When the fly ash content was increased from 0 to 30%, MDD decreased from 1.6802 g/cm<sup>3</sup> to 1.5931g/cm<sup>3</sup> in first seven days curing period. When the rice husk ash content was increased from 0 to 15%, MDD decreased from 1.6802 g/cm<sup>3</sup> to 1.5913g/cm<sup>3</sup> in first seven days curing period and at any fly-ash content, increase in RHA up to 15% decreases MDD. Conversely, RHA increases up to 15% at any fly-ash content, and it causes to increase the MDD with the curing time period. When the fly ash content was increased from 0 to 30%, OMC increased from 19.776 % to 20.108% in 1st seven days curing period. When the rice husk ash content was increased from 0 to 15%, OMC increased from 19.776 % to 20.173% in first seven days curing period and at any fly-ash content, increase in RHA up to 15% increases MDD. Conversely, RHA increases up to 15% at any fly-ash content decreases OMC with the curing time period.

The decrease in the MDD can be attributed to the replacement of soil by the Fly ash and RHA in the mixture. Because of RHA and Fly ash have lower MDD values. The decrease in the MDD may also be explained by considering the Fly ash and RHA as filler (with lower specific gravity) in the soil voids. There is increase in OMC with the increase of Fly ash and RHA contents. This increase is due to the addition of Fly ash

and RHA, which decreases the quantity of free silt and clay fraction and coarser materials with larger surface areas are formed. These processes need water to take place. This implies also that more water is needed in order to compact the soil-RHA-Fly ash mixtures.



**Figure 5:** California Bearing Ratio (CBR) variation on 28 days curing time period

CBR value of the different admixtures with the original soil in varying proportion at OMC soaked conditions is shown in Table No 4.5.3. Figure 4.5.4.1-4.5.4.3 shows variation of CBR with Fly Ash and RHA combinations at OMC in Soaked condition.

California bearing ratio is the ratio of force per unit area required to penetrate into a soil mass with a circular plunger of 50mm diameter at the rate of 1.25mm/min. This test method covers the determination of the CBR of pavement sub-grade, sub base and base course materials from laboratory compacted specimens. The CBR value obtained in this test forms an integral part of several flexible pavement design methods.

For laboratory CBR tests, specimens were prepared in the CBR mould as per the standard practice. Immediately after preparation, specimen was submerged for four days for soaked tests. For every combination of soil and stabilizers, specimens were kept in closed dessicator after covering the same by plastic sheet for 7 days, 14 days and 28 days. Thereafter the specimens were tested for four days soaked tests to investigate the effect of curing.

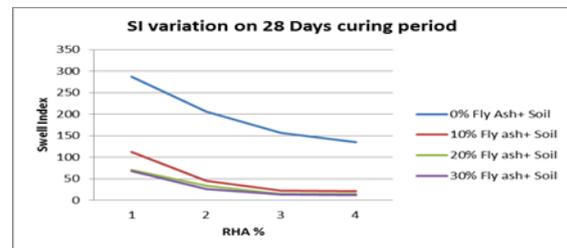
As an indicator of compacted soil strength and bearing capacity, it is widely used in the design of base and sub-base material for pavement. It is also one of the common tests used to evaluate the strength of stabilized soils.

California Bearing Ratio (CBR) of the untreated natural soil sample was 8.5%. When the fly ash content was increased from 0 to 20%, CBR increased from 8.5 % to 13.37 % in 1st seven days curing period. Further increase in fly-ash decreased CBR, indicating that 20% is the optimum value of fly-ash. Conversely, at any fly-ash content, increase in RHA up to 10% increases CBR. Further increase in RHA decreases CBR, indicating that 10% is the optimum value for RHA. Also at any fly ash and RHA combination CBR increases with the curing time period. Maximum CBR value was obtained, when 70% of soil blends with 20 % of Fly ash and 10 % of RHA at any curing time period. The maximum CBR value is 27.94% in 1<sup>st</sup> seven days curing period. It increases up to 36.01 % in next 21 days curing period.

The reason for increment in CBR may be because of the gradual formation of cementitious compounds in the soil by the reaction between the Fly ash, RHA and some amounts of

CaOH (Calcium Hydroxide) present in the soil. Fly ash and RHA have 57 % and 90% silicon dioxide respectively. This high amount of silicon dioxide reacts with calcium for generating pozzolonic materials. The pozzolonic materials increase the strength of the clay-flyash-RHA blend. The decrease in CBR at RHA content of 15% and Fly ash content 30% may be due to extra RHA and Fly ash that could not be mobilized for the reaction which consequently occupies spaces within the sample. This reduced the bond in the soil-RHA-Fly ash mixture.

According to clause 6201 of Federal Ministry of Works and Housing (F.M.W & H) Specification Requirement, the minimum strength of base course material shall not be less than 80% CBR (un-soaked) while minimum strength for sub-grade/fill shall not be less than 10% after at least 48 hours soaking. The sub-grade samples are good because they exhibit CBR (soaked) values that are even higher than what is stipulated in the specification.



**Figure 6:** Swell Index (SI) variation on 28 days curing time period

Swelling percentages of the samples decreased considerably with increasing stabilizer percentages. The swelling percentage of soil is diminished by 56.04% after 7 days curing by adding 10% of fly ash. Reduction is continued with increasing fly ash percentages. The amount of reduction is decreased as fly ash additions increased. Adding 20% and 30% fly ash around 73% decreased the swelling percentage of Soil nearly by the same amount (72.81% and 73.74% respectively). 5% rice husk ash (RHA) addition is caused a reduction of 44.35% in the swelling percentage of soil. A gradual reduction is continued up to 10% RHA addition. Reduction nearly slowed down thereafter. 10% RHA addition reduced the swelling percentage of soil by 44.21%, and 15% RHA addition resulted in a reduction of 52.32%. The swell index (SI) and swelling percentage are decreased gradually, when RHA content is on increasing with respect to certain percentage of Fly Ash as per calculated results and Figure 4.3.4.1, 4.3.4.2 and 4.3.4.3. This gradual reduction is continued up to Soil:FlyAsh:RHA combination of 70:20:10. Reduction nearly slowed down thereafter.

7 days, 14 days and 28 days curing provided considerable reductions in the swelling percentages of the samples. Reductions were gradual for each of the stabilizer additions. Swell Index (SI) value of each sample was the highest for 28 days curing and lowest for 7 days curing. That is each sample followed the order below:

(SI) 28 days curing > (SI) 14 days curing > (SI) 7 days curing  
Curing helps the moisture to be distributed uniformly in the mixture, and by providing the time necessary for the development of pozzolanic reactions it encourages self-

hardening with time. The resulting cementitious soil matrix provides extra resistance against swelling and cause further reduction in swelling percentage.

Statistical Analysis using sas 10.1

According to the result P value is 0.0001 and it is smaller than the alpha value (0.05). Therefore,  $H_0$  is rejected. That means all the mean values of 16 treatments are not equal. And according to the result highest mean value is obtained from 11<sup>th</sup> treatment. Therefore 11<sup>th</sup> treatment is the best mixture for soil stabilization. The best ratio of fly ash + RHA+ Soil is 20: 10: 70.

#### 4. Conclusions

Results suggest that maximum California bearing Ratio (CBR) value was obtained, when 70% of soil blends with 20 % of Fly ash and 10 % of RHA. The Plasticity Index (PI) and Swell Index (SI) of this proportion are good because they exhibit values that are even better than what is stipulated in the specification. Therefore, the best Soil-Fly Ash-Rice Husk Ash proportion for strengthening the weak sub-grade soil is 70%-20%-10%. Also Strength properties of treated soil increase with curing.

#### 5. Other recommendations

In this study, the geotechnical performances of fly ash and rice husk ash (RHA) in stabilizing the weak sub-grade were presented. However, fly ash and rice husk ash (RHA) can contain materials like heavy metal that are harmful to the natural environment. The risks imposed on the environment by possible geotechnical applications of fly ash and rice husk ash (RHA) must be carefully weighed against creating new pollution sources elsewhere. Therefore, to define more clearly the conditions for a safe application from an environmental point of view this research must be extended by performing leachate analyses of the samples used in this study.

It should identify the field application of this method, by using suitable technology. Also cost-benefit analysis should be made to evaluate the effectiveness of this technology.

Only two types of stabilizers, Fly Ash and Rice Husk Ash, were used as a stabilizing agent in this study, further research could be done with wide range of chemical stabilizers.

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# Change The Function Of Colonial Buildings For Independent Businesses In Semarang Old Town

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**Abstract-** The Old Town of Semarang is a conservation area with many colonial buildings. In the 1920s, the old city became a center of trade, and to secure its citizens and territories, a fortress was built. This area has an area of approximately 31 hectares. Seen from the geographical condition, this area is separated from the surrounding area, so it is formed like the city itself, and earned the nickname "Little Netherland". Some of the buildings in the colonial period, have now turned function into business premises, such as restaurants, cafes, retail and galleries.

The purpose of this study is to know how the modification of the colonial house, especially in the spatial dalamalamnya in maximizing space as a place of independent business. The research was conducted by descriptive method, with the sample taken by purposive. The result of the research shows the change of colonial building function for the independent business is realized in the change of the function of the building and the space into a place of business that is adjusted to the specificity of its business activity. In addition, the addition and alteration of building materials is used to emphasize the main functions of the business. While in general the main colonial building function plan tends not to change.

**Index Terms-** Change the function, colonial buildings, independent businesses

## I. INTRODUCTION

Semarang like any other big city Jakarta, Surabaya or Bandung which in the past is a busy city with economic activity has many relics of Dutch colonial buildings with various functions such as offices, shops, schools, markets, stations, churches and various types of urban dwellings. In Semarang, Dutch colonial buildings are located centrally in the Old Town of Semarang, especially buildings for trade, office, warehousing, school, church and some houses. Dutch colonial buildings around Jl. Bojong, now Jl. Youth and Tugu Muda area.

Based on Law Number 11 Year 2010 on Cultural Heritage stipulated that the building is more than 50 years of colonial buildings are worth preserving. Based on these regulations then all the buildings built in the Dutch colonial period or before independence deserve to be preserved. With regard to the matter in 1992 in the city of Semarang has been issued Decree of Mayor KDH Tk.IISemarang no. 646/50 / Year 1992 on the Conservation of Ancient / Historic Buildings in the Region of Dati II of Semarang, where there are 101 Dutch colonial buildings to be preserved, with varying degrees of preservation of buildings. But now some buildings have been damaged, and cut into new buildings.

Currently some of the remaining Dutch colonial buildings in the city of Semarang have been preserved by involving community participation with independent efforts. Some people in Semarang see business opportunities in Dutch colonial buildings such as culinary moves such as cafes and restaurants. Buildings used for businesses are usually private colonial buildings. The utilization of colonial buildings for self-sustaining business had an effect on the environment in the formation of a new environmental atmosphere in the Dutch colonial building environment. The development of business activities in colonial buildings must be balanced with the rules in the management of colonial buildings. The need for conservation of colonial buildings in the city of Semarang has become urgent to involve community participation, given the absence of incentives from the government. Community participation in the form of Dutch colonial building utilization for self-supporting business provides building preservation opportunities with the cost of the independent business. Independent efforts on Dutch colonial buildings should be able to keep the rules of preservation of colonial buildings such as regulations that apply. On the other hand preservation regulations provide space for creativity in the development of

independent business and the creation of space with a new image with colonial feel by utilizing the character and business potential in the city of Semarang. Efforts made by independent business actors in utilizing the colonial buildings to adjust the type of business is certainly interesting to be observed.

## II. IDENTIFY, RESEARCH AND COLLECT IDEA

### Change The Function of Historical Buildings

Building function is a change in the function of the Building, originally its function as the Dutch left house into a commercial function, such as restaurant, fashion house, Cafe, both permanently and temporarily. (Hanum, Meivina 2012)

The transfer of historic buildings is a change of building usage of an activity that becomes another activity. The transfer of historic buildings emerged as a result of development and increased population and lack of fulfillment of life needs. Population growth and increased living needs for development activities have changed the structure of ownership and the use of historic buildings on a continuous basis. (Hanum, Meivina 2012)

The rapid development of technology has changed the ownership structure and the number of cultural heritage buildings into commercial centers, since the majority of cultural heritage buildings have a very strategic position as well as the economic factor of the owner of the cultural heritage building which is unable to finance the maintenance of the cultural heritage building due to the cost which is not small. use of buildings that have been designated as historic buildings. (Hanum, Meivina 2012)

In addition to meeting the needs of the owners of historic buildings who want to get big profits because it has a historic building by selling or leasing to parties who need to field of business. (Hanum, Meivina 2012)

## III. WRITE DOWN YOUR STUDIES AND FINDINGS

### Change The Function Of Colonial Buildings For Independent Businesses In Semarang Old Town

In this research, three colonial buildings were taken for self-supporting business: Spigele Bar and Bistro, Ikan Bakar Cianjur, and Contemporary Art Gallery in one area on Jl. Lieutenant General Suprato in the Old Town area. The three buildings have characteristics of Indish architecture built in the late 19th century.

#### Status of Land and Building Ownership

Building Name	Change The Function Of Colonial	Status of Land and Building Ownership (Early)	Status of Land and Building Ownership (End)
 <p>Spiegel Bar and Bistro</p>	Office - Restaurant	Personal	Personal
	Court - Restaurant	Government	Personal

 <p style="text-align: center;"><b>Ikan Bakar Cianjur</b></p>			
 <p style="text-align: center;"><b>Contemporary Art Gallery</b></p>	<p style="text-align: center;">Trade Building - Gallery</p>	<p style="text-align: center;">Personal</p>	<p style="text-align: center;">Personal</p>

*Table Land and Building Ownership Status Table Spiegel Bar and Bistro, Ikan Bakar Cianjur, and Contemporary Art Gallery in Kota Lama*

*Source: Personal Analysis*

**Spiegel Bar and Bistro**



*Picture of Spiegel Building In the Dutch Colonial period*

*Source : [https://www.kompasiana.com/christiesuharto/metamorfosa-spiegel-bar-bistro-eropa-lama-di-semarang\\_56541c39a523bd5d0c7a596a](https://www.kompasiana.com/christiesuharto/metamorfosa-spiegel-bar-bistro-eropa-lama-di-semarang_56541c39a523bd5d0c7a596a),*

Spiegel Bar and Bistro is a colonial building that was originally an office building and is a 2 storey building. Prior to use for Bar and Bistro the Spiegel building is a building that is not functioned in a long time. 2016 Spiegel building renovated and made Bar and



Change only occurs in building function and interior room order. Several windows and doors are still in the original preserves, but only redeem to improve the aesthetic value of the building.

The thick walls characteristic of colonial buildings make the character of the past space present an atmosphere different from the general building.

The main room at Spiegel Bar and Bistro that presents the twilight ambiance. With no barriers, just place the Bar table in the main room void. European concept is very thick on the interior atmosphere of Spiegel Bar and Bistro. Curves typical of European buildings are still maintained in the atmosphere of Space Spiegel Bar and Bistro, with the authenticity of exposing bricks are still maintained in order to conserve this historical colonial buildings.

### **Ikan Bakar Cianjur Restaurant**



*Picture of Ikan Bakar Cianjur Restaurant ex. District Court th. 1925*  
*Source : Dimensi Teknik Arsitektur Vol. 32, No. 2. (Purwanto, LMF 2004)*

Building restaurant Ikan Bakar Cianjur on Jl. Lt. Gen. Suprpto of the Old City of Semarang, occupying an old building built during the colonial period in 1760 (Groll, 2004). At first this building served the court office in the colonial period, is a one-story building. The architectural style of this building is an example of a Closed Dutch Style style building similar to Reiner de Klerk's house which currently houses the Archive Building in Jakarta (Groll, 2004 and Heuken, 1997).

*Renovation Picture of Ikan Bakar Cianjur , 2007*  
*Source: Private Document*



After the independence period was used as a private office and dormitory. The building had been vacant for a long time, although it was an important building with a strategic location that became part of the history of the Old Town area. In 2006 the building could be purchased by private parties, before it was renovated to be restaurant in 2007. The former courtroom building was renovated with small changes in the kitchen and side room development.



*Picture of Part of the building that's still in defend  
Source : Private Document*

Changes that exist in the IBC building Semarang exist on the function in space space on the condition of the existing space available for business activities culinary / restaurant.

The addition of new spaces occurring in IBC buildings is visible on the right side of the IBC is a new dining room with a design that looks most different from other dining rooms that still show its original condition

**Contemporary Art Gallery**



*Picture of Contemporary Art Gallery ex. De Indische Lloyd 1937*

Contemporary Art Gallery is an art gallery located in Kota Lama Semarang. At first this building is a building for trading business. Historically this building was torn down and rebuilt in 1918 in colonial style and recorded as the first office of an insurance company named "De Indische Lloyd" in 1937, owned by businessman Oei Tiong Ham Concern, the sugar king of Indonesia. In the course of this building was once dominated by Tasripin indigenous businessmen and had been hired as a warehouse. The last was used as a Fresh syrup company until 1998. After 1998 had not been functioned and left empty in a long time to experience destruction due to wear and damaged by the roots of wild plants. In 2007 the building was renovated by Mr. Chris Dharmawan to be a gallery. Year 2008 is used as Semarang gallery.



*Picture of during the renovation maintenance phase  
Sumber : Private Document*

Contemporary Art Gallery building in general still according to the original. Only many windows are closed for the gallery display space. The building facade is still the same as the original as it was when it was first built. The interior of the building is designed to optimize gallery functions, with few openings or windows, especially spaces outside the gallery.



*Picture of Floor Plan and Interior Contemporary Art Gallery  
Source : Private Document*

The authenticity of the floor plan in Contemporary Art Gallery building did not undergo much change. Only the interior atmosphere that changed due to the change of building function, which formerly an office into a gallery



Contemporary Art Gallery	Building for the insurance company De Indiche Lloyd in 1937. In the course of the building was occupied by indigenous businessmen of the colonial period Tasripin, and last used as a factory syrup Fresh until the end of 1998. In 2007 the building was renovated to become a gallery and inaugurated in 2008.	Expression of the building from the outside looks in accordance with the original. Changes are in the inner space, many windows are closed for display space in the gallery, especially to display the painting. For the facade still the same, the window of the typical colonial period and interior blinds are optimized for gallery function.
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*Table of Utilization of Colonial Building for Independent Business  
Sumber : Analisis Pribadi*

#### IV. CONCLUSION

From the above discussion about Change The Function Of Colonial Buildings For Independent Businesses in Semarang Old Town, it can be concluded:

1. Trade building and court office as a colonial building can be change to gallery or restaurant with the original architectural expression.
2. Change the function of spatial colonial buildings adapted to new functions for specific business activities,
3. The changing function of colonial buildings was basically more dominant to preserve colonial buildings and revive the atmosphere of the old city of Semarang

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# Prevalence of Hamstring muscle tightness among undergraduate physiotherapy students of Nepal using Passive Knee Extension Angle Test

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**Abstract-** Inability to extend the knee completely when the hip is flexed, accompanied by discomfort or pain along the posterior thigh and/or knee is hamstring muscle tightness. This study aims to find the prevalence of the hamstring muscle tightness among the undergraduate physiotherapy students and assess association between hamstring muscle tightness and Low back pain.

**Methods:** A cross-sectional study was conducted among 107 physiotherapy students of Kathmandu University School of Medical Sciences (KUSMS). Passive knee extension test was used to determine the hamstring muscle length. Descriptive analysis was done by using SPSS version 16 to find out the result.

**Results:** Out of 107 respondents, the study showed 40.17% with prevalence of hamstring muscle tightness, in which tightness was found to be high in male than female participants. Prevalence of hamstring muscle tightness is greater in clinically exposed student compared to clinically not exposed students. The present study has revealed no significant association between hamstring tightness and LBP.

**Conclusion:** The present study shows medium prevalence of hamstring muscle tightness among physiotherapy students of KUSMS and no association were found between low back pain and hamstring muscle tightness.

**Index Terms-**Hamstring muscle tightness, Knee extension angle, Prevalence, Physiotherapy students

## I. INTRODUCTION

### Background:

The hamstrings comprise three large muscles, namely semi-tendinous, semi-membranous and biceps femoris which originate from the infero-medial impression on the upper part of the Ischial tuberosity and gets inserted on the upper parts of posterior surface of tibia. They are located in the posterior compartment of the thigh and acts on the hip and knee joint. Hence, they are extensors of the hip and flexors of the knee. Muscle tightness is caused by decrease in the ability of the muscle to deform, resulting in a decrease in the range of motion at the joint on which it acts[1].

“Inability to extend the knee completely when the hip is flexed accompanied by discomfort or pain along the posterior thigh and/or knee is usually attributed to hamstring muscle

tightness”[2]. Clinically, hamstring muscle length is not measured directly but instead, it is represented indirectly by angular measurements of unilateral hip flexion with the knee extended[3]. Hamstring muscle tightness is defined as Knee Extension Angle (KEA) greater than 20 degrees where KEA is the degree of knee flexion from terminal knee extension[4].

Methods to assess hamstring flexibility include the Straight-Leg-Raising (SLR) test, Sit and Reach (SR) test and Active Knee Extension (AKE) test[1, 4, 5]. The SLR test specificity has been questioned, as it is also widely used as a neurological test. Further, cinematographic study showed that pelvic rotation may influence the validity of SLR angle measurements. Even though hamstring flexibility assessment is easy using the Sit and Reach (SR) test, the validity of this test is considered poor[6]. Among them KEA with plantar flexion is the gold standard measure for hamstring muscle length with the Intra-Tester reliability 0.99[4, 7].

Hamstring tightness occurs in early childhood and it tends to increase with age. The progressive decline in flexibility with age has been attributed to change in elasticity and decreased level of physical activities[1,8]. Hamstring extensibility is a physical fitness component widely recognized as an important marker of health and quality of life[9]. Female tends to be more flexible than male of same age throughout the life, this is because of anatomical variation in joint structure and also performance of more rigorous physical work by men, resulting in greater micro trauma[8].

LBP is defined as pain in the area from below the ribs to the hips. Hamstring muscle tightness leads to decrease in range of motion of lumbar flexion and pelvic tilt. Reduction of hamstring flexibility was found to be one of the cause for development of low back pain. One previous study stated that there is no relationship of hamstrings flexibility and development of low back pain. Due to lack of adequate physical activity, muscle weakness and some degenerative factors like osteoarthritis, senile osteoporosis and degenerative disk disease, low back pain occurs in elderly people[8,10]. Young people with adequate hamstring extensibility seems to have lower risk of current low back pain[11]. LBP is commonly treated by physiotherapist. However physiotherapist themselves have been reported as being LBP sufferer. Students aged 20 and 21 years, and were in final year of the program, demonstrated significantly higher risk of all measure of LBP compared with younger students[12]. Educational exposures of 'sitting, looking down' and 'treating

patients' were related to recent occurrence of LBP. Physiotherapy students reported a higher prevalence of LBP when compared with other medical students. One in six physiotherapist changed settings or left the profession due to work related musculoskeletal injuries[13].

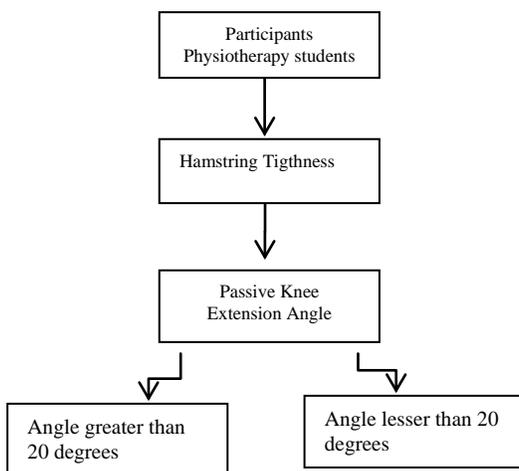
**Statement of the Problem:**

Hamstring muscle tightness is present in all age group population and it increases with age. Study shows that physiotherapy students have more low back pain compared to other medical students. One study stated that there is no relationship of hamstrings flexibility and development of low back pain. Similarly, it was reported that hamstring flexibility was strongly correlated with pelvic rotation and forward bending range (Bellew et al, 2010), which may affect the lumbar region and in this study, there is a strong correlation between hamstring flexibility and low back pain. Therefore there are different studies with controversial findings relating to hamstring tightness and low back pain. Moreover, such research study has never been performed in the context of Nepal.

**Research Question:**

What is the prevalence of hamstring muscle tightness in physiotherapy students in Nepal?

**Conceptual Framework:**



**OBJECTIVES**

**Primary Objective:**

To identify the hamstring muscle tightness among the undergraduate Physiotherapy students in Nepal.

**Secondary Objective(s):**

- a. To compare hamstring muscle tightness between Physiotherapy students with and without clinical exposure.
- b. To identify the association between hamstring muscle tightness and low back pain.

**LITERATURE REVIEWS**

Hamstring extensibility is a physical fitness component widely recognized as an important marker of health and quality of life. Young people with adequate hamstring extensibility seems to have a lower risk of current low back pain.[14]

In a study by Jose Muyor, Pedro A.lopez (2013), among 75 male cyclists, the average passive knee extensive test was 77.13° and showed higher significant correlation between pelvic tilt and hamstring muscle extensibility than thoracic spine. The cyclist had greater hamstring muscle extensibility than sedentary subject which might be because of influence of training[15]

An exploratory study with 72 participants concludes that there was a possible relationship between low back pain and hamstring tightness. It was found that more the tightness, the higher the severity of back pain. Dominant lower extremities of patients were more flexible than non dominant.[16]

A study done in university of South Australia, City East Campus shows that the risk of low back pain for physiotherapy student in year 2-4 was significantly greater compared with 1<sup>st</sup> year student. The gender specific response rates were not different from the proportion of males and females enrolled in each year level. Educational exposure of sitting, looking down and treating patient were related to occurrence of low back pain.

Another study done by Asdrubal Falavigna et.al revealed that physiotherapy students are potentially exposed to same low back pain as graduate students with poor working posture and frequent manual handling.77.9% of student had LBP at some point of their lives, 66.8% in the last year and 14.4% of them reported suffering from LBP at moment of answering the questionnaire. The result showed that physiotherapy students were 2.51 times more likely to have low back pain than other medical students, as physiotherapy students perform manual therapy such as soft tissue manipulation, transferring dependent patients, assisting patients in gait, providing manual resistance and heavy lifting[13]

A study done in University of Ibadan, Nigeria showed that among 240 individual which comprised of 122 male and 118 female, tightness is higher in male than in female. Hamstring tightness occurs in early childhood and tends to increase with age. At age of 5-12yrs, tightness was 40° whereas at age of 50-59, tightness increases to 52.6°.The progressive decline in flexibility with age has been attributed to change in elasticity and decreased level of physical activities[1]

A randomized controlled study done in a College of physiotherapy, Gujarat with 60 participants, 30 in each group concluded that there was significant difference of hamstring flexibility between participant having low back pain and normal individual .The knee extension angle of participant with low back pain was 31.63° and 14.30° in normal individual[11]

## METHODOLOGY

### Study design:

Quantitative cross sectional study.

### Study Site and justification:

The study was conducted at Kathmandu University School of Medical Sciences, Dhulikhel Hospital which is running the only Bachelor of Physiotherapy course in Nepal.

### Population and Sample:

#### Study population:

Physiotherapy Students studying in Kathmandu University School of Medical Science (KUSMS).

#### Selection Criteria:

##### Inclusion Criteria:

- All undergraduated physiotherapy students studying in KUSMS

##### Exclusion Criteria:

- Surgery of hamstring or lumbar muscles in past 6 months
- Lower extremities or spine fracture in past 6 months
- Students who are not interested to take part in this study

#### Sampling method:Census

**Sample Size:** All Physiotherapy Students studying BPT in Nepal

### Measurement

The Study measurement was divided into two variables i.e. dependent and independent variables. The following study attributes were measured in the study.

#### Independent Variable:

- Gender
- Year level

#### Dependent Variables:

- Hamstring muscle length

### Data Collection Tools/ Measures:

The students were asked if they have ever suffered LBP at some point and at the moment they were filling the questionnaire. Pain intensity was assessed by the numerical rating scale, ranging from zero (no pain) to ten (worst pain)[13]

### Passive Knee Extension Angle

Passive knee extension angle is used to assess hamstring muscle length. Hamstring muscle tightness is defined as Knee Extension Angle (KEA) greater than 20 degrees where KEA is the degree of knee flexion from terminal knee extension. It is a gold standard measure for hamstring muscle length. Inclinometer is used to measure the angle.

Passive Knee Extension Angle has good psychometric properties. It has excellent test-retest reliability (ICC=0.94). It has moderate concurrent validity (correlation with sit and reach test,  $r = 0.57$ , correlation with straight leg raise,  $r = 0.63$ ). Inter rater reliability

of inclinometer (ICC=0.80) is good and the concurrent validity with universal goniometer is 0.85.

### Ethical considerations and Data Collection

This research was conducted after the approval from Institutional Review Committee, Kathmandu University School of Medical Sciences considering the guidelines to conduct research given by Declaration of Helsinki and permission was taken from the physiotherapy Department. Verbal and written consents were taken from all subjects prior to data collection. The purpose of the study was explained to all the participants. The participants could withdraw from the study at any time without giving reason and without fear. The privacy and confidentiality of the subject was maintained throughout the study and thereafter.

Data was collected administering the Passive Knee Extension Angle. At first dominant leg will be determined as in the previous study (O' Hora et al, 2011). Passive knee extension angle of both legs were measured. For dominant leg, subject was positioned supine on examination table, and the non dominant lower extremity will be secured to the table with a cloth strap across the thigh. Another cloth strap was placed over the anterior superior spine of iliac to stabilize the pelvic. Gravity inclinometers will be placed at two points on the tested lower extremity. One inclinometer was placed on the distal thigh 5cm superior to the patella, and second inclinometer was placed on the distal anterior tibia. The distal edge of the inclinometer was aligned with the superior aspect of the medial malleolus. The tested lower extremity would be then passively raised by examiner to 90 degree of hip flexion as recorded by the inclinometer placed at distal thigh. The subject's knee would be then passively straightened to a point where the subject reported a strong but tolerable stretching at their posterior thigh. The angle of the knee will be measured using the inclinometer placed on lower leg. Alternatively, the tester could measure the obtuse adjacent angle measured between the femur and the tibia. The angle is called popliteal angle. The sum of knee extension angle and popliteal angle is 180 degrees. Same procedure will be continued in the non dominant leg.

### Analytical procedure and methods

#### Data processing

##### Editing

After data collection, the scores were rechecked and compared with the normative scores for accuracy and completeness. It was seen that none of the components were skipped or missed. The obtained informations were only accessible to the researchers.

#### Categorization, Coding and Tabulation of data

All the collected data were analyzed and categorized on the basis of research objectives. Each data were given de-identification code after the data was gathered. Data were tabulated as per the number of responses in master sheet for each test. They were arranged and entered in SPSS-16.0 for further analysis.

#### Data Analysis and Summarization

The raw data collected were analyzed in SPSS-16.0 version for both descriptive and inferential statistics. Frequency distributions

were used to present the demographic information of the participants. Chi-Square test was used to assess the association between low back pain and Hamstring muscle length. After the data analysis, the findings were summarized in accordance to the consultation with the statistician.

**Interpretation of Data**

After careful analysis of the collected data and upon completion of summarizing and drawing conclusions, exploration of their significance was done. Attempts were made to search for their meaning in relation to the conceptual framework, purpose and all research decisions made in developing and implementing the empirical phase of the study and to determine its possibility of generalization, recommendation and application.

**Data Presentation**

The information data was presented in the tables and pie chart.

**RESULT**

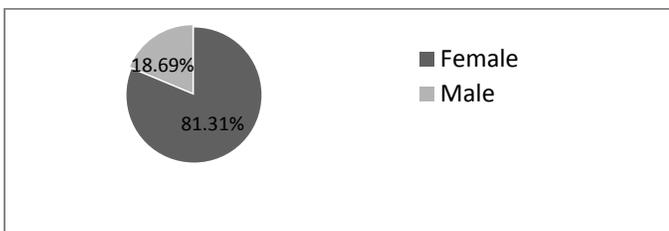
This study deals with the findings of prevalence of hamstring muscle tightness among physiotherapy students of Kathmandu University School of Medical Sciences. All undergraduate physiotherapy students including 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year participated. Total 107 subjects were screened in the study and all of them were included. The analysis and interpretation of the study are presented by addressing each objective of the study. Prevalence of hamstring muscle tightness among the physiotherapy students of KUSMS according to gender and clinical exposure and the association of hamstring muscle tightness with low back pain was analysed.

In Figure 1, among 107 participants, 87 students were female (81.31%) and 20 students were male (18.69%).

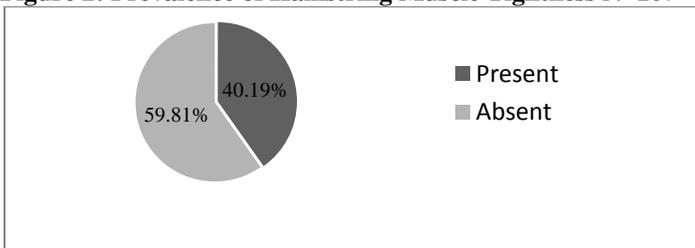
In Figure 2, among 107 students, 40.19% had hamstring muscle tightness and 59.81% did not have tightness.

In Figure 3, among 107 students, 10.3% complained of LBP at the time of questionnaires filling and 89.7 did not complain of LBP.

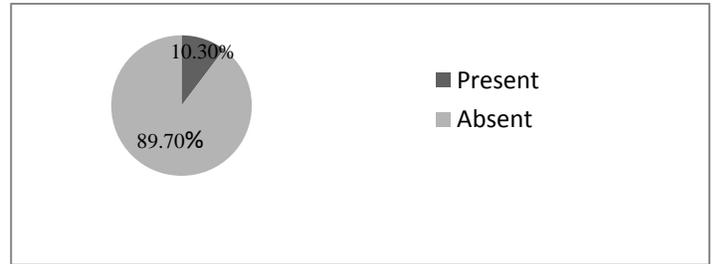
**Figure 1: Gender wise Demographic data N=107**



**Figure 2: Prevalence of Hamstring Muscle Tightness N=107**



**Figure 3: Prevalence of Low Back Pain N=107**



**Table 1: Prevalence of Hamstring Muscle Tightness according to gender**

Gender	Normal Hamstring	Tight Hamstring	Total
Male	7	13	20
Female	57	30	87
Total	64	43	107

Table 1. showed tha Hamstring tightness was seen in 13 male students(65%) and 30 female students(35%) out of total 107 participants. According to the table, the prevalence of hamstring muscle tightness is greater in male compared to female students.

**Table 2: Prevalence of Hamstring Muscle Tightness according to Clinical Exposure**

Exposure	Normal Hamstring	Tight Hamstring	Total
Clinically exposed	24	20	44
Clinically non exposed	40	23	63
Total	64	43	107

Table 2. showed out of 107 participants, 44 were clinically exposed and 63 students were not. Among clinically exposed students, hamstring tightness was seen in 20 students (45.45%) of exposed students and among not exposed students, hamstring tightness was seen in 23 students(36.5%). The prevalence of hamstring muscle tightness was found to be greater in clinically exposed students compared to non exposed students.

**Table 3: Hamstring Muscle Tightness and its association with LBP**

LBP	Normal Hamstring	Tight Hamstring	Total	P-Value
Present	6	5	11	
Absent	58	38	96	
Total	64	43	107	0.707

Table 3. revealed that out of 107 students, 11 students report LBP pain at time of data collection and there was no statistically

significant association found between hamstring muscle tightness and low back pain with p-value 0.707.

## DISCUSSION

Reduction in hamstrings flexibility has been found to be one of the causes for development of low back pain[8]. Hamstring muscle tightness leads to decrease range of motion of lumbar flexion and pelvic tilt[8]. This can alter the biomechanics of lumbar spine and may lead to back pain. Stiffness of one muscle group can cause compensatory movement at an adjoining joint that is controlled by muscles or joints with less stiffness[15].

The result of present study shows that females tend to be more flexible than males of the same age throughout the life. Results also showed that males recorded higher values of hamstring tightness compared to their female counterparts across the age groups (Female=40.48±9.24 Male=49.03±7.50). Our study also showed that the prevalence of hamstring muscle tightness is greater in male compared to female students.

Undergraduate physiotherapy students represent a group of young-adults expected to have a good working knowledge of physical activity and related health benefits[18]. They are expected to promote and prescribe exercise to patients and the general public[17]. But a study done on Physical inactivity among physiotherapy undergraduates shows higher percentage of participants were 'inactive' (48.7%), while only 15.9% were in the 'Highly active' group. Lack of support and encouragement received during childhood to engage in sports activity seems to have played an important role in continuing their exercise behavior through to the adult life. Academic activities were given priority by both parents and teachers[18]. Similar studies among physiotherapy students and physiotherapist conducted in developed countries such as Australia and Latvia, have indicated that majority of the participants were either 'Moderately' or 'Highly' active[17].

It is also predicted that prolonged tight hamstring muscle causes low back pain (Bellew et al, 2010)[19]. But Stutchfield and Coleman (2006) in their study found no association between low back pain and hamstring flexibility while studying university male rowers[8]. Also in a study done by Leino et al (1994) and Hurwitz and Morgenstern (1997), the findings of the study showed no association of hamstring flexibility and low back pain[10, 20] which correlates with the findings of our study.

In one of the studies conducted, 77.9% of the students had LBP at some point in their lives, 66.8% in the last year and 14.4% of them reported they were suffering from LBP at the moment of answering the questionnaire. It is interesting that 37% of LBP worldwide are attributable to occupational risk factor, they observed that patient transfers and repositioning were the main risk factors for LBP. 27% physiotherapy students were reported in one study to have experienced LBP as a direct result of handling patients[12,13].

Due to lack of adequate physical activity, muscle weakness and some degenerative factors like osteoarthritis, senile osteoporosis and degenerative disk disease low back pain occurs in elderly people[20].

Hence routine stretching of the hamstring muscles need to be taught to all age groups, especially before age 30 when the tightness seems to increase greatly[5]. School teachers, especially physical education teachers can help in this condition. Physiotherapists should also include hamstring stretching exercises into the treatment programmes of patients suffering from musculoskeletal disorders of the lower limbs and the lower back. This may reduce the possible contribution of hamstring tightness to these disorders, especially low back pain syndrome.

## Limitations

In this research, Low back pain classification was not described and there was unequal ratio of male and female.

## Conclusion

The present study showed medium prevalence of hamstring muscle tightness (40.17%) among physiotherapy students of KUSMS. The prevalence of hamstring muscle tightness is found to be greater in male compared to female students and there was no statistically significant association between hamstring muscle tightness and low back pain with p-value 0.707.

## Clinical Implications

Stretching once a week shows good result with hamstring flexibility. Therefore routine stretching of the hamstring muscles need to be taught to all age groups, especially before age 30 when the tightness seems to increase greatly.

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# Level of disability among individuals with Adhesive Capsulitis visiting Dhulikhel Hospital using Quick-DASH

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**Abstract-** Adhesive capsulitis affects shoulder joint with pain and mobility deficits. It has been termed as a self-limiting condition but recent evidences have shown patients facing long term disability for years due to this condition. Pain and stiffness are the factors defining disability with early pain or late stiffness in this condition. The level of disability is a component defining clinical state of adhesive capsulitis by which interventions can be planned out. **Method:** This is a cross-sectional study of 30 individuals with Adhesive Capsulitis visiting Dhulikhel Hospital in Nepal. Socio demographic factors, pain intensity and level of disability were recorded. Numeric Pain Rating Scale (NPRS) and Quick-Disability of arm shoulder and hand (Q-DASH) were the two outcome tools used to measure pain intensity and disability levels. Descriptive analysis was used for the sociodemographic findings and Chi-square test was used to observe the association between Pain and Disability. **Results:** The study found that majority of individuals had moderate level of disability (70%) followed by mild (23.3%) and severe level (6.7%). There was an association between pain and disability ( $p < 0.05$ ). **Conclusion:** Maximum number of individuals had moderate level of disability affecting their functional task due to pain and stiffness.

**Index Terms-** Adhesive capsulitis, Disability, Shoulder joint, Pain, Stiffness

## I. INTRODUCTION

Shoulder is the third most-frequently painful region after the back and neck [1]. In general population, 2-5% have Adhesive Capsulitis and the incidence is 4.3-38% in individuals with diabetes and thyroid disease. Adhesive capsulitis (AC) is common between 40-65 years age where females are mostly affected. The occurrence of this condition is 5-34% in the contralateral side after the involvement of one side. The causes can be primary or secondary cause, former being the idiopathic with no systemic condition or history of injury and later one has 3 subcategories-systemic, extrinsic & intrinsic.<sup>2</sup> This condition affects shoulder joint with pain and mobility deficits [2,8,14].

### Adhesive capsulitis and Disability

Disability is defined by WHO as "Any restriction or lack of ability to perform an activity in a manner or within a range considered normal for human being"[3]. Adhesive capsulitis has been termed as a self-limiting condition but recent evidence has

shown to have long term disability in patients for many years[4]. There is inflammation of the joint capsule and synovium which results for capsular contracture thereby holding the humeral head tightly in glenoid labrum and limiting the glenohumeral joint Range of Motion (ROM). There is the growth of new vessels and nerve and this new nerve produces increased pain response to the joint and ultimately affects the mobility and functional ability[12,13]. ROM impairment in this condition has affected individuals' ability to participate in self-care and occupational activities[3].

### Pain and Disability:

The intensity of pain and level of disability are to define clinical state in Adhesive capsulitis. In many chronic cases, there is a direct relation of pain intensity and disability but in the condition of adhesive capsulitis, initially there is pain and then stiffness begins to develop. After certain time, pain starts to resolve but the stiffness persists resulting in disability. [2].

### Quick-DASH:

Quick-Disability of Arm, Shoulder and Hand (Quick-DASH) a self-reported questionnaire is a shortened version of DASH with 11 items to measure physical function and symptoms in people with upper limb musculoskeletal disorder. In Quick DASH, mental function, sensory function and pain, neuromuscular movement, mobility, self-care, domestic life, interpersonal interaction are some parameters that define disability level[11]. The final interpretation is ranged from 0 to 100 where 100 defines higher rate of disability and 0 as no disability [3,15].

### Statement of the Problem:

Individuals with adhesive capsulitis is one of the common shoulder problems seen in out patient department. Patient reported pain intensity and level of disability are the factors for determining clinical state and intervention of the condition. Pain is commonly assessed but assessment of disability level is often missed.

### Need of the study:

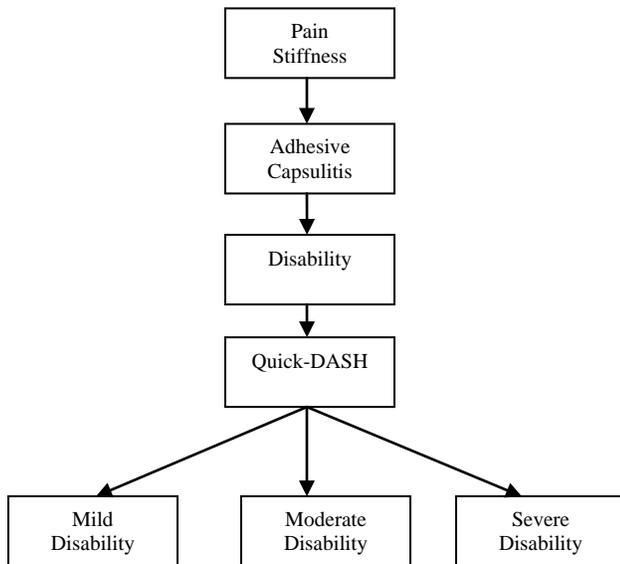
There is difficulty in performing activities of daily living due to pain and mobility deficit in the patient suffering from this condition. Cause of disability initially is due to the pain which is followed by stiffness in later stages of the condition. Patient self-reported disability level is a factor describing clinical state of the

condition which affects the intervention plan. Therefore, there is a need to determine the level of disability in patients having adhesive capsulitis and such a study has never been conducted in out patient settings in Nepal

### Research Question

What is the level of disability among individuals with Adhesive capsulitis visiting Dhulikhel Hospital?

### Conceptual Framework:



### OBJECTIVES

#### General Objective:

- To determine the level of disability among individuals with Adhesive Capsulitis visiting Dhulikhel Hospital.

#### Specific Objective:

- To find the association between pain and disability level.

### RESEARCH HYPOTHESIS

#### Alternate Hypothesis

- There is association between pain and disability level.

#### Null Hypothesis

- There is no association between pain and disability level.

### LITERATURE REVIEW

Shoulder is the third painful region after back and neck. In a study conducted by Trevor et al 2013, the prevalence of shoulder pain in adult accounted for 6.9% to 26%. Within this population 18.6% to 31% individuals had disability in the first month whereas 4.7 to 46% have disability for 1 year [1,6].

Adhesive Capsulitis is characterized by disabling pain and restriction in the range of motion of the shoulder joint. Pain is

usually gradual, progressive and sleep disturbing type. This painful phase is followed by stiffness. Kelley et al, in 2013 explained the phases of the condition as stage I lasting for 3 months having sharp pain and sleep disturbances with minimal to no ROM restriction. Stage II lasts for 3- 9 months with pain and gradual loss of motion in all directions. With stage III, the pain and inflammation decreases but capsular fibrosis begins to develop decreasing the ROM which lasts for 9 to 16 months. In stage IV, pain resolves but significant stiffness develops for 17 to 24 months [2].

There is a proposed guideline for diagnosis, examination and treatment of shoulder pain and restricted range which states patient reported pain intensity and level of disability as the factors for determining clinical state and intervention in Adhesive capsulitis. In the study conducted by Trevor et al 2009, pain intensity has been shown strong association with functional disability. In adhesive capsulitis, pain and stiffness phases appear at different time which affect level of disability unlike to any other cases where pain and disability are directly linked. In a study by Fernandes et al 2014, minimal level of disability persists in individuals even after 24 month. The previous studies said that the condition is self-limiting within 24 months. However, 15% of the individuals experience long term disability as a result of chronic loss of shoulder mobility [1,2,4,6].

In a study with stage II of adhesive capsulitis by Griggs et al 2000, after 22 months, 40% of the individuals reported residual shoulder disability with SD score of 9.7 to 13.6 in DASH score[12]. There has been study finding that even after 44 months of the condition, individuals had mobility deficit with little functional deficit. This was also supported by the study done by Shaffer et al that even after 7 years of follow up, 89% of the individuals had functional limitations and deficits[2,19,20].

In 2014, study done by Fernandes et al. stated that Adhesive capsulitis has worst impact in the physical domain of Quality of Life. The psychological factors like fear of pain, pain catastrophisation contribute to the musculoskeletal pain and disability[18].

DASH is an outcome tool used in Adhesive Capsulitis having a good psychometric properties in shoulder pathologies[11].

### METHODOLOGY

**Study design:** A Quantitative Cross Sectional study

**Study Site:** The study was conducted at Physiotherapy Outpatient Department of Dhulikhel Hospital, Nepal

#### Population and sample:

**Study population:** Individuals diagnosed as Adhesive Capsulitis

#### Selection Criteria:

#### Inclusion Criteria:

- Age 40 years or above
- Complain of shoulder pain

- Physical examination: Loss of full shoulder abduction and external rotation range

**Exclusion Criteria:**

- Passive ROM is normal
- Glenohumeral external rotation ROM increases as the humerus is abducted from 45° toward 90°
- 6 months of history of recent trauma on affected shoulder

**Sampling technique:** A non-probability purposive sampling method

**Sample Size:** 30 Adhesive capsulitis individuals

**Measurement**

The Study measurement was divided into two variables: dependent and independent variables. The following study attributes were measured in the study.

**Independent Variable:**

- Pain
- Stiffness

**Dependent Variable:**

- Disability

**Data Collection and Ethical considerations :**

- An official permission was taken from Institutional Review Committee - Kathmandu University School of Medical Sciences and the Department of Physiotherapy, Dhulikhel Hospital.
- Verbal and written consent was obtained from the participants prior to the data collection. The purpose of the study was explained to all the participants.
- The participants could withdraw from the study at any time without giving any reason on their own choice. The participants were reassured that confidentiality would be maintained throughout the study.
- Data was collected using self-administered questionnaires.

**Data Collection Tools:**

**Quick- DASH:** Quick-Disability of Arm Shoulder and Hand (Quick-DASH) is a shortened version of DASH. The patient reports their level of difficulty in 11 questions where the difficulty rating for each question is from 1 to 5. The obtained result is always between 0 to 100 where 100 is higher rate of disability and 0 is no disability. The level of disability is classified as mild level (<33), moderate level (33 to 66) and severe level (>66). It has good psychometric properties with reliability 0.94, validity 0.70 and responsiveness 0.79. Translated Nepali Version was used for the study.

**Numeric pain rating scale:**

Participants rated the intensity of their pain on a Numerical Pain Rating Scale (NPRS). In the present study, an 11 -point NPRS was used with 0 labeled as “no Pain” and 10 as “extreme pain.” Participants were prompted to rate the intensity of the pain. All of the NPRS ratings will be then averaged for each participant to give a global pain-intensity score. The psychometric properties of Nepali- version is good.

**DATA ANALYSIS**

**Data processing**

**Editing**

After the collection of data, it was rechecked to see whether all the contents were present. It was seen that none of the components were skipped or missed. The obtained information was only accessible to the researchers.

**Categorization and Tabulation**

All the collected data were analyzed and categorized on the basis of research objectives. Data was arranged, entered and tabulated in SPSS-16.0

**Data Analysis and Summarization**

Descriptive statistics and inferential statistics (Chi-Square Test) were used. After the data analysis, the findings were summarized in consultation with the statistician.

**Data analysis and Interpretation of Data**

After careful analysis of the collected data and upon completion of summarizing and drawing conclusions, exploration of their significance was done. Attempts were made to search for their meaning in relation to the purpose of the study. The ultimate aim was in developing and implementing the empirical phase of the study and to determine its possibility of generalization, recommendation and application.

**Data Presentation**

Prevalence of disability was found out in frequency and percentage. Chi- Square test was used to assess the association of pain and disability.

**RESULTS**

Total 30 individuals who met the criteria set were taken in the study. The detailed results with description are shown in the table below.

**Table 1: Demographic Information**

Variable	Frequency	Percentage (%)
<b>Gender</b>		
Male	15	50
Female	15	50
Total	30	100
<b>Dominance</b>		
Right	29	96.7
Left	1	3.3
Total	30	100
<b>Affected shoulder</b>		
Right	13	43.3
Left	17	56.7
Total	30	100

**Table 2: Number of Patients during different stage of AC**

Duration of AC	Number of Patients	Overall Percentage
0-3 month	15	50
3-9 month	9	30
9-16 month	5	16.7
16-24 month	1	3.3
Total	30	100

Table 1 shows that equal number of male and female individuals visited in physiotherapy OPD with AC. Out of which 96.7% individuals were with right hand dominance and 3.3% with left hand dominance 56.7% of individuals came with problem in their non dominant left shoulder.

Table 2 shows 50% of the individuals visited during 0-3 month duration followed by 30% in 3-9 month, 16.7% in 9-16 month and 3.3% in 16-24 month. There were no individuals visiting after 24 months.

**Table 3: Prevalence of Level of Disability**

Disability	Frequency	Percentage
Mild	7	23.3
Moderate	21	70.0
Severe	2	6.7
Total	30	100.0

Table 3 shows the majority of individuals had moderate level of disability(70%) followed by mild level (23.3%) and severe level (6.7%).

**Table 4: Association of Pain and Disability**

	NPRS total	QD int
Chi-Square	11.600 <sup>a</sup>	19.400 <sup>b</sup>
Df	12	2
Asymp. Sig.	.478	.000061

Table 4 shows the p value is 0.000061 which is less than 0.05. Therefore, there is association between pain and disability

## DISCUSSION

Pain and disability are commonly encountered and interrelated with shoulder pathologies. Pain in early phase of adhesive capsulitis is followed by stiffness. The increase in pain intensity causes decrease in range of motion resulting for disability. The relation of pain, stiffness and disability are explained with different phases[1,2].

In our study, many individuals (50%) visited in their early stage with increase in pain intensity accounting for disability. Therefore pain induced disability was found to be more. The remaining individuals were from stage II to IV. In these stages, there is reduction in ROM which results for their disability. Thus,

pain and restricted ROM are two variables for defining the level of disability in Adhesive Capsulitis.

The final result of the study showed that majority of individuals had moderate level of disability. This could be because of active movement of shoulder in functional activity and occupation despite pain or stiffness. Majority of individuals in the study visited with the complain of pain at Stage I and therefore the dominant effect of pain on disability was found which is similar to the previous studies showing strong association between pain and disability.

In this study, 56.7% individuals had problem in their non-dominant hand so their functional capacity was not much affected as they could perform the task with dominant hand without greater level of difficulty. This could also be a plausible reason for more number of individual with only moderate disability level otherwise.

Various studies state that disability is related with pain, age, duration and psychological variables[18]. In our study, pain was reported on all the individuals, the mean age is 57 years and the duration of symptom is more in first 3 months accounting for disability related to pain. But the psychological variables that can affect the disability level was not assessed which tends to be limitation of the study.

## Further Recommendations:

- The increase in number of adhesive capsulitis individuals with reported stiffness also can be taken for being more specific to stiffness induced disability with larger sample size.
- Assessment of Psychological factor of pain can be done.

## Conclusion

Maximum number of individuals were found with moderate level of disability affecting their functional task, with reporting of pain in the early stage of condition and therefore the pain and level of disability was found to be associated.

## Clinical Implication

Based on the result, there is a need to focus in the management of pain for reducing the disability level because pain limits the range of motion and functional activities in an individual visiting with acute onset of pain. Other interventions include education, pain modulation, gentle stretching, and shoulder mobilization<sup>2</sup>.

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# Phytochemical Screening of Pomegranate Peel using crude Hydro-alcoholic Extract and pharmacological activities

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**Abstract-** Pomegranate is a curative plant from ancient times which belongs to punicaceae and Lythraceae family. This plant is developed as small trees or shrubs in several countries like Iran, Iraq, Afghanistan, Pakistan, India, Russia and Mediterranean area. From the peel extract the tests were carried out to find the presence of the following chemical compounds such as carbohydrates, reducing sugars, glycosides proteins, amino acids, phenolic compounds, tannins, alkaloids, flavonoids, saponins, sterols, etc. This paper shows a comparative report of the screening test of pomegranate peel using crude, hydro alcoholic extract and In vitro antimicrobial activity.

**Index Terms-** pomegranate peel extract, hydro alcoholic extract, antimicrobial activity,

## I. INTRODUCTION

Pomegranate (*Punica granatum* L.); the common name is derived from the Latin words *ponus* and *granatus*, a granular apple which is a delectable fruit consumed worldwide. The total production of pomegranate around the world is 1,500,000 tons, in that 60% is the weight of the peel itself. *Punica granatum* Linn. (Pomegranate) is a plant belongs to Punicaceae family locally East for more than 5,000 years ago and it is found in Iran, Egypt, India, Bangladesh, Sri Lanka, North Africa. Pomegranate peels are used as a popular remedy throughout the world and exploited in traditional medicine because of their strong mordancy properties (Nitave and Patel, 2014). Bark, leaves, immature fruits and fruit rind of different parts of pomegranate have valuable therapeutic potential. Several studies focused on prevention and treatment of cancer, cardiovascular disease, diabetes, dental conditions, erectile dysfunction and skin allergy investigations were carried out to determine antioxidant, anticarcinogenic and anti-inflammatory properties of pomegranate constituents. Pomegranate peels are distinguished by an internal network of membranes encompassing almost 26–30% of total fruit weight and are characterized by considerable amounts of phenolic compounds, including flavonoids such as anthocyanins, catechins and other complex flavonoids and hydrolysable tannins (punicalagin, punicalin, pedunculagin, ellagic and gallic acid). Preliminary phytochemical screening of the aqueous extract of *P. granatum* peels gave positive tests for tannins, flavonoids, and alkaloids and showed that the hydroalcoholic extract of *P. granatum* peels may contain some biologically active principles that may be the basis for its traditional use (Qnais et al., 2007).

The ethno pharmacological Profile of pomegranate Peel makes it a prized traditional asset due to its antimicrobial, antimutagenic and antioxidant, anti-inflammatory properties.

## II. MATERIALS AND METHODS

**Collection of plant materials:** fresh peel of *punica granatum* were collected from local market of Dehradun and transported in to laboratory. The peel removed from fruit carefully by sharp knife and allowed to dry. The peel washed with distilled water and dry in oven at room temperature.

**Preparation of extract:** the dried peel converted into powder with the help of grinder and pass through the sieve no 120. The peel *Punica granatum* (5g) was extract with 100ml hydro alcoholic solvent. The hydro alcoholic solution was prepared water: ethanol (40:60). The extraction process were done hot maceration method and crude extract was stored at 20°C in refrigerator.

**Phytochemical screening:** phytochemical screening of *punica granatum* peel extract were assessed by the standard method as describe by Khandelwal et al 2009

✓ **Alkaloids** Dried extract were treated with dilute hydrochloric acid, shake well and then filtered. The filtrate is further used for different test.

**Mayer's test:** Filtrates were treated with Mayer's reagent (potassium mercuric iodide). The formation of a yellow cream precipitate indicates the presence of alkaloids.

**Wagner's test:** Filtrates were treated with Wagner's reagent (potassium bismuth iodide). The formation of brown and reddish brown precipitate indicates the presence of alkaloids.

**Dragendorff's test:** Filtrates were treated with Dragendorff's reagent (iodine in potassium iodide). The formation of red precipitate indicates the presence of alkaloids.

**Hager's test:** Filtrates were treated with Hager's reagent (saturated solution of picric acid). The formation of yellow precipitate indicates the presence of alkaloids.

✓ **Carbohydrates**

**Molisch's test:** Extracts were treated with alcoholic  $\alpha$ -naphthol solution in a test tube and concentrated sulphuric acid is added carefully along the sides of the test tube. Formation of violet ring at the junction indicates the presence of the carbohydrates.

**Fehling's test:** Extracts are hydrolyzed with dilute hydrochloric acid, neutralize with alkali and heated for 5-10 minute on water bath after adding Fehling A and B solution. First yellow, then brick red precipitate indicates the presence of reducing sugars.

✓ **Glycosides**

Determine free sugar content of the extract, Hydrolysed the extract with mineral acid. Again determine the total sugar content of the hydrolysed extract. Increase in sugar content indicates of glycosides.

**Legal's test:** The extract was treated with sodium nitroprusside in pyridine and methanolic alkali. The formation of pink to red colour indicated presence of cardiac glycosides.

**Killer Killani test:** A small amount of dried extract was dissolved in 2ml of glacial acetic acid containing one drop of ferric chloride solution. These were kept for some time after addition of 1ml of concentrated  $H_2SO_4$ . A brown ring obtain at the presence cardenolides.

✓ **Saponin glycosides**

**Foam test:** The extract was diluted with 20ml of distilled water separately and shaken for 15min. in graduated cylinder. A layer of foam, measuring about 1cm, indicates the presence of saponins.

✓ **Coumarins glycosides**

**With Ammonia:** A drop of Ammonia is taken on a filter paper and a drop of aqueous extract was added to it. Fluorescence was observed if coumarins are present and fluorescence was not there if coumarin absent.

**With dilute  $HNO_3$ :** Small quantity of extract was added to dilute  $HNO_3$  presence of coumarin was confirmed by the formation of yellow precipitated

✓ **Flavonoids**

**Shinoda test:** A small amount of dried extracts are extracted with 10ml of ethanol for 15 min on a boiling water bath and filtered. To the filtrates, added a small piece of magnesium ribbon and concentrate HCl. Formation of pink colour indicates the presence of flavonoids.

**$FeCl_3$  test:** To the sample solution, added  $FeCl_3$  solution. A change of colour from green to black indicates presence of flavonoids.

✓ **Proteins and Amino acids**

**Million's test:** The extracts were treated with Million's reagent. The formation of white precipitate, which turned to red upon heating, indicates the presence of proteins and amino acids.

**Ninhydrin test:** To the extracts, 0.25% Ninhydrin reagent was added and boiled for few minutes. Formation of blue colour indicates presence of amino acids.

✓ **Tannins**

**Ferric chloride test:** The extract was treated with few drops of neutral ferric chloride. Solution (5%). The formation of bluish black colour indicates the presence of tannins.

**Lead acetate test:** The extract was treat with few drops of neutral Lead acetate solution (10%). The formation of yellow precipitate indicates the presence of tanins.

✓ **Steroids and Triterpenoids**

**Liebermann-Burchard reaction:** To the dried extracts ethanol, chloroform and acetic acid were added. To the above mixture, 1 to 2 drops of concentrated sulphuric acid is added. Dark green coloration of the

Solution indicates the presence of steroids and dark pink coloration of the solution indicates the presence of triterpenoids.

**Salkowaski reaction:** Chloroform was added to the dried extracts followed by addition of a few drops of concentrated sulphuric acid, shaken well and allowed to stand for some time. Red colour appearance in the lower layer indicates the presence of steroids and formation of yellow colure lower layer indicated the presence of triterpenoids.

✓ **Fixed oil and fats**

**Greasy spot test:** Small quantity of extract was pressed between two filter papers. An oil stain on filter paper indicates the presence of fixed oil.

✓ **Volatile oil**

**Sudan red:** Small amount of extract was added to Sudan red solution to produce red colour precipitate .It shows presence of volatile oil.

**$CuSO_4$  solution:** Small amount of extract was added to Copper sulphate solution to produce clear solution It show presence of volatile oil.

Phyto constituents test	Reagent name	Hydro alcoholic extract
Tannin	1. Ferric chloride test	+
	2. Lead acetate test	+
Alkaloids	1. Mayer reagent	+
	2. Dragendroff reagent	+
	3. Wagner reagent	+
	4. Hager reagent	+

Carbohydrate	1. Molisch test 2. Fehling solution 3. Osazone test	– – –
Glycoside	1. Legal's test 2. Killer Killani test	– –
Saponins	1. Foam test	–
Flavonoids	1. Shinoda test 2. Ferric chloride test	+ +
Steroids	1. Liebermann-Burchard reaction 2. Salkowaski reaction	+ +
Protein and amino acid	1. Million's test 2. Ninhydrin test	– –
Coumarins	1. With Ammonia 2. With dilute HNO <sub>3</sub>	+ +
Fixed oil	1. Gray spot test 2. Sudan red test	– –

### Pharmacological activity

#### Antimicrobial activity

#### Agar well diffusion method

#### Preparation of agar media

- Suspended 9.5gm MHA agar in a 500ml conical flask and 250ml distilled water will be added.
- Then, it will be heat on hot plate with frequent agitation until it completely dissolves.
- Then, media will be sterilizing in autoclave at 121°C for 1 hour.

#### Procedure

Approximately 25ml of Mueller- Hinton agar (MHA) will be pouring into sterile Petri- dish and allow to solidify. 50 micro liter of bacterial inoculums will be spread on the solidify MHA media by using sterile spreader. In each of these plates four wells (5mm diameter) will be punching into the agar by using sterile cork borer. Then, working concentration of 25mg, 50mg, 75mg and 100mg dilution will be prepare from 500mg/ml of stock solution of each extracts and 100micro liter of each extract will be separately adding into wells and allowed to diffuse at room temperature. Equal volume of alcohol will be use as negative control and standard antibiotics (Gentamicin, amikacin, tetracycline and ofloxacin) using as positive control. The plates will be incubate for 24 hours at 37°C & the diameter (in mm) of clear zone of growth inhibition will be recording and measure with the help of radius scale ((Natarajan *et al.*, 2010).

#### Test organism used in antimicrobial activity

- *E. coli*- gram negative bacteria(rod)
- *Pseudomonas*- gram negative bacteria(rod)
- *S. aureus*- gram positive bacteria(coccus)
- *Klebsiella*- gram negative bacteria(rod)

### Determination of total phenolic and flavonoids content hydro alcoholic extract

**Determination of total phenolic content:** The total phenolic content of all extracts of drug estimate according to the method described in Ayurvedic Pharmacopoeia of India. The total phenolic content expressed in milligrams of Gallic acid equivalents per gram of extract. Stock solution (1 mg/ml) of the extract in methanol is prepared. From the stock solution, suitable quantity of the extract is taken into 25ml volumetric flask and added 10 ml of water and 1.5ml of folin ciocalteau reagent. Kept the mixture for 5 min and then added 4 ml of 20% Na<sub>2</sub>CO<sub>3</sub> solution and made up to 25 ml with double distilled water. Kept the mixture for 30 min and recorded absorbance at 765 nm. Calculated percentage of total phenolics from calibration curve of gallic acid prepare by using the above procedure and expressed total phenolics as percentage of gallic acid according to Ayurvedic Pharmacopoeia of India (2008).

#### • Reagents

1. Sodium carbonate solution (20%): 20 g Sodium carbonate was dissolved in 100 ml water, and then it was filtered after allowing it to stand overnight.
2. Gallic acid stock solution (1 mg/ml): 10 mg Gallic acid was dissolved in 10ml distilled water

**5.9.2 Determination of Flavonoids Content:** The total flavonoids content of all extracts estimated according to the aluminum chloride method as follows. The aluminum chloride method is used for the determination of the total flavonoids content of the sample extracts. Aliquots of extract solutions are taken and the volume is made up to 3 ml with methanol. Then 0.1 ml aluminum chloride (10%), 0.1 ml potassium acetate (1 M) and 2.8 ml distilled water added sequentially. The test solution is vigorously shaken. Absorbance at 415 nm is recorded after 30 minutes of incubation. A standard calibration plot is generated at 415 nm using known concentrations of rutin. The concentrations of flavonoids in the test samples calculated from the calibration plot and express as mg rutin equivalent/g of sample. ( Mervat *et al.*, 2009).

#### Reagents

1. Aluminum chloride solution 10 %: 10g Aluminum chloride was dissolved in 100 ml methanol.
2. 1 M Potassium acetate solution: 9.815g Potassium acetate was dissolve in 100 ml of distilled water.
3. Standard rutin solution (1mg/ml): 10 mg rutin was dissolved in 10 ml methanol.

#### Result and discussions

Pomegranate peel is rich in tannins, high-molecular weight plant polyphenols, which can be categorized into two chemically and biologically separate groups: condensed hydrolysable tannin and tannin, the latter composed of glycosyl esters and phenolic acids. Hydrolyzable tannins are parted into gallotannins containing gallic acid and ellagitannins, containing ellagic acid. The cytoprotective and inhibitory effects of peel demonstrates the potential to prevent some human carcinomas. Table 1 lists the phytochemical constituents of Punica granatum peel extracts. All the phytochemical constituents tested were present in aqueous

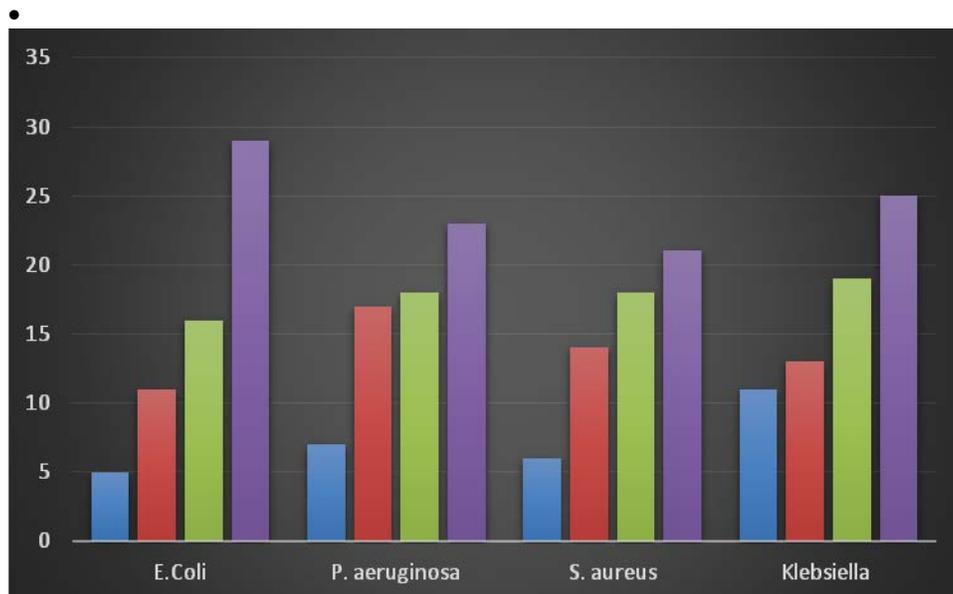
extract of *P. granatum* peel except glycosides and anthocyanin. It was noted that ethanolic peel extract of *Punica granatum* showed the presence of all phytochemical constituents except tannins, glycosides. The prophylactic potential of the peel against viral epidemics and pandemics, specifically influenza, may open up new avenues for research in the nutritional and medical science domains. In the present study, anti-bacterial activity was studied against *E.Coli*, *Pseudomonas aeruginosa*, *S.aureus* and *S.typhii*. It can be seen that both the tested strains were susceptible to the aqueous peel extract as dose dependent manner (Figure 1). A steady increase in inhibitory zone was recorded in high concentration. In the case of *P.aeruginosa*, maximum zone of inhibition was recorded at 100µL with 20mm followed by 50µL with 19mm; 10µL revealed 11mm of zone of inhibition whereas in the case of *S.aureus* and *S.typhii*, the zone of inhibition was around 21mm at the highest dosage level of 100µL. *E.coli* showed high sensitivity to high concentration of aqueous peel extract (100µL, 50µL, 10µL); 22, 21 and 7mm of zone of

inhibition has been observed at the respective concentrations (Table 1) (Graph 1).

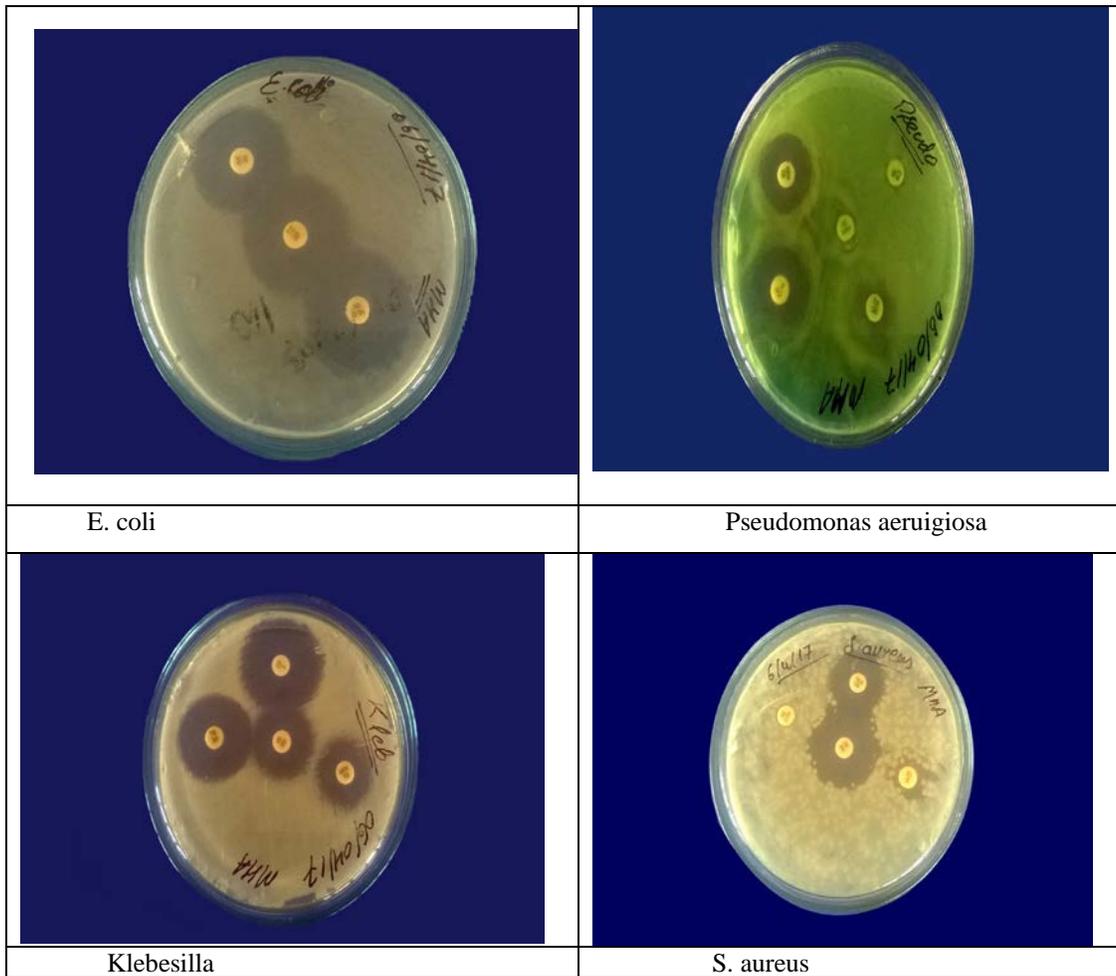
**Table 2 Antimicrobial activity of hydro alcoholic extract by well diffusion method**

S.no	Organism	Zone of inhibition	10µL	50 µL	100µL
		<b>Positive control</b>			
1	<i>E.Coli</i>	29mm	5	11	16
2	<i>P. aeruginosa</i>	23mm	7	17	18
3	<i>S. aureus</i>	21mm	6	14	21
4	<i>Klebsiella</i>	25mm	11	13	19

**Graph 1 zone inhibiton (mm) of hydro alcoholic extract at different concentration against pathogenic micro organism**



- Positive control
- 10µL
- 50µL
- 100µL

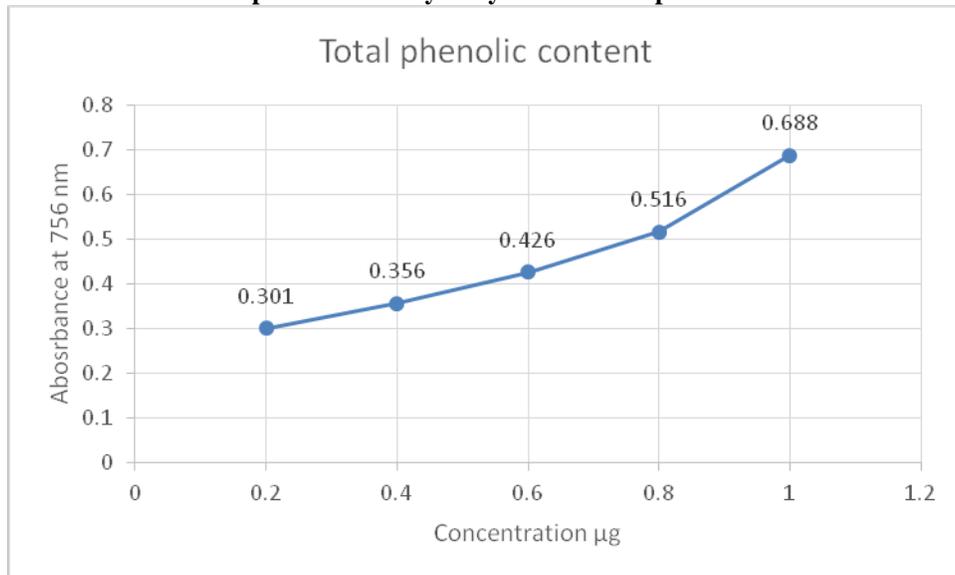


In the present study, antimicrobial activity was studied against the *E. coli*, *Pseudomonas aeruginosa*, *Klebesilla*, and *S. aureus*. It can be seen both tested both strains were susceptible to hydro alcoholic peel extract as dose depend manner (Figure 1). A steady increase zone inhibitory was recorded in high concentration. In case of *S. aureus* maximum zone of inhibition was recorded at 100 $\mu$ L with 21mm followed by 50 $\mu$ L with 14mm; 10 $\mu$ L with 6mm zone of inhibition. Whereas case of *S. aureus* and *Klebesilla* was around 21 and 19 at highest level of 100 $\mu$ L. *E. coli* has showed highly sensitivity of high

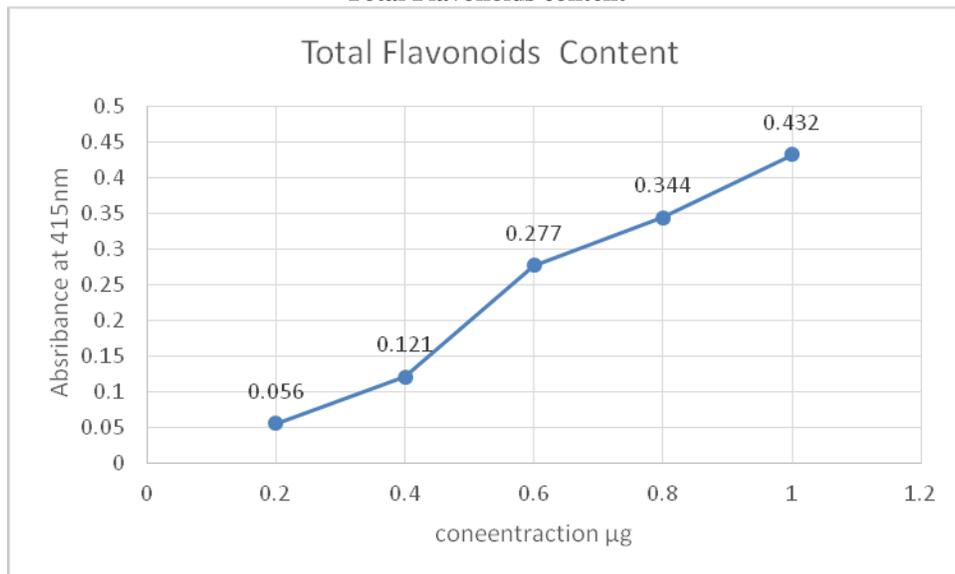
concentration of hydro alcoholic extract (100, 50, 10 $\mu$ L); 19, 13 and 11 zone of inhibition has been observed at respective concentration( table 2) and (graph 1).

Plants are opulent in secondary metabolites, including phenolics, carotenoids and flavonoids due to their chemical structures and redox properties. It gives us a complete estimation of reducing capacity of antioxidant. This particular study represented the higher percentage of phenolics, flavonoids.

### Total phenolic activity of hydro alcoholic peel extract



### Total Flavonoids content



### III. CONCLUSION

Our result suggest that the hydro alcoholic extract of pomegranate is potential source of antimicrobial activity. The specific isolation of the active component in the hydro alcoholic extract and characterization should be further examined. Further phytochemical analysis is initiated to isolate the elements of peel that show a wide spectrum of pharmacological activity.

### CONFLICT OF INTEREST

Conflict of interest as none

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# EXPERIMENTAL INVESTIGATION ON PARTIAL REPLACEMENT OF COARSE AGGREGATES BY CERAMIC WASTE AND PARTIAL REPLACEMENT OF CEMENT BY FLY ASH

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**Abstract-** Natural sand is a standout among the most ordinarily utilized fine aggregate as a part of concrete. Owing to acute shortage of natural sand in many areas and keeping environmental and cost factors into consideration an alternative for the same is pondered. In view of above discussion, an attempt is made to replace the cement and coarse aggregate in concrete of M50 grade with fly ash and ceramic waste to study the workability and compressive strength at 7,14 and 28 days curing periods. According to the results of the experiment, it is concluded that with increase in replacement of fly ash, the maximum compressive strength was obtained in M2 mix at 28 days which was 6.93% more than M0. In final mixes maximum compressive strength was achieved in M2C1 which was 13.61% more than M0 mix. Also the unit weight of the specimen decreased by 8% for M2C1 therefore it can be used for lightweight concrete.

**Keywords-** Natural Sand, Fine aggregates, Fly Ash, Ceramic Waste, Coarse aggregates

## I. INTRODUCTION

Concrete is a paste of cement, water and aggregates and in some cases rocks. Water and cement mixture coats the surface of the fine aggregates and the coarse aggregates. The paste gets starts gaining strength and gets hardens to form the rock-like mass known as concrete through a process called hydration. Fly ash remains, which is additionally termed as "pulverized fuel ash", is one of the waste buildup produced by coal ignition, and is made out of the fine particles that are driven out of the boiler alongside flue gasses. Ash that settles down the base of the boiler is termed bottom ash.

In the creation of Portland cement concrete fly ash is utilized as a secondary cementitious material (SCM). A secondary cementitious material, utilized as a part of conjunction alongside portland cement, adds to the properties of the solidified concrete through hydraulic or pozzolanic action or both.

A ceramic material may be defined as any inorganic crystalline material, compounded consists of metal and non-metal or metalloid atoms. Ceramic Materials are strong and inert. Ceramic materials are brittle, hard, and solid in pressure, frail in strain and additionally in shearing. They can withstand compound disintegration that happens in an acidic or scathing 'environment. Ceramics generally can withstand very high temperatures that can go from 1,000 °C to 1,600 °C (1,800 °F to 3,000 °F). Exemptions are there for the inorganic materials which don't have oxygen and in addition silicon carbide.

**Table -1 Physical Properties of Cement**

<b>GRADE OF CONCRETE</b>	<b>Experimental</b>	<b>43GRADE ( As per IS:8112:2013)</b>
MINIMUM SPECIFIC SURFACE (Blaine's air permeability) m <sup>2</sup> /kg	200	225
Initial setting time	110 minutes	30 MINIMUM
Final setting time	216 minutes	600 MAXIMUM
Soundness, expansion (mm)	5mm	10 maximum (Le Chatelier Test)
Normal Consistency	32%	-
<b>Compressive Strength</b>		
7 Days	33Mpa	33Mpa
28 Days	43.5Mpa	43Mpa

**Table2 – Sieve Analysis of Fine Aggregates**

<b>IS Sieve Size</b>	<b>Weight of Aggregate Retained (gms)</b>	<b>Average (gms)</b>	<b>% of total Weight retained</b>	<b>Cumulative % of total Weight retained</b>	<b>% of Passing</b>	<b>Permissible value as per IS:383-1917 (Zone-2)</b>
10mm	0	0	0	0	100	<b>100</b>
4.75mm	92	92	9.2	9.2	90.8	<b>90-100</b>
2.36mm	53	53	5.3	14.5	85.5	<b>75-100</b>
1.18mm	101	101	10.1	24.6	74.8	<b>55-90</b>
600 µm	169	169	16.9	41.5	58.5	<b>35-59</b>
300 µm	378	378	37.8	79.3	20.7	<b>8-30</b>
150 µm	180	180	18.0	97.3	2.70	<b>0-10</b>

**Table3- Sieve Analysis of Coarse Aggregates**

Sieve Size (mm)	Weight of Aggregates retainer (gms)	Avg.	% of total Wt. Retained	Cum. % of Wt. retained	% of passing	Permissible values as per IS 383:1917
20	109	109	10.9	10.9	89.1	85-100
10	852	852	85.2	96.1	14.8	0-20
4.75	39	39	3.9	100	0	0-5
PAN	0	0	0	100	0	-

### **Materials and Methods**

*Experimental Study:* After proper mixing of ingredients, moulds of size 150mm×150mm×150mm were placed on vibrating machine after proper oiling and securely tighten to correct dimension. Proper care was taken that there is no gaps left from where there is any probability of leakage of concrete paste (slurry). Then the concrete is poured in the moulds in three layers. Each layer is left to vibrate for 8-12 seconds to avoid honey combing and moulds are filled up to the brim. After concreting and compaction upper surfaces made smooth with the help of trowel. The moulds were left undisturbed for 24 hours in the laboratory. A total of 81cubes were casted for the experimental study. All the specimens were casted according to IS 516:1959.

*Cement:* To prepare mixes, ordinary Portland cement (O.P.C) grade 43 manufactures by shri ultra was used throughout the study. The physical properties of the cement are listed in Table 1. The cement satisfies the requirements of IS 8112:2013.

*Fine Aggregates:* The fine aggregate which was used was locally available river sand, which passed through 4.75 mm. Result of sieve analysis of fine aggregate is given in Table 2. The specific gravity of fine aggregate is 2.61 and fineness modulus is 2.67. Bulk density of fine aggregates is 1.29.

*Coarse aggregate:* Crushed stones of size greater than 4.75mm and passing through 20mm sieve conforming to IS 383:1970 were used in the study. Sieve analysis of coarse aggregates is given in Table3. The specific gravity of coarse aggregates is 2.63 and bulk density is 1.5.

*Fly Ash:* Fly ash supplied by Qasimpur Power House, Aligarh which belongs to class C was used. It is used as partial replacement of cement in concrete mix. Fineness and lime reactivity of Fly Ash was 360m<sup>2</sup>/kg and 5.2N/mm<sup>2</sup> respectively.

*Ceramic Waste:* The waste generated by the ceramic industries is termed as ceramic waste. In this study ceramic waste was collected from various ceramic industries located in Khurja. Specific Gravity obtained was 2.15 whereas water absorption was obtained 0.18%.

*Water:* Potable water was used for mixing and curing.

*Mix Design:* Design mix proportion of 1:1.77:2.278 at w/c ratio of 0.35 were used for M50 grade concrete and cement content were 450kg/m<sup>3</sup> satisfying all the basic requirement as per IS:10262-2009.

Table 4 – Replacement percentage of cement and aggregates by fly ash and ceramic waste

S.No	Concrete Mix	Mix Content
1.	M0	M50
2.	M1	M50 + 10% fly ash
3.	M2	M50 + 20% fly ash
4.	M3	M50 + 30% fly ash
5.	M4	M50 + 40% fly ash
6.	M2C1	M50 + 20% fly ash + 10% ceramic waste
7.	M2C2	M50 + 20% fly ash + 20% ceramic waste
8.	M2C3	M50 + 20% fly ash + 30% ceramic waste
9.	M2C4	M50 + 20% fly ash + 40% ceramic waste

**Results and discussions:**

Fresh property of concrete is determined by Workability of concrete which is one of the main physical parameter which affects the strength and durability as well appearance of the finished concrete and the cost of labor. Workability of concrete is measured with the help of slump test. The slump flow of M0 was 20mm which is acceptable according to IS 4926:2003. The slump value goes on increasing from M0 to M4 as Fly ash imparts lateral strength as compared to cement which imparts early strength in concrete. According to IS code all the values are within the limiting range. The compression in slump values for initial mixes is shown in Fig.1.1. The slump flow goes on increasing from M2C1 to M2C2 and maximum slump was achieved in M2C4 i.e. 40% replacement of cement by Fly ash and 40% replacement of coarse aggregates by ceramic waste because angular and rough aggregates which results in poor workability are replaced by 40% by ceramic waste which are cubical in shape and smooth in surface. Comparison in slump values for final mixes is shown n Fig.1.2. The overall comparison is shown in Fig.1.3.

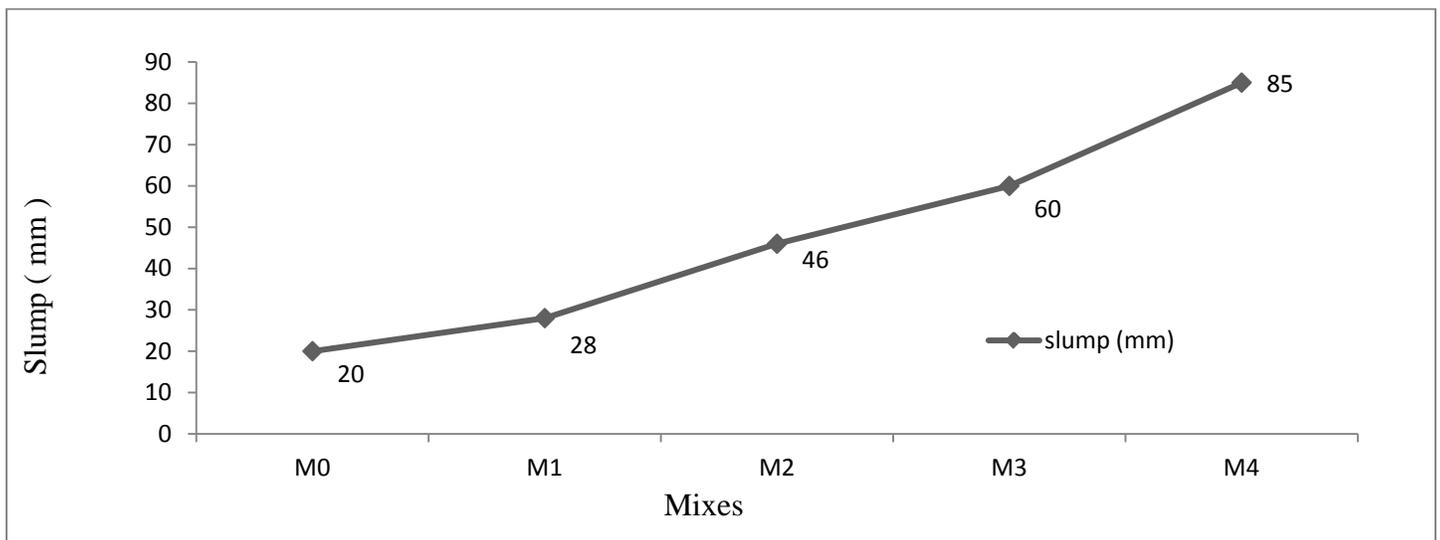
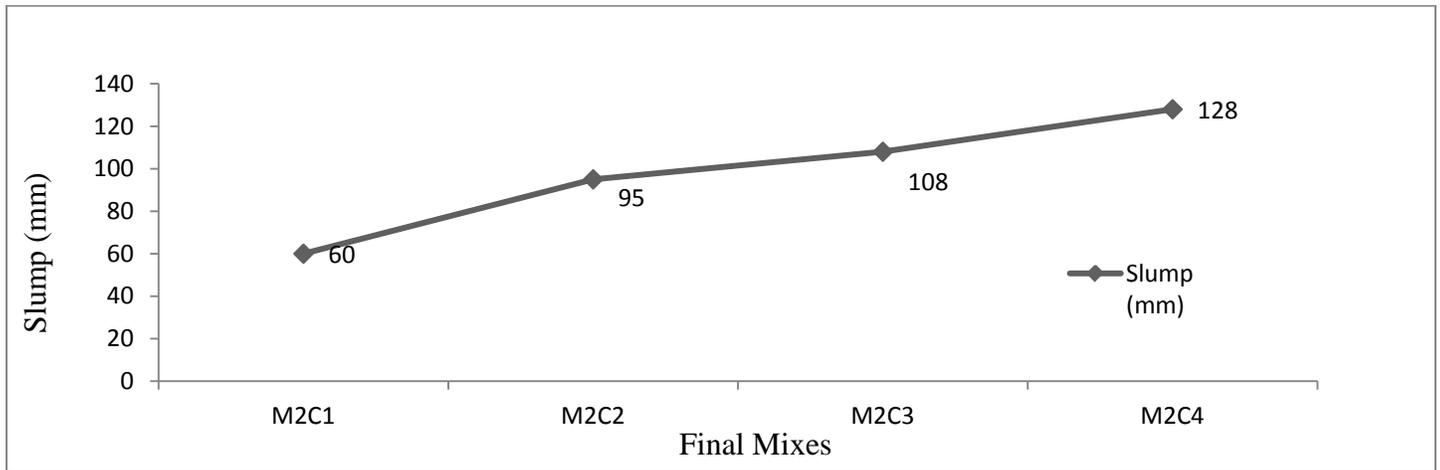
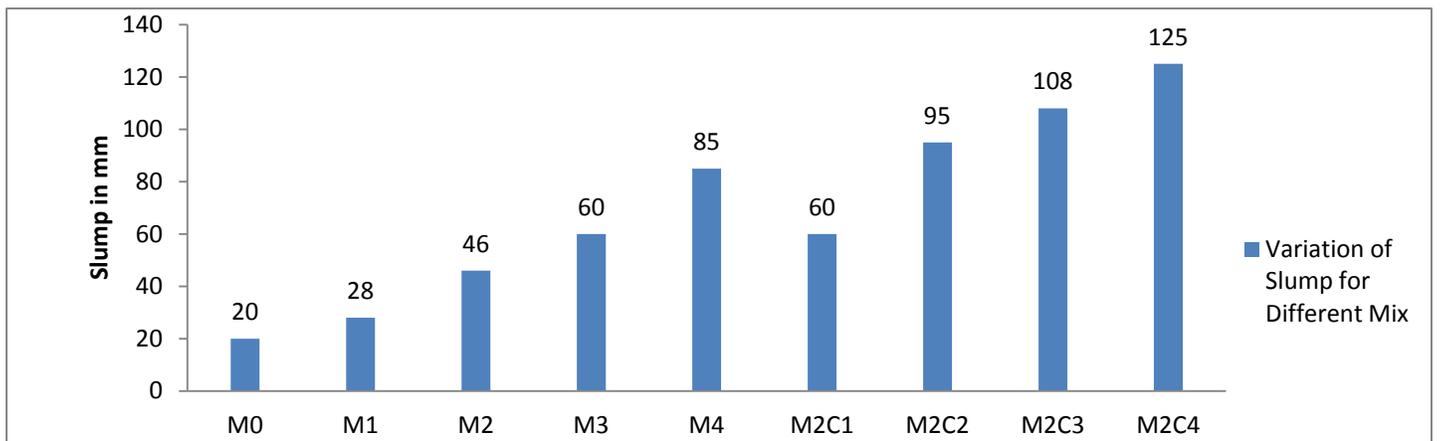


Figure 1.1 Comparison in slump values of initial mixes



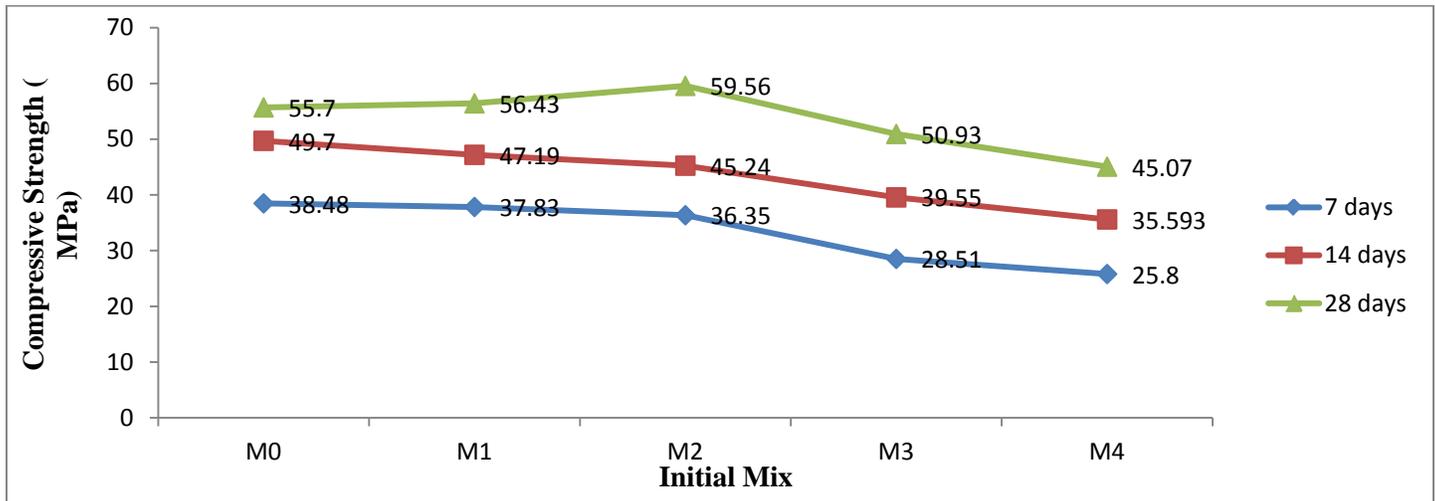
**Figure 1.2 Comparison in slump values of final mixes**



**Figure 1.3 Slump values of different mix**

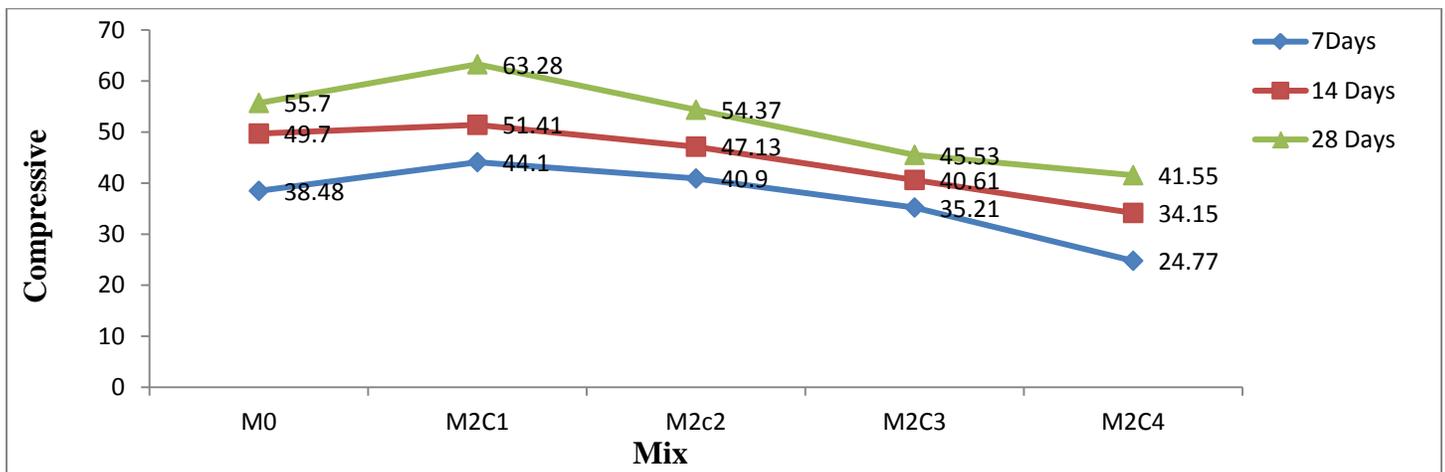
After the completion of curing period of 7days, 14days and 28days cubes were tested for their compressive strength with the help of C.T.M, conforming to IS 516:1959.

Cubes were tested immediately after removal from the curing tank. Cubes were placed on the platform of C.T.M. as shown in Figure 4.6 and the load was applied and gradually increased until the specimen is no more able to bear the load and graph shows a decreasing reading. The total load applied at the failure is noted down and this load divided by the area of the specimen gives the compressive strength of the specimen. Average of at least three specimen were taken for each day and results were recorded.



**Figure 1.4 Comparison in compressive strength of initial mixes**

From the Fig.1.4 it can be observed that the 7days and 14days compressive strength of mixes goes on decreasing from M0 to M4 on replacement of cement by fly ash. As increase in percentage level of fly ash in mix the percentage decrease for 7 days compressive strength was found to be 1.69% to 32.95% for M1to M4 respectively while for 28 days curing period the increase in percentage in compressive strength was observed to be 1.31% and 6.93% for M1 and M2 respectively while percentage starts decreasing as we go to M3 and M4 from 8.56% to 19.04% respectively. This is due to pozzolan and self-cementing property of Fly ash which in case of water hardens and gets stronger over time.



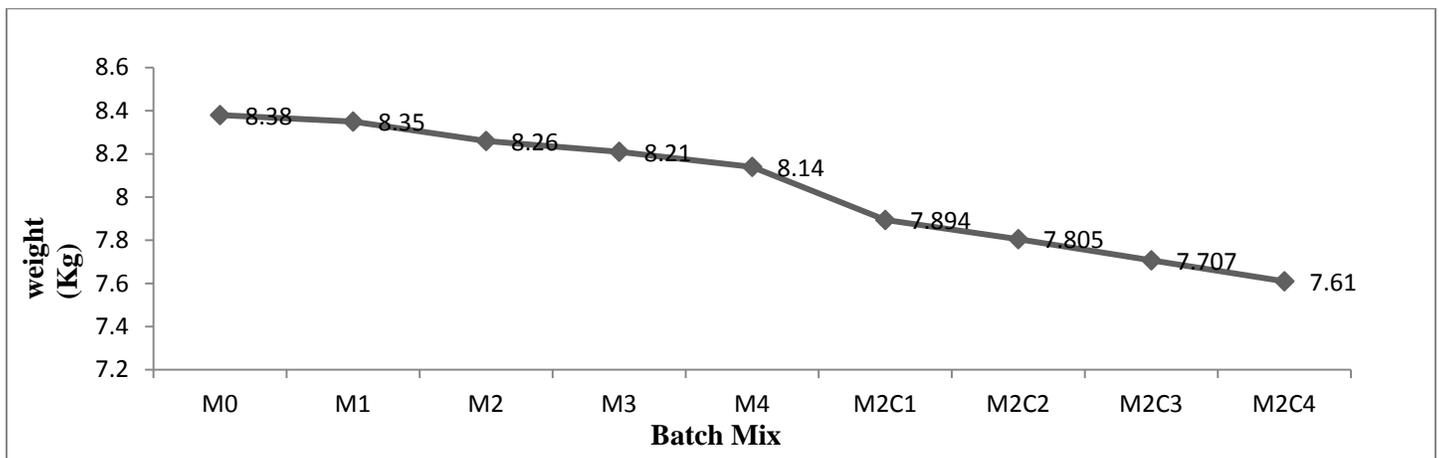
**Figure 1.5 Comparison in compressive strength of final mixes.**

From Fig.1.5 it can be observed that there is increase in percentage in compressive strength, moving from M0 to M2C1. The increase in percentage is 13.61% after 28 days of curing. In case of other mixes the strength goes on decreasing from 2.388% to 25.40% in M2C2 and M2C4 respectively. The compressive strength goes on decreasing because of the fact that ceramic waste has smooth surface and cuboidal shape which results in less bonding of materials.

On the other hand compressive strength goes on increasing from M0 to M2C1 because the replacement of coarse aggregate was just only 10% and maximum ceramics were indulge in filling the voids present in the coarse aggregates which results in great bonding of materials and hence results in high compressive strength.

Moving from normal M50 grade concrete the weight of concrete goes on decreasing on replacement of cement by fly ash and coarse aggregates by ceramic waste because fly ash is light in weight as compared to cement and ceramic is also light

in weight as compared to coarse aggregates which results in light weight cubes. The specific gravity of ceramic waste is less as compared to specific gravity of coarse aggregate while specific gravity of fly ash is less as compared to specific gravity of cement. The comparison in weight of cubes in all mixes is shown below in Fig.1.6.



**Figure 1.6 Variation of weight after 28 days for all mixes.**

Figure 1.6 shows that there was gradual decrease in weight of each cube as we go from M0 to M2C4. The decrease in percentage of unit weight varies from 0.35% to 9.2% per cube from M1 to M2C4 respectively. The maximum compressive strength was attained in M2C1 composition which results in 5.8% decrease in weight per cube as compared to normal mix. The compressive strength was 13.61% more compared to M0, hence it can be used in light weight structures.

### **Conclusion:**

- Based on the work it has been concluded that at 20% replacement of cement by fly ash maximum compressive strength was achieved with reference to standard design mix the compressive strength at 28 days was 6.93% more. The compressive strength goes on increasing from 10% to 20% and above 20% replacement level compressive strength goes on decreasing due to low cement content.
- Workability of concrete goes on increasing from 10% to 40% replacement of cement by fly ash. Maximum workability was attained at 40%.
- Replacement of cement by fly ash also reduces the bleeding of concrete and hence results in improved surface finish.
- At 20% replacement of cement by fly ash, the maximum compressive strength is achieved when crushed 10% coarse aggregates were replaced by crushed ceramic waste. But after that it is decreasing for 20% replacement and so on.
- Specific Gravity of ceramic waste is 2.15, which is 18.25% lower when compared to the specific gravity of coarse aggregate which is 2.63. So ceramic waste satisfied limit of specific gravity as per IS Code. Therefore, the usage of ceramic waste can reduce the dead weight of the structure up to 18.25%.
- In combination, maximum compressive strength was obtained for the mix having 20% replacement of cement by fly ash and 10% replacement of coarse aggregate by ceramic waste which is 13.6% more with reference to standard design mix at 28 days.
- By using the mix M2C2 the mass of cube reduces from 8.38 kg to 7.894kg, which can result in light weight structure as compared to normal concrete.
- The slump value goes on increasing with increase in quantity of Fly ash in M2 the slump value was 130% more than that of M0 and this increase in percentage is up to 325% for M4.
- On replacing coarse aggregates by ceramic waste the slump value goes on increasing from M2C1 to M2C4. The slump value in case of M2C1, for which maximum slump value was obtained was 200% more than that of M0 and this increase in percentage is up to 525% for M2C4.
- Cost of construction can be minimized with usage of fly ash which is cheaply available.

- To realm the saving of environment pollution by cement production, fly ash and by the ceramic waste was the main objective as being a civil engineer.

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# Wild Edible Fungi Sold In Local Markets of Ukhrul District of Manipur, India

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**Abstract-** Ukhrul district which is one of the nine districts of Manipur, is a hilly region predominantly inhabited by the *Tangkhal* tribe. Wild edible fungi constitute an essential component in the diet and food security of the *Tangkhal* tribe living around the forest fringe or in its vicinity. Since time immemorial, *Tangkhal* tribe collects and consumed a wide variety of wild edible fungi for sustenance their livelihood. Moreover, many wild edible fungi are rich in nutrient content and formed as good sources of proteins, carbohydrates, fats, vitamins, minerals etc.,. This article reports 14 wild edible fungi species documented during field survey in the local markets of Ukhrul district of Manipur, along with their vernacular names and mode of uses.

**Index Terms-** Edible fungi , Local markets, Ukhrul, Manipur.

## I. INTRODUCTION

The *Tangkhal Naga* tribe is one of the largest tribe among the Naga tribes of Manipur. The *Tangkhal* people of this region are simple, brave, reliable, generous, sincere and friendly. The majority of the people are agriculturist and Rice (*Zhat*) is their staple food. The *Tangkhal* tribe largely depends on wild edible plants, which constitute the major nutrient source in their daily diet. Agriculture is the mainstay of these people and *Tangkhal* people had been practicing terrace and Jhuming cultivation since their ancient times. Wild edible fungi also plays a major role in food stuff of the *Tangkhal*, many of the species like *Auricularia delicata*, *Lentinula edodes*, *Lentinus squarrossulus*, *Schizophyllum commune*, *Termitomyces clypeatus*, etc. are collected by the local people during the rainy season for their own consumption as well as selling in the local markets and thereby generating a supplementary income to their household economy.

## II. STUDY AREA AND METHOD

Ukhrul, the main homeland of *Tangkhal Naga* tribe lies between 23°13'N and 25°68' N latitudes and 94°20' E and 94°25' E longitudes, having an area of 4,544 km<sup>2</sup> of which forest occupied about 2,600 km<sup>2</sup>. It is a hilly region, surrounded by Myanmar in the east, Nagaland state in the north, Chandel and Senapati districts of Manipur respectively in the south and west with the population of 1, 83,115. (as per 2011 Census). The Climate of the district is temperate nature with a minimum and maximum degree of 3<sup>0</sup> C to 33<sup>0</sup> C. The soil ranges from laterite

to sandy loams with general red colour and have moderate fertility.

The *Tangkhal* tribe largely depends on wild edible plants, which constitute the major nutrient source in their daily diet. Consumption of wild edible fungi works as dietary supplements during times of food shortage is still an integral part of the *Tangkhal* community. Women and children generally collect a good number of edible fungi from the surrounding forest for daily consumption as well as to sell the excess harvest in local markets as good source of income. Most of the markets in every district of Manipur are run and controlled by women, even in Ukhrul district *Ava*(Mother), *Avakatu* (Aunty) and *Achon* (Sister) of the *Tangkhal* community run different markets to support their families. The study indicated the presence of a large number of wild edible fungi in the district; however, the present paper enumerates only those species, which are sold in the local markets of Ukhrul District of Manipur.

In fact, a good number of valuable accounts have been published during the last two decades. In fact, a good number of valuable accounts have been published in recent years within the country including Baruah *et al* (1971), Singh & Singh (1993), Rai *et al* (1993), Verma *et al* (1995), Barua *et al* (1998), Sarma *et al* (2010), Tanti *et al* (2011), Polashree & Joshi (2013).

## III. MATERIALS AND METHODS

The preliminary survey was made in different rural areas of the Ukhrul District, Manipur during 2014-2015 for gathering information on wild edible fungi traditionally used by them. The authenticity of the uses was repeatedly verified by asking to the different informer. In case of contradictory information, efforts were made to get the correct information. Regular surveys were conducted at the selected local markets (Litan, Lambui, Ukhrul) at least twice in a month. A minimum of 10 – 12 women vendors in each market were interviewed regarding the local name of the edible fungi , their use, source and market price. The identification of each sample was done with the help of standard manuals studying carefully different microscopic and macroscopic characters. Further, the collected samples were preserved in 4% formaldehyde and deposited in the Museum of the Department of Botany, Nagaland University Headquarters: Lumami and in the Life Sciences Department of Manipur University, Manipur..

### Wild edible fungi and their uses

As much as 14 species of wild edible are recorded during the present survey. These are enumerated below alphabetically in

Table 1 with their scientific names along with family and references to voucher specimens followed by the vernacular names, market price and mode of used by *Tangkhul* Nagas. (Table 1)

**Table 1: Wild edible fungi used by the *Tangkhul* tribe in Ukhrul district, Manipur.**

Botanical name	Family	Vernacular Name	Market price	Mode of use
<i>Agaricus campestris</i> L.	Agaricaceae	<i>Sipovar</i>	Rs 15-20 per bundle	Eaten fried or cooked with meat
<i>Auricularia polytricha</i> (Mont.) Sacc.	Auriculariaceae	<i>Shiokkhanavar</i>	Rs 50-70/-per kg	Eaten fried or cooked with dal
<i>Auricularia delicata</i> (Fr.) Henn.	Auriculariaceae	<i>Shiokkhanavar</i>	Rs 50-70/-per kg	Cooked with dal
<i>Lactarius princeps</i> Berk	Russulaceae	<i>Chengum khomthokpi</i>	Rs 20-25/- per bunch.	Cooked as vegetable with dry fish
<i>Laetiporus sulphureus</i> (Fr.) Murr.[]	Polyporaceae	<i>Uyen</i>	Rs 30-45/-per kg	Eaten in the form of <i>iromba</i> (mashed with fermented fish)
<i>Lentinula edodes</i> (Berk.) Pegler	Polyporaceae	<i>Thangjiyen</i>	Rs 40- 50/- per kg	Cooked as vegetable in mixing with others
<i>Lentinula lateritia</i> (Berk.) Pegler	Polyporaceae	<i>Thangjiyen</i>	Rs 40- 50/- per kg	Eaten in the form of <i>iromba</i> (mashed with fermented fish)
<i>Lentinus conatus</i> Berk.	Polyporaceae	<i>Uyen</i>	Rs 60-70/- per kg	Cooked with pork meat
<i>Lentinus squarrossulus</i> Mont.	Polyporaceae	<i>Uyen</i>	Rs 60-70/- per kg	Cooked with meat
<i>Pleurotus flabellatus</i> (Berk. and Br.) Sacc.	Polyporaceae	<i>Uyen</i>	Rs 40-50/-per kg.	Cooked as simple boiled vegetables with dry fish.
<i>Ramaria sanguine</i> (Pers.) Quel.	Clavariaceae	<i>Uchek khong</i>	Rs 40-50/-per kg	Eaten fried or cooked with fish
<i>Schizophyllum commune</i> Fr.	Schizophyllaceae	<i>Lengphong</i>	Rs 150-200/- per kg.	Cooked with fish or pork
<i>Termitomyces clypeatus</i> Heim.	Tricholomataceae	<i>Varlang</i>	Rs 35-45/- per kg	Cooked with fish
<i>Termitomyces eurrhizus</i> (Berk.) Heim.	Tricholomataceae	<i>Shipungvar</i>	Rs 10-20/- per bunch	Eaten fried or cooked with meat.

#### IV. RESULTS AND CONCLUSION

During the current survey 14 species of wild edible fungi belonging to 8 genera under 7 families were recorded from Ukhrul district used by the *Tangkhul* community. Many of the edible species which are consumed throughout the year in both fresh and dried form by the *Tangkhul* people are collected and sold in local market by wrapping them in *Musa* spp or *Phrynium capitatum* leaves which are in high demand by the *Tangkhul* people of Ukhrul district and fetches good market price even today. The price of different species fluctuates from season to season depending on their availability. Majority of the species are eaten simple boiled with fermented fish (*Ngari*) or dry fish, cooked with meat or dal, used as part of ingredients in the preparation of *Iromba* (mashed with fermented fish) and only few are taken fried. Some species like *Auricularia polytricha*, *Lactarius princeps*, *Lentinula lateritia*, *Lentinus conatus*, *Pleurotus flabellatus*, *Termitomyces clypeatus* that are commonly consumed by the local people are non-toxic according to the

gathered information and has a strong market demand, and this is reflected in a higher price as it possesses nutritional value and medicinal properties. Edible fungi species have not been systematically documented and studied in Ukhrul district, Manipur. So, there is a need to document the existing species of edible fungi species and to disseminate the knowledge among the *Tangkhul* tribe to generate interest in conservation and cultivation of edible fungi species.

#### ACKNOWLEDGEMENT

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# Local Indigenous Branding: Bali Ecological Tourism Village

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**Abstract-** This article is aimed to understanding the brand construction of an ecological tourist village with local indigenous wisdom. A research was conducted in Banjar Kiadan, a member of *Jaringan Ekowisata Desa Bali* (Balinese Village Ecotourism Network). A successful brand construction of an ecological tourist village requires the robust and rich connectedness among local indigenous values, which will strengthen the ability of knowledge sharing to create linkage attitude between hosts and guests. *Jaringan Ekowisata Desa* has created their own brand of "BALI DWE" (Bali Ecological Village Tourism), which reflects the real form of Balinese local indigeous. The brand construction of ecological tourist villages follows the pattern of social construction of BALI DWE by Yayasan Wisnu, JED, and Balinese ecotourism activists. The aforementioned dialectics are at play within a social processes of three simultaneous moments; Externalization, Legitimation of Objectivity, and Internalization.

**Index Terms-** Local indigenous branding; Bali village ecotourism network; Bali ecological village tourism; social construction of reality brand destination.

## I. INTRODUCTION

Bali as a tourist destination is already well known by international community. The map of Bali by Willem Lodewijksz, one of the member of the first Dutch expedition to South East Asia led by Cornelis de Houtman in 1595-1597, accentuated the existence of Bali. The "Early Mapping of South East Asia", written by Suarez (1999), mentioned that the map reflects the adoration of Europeans towards Bali, which was a constant attraction.

The year of 1598 was the historic moment as the beginning of Bali's popularity in world map since its discovery in 1597. Balinese tourism had been built since 1930s, and was depicted differently than those of islands in southern hemisphere as the tourist destination of 1920s. The attraction of Bali is on its people's contentment, reflected by their daily routine of worshipping the gods through endless rituals and art. The image of Bali as the Island of Gods stems firmly to this day, despite various changes due to the development of tourism industry. The concern of the extinction of Balinese cultural tourism due to modernization has been a subject of debate among antropologists and tourism researchers (Mead, 1977; Picard, 2006). Changes through tourism modernization do exist, but they do not affect the substatial values of it.

Parallel with the development of ideas of tourism development, the fact that Bali as an international tourism destination has shown that the tourism sector as the main driver

of Bali's economy. Unfortunately, the local people mostly act as spectators of Bali's tourism. Agriculture has to step aside as consequence of the demand of tourism development. Irrigation were covered by roads, ricepaddies were sold and hotels were built upon which, etc.(Dipayana & Sunarta, 2015). The aftermath of the development of mass tourism infrastructure forces four villages in Bali to create a common network amid their marginalization (Widyatmaja, 2013) and it was called *Jaringan Ekowisata Desa* (JED/ Village Ecotourism Network). JED is a form of touris village development with emphasis of village ecotourism (Wight, 1993; Lash & Austin, 2003; Sastrayuda, 2010; Damanik, 2013) founded by Yayasan Wisnu. JED was founded in 2002 as the answer to the problems caused by mass tourism in Bali. JED operates under cooperative license, owned by the people of four villages in Bali; (1) Banjar Dukuh in Sibetan Village; (2) A group of people in Tenganan Pengringsingan; (3) Banjar Kiadan in Pelaga Village; and (4) Nusa Ceningan, in cooperation with Yayasan Wisnu, one of the oldest environmental NGO in Bali. JED was founded as an effort to recoup Bali which was overly-exploited in the name of Tourism.

The intended outcome from JED is to create an income and benefit parity from tourism for the people as the factual organizer and caretaker of the land. The management model of JED's ecotourism is unique, as the whole operation is conducted by the people, from site maintenance, ecotourism attractions, to the tour guides (Chubchuwong & Speece, 2015). They also compiled the local history of the villages. JED doesn't prioritize the number of tourists, as they are focused on the quality of village ecotourism development.

## II. RESEARCH ELABORATIONS

The strategy of JED's ecotourism development is based on the Balinese social system, where people's life are regulated in a certain set of villages's cultural norms called "*Desa Pekraman*". *Desa Pekraman* (Surpha, 2004) *Desa Pekraman* is a traditional institution, known from feudal era and lives up until today, which owns land, people, and the assets of the village (Surpha, 2004). *Desa Pekraman* is led by a village chief along with his/her staffs, which are responsible to uphold cultural law (*awig-awig*) which regulates people's rights and obligations. *Awig-awig* is assembled based on religious belief, culture, and tradition – the way of life and local wisdom of Balinese people. The principle of Balinese local wisdom is to balance life through balancing the relation between human and human, human and nature, as well as human and God, or known as "*Tri Hita Kirana*" concept (Windia, Dewi & Ratna, 2011).

The principle of ecotourism development goes along with the values of Balinese local wisdom (Ichsan, 2014). Consequently, it is interesting to enquire and understand the effort of Balinese to understand, use, introduce, and preserve their local wisdom values through the development of village ecotourism which focuses on cultural and natural conservation and incorporates the role of tourists' togetherness as special interest ones (Douglas, Ngairé & Ros, 2001; Muzaini, 2016). The efforts of villagers to build and develop village ecotourism pioneered by Yayasan Wisnu, an environmental NGO, by creating JED body and from which they develop an ecotourism attribute (Wilde, Cox, Kelly & Harrison, 2017) by the brand of BALI DWE which stands for "Bali *Desa Wisata Ekologis*" (Bali Ecological Tourism Villages). The branding of BALI DWE is an internal branding which contains Balinese local indigenous wisdom. The problem being inquired in this research is "How does a village ecotourism branding with Balinese indigenous local wisdom being socially constructed?"

Methodologically, this research portrays the writer's intensive immersion with the area of research for 3 months, from the end of 2016 to early 2017. During the field work, observations and several interviews with informants from Yayasan Wisnu, JED Officers, village ecotourism operators, and tourists of the site. Materials of ethnography, the actions and words spoken by the informants, have an work as materials of analysis from the beginning to the end of the research.

### III. RESULTS

#### People's Understanding of Ecotourism

The conceptual and practical development of ecotourism practices as a form of alternative tourism (or the antithesis of Mass Tourism), signal the awareness of people towards the importance of honing "responsible" forms of tourism (Ceballos-Lascurain, 1996; Wearing & McDonald, 2002; Sunaryo, 2013). The development of alternative tourism is not only meant and understood as a product development effort which is merely aimed to fulfill customers' satisfaction, but more towards an effort to harmonize the motives of tourism development with those of customers which mutually care about environmental and cultural aspects. The success in creating the harmony of their tourism motives is one of the reputation of the development of alternative tourism.

The reputation within the context of motive harmonizing is a pivotal part in the development of the brand of village ecotourism destinations through *brand identity*. The constructed brand has a complete visual position and a robust identity. Therefore brand plays an active role as a publication and marketing medium, as well as the identity of a destination and as a form of national resilience (Guillen, 1998; Lamont, 1999; Stronza, 2001; Wildes, 1998; Bungin, 2015). The brand of a destination shows the identity of its products, and it strongly develops image and perceived benefit felt by its surrounding people and visitors through the process of 'service and experience' in village ecotourism.

The understanding of ecotourism is perceived through the involvement of surrounding people, where Hindu women particularly have an important role (Tajeddini, Walle & Denisa,

2017) in the development of village ecotourism, as mentioned by I Made Suarnatha:

"...there are levels of community development through the process of community organizing, starting from persuading them both physically and rationally in order to: (1) figure out their area, although some of the parts are not physically able to join, and to (2) socially and culturally involve them as interviewees, story-tellers, or contributors of the history as well as for their roles in their community. We can also involve the youth from women perspective..."

Subsequently, on the aspect of the benefit of ecotourism to the local economy and welfare (see Arida, 2008, where the relevance is at 96%), I Gede Astana Jaya, the manager of JED, answers that:

"...in certain contexts of capacity building, there is a division of roles, for instance as local tour guides, orderers, culinary, guest house operators, etc. These roles cannot be taken by any people. Only capable individuals for those roles are assigned to them, and the support of this assignments are subject to institutionalization. Therefore, the roles are owned by the assigned individuals, they are neither involved nor uninvolved, but they are the owners of the site. There will be some percentage of the individual and collective earnings from the whole ecotourism operations that will be given to *banjar*, conservation fund, rituals fund, so the income are accessible for communal use, not mere individuals. Therefore..."

The testimony of Yayasan Wisnu and JED explain the way to start the development and overseeing of village ecotourism that has been operating for sixteen years. The strengthening of understanding towards tourism for management trainees of village tourism in Banjar Kiadan is conducted through people's capacity building process in the village ecotourism.

#### Brand Characteristics of Village Ecotourism Destinations

Branding is one of the conscious efforts to create positive image through various well-managed activities in order to maintain the identity and personality of an ecotourism destination. Brand works as a value indicator offered to the customers. Brand is an asset which creates value by enhancing satisfaction and loyalty, which makes it a robust marketing tool (Kotler & Pfoertsch, 2006; Kertajaya, 2006).

An ecotourism which is created, managed, and fully controlled by local community is characterized as grass-root ecotourism. The community, whether autonomously or with assistance of external parties (public figure of NGO), initiates the creation and development of ecotourism based on the area's natural resources. The development of this kind of ecotourism is generally naturally staged based on local understanding (Mitchell, 1998; Nasikun, 2000; Pitana, 2002).

There is a pattern of results of researches on Balinese ecotourism, based on the typology and strategy used on each study (Arida, 2016). The pattern is that there is a 'set of threes' (*Tri Ning Tri*) of Balinese ecotourism types. The set of threes are, for instance, *Tri Hita Karana* (three forms of life balance with fellow human, nature, and Gods), *Tri Mandala* (three zones of cultural villages), *Tri Kahyangan* (three worshipping spots in cultural villages), etc. There is also a profound local wisdom values applied in any development of Balinese ecotourism,

which eventually becomes an attraction for both special-interest and common tourists.

### Adequacy Analysis of Ecotourism Criteria

JED applies certain principles in their village ecotourism programs, (1) JED programs' planning and management are made together with a group of people in each village; (2) JED profits will be used for social, cultural, and environmental causes; (3) JED is created as a means to strengthen the cooperation among villages; (4) JED travels are designed to minimize negative impact towards local environment; and (5) JED is aimed to become a bridge of cross-cultural understanding by facilitating discussion between local people and visitors.

Regardless of the bombardment of modern tourism industrialization which leans towards mass tourism, there is already a concern of lack of natural resources available for the infrastructure of rituals. Preserving natural resources through nurturing, reforestation, protection, with an understanding that the nature is a creation of The Almighty (*Sarwe Prani Hitang Karah*) as a core is coined by I Made Suarnatha (Director of Yayasan Wisnu), as follows:

"...The crystallization of DWE (Village Ecotourism) concept that "*Sarwe Prani Hitang Karah*" or everything that breathes is of The Almighty lays on our actions to glorify the life itself. Therefore, the conception must be applied by protecting, appreciating, and responsibly utilize the natural resources to make it sustainable for us."

The understanding of natural preservation as a purpose of ecotourism by Yayasan Wisnu, JED, and other communities are more than mere rituals, as mentioned by I Made Suarnatha:

"...natural preservation is more than just to protect the materials for our rituals. As we progress on biodiversity, we have to ensure a detailed mitigation for biosafety, plasmgerm security, genetic security, and natural resources. We have the rituals in doing so, but the people needs to be socially educated so they understand the rituals true conservational meaning."

Based on the aforementioned explanations, it is clear that the purpose of village ecotourism management is to conserve natural and cultural resources through community involvement (Sekartjakrarini & Legoh, 2004; Pratiwi, 2008), capacity building, and community organizing of the ecotourism of each village, especially in Banjar Kiadan. Therefore, JED's village ecotourism management suits the criteria of ecotourism adequacy.

With regards to people involvement in ecotourism development, it is highly urgent for one to be careful not to use an artificial involvement. Moreover, it has to be maintained that there will be no authoritative actions that can cause people's discontent and jealousy, which will prove to be counterproductive towards the purpose of ecotourism development, as mentioned by JED's I Gde Astana Jaya:

"...decision making is the most important thing for us, that each and every problem needs to be addressed within community fora. There needs to be a mutual mechanism. We don't have full control of the decision, as it has to refer to the mutual mechanism."

Based on the testimony, it can be understood that the involvement of people in study area is in place, so they have fulfilled the second criterion of ecotourism adequacy

(Sekartjakrarini & Legoh, 2004; Pratiwi, 2008). With respect to the third criterion of ecotourism adequacy, which is on how it aids local economy (Pratiwi, 2008), it can be seen that in general the village ecotourism has helped create job opportunities, such as local guide, local culinary, art shows, and homestay. These economic instruments drives the income of local people, both individually or collectively, based on their capacity and skill. This context, as mentioned by I Made Suarnatha, works as follows:

"...we create their village as destinations, and as consequence, job opportunities are created, such as tour guides, chefs, art performers, or homestay owners. Given there's an organic coffee that they can package, it can also be developed as souvenir products from Kiadan."

After the local people and the owners have successfully nurtured their awareness, mind set of ecotourism, and given education and training to enhance their rationality and skills – whether it's packaging, itinerary, and costing – through capacity building programmes, they will be ready to become the organizers as they have understood the philosophical values of Balinese, been trained skills and capacity as organizers, entered the community spaces, and done institutionalizing the aspects of ecotourism in the village cultural institution (*Desa Pakraman*). Ultimately, the management of village ecotourism will enhance the economy of local community based on values of life balance rather than greed and environmental sacrifice (Spillane, 1994; Pitana, 1999).

The development of ecotourism product as the fourth criterion of ecotourism adequacy (Pratiwi, 2008) of this research starts from understanding the perception of the drivers and overseers of Banjar Kiadan ecotourism village, which are Yayasan Wisnu and JED. I Made Suarnatha as the Director of Yayasan Wisnu expresses his views on village ecotourism development by the context of its products and processes as follows:

"...our initial concept was to develop village ecotourism from two ways, (1) ecotourism/environmental and sociocultural service possessed by the village, and (2) local commodities. In the case of local commodity, we would like to develop the conception of coffee in form of Coffeepark".

Based on the expression, it is clear that the ecotourism of Banjar Kiadan village has had a proper ideational foundation of ecotourism product development, which contains the making of education, starting from teaching, socialization, and training for both operators and surrounding community on how to create an ideal practice of ecotourism. Nonetheless, it is important to understand that the education is a never-ending process (Reimer, 1994; Bennet & Roe, 1999; Sulistiyani, 2004). There is an implicit yet substantial meaning included in this context for the existence of ecotourism. Namely, the ecotourism product cannot be understood as a tool to satisfy the visitors, but as a more fundamental meaning, such as manifestation, symbolization, characterization, and expression of values within the core beliefs of hosts' way of life and local wisdom. These values combines in totality within the village ecotourism activities

The village ecotourism activities, for whatever it is packaged as any products, have to be understood and valued as social and ethical interactions between the hosts and the guests (Edington & Edington, 1986; Reisinger, 1994; Parining, 2001; Smith, 1992; Tiberghien, Bremner & Milne, 2017). There is a

process of giving and taking, mutual understanding and appreciation, compassion nurturing, and high level of care towards both environmental and cultural aspects. In this context, the ideal meaning of the product development of village ecotourism has been thoroughly fulfilled, as mentioned by I made Suarnatha:

“...we meant to invite our friends and foreign tourists that each interaction and meeting works as knowledge sharing medium, and we are more than mere hosts and guests, as there’s a linking attitude of them asking and us answering and vice versa”.

It is truly difficult to enter the acknowledged spaces of communities, as those of practical minds thinks pragmatically and act permissively on anything that happens in society. It is all because they failed to comprehend the responsibility to find and understand the pattern and way of thinking and actions with respect to the values of the community they live in. Regardless of the application of values of local wisdom by cultural institutions, the bombardment of cutting-edge information technology as well as contents which are perceived as trendy, modern, and prestigious can still misled people from choosing the positive information. Thus, the mission of Yayasan Wisnu is stated on their desire, means, and effort to revitalize the understanding of Balinese values of life philosophy that are fundamentally paramount and full of educative meaning which make them the Balinese way of life.

With regards to the minimum environmental damage in ecotourism development (Pratiwi, 2008), this research chooses qualitative assessment over quantitative analysis, where the inquired aspects are treated as physical sphere as a single living space of community that needs to be well-managed based on their local wisdom. The utilization of modern technology (Vellas & Becherel, 2008) in various living aspects can still be applied without eliminating religious and local wisdom values, as quoted from I Gde Astana Jaya:

“... We will save the ideological aspect. We revitalize the conception and constellation of values, life and way of life of the community. For instance, there is a *Ngage* concept, which is mountain and dry-land agriculture, as part of their glorified way of conserving their food sources”.

Therefore, the meaning to minimize the negative effect of environment are not measured by the aforementioned parameters *per se*, but it involves deeper sense of preventing any shift of mindset of ecotourism operators from their local wisdom values. The commitment to protect the environment and culture are shared among operators and visitors.

### Social Construction toward Destination Branding Reality Externalization

Social construction toward branding reality begins from the externalization process in which the process occurs the interest party extending ideas, concepts, and information aimed to certain groups in the village in a scope of individual, families, and the local people (Berger & Luckmann, 1966; Eberle, 1992; Searle, 1996; Gordillo de Anda, 1997; and Hacking, 2000). In the context of social construction toward village ecotourism branding reality in the Banjar Kiadan, Pelaga Village, Badung Regency, Bali Province, cannot be substantially separated from the Balinese local wisdom. The values of local wisdom and the

Balinese Hindu’s cosmological conception (Pasek, 2015) is an innate manifestation from the holy teachings of Hindu belief which further manifested in the socio-cultural of Balinese people’s life, with the touching of local aesthetics, the local architecture, as well as showing typical and unique characteristics, i.e. authentic and original nuances, but is not apart from the universal values.

Concerning with the importance of conception in giving attention and establishing a local wisdom values in order to develop ecological village tourism, I Made Suarnatha states, as follows:

“...Technologically, it is probably a man who has got a silicone surgical B treatment is great, but from creativity and rituality dimension we have is probably much better. That’s seen from socio-cultural context, as well as from uniqueness, landscape artifact, historical soul, geography, and from belief system are absolutely outstanding; how jungles must be conserved, and how deep the symbolization of Goddess must be taken care tenderly. It’s extraordinary things, isn’t it?”.

Social construction toward ecotourism branding reality based on the local Balinese wisdom, at the externalization phase, is carried out for reminding the village society that they consistently have the local indigenous values (Ridwan, 2007; Aulia & Arya, 2010; Ichsan, 2014; Subadra, 2008). This conception is then manifested in the form of logo, tagline, symbol for brand (Kotler & Pfoertsch, 2006; Lusi, 2008) of the ecological tourism in Bali.

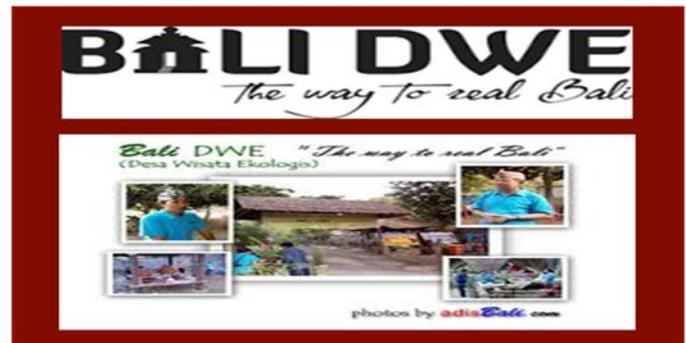


Figure 1. “Brand” Wisata Ekologis Bali. Source: Google

Brand construction on “BALI DWE” is the form of developing internal branding (Vallaster & de Chernatony, 2006; Aaker, 2015). In accordance with the Baldoni’s advise consideration (2004) in building internal branding; that is, (1) branding vision & mission supported by cultural and a valid brand values; (2) leadership as a brand driver; and in this case is the role of Yayasan Wisnu, while JED is the catalyst the Pekraman village brand altogether by constructing brand of societal attitudes and behavior, as well as the village ecotourism developers in accordance with their local indigenous values (Yang, 2010; Aaker, 2015); and (3) a brand must be communicated, so that the map in externalization phase is an effort to communicating brand as a significance of symbol and values existing in it; (4) there exists ‘fun’ element in a brand, that is promising from the tagline, “The Way to Real Bali”, on which it is a comfortable experience for visitors; and (5) BALI DWE is

something inclusive, and with it, brand holds a new initiative message increasing step by step.

There are some dimensions affecting a success of internal branding (Tosti & Stotz, 2001; de Chermatony, 2001), those are: (1) Brand Character. BALI DWE branding has shown a typical character of Bali island as “the Island of Paradise” by the international communities; (2) Alignment, that is hospitality of Balinese people as business values and the specific practice to extend value to visitors; (3) Education and Enrolment, on which a sharing knowledge and linkage attitude developed in the village ecotourism practice has got values of education and well-expertise to communicate and to revive the village ecotourism brand; and (4) Evaluation, that is to carry out the evaluation on a series of activities in the process of internal branding and keep an eye on influence to the process done. Based on the research finding, study on social branding of village ecotourism destination construction at the externalization phase is arranged the first minor proposition, as follows:

The first minor proposition:

“if the village people are more comprehensive on the “village ecological tourism” identity base on Hinduism Bali cosmology, the more they awaken their self-consciousness to develop the local indigenous branding on ‘BALI Ecological Tourism Village’.

### Objective Legitimacy

Objective legitimacy process is a legalization in a logical explanations to the institutionalization process on socio-cultural values into the heart and minds of the people. The social process gives a make sense reasoning toward the ecotourism destination branding which has been given to the people in the institutionalizing process (Tosti & Stotz, 2001; Bungin, 2015). Throughout this phase, the village people are more understood and conserved as well as wiser to color ecotourism products much typical, authentic, and innate with the environmental and cultural at site situation. Tourists who are consuming the ecotourism products will be, directly and indirectly, obtaining some principles of environmental conservation (nature and culture) throughout experience and interaction with the local people (Reisinger, 1994; Fill, 2013).

Technically, it is performed the mapping areas on this phase (*Tri Mandala*) to be the most important part in early planning on village ecotourism. There are some mapping areas, those are: (1) to understand the village potentials concerning with the natural, social, and cultural resources capacity in supporting ecotourism development at the areas concerned; (2) to understand the weakness sides of the areas, and then they can be formulated by the anticipating steps to establish in a form of conservation model; (3) to use as a strategic base in enforcing and organizing the people at the planning space and area; (4) to create the sketch map of area bases on the local knowledge as well as a mental societal map; (5) to use as a transformation media of some local knowledge on spatial environment on which it stores in the mind of the old men. At the same time, the spatial knowledge can be discussed and transformed to the young generations. The dialectical process happening in order to gain a collective life space (at village potential) is, in fact, very typical in line with the village characteristic nuance.

*Tri Hita Karana*, *Tri Mandala*, and *Tri Angga* conceptions as the manifestation of cosmological teachings in Hinduism Bali (Pasek, 2015) at the zoning of village ecotourism development are as follows: (1) *Parahyangan* (*the main mandala, the beginnings, the sacred, and the head*) is the pure conservation zone (the protection zone). For the conservation zone of many habitats, the village fauna and flora. Tourists cannot access this zone; (2) *Pawongan* (*Middle Mandala, transition zone, the center zone body*) is the limited use zone (transition zone). Tourists can cross this area for ecotourism activities with some regulations; and (3) *Palemahan* (*the common mandala, the lower course, profane, and footsteps or teben*) is the common land space use. This area is used as a means of accommodation and other facilities for the need of tourists. Starting from the research result explanation above, it can be formulated to the second proposition, as follows:

The Second Minor Proposition

“... the richer and the stronger connectivity to the local indigenous values of the village ecological tourism, the more improving skill of people sharing knowledge about goods and services product of their ecotourism village”

### Internalization

Social construction process toward social branding on the village ecotourism destination “BALI DWE”, including at Banjar Kiada, Pelaga village, is through the institutionalized process, then be followed up with socializing to the members in a social group (around at Pakraman village in Bali having the village tourism potentials) as the process of ‘internalization’. The internalization process can be able to strengthen a social system in accepting social construction toward the destination branding reality.

Internalization process in the supply side context (internal branding) is closely in line with the Pekraman village government system (Surpha, 2004) in Bali. In implementing social structure at Pakraman village, relationship etiquette on social living is regulated hereditary in the ties of Awig-Awig, internal and external relationship, including in a context of village ecotourism obeying the order of Hinduism Bali cosmology (Pasek, 2015), that is, *Tri Hita Karana* (the three balances of human, nature, and Gods relationship); *Tri Mandala* (the main zone, middle zone, and low or profane zone). In a context of creativity development of BALI DWE, it is a must to establish it without being out of local value comprehension of Bali. The successful process on internalization value is able to improve their skill in sharing knowledge as well as creating harmony of linkage attitude among hosts community and the guests/tourists. Based on the result of the research, then it can be able to formulate the third minor proposition, as follows:

The Third Minor Proposition is that:

The successful branding BALI DWE construction based on the local indigenous wisdom marked by much stronger of sharing knowledge and building of linkage attitude among village community and the visitors or tourists.

Based on the three minor propositions above, they then are formulated with the major proposition in the research, as follows: The Major Proposition:

The success of a social construction toward the local indigenous branding needs strongly connectivity of rich local

indigenous values in order for improving the ability to have sharing knowledge to build linkage attitude of the ecological village ecotourism doers with the guests or visitors.

### Theoretic Implication

Construction on branding theory as a novelty study is the “Local Indigenous Branding”, that is as a new form of developing the Internal Branding Theory. “Local Indigenous” derives from the two words: *Local* means *existing in, serving, or responsible for a small area*; while *Indigenous* means *naturally existing in a place* (<http://dictionary.cambridge.org/dictionary/british/>). *Local Indigenous Branding* has a subject proposition, that is “*The success of a social construction toward the local indigenous branding needs strongly connectivity of rich local indigenous values*”; while predicate proposition is “*improving the ability to have sharing knowledge to build linkage attitude of the ecological village ecotourism doers with the guests or visitors*”; and the copula proposition is “*in order for or in order that*”.

Proposition category is able to explain as follows: (1) the aspect of proposition form is that of compound proposition (Kamdhi, 2003) due to that it includes a group of the local people/community; (2) the characteristic aspect of proposition is that of conditional hypothesis because it refers to a conditional justification. It means that if a proposition is compiled with, the justification happens (Kamdhi, 2003); (3) the wide aspect of proposition is a particular proposition (Kamdhi, 2003), including a part of community being empowered, obtaining education and training of capacity building, and the motivators of village ecotourism for the sake of society/people; and (4) the quality and/or quantity aspect, including in proposition group A, due to the positive singular proposition which explains overall things and justification, acknowledgement, or positive things (Kamdhi, 2003; Sudarminta, 2009); and proposition I, due to the particular active proposition, explaining or expressing a part of the overall acknowledgement, justification, or active (Kamdhi, 2003).

### IV. CONCLUSIONS

Externalization process is carried out by expressing idea, concept about a village ecotourism program to the people around a community of village ecological ecotourism. The importance of responding eco-labeling issue for the sake of village ecological tourism in Bali is in line with customs, norms, and environmental condition as a local indigenous (Subadra, 2008). At the objectivity of legitimacy phase is the reminding process to the local community that they possess ability to manage their own ecological village tourism by means of improving capacity, empowerment, enriching knowledge, and appreciating local indigenous values, particularly in the very popular philosophy of Balinese cosmological system (Pasek, 2005), that is *Tri Hita Karana* (Wandia, Dewi & Ratna, 2011). At the internalization phase, processing participation (Reimer, 1994) into a dialectic relationship between the self and the socio-cultural dynamics established by BALI DWE concerning with comprehension or direct interpretation value from an objective phenomenon as a part of expressing a significance or meaning of Bali ecotourism must be in line with the local indigenous value. The success of construction of the ecological village tourism in the form of

visual BALI DWE is a proof of the three Balinese principles balance of lives, *Tri Hita Karana*.

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# Factors Affecting the Job Performance of Employees at Work Place in the Higher Education Sector of China

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**Abstract-** The purpose of the present study is to investigate the factors impact on employee job performance on private higher education sector of China. The study examined the effect leadership styles, organizational commitment and self-efficacy on employee job performance. The survey has done by 800 academicians in top ten 10 Chinese Private Universities via e-mail or walk-in. Hence, the sample will be selected by convenience sampling. The target respondents for this research are academicians in Chinese Private Universities mainly because the boosting of private higher education and a positive future prospect in China. Questionnaire was designed on 5-point scale (Burton, K. D., & Curtis, M., 2003). The research technique used Smart PLS 2.0 to assess the correlations between the variables. Findings revealed that leadership styles, organizational commitment and self-efficacy have positive and significant impact on job performance. Future research directions are also discussed in the study.

**Index Terms-** leadership styles, organizational commitment, self-efficacy, job performance

## I. INTRODUCTION

Based on Barrick et al., (2002) despite the academic community has spent significant amount of efforts on understanding conscientiousness-performance relationship is "few research has examined the mechanisms through personality traits influence performance". Liu, yao et al (2016) found that Chinese higher education faces academicians' team crisis. According to a survey conducted the "100 Private Higher Education Institutions" in China, two-thirds of private colleges have no more than 40 full-time teachers and nearly 80 private colleges have fewer or no full-time teachers. Private higher institutions in China are facing problem with the quality of teaching due to decreasing teaching performance of academicians. They found out that self- efficacy and leadership style were part of the factors that influence the problem (Liu, yao et al, 2016). China Daily news (Sep, 2017) in their report, mentioned that the construction of qualified personnel is one of the fundamental problems in the survival and development of private colleges and universities. The performance and quality of the academic staffs largely determines the quality of private colleges and universities. The higher education ministry in China has raised concern with the issue of academician performance due to some complaints that lodged to the ministry by the parents and the students.

## II. LITERATURE REVIEW

### Leadership Style

Leadership is an essential factor to influence an individual or a group's behavior to achieve organizational goals and job performances (Hersey & Blanchard, 1974; Hsu, 2001). A suitable leadership can push organizational members comply with the right direction to fulfill organizational goals, a good leader as a signpost to guide or identify job direction for subordinates to follow (Hsien, 1985; Robbins, 2001). DuBrin (2004) believed that leadership can inspire employees to attain organizational objectives with confidence. Leadership style will affect the relationship between supervisors and followers and significantly mobilize workers' motivation, attitudes, and job performance (Dale & Fox, 2008). In the past, the major leadership researches based on the trait theory, contingency theory, and behavioral theory. It was until Bass proposed transformational leadership and transactional leadership in 1985, the researches of leadership style become extensively noticed. Bass (1985) defined that transformational leadership refers to leaders with charisma characteristics that will provide subordinates' intellectual motivation and individualized consideration. Bass and Avolio (1993) further indicated a transformational leader can inspire his or her followers to exceed the original performance expectations by enforcing, communicating and leading them willing to carry on organizational objectives.

### Organizational Commitment

Buchanan (1974) asserted that organizational commitment is a kind of belief that connects feeling of individual values and objectives with organizational values and objectives. Organizational commitment is an individual expression of loyalty and devotion to an organization (Kanter, 1968). Organizational commitment is "the relative strength of an individual's identification with and involvement in a particular organization" (Steers, 1977) and on behalf of a high level of affection, loyalty and concentration on a job role in an organization (Dee, Henkin, & Singleton, 2006). Organizational commitment indicates that individual goal is similar or identical with organizational goals whereby stimulate employees' productivity and loyalty (Chen & Aryee, 2007). Chen and Hong (2005) commented that if members in an organization trust and accept the organizational value, they are more willing to work hard to achieve organizational goal and have more organizational commitment. High organizational commitment will be beneficial

for an organization because it signals that employees have high organizational identification (Jiang & Huang, 2002).

### **Self efficacy**

Based on social learning theory (Bandura, 2007), Self-efficacy was called as a social cognition construct (social learning) which refers to a people's self-beliefs in their ability to perform specific tasks, as well as it has been shown to be a reliable predictor for either motivation or task performance, and influence on personal goal setting. Based on the description of Bandura about the human cognitive self-regulation system, self-efficacy is a kind of beliefs that the most central and pervasive effect on people make decisions, their goals, the amount of effort they would like to pay on a particular task, the time they persevere at a task when facing on failure or difficulty, how to deal with the amount of stress they experience and the degree to the extent they might be susceptible to depression.

Albert Bandura's (1977) identified that self-efficacy is a central principle in social cognitive theory. Self-efficacy refers to the belief, confidence, which can support people successfully execute a behaviour required to produce an outcome, the higher level of self-efficacy, the more confident an individual possesses and believe themselves can execute the behaviour necessary to obtain a particular outcome.

### **Job performance**

Job performance is the degree to which a firm anticipates employees regarding excellence and quantity. Performance is a key to measure the success and outcome of the firm (Yahaya, Yahaya, Bon, Ismail & Ing, 2011). It is argued that the success and failure of firm depends on performance of the employees. Cash and Fischer (1987) in Heidjrachman Ranupandoyo and Suad Husnan, (2000) states that the level of performance and employees' performance can be measured by several factors, namely:

1. Quality of work refers to assessment of the employee's ability to complete the job compared to the set targets.
2. Quantity of work refers to assessment of the ability of employees to complete tasks accurately according to the quality of the work planned.
3. Timeliness means that the assessment of the ability of employees to complete tasks and work closely in the time according to the time been given and planned.

Nowadays it is generally agreed that job performance consists of complicated series of interacting variables belong to aspects of the job, such as the employee and the environment (Milkovich et al, 1991). Researchers have a common sense that performance has a multi-dimensional concept. Basically the performance distinguish between a process aspect (i.e., behavioral) and an outcome aspect of performance (Borman and Motowidlo, 1993; Campbell, McCloy, Oppler, and Sager, 1993; Roe, 1999).

### **Leadership Style, Organizational Commitment, Self-Efficacy and Job Performance**

Devi & Prabhu (2011) in their study selected public and private sector enterprises and the data comprises of 43 middle-level managers and 156 subordinates. The result revealed that the transformational leadership style has significant

relationships with performance outcomes. Oladipo & Daskareem (2013) in their study on the sample of 30 leaders and 150 raters and found that there is a significant positive linear relationship between employee performance and an emotionally intelligent transactional leader as well as there is a significant relationship between employee performance and an emotionally intelligent transformational leader. In other studies that followed, a negative correlation was usually found between the transactional leadership style and organizational performance (MacKenzie et al., 2001; Parry, 2003). The studies of MacKenzie et al. (2001) examined the effect of transformational and transactional leadership on marketing personnel performance at an insurance company and found that transformational leadership has more influence on performance than transactional leadership.

Based on Irvan, Armanu et al. (2013), in their study surveyed on 92 employees found that the organizational commitment of employees influential to improve the performance of employees in PT. Pelabuhan Indonesia IV (Limited) Branch. Bitung. Folorunso & Adewale (2014) examined the impact of organizational commitment dimensions on employees' performance among academic staff in Oyo State owned tertiary institutions. The total sample size was made up of 197 respondents from the pay roll list of two institutions and result revealed that organizational commitment dimensions jointly and independently influence employees' performance among academic staff of tertiary institutions in Oyo State. Habib & Khursheed (2010) in their study utilized survey data collected from 310 employees of 15 advertising agencies of Islamabad (Pakistan). The study identified insignificant impact of organizational commitment on job satisfaction and attitude towards work on job performance. Jack & Eka & Margono (2012) in their research the samples were 127 employees at Municipal Waterworks of Jayapura, Papua Indonesia and revealed that organizational commitment significantly influence to employee performance directly or indirectly through work satisfaction.

Rubina and Azam (2004) conducted a study to explore the relationship between teachers' stress, teachers' job performance and self-efficacy of women school teachers. The study was carried out with a sample of 420 teachers selected at random and found that there is a significant negative correlation between job performance and teacher's self-efficacy. However, according to Judeh (2012) evaluated whether the characteristics of a job had any influence or impact on the workers performance and self-efficacy and implied that there was no conclusive evidence that showed that self-efficacy had an influence on job performance. Luo Biao & Cheng Shuping (2014) in their study proceed in-depth exploration of internal mechanisms in company and found that self-efficacy has a significant impact on job performance, respondents included employees from 12 companies in China, 420 surveys were returned for an overall response. Sarwat & Nukhba (2014) in their study chose 380 lecturers from different public colleges of Punjab and found that there is a significant positive effects of self-efficacy on employee performance. There were against results from the researches.

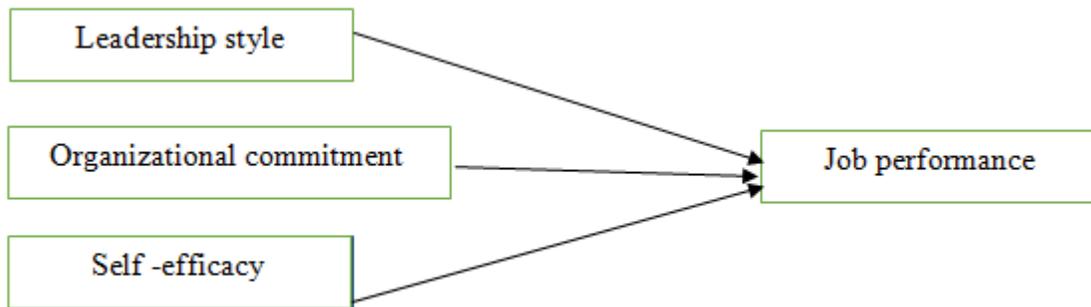
### **Hypotheses**

H1: Leadership style is significantly related to employee job performance.

H2: Organizational commitment is significantly related to Employee job performance.

H3: Self -efficacy is significantly related to employee job performance.

**Figure 1: Theoretical Framework**



This study examined the relationship of leadership styles, organizational commitment and self -efficacy and employee job performance of private education sector academicians in China. The population for the study is education sector academicians in top-ten private universities. The primary data were collected by survey through personally administered questionnaires from 800 respondents in a non-contrived environment during April 2015. 500 questionnaires were used for data analysis out of 800 distributions making the response rate 62%.

In order to examine the response rate from all the respondents, 7 items of leadership style were developed by Marlowe and Nyhan (1992) but with some modifies. 7 items of organizational commitment were developed by Allen and Myer (1997). 7 items of job performance were developed by Goodman & Svyantek (1999) and 7 items of self -efficacy were developed by Schwarzer, R., & Jerusalem, M. (1995).

Questionnaire was based on 5-point scale i.e. 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree. Questionnaire included three sections. First section was about demographics which included gender, position, age, and tenure. Second section was about independent variable which were leadership style, organizational commitment, self -efficacy. Third section was about dependent variable job performance.

Afterwards, Fornell and Larcker (1981) suggested that the measure of composite reliability can be taken advantage by confirming how well a construct is established by its allocated indicators. The range of composite reliability is between 0 and 1, the acceptable values should be greater than 0.6 (Bagozzi and Yi, 1988). The results of reliability refers to table 1.

**Table 1: Reliability Analysis**

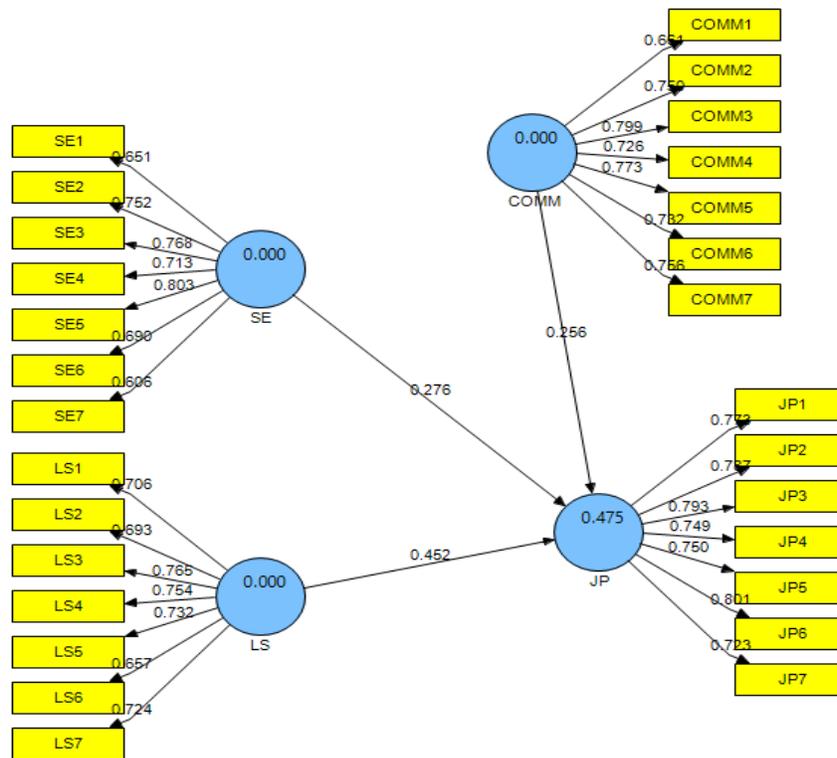
Variables	Composite Reliability	No. of Items
LS	0.882	7
OC	0.896	7
SE	0.879	7
JP	0.910	7

Fornell and Larcker (1981) pointed out if the common variances (squared correlations) of a latent variable with other model's constructs is lower than AVE (average variance extracted) value of this latent variable, which means that discriminant validity is established. Table 2 shows the constructs correlation coefficient among the variables. It found that the correlation of the two constructs is lower that the square root of AVE which indicates that the data met the Discriminant Validity.

**Table 2: Latent variables Correlation Coefficients against AVE Square- Root**

	OC	JP	LS	SE
OC	<b>0.744</b>			
JP	0.5753	<b>0.768</b>		
LS	0.6371	0.6491	<b>0.719</b>	
SE	0.5207	0.4141	0.4675	<b>0.715</b>

**Figure1: Direct relationship- Model 1**



**Table 3: Path coefficient and t-value (Model 1)**

Path	Path coefficient	t-value
LS=>JP	0.462	14.727
OC=>JP	0.256	28.159
SE=>JP	0.276	5.195

Sig t-value>1.96

Based on figure 1 and table 3, it shows leadership styles (.462,  $t > 1.96$ ) were significantly associated with employee job performance. Organizational commitment (.256,  $t > 1.96$ ) and self-efficacy (.276,  $t > 1.96$ ) were positively associated with employee job performance.

**Table 4: Hypotheses Result**

Hypothesizes Relationship	Path Coefficient	p-value	Conclusion
H1 There is a positive relationship between	0.462	0.00	Supported
H2 There is a positive relationship between	0.256	0.00	Supported
H3 There is a positive relationship between and	0.276	0.00	Supported

### III. CONCLUSION AND DISCUSSION

This study intends to estimate the factors influence on job performance in Chinese private higher education sectors. The results displayed that leadership style has a positive and significant direct effect on job performance, it consistent with previous studies (Zuhaidi, 2011; Durga Devi & Prabhu, 2011; Christopher 2007), and it was found that organizational commitment has a positive and significant direct effect on job performance. Even though there were widely research on the factors influencing job performance, yet there were few research focus on personal traits like self-efficacy influence on job performance. And this study was conducted in private universities' academicians as well as it exists difference in different environments. It also practically contributes to create an applicable view of leadership, organizational commitment, self-efficacy and job performance for management of private universities in order to equip them with a new set of workable knowledge for making more effective decisions and setting policies more efficiently.

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# Cultural festivals in Botswana: Just entertainment or a teaching and learning aid in the CAPA classroom- Teachers' perspectives

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**Abstract-** Cultural festivals play a vital role in promoting culture, ensuring culture preservation, showcasing the cultural arts and unearthing talent. This article examines the influence and the role played by cultural festivals in the CAPA classroom in Botswana. Eight experienced CAPA teachers who are currently teaching CAPA in primary schools in Botswana were interviewed. The study is structured in the multiple case approach involving eight primary school teachers in eight districts. An interview was made with these teachers and to reach those teachers residing at remote places, questionnaire and responses went through mobile phone text exchange. Findings of the study suggest that cultural festivals do exhibit skills and knowledge that could immensely benefit CAPA teachers. However, the study revealed that the CAPA content is purely theoretical and therefore lacks direct link to cultural festivals, and consequently do not benefit from this festivals. The study also suggests that although teachers understand the role that cultural festivals, they are not bringing the knowledge to the classroom, as it would take more of their time. As a result they would rather cover all the objectives and complete the syllabus. The paper will hence make some recommendation regarding what could be done; hopefully the synergy of the two can be exploited to benefit CAPA the classroom.

**Index Terms-** Botswana, Creative and Performing Arts, Cultural festivals, Botswana and Performing Arts

## I. INTRODUCTION

The participants in the study are teachers who are compelled to teach CAPA and all subjects where they teach. In this paper, we focus on participants' role as CAPA teachers. This paper was inspired by the authors' passion in the creative and performing arts education. Having been involved in the training of CAPA teachers for years and being part of the cultural festivals, they realized that are most of the CAPA/ Music teachers are not familiar indigenous music games, dances and other arts which is included in the curriculum.

Creative and Performing Arts form part of the primary school curriculum in Botswana, but this has not always been the case. CAPA subjects then were either offered and as extra-curricular activities or specific entities for those schools which chose to offer them. In 1977, just 10 years after independence, Botswana's first educational policy known as Education for *Kagisano* was designed. Education for *Kagisano* which means

social harmony was based on four principles namely democracy, development, reliance and unity (Republic of Botswana 2001). In 1993, a National Commission on Education was set up to revise the education system at that time. A Revised National Policy on Education (RNPE) was then released there-after in 1994 (Botswana, 1994). The RNPE recommended the incorporation of practical subjects in the Botswana curriculum, hence the inclusion of the CAPA in order to address these requirements. The Botswana Creative and Performing Arts was introduced in 2002 in a inter disciplinary mode including music, Art & Craft, Design and Technology and Physical education which are grouped together and taught as one subject.

Like any other new initiative, there were some challenges with the implementation of the CAPA curriculum, the first challenge being lack of resources to implement the CAPA curriculum. A number of researches conducted locally with regard to the implementation of the CAPA suggest that teachers biggest challenges in implementing CAPA is lack of resources and instructional materials (Kekana 2016, Phuthego, 2008; Mannathoko, 2008; Phibion, 2011). The lack of resources and materials is not only peculiar to CAPA, but to other subjects as well.

Many schools across the country are not adequately equipped, particularly primary schools. This has resulted in lack of science equipment or laboratories, double shifts and schools without electricity. These are major challenges that must be met by the year 2016 Vision (Vision, 2016:18)

The other challenges were the fact that teachers found the CAPA syllabus difficult as most of them were not specialist in the subjects. Baputaki (2007:1) states, " most teachers are still struggling to teach the newly introduced subject called Creative and Performing Arts (CAPA) in primary schools around the country. Furthermore, according to studies done locally, some of those schools who do implement the CAPA do not address the stated objectives (Mannathoko, 2008). As a teacher, it is imperative to always have objectives so as to know the outcomes you expect. Objectives play a very important role in the teaching/learning process as they are a roadmap of what is to be achieved. Hoffer states:

State the objectives for the class or group in terms of what students should be able to do as a result of instruction. Unless the students can provide evidence of how much they have learned, it is more difficult for a teacher to determine what should be taught in subsequent classes. (Hoffer, 2009, p. 32)

Through these festivals people get to appreciate the diverse cultures of Botswana which help them to be tolerant of each other's culture and therefore understand that no culture is inferior or superior.

There are different are so many cultural festival held every year in Botswana. Every region or district has their own festival. These include the *Kuru* Dance Festivals, Dithubaruba, Letlhafula, and Son of the soil, *Mmakgodumo*, *Khawa* dune challenge and cultural festival, *Kgalagadi* west cultural festival, *Tsodilo*, *Maun*, *Gchwihaba*, *Maitisong*, *Gutjilenje*, *Mayeyi*, *Domboshaba* and Heart of the city carnival.

At the heart of these festivals are the performing arts, the visual arts, literary arts, the culinary arts and applied arts. Popular participation in cultural activities is necessary for social justice and an effective tool for social integration and international intercourse (Botswana, 2001).

### **Purpose of the study**

The purpose of this study is to find out if cultural festivals play any role in the creative and performing arts in the classroom, and if it does to what extent. The researcher has observed that, there are many cultural festivals showcasing music and dance.

### **Research questions**

The study will be framed by the following questions:

1. How do cultural festivals influence CAPA teachers in Botswana?
2. What are CAPA teacher's perceptions with regard to the role played by cultural festivals?
3. What skills and knowledge form part of the cultural festivals?
4. To what extent do teachers understand the role and values of cultural festivals?

## **II. IDENTIFY, RESEARCH AND COLLECT IDEA**

It is imperative, as the Revised National Policy on Education recommended, that the arts form part of the school curriculum. The curriculum of the education system must be based on the Botswana culture and provide programmes and facilities aimed at teaching skills of culture centred disciplines (Botswana, 2001) through cultural festivals indigenous music is preserved and there is continuity of the music as it's not documented. Indigenous music in preserved through Cultural festivals.

In the past ten years, Botswana has seen the number of cultural festivals rising each year. These festivals are good platforms to showcase indigenous music, cultural dances and artifacts, it is through cultural festival whereby people experience the practical live performance of indigenous music without reading about it theoretically and get to see the traditional instruments. Cultural festivals are held with an objective to revive and promote culture and ensure preservation. Moreover, they are held to unearth talent and showcase the arts. Different ethnic groups in Botswana showcase their cultural product including music, dances, games, costumes, food and artifacts. CAPA teachers and students could benefit from these festivals, but do they?

Delivering a key note speech at a conference in 2013, entitled: Arts Up Front: ACT Arts Education Professor Brian Caldwell Managing Director and Principal Consultant Educational Transformations had these key remarks to make about importance of Arts in education:

The Song Room study had a powerful personal impact and that is why I will take every opportunity to make common cause on the issues, hence the title of my address. I invite you to make common cause on matters related to arts education, even to the point of rattling the policy cage, so to speak, because Australia will never be a top-tier nation in school education until the arts holds the same place as mathematics and science.

With the citation below, Caldwell further stresses the importance of Art Education

Culture and the arts are essential components of a comprehensive education leading to the full development of the individual. Therefore, Arts Education is a universal human right, for all learners, including those who are often excluded from education, such as immigrants, cultural minority groups, and people with disabilities. (UNESCO 2006: 3)

Indigenous music in preserved through Cultural festivals. Through these festivals people get to appreciate the diverse cultures of Botswana which help them to be tolerant of each other's culture and therefore understand that no culture is inferior or superior. (Phibion 2012).

Phibions researches cover indigenous music, dance and traditional music instruments from several ethnic groups in Botswana. In his recent publication with Khudu-Petersen Tsutsube Dance Festival, they presented and described Tsutsube a cultural practice that they describe as rich in cultural content which can be adapted in the teaching of Social Studies, CAPA and Cultural Studies. (Phibion and Petersen 2016) bemoan disregard of cultural practices in schools as they state:

Like most communities in Botswana, this research revealed that Botswana schools in the Basarwa occupied areas do not have any of their musical genres taught or practiced. As the schools' syllabus at primary and secondary schools is designed, it calls for an urgent revival of the local traditional musical genres including

that of Basarwa, so that they are taught to the current learners before they become obsolete. The system of education should stress the value of a multicultural society and the strength that it can offer in terms of international connections and flexibility to respond to change. In addition to the performances in schools, Denbow (2006, p. 50) observes that some Sarwa healing dances are also being performed in Gaborone (the capital city of Botswana) and other urban centers as tenets of Sarwa cosmology are woven into changing Tswana culture and practice (p. 65) Our study explored whether CAPA teachers and (learners?) could benefit from festivals which are rich sources of Arts and Culture.

In view of those facts UNESCO has declared exposure to Culture and the arts as one of the universal human rights, for all learners, the government of Botswana is interested in promoting arts and culture through a variety of ways, which include the inclusion of an integrated art curriculum (CAPA) at primary school level, supporting and financing Arts, Culture festivals. Another example of effort to transmit arts and culture values are a project entitled 'Museum in the Box' initiated by UNICEF and well received by Botswana government, delegating the National Museum and Art Gallery to implement it. Khudu-Petersen (2008) elucidates the aims of the program:

Museum-in-the-Box project was supposed to teach the RAD children arts and crafts of their culture in school during weekends. -- according to the teacher participants, [‘that] RAD children seem to be gifted in hand crafts so much, that even if they do not succeed in school academically, they can learn skills that can reward them in future’. Children were taught by local cultural practitioners, recruited on voluntary basis. Skills taught included: cutting and carving (wood work), leather work, egg shell decorating and bead making (p. 77)

Although the project described above was based in schools and focused on marginalized ethnic minority learners, the involved teachers encountered too many challenges and demands regarding its implementation. Therefore, they could not take the methodology on board and use it their classroom teaching. Considering that the project had actually taken art and culture into schools, we see its failure as a missed opportunity. This observation brought us back to the question whether did not gain enough skills or knowledge of teaching of Culture Festivals, which take place and timed remote from schools, with schedules that do not correspond with the school's.

*Cultural festivals influence CAPA in a positive way, and that making CAPA to be understood and learned in a simpler way, which improves the quality of CAPA as a subject. They influence CAPA in the area of creativity. For example, as people in the community perform, maybe in drama or theatre, teachers can acquire creativity skills of how to become innovative in class. Cultural festivals also play a big role when it comes to participation in cultural activities as this emphasizes a sense of identity.*

From another perspective, Arts and Culture festivals have dramatic effects, they display different aspects of the arts; music, dance, poetry, drama and visual art displays. We therefore hoped/expected them to enrich, inform, awakening creativity and inspiring them to convert what they experienced to the pedagogical context. Teachers attend festivals at their own accord; one could expect them to be relaxed, entertained and ready to absorb knowledge and skills about different cultures. Which is why it would be interesting to hear from them what they bring back into their professional practice.

### III. FINDINGS

The study will follow a qualitative approach in order to obtain an in-depth understanding of the research problem. Eight experienced CAPA educators currently teaching CAPA will be interviewed to get their perspectives with regard to cultural festivals

#### Results and Discussions

The findings are presented as captured from the interview With CAPA teachers. Eight CAPA teachers shared their views regarding the influence of cultural festivals on the CAPA syllabus. Data is presented in themes as adapted from the research questions.

#### What are CAPA teacher's perceptions with regard to the role played by cultural festivals?

##### Teachers' voices

Teachers were first asked how they regard the role of cultural festivals in CAPA. Response from the different teachers' interview showed that they do share the same sentiments that cultural festival can bring positive to the CAPA classroom, but this is not the case because. The excerpts include: *The CAPA content at both primary and junior schools is treated purely as academic hence it lacks direct link to the cultural festivals and the outer community. The Cultural festivals on the other hand are designed to disregard the academic function that they serve especially on the young learners. Therefore, the two entities are absolutely divorced from each other, consequently denying learners the role that can be played by the performing arts content and also giving the outer community a wrong perspective about the festivals that it's an entertainment function for adults. They can contribute to in-depth knowledge of various musical cultures and offer opportunity for experiential learning*

*Festivals compliment CAPA in the sense that they add on to what is being taught, therefore what isn't being taught can be seen during this festival. They provide the practical aspect as opposed to abstract theories in the music classroom.*

*The festivals resuscitate and preserve our cultural practices which are already under threat, and this also promotes CAPA as a subject to the students, parents and community. There is a huge influence as same aspects taught in theory are put to reality/ practicality during this festivals*

*Cultural festivals play an important role in CAPA because at schools, student are taught the theoretical knowledge, therefore cultural festival can provide the practical aspect. They give order and meaning to social aesthetic and religious norms that distinguish one group of people to the other. Since culture is not taught but is caught, children observe and mimic the actions of others hence cultural growth is gained. Cultural festivals have a huge impact on the learning of CAPA, cultural ideas, activities, artefacts; song and dance from different cultures is easily imparted to the CAPA learner, most importantly through oral transmission.*

## **Question 2**

### **What skills and knowledge that form part of the cultural festivals could benefit CAPA teachers?**

#### **Teachers' voices**

Teachers were also asked if there are skills and knowledge that form part of the festivals which can benefit the CAPA teachers. Teachers do believe in unison that cultural festivals are a fountain of skills and knowledge in the arts as illustrated by the following excerpts. *The improvisation aspect in all dances and songs at the festivals is relevant to learners when it comes to virtuoso artistic expression of the self. The same improvisation element which is common and popular across various genres in festivals is ideal for CAPA content when we look at it through the lens of interdisciplinary in the arts. Documentation, research, performance knowledge, traditions, history and culture.*

*Teachers can benefit through the enhancement of their social, religious and aesthetic values thereby attaining a thick description of a particular culture. Skills and knowledge that form part of cultural festivals are ideas, knowledge, practical skills, performance skills, and indigenous arts including pottery and weaving which all from the appreciation part that students will learn from different cultural activities from many cultures that they don't know or have contact with.*

*Practical skills including artistic s and craftsmanship skills application aspects and interactive skills. The history of most of these cultural, the artefacts and practical skills Indigenous knowledge, indigenous arts, knowledge about fauna and flora, traditional healing systems, rituals, beliefs and initiatory rites.*

## **Question 3**

### **To what extent do CAPA teachers understand the value and role of cultural festivals with regard to the CAPA classroom?**

#### **Teachers' voices**

This question sought to get CAPA teachers views on the extent to which they understand the values and role played by cultural festivals in regard to the CAPA classroom. Most of the teachers felt teachers do not know or underestimate the role that can be played by cultural festivals in the CAPA classroom. Teachers are naïve because they just take these festivals as a form of entertainment for adults and do not associate the activities to the classroom. These are some of the responses. *Some teachers at primary schools who pursued CAPA as subject specialists have*

*the potential to express knowledge of how to link their content with the festivals repertoire. CAPA in relation to the festivals. Their response to the subject is purely academic and they consider the festivals to be entertainment as opposed to the edutainment concept.*

*They don't understand because of the current obsession with the coverage of objectives and teaching for marks/examination. Children's development, expression & self-actualization see not to be valued. Very little unless they come from a traditional background such that they have lived the experience of a particular culture.*

*The extent at which CAPA teachers understand the role and values of cultural festivals is very minimal. There is limited information dissemination and most lack interest in trying to know more. CAPA teachers do understand the role and value of cultural festivals but take it do underestimate the positive change it can bring to the classroom .It's taken for granted, or taken as something that belongs to a different ministry, not the education environment. Teachers do not have the interest since CAPA subject is not examined in the Primary School Leaving Examinations, they focus more on the examines subjects. It's under estimated, it's a taken as a culture thing.*

## **IV. CONCLUSION**

The study revealed that, cultural festival could be vital source of knowledge to the CAPA classroom and the teachers do understand that very well, but currently, they are just entertainment. It is revealed that teachers understand the role that cultural festivals play but do not think they can relate the two due to a number of factors. For example, they complain of limited time allocated for the subject and the subject not being part of the subjects examined for the Primary school leaving examination, which schools are judged.

Cultural festivals, if linked to the curriculum, they could provide excellent teaching and learning aids in the CAPA classroom. Teachers always complain of lack of African of resources and teaching aids, but cultural festivals could provide an alternative. Music teachers should not be daunted by the fact that Dalcroze taught improvisation on the piano (Mead, 1996), an instrument they may not have. They do not have to have to look too far for the resources they could utilize. For instance, spontaneous poetry serves to develop a sense of improvisation through speech (Phuthego, 2005). Traditional music knowledge system has the capability for promoting music education, especially as it relates to the ways, cultures and values of where it evolves (Ogunrinade, 2014).

## **V. RECOMMENDATIONS**

1. My first recommendation would be that The Ministry of Youth Sports & Culture, which is responsible for cultural festivals in Botswana should share the cultural festivals calendar with the Ministry of Basic Education. This will enable CAPA teachers to plan ahead, choose wisely which festival to attend and prepare well in advance.

2. The Department of Curriculum and Evaluation, which is responsible for curriculum implementation should sensitize CAPA teachers on the importance of cultural festivals and why it is imperative for them to attend and relate to the festivals to the CAPA classroom.

3. The CAPA and Music curriculums stipulates that teachers should teach local music, of the area where they teach. Therefore, CAPA Teachers should liaise with the communities where they teach, so that they can also benefit from cultural festivals, if they are held in that community. Working closely with the community will benefit them more as part of the festivals as opposed to observers. They can invite these artists as resource persons even long after the festival.

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# Task Profiling Algorithm for Scheduling Highly Heterogeneous Tasks on Cloud Computing

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**Abstract-** The use of cloud computing becomes more mature for large-scale system. To optimally utilize cloud computing resource, task scheduling algorithm needed. Task scheduling algorithm approach try to minimize completion time and optimally utilize cloud computing resource. The biggest challenge of task scheduling algorithm not only how to distribute tasks to workers fairly, but also distribute task to the right worker at the right time. On the real world, the tasks may have different resource usage. There exists task with high computational usage and a task with high memory usage. The different type of task may affect performance of task scheduling algorithm. Grouping or classification of task may increase scheduling performance [1]. In this paper, task scheduling algorithm based on task profiling is introduced. The task profiling algorithm profiles the task based on its resource need, then classify it to HIGH\_CPU for high computing task, HIGH\_MEMORY for high memory task or LIGHT for task which not consume much resource. Using profiled tasks, proposed system is able to choose worker more precisely. Result shown, the proposed task profiling algorithm gives better completion time compared to traditional scheduling algorithm.

**Keywords-** Cloud Computing; Task Scheduling; Task profiling; Load balance;

## I. INTRODUCTION

Cloud computing technology becomes more mature for a large scale system. The use of cloud computing on large scale system may increase user satisfaction. User satisfaction can be measured by quality of service (QoS) [2] [3] [4]. There are many techniques to provide quality of service to the cloud applications, *Scheduling, admission control and dynamic resource provisioning* [5]. Scheduling manage cloud resource by scheduling and distributing task to worker in cloud computing datacenter. Worker can be physical or virtual machine [6].

A million of tasks may be executed at a time. That make completion time become considerably high [7]. The response time of each task that user may tolerate is 2 up to 8 seconds [8]. Minimizing response time can be done by reducing task completion time. Traditional scheduling algorithm minimize completion time by distributing task to the worker based on worker specification only. This approach works well in the homogeneous task or on the tasks with little difference resource usage. The biggest drawback of this approach is imbalance load where the tasks have different resource usage. for example, there exist task A and B. Task A

needs 8 seconds computation time and 50 megabytes memory in order to run and finished. On the other hand, task B needs 4 second computation time and 500 megabytes memory in order to run and finished. If there are a bunch of task A and B scheduled and distributed normally only based on worker specification. There will be a worker with a lot of task B and a lot of task A. The worker with a lot of task A will finish slower and increase completion time, and worker with a lot of task B will fail due to run out of memory. High completion time and low success rate can reduce QoS and impact to user satisfaction.

To overcome the drawback, more advanced scheduling algorithm is required. We need scheduling algorithm that made decision not only based on worker specification but also based on resource usage of task. In this paper, we proposed new scheduling algorithm based on resource usage of task and worker specification. This new algorithm proposed to minimize task completion time and increase success rate. Hereafter in this paper, will be organized as: Section II present overview of previous works about task scheduling algorithm. In Section III present the new task profiling algorithm. In Section IV presents about implementation of algorithm and the tests scenario. Later in Section V will be a discussion of the test results. Finally, Section VI give a conclusion of the papers and possibility of future works.

## II. RELATED WORK

Traditional task scheduling intends to minimize task completion time and increase success rate. The scheduling algorithm known as NP-Complete problem. Task scheduling architecture shown in Figure 1.

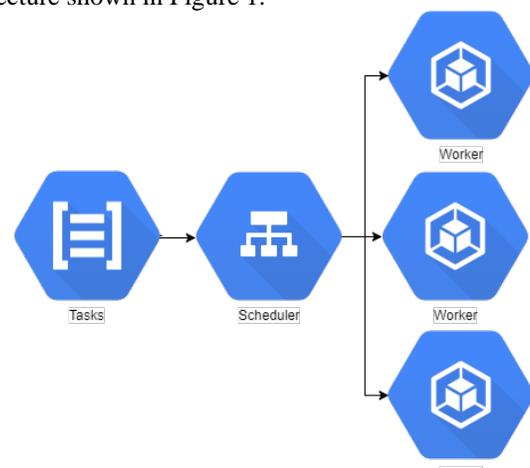


Figure 1: Task Scheduling Algorithm

In cloud environments, scheduling problem becomes more challenging because of the characteristics of high heterogeneity in resources and high heterogeneity of tasks [9]. Several task scheduling algorithms already proposed. Kumari and Saxena [10] have a study about traditional task scheduling based on round robin. They make comparison of round robin, weighted round robin, least connections, weighted least connections and random. The result shown that the round robin approach has good performance on homogeneous task and homogeneous worker. Later Kaur and Luthra [11] give a study of performance min-min and max-min algorithm. They compare performance min-min and max-min to first come first Served algorithm (FCFS) and round robin scheduling algorithm (RR). The result shown, min-min and max-min have better resource utilization and performance compared to another algorithm.

### 1) Round-Robin

Round robin approach distributes task evenly across all workers. In round robin, tasks will be distributed normally without considering capacity of workers. Suppose, there are Server A and Server B. Server A have 4 cores of CPU and 2 Gigabytes memory. Server B have 1 cores of CPU and 512 Megabytes memory. We know that Server A have resources twice than Server B. So, Server A may handle request capacity twice larger than Server B. But using round robin approach, task will be distribute evenly on Server A and Server B. Because of task evenly distributed, Server B will get overloaded faster than server A. Overloaded servers are at risk of failure and may go down. According to round robin behavior, it is fit to be used in homogenous worker only.

### 2) Min-Min

Min-min scheduling algorithm complete the shortest task first. Algorithm work with following step: First, the algorithm calculates completion time of each task and sort it from the shortest task. Then, worker sorted from the fastest finished the task. Finally, task will be executed sequentially, that means one worker can only executed one task at the same time.

### 3) Max-Min

Max-min algorithm work like min-min algorithm. While min-min algorithm execute task from the shortest completion time first, max-min algorithm execute task from the longest one. This approach improves min-min algorithm by execute longest task first. Max-min algorithm best suite in environments with more longest task than shortest task.

## III. PROPOSED METHOD

Task profiling algorithm consists of following steps: collecting worker available resource, collecting task resource usage, profiling and task scheduling.

### A. Collecting worker available resources

Before run the profiling, we need to collect worker available resources and task resource usage. Worker available resources are collected by measuring number of CPU cores and total physical memory. After collecting the data, we will

get Worker Resource ( $WR$ ) variable.  $WR$  variable consist of  $WR_{CPU}$  and  $WR_{mem}$ .

1. **For** worker in worker list;
2. Get  $WR_{CPU}$  and Get  $WR_{mem}$
3. **End For**;

Figure 2: Collecting worker available resources

### B. Collecting task resource usage

Collecting task resource usages can be done by executing each task to every worker and get the resource usages. The resource measured is computation time of CPU and memory usage. Computation time measured in second, while memory usage in megabytes. After collecting data, we will get Task Resource ( $TR$ ) variable.  $TR$  variable consist of CPU computation time, memory usage and worker list sorted from the fastest.

1. **For** task in task list;  $T_i$
2. **For** worker in worker list;  $W_j$
3. Execute  $T_i$  on  $W_j$
4. Get  $TR_{i(CPU)}$  and  $TR_{i(mem)}$
5. **End For**;
6. Sort  $W$  based on the fastest finished the task
7. **End For**;

Figure 3: Collect task resource usage

### C. Profiling

In order to get task executed to the right server, tasks needs to be classified. Classification of task can be done by profiling step. The output of the profiling step is the task classification, HIGH\_CPU for task with high computational time, HIGH\_MEM for task with high memory and LIGHT for task which not consume much resource. Classification of task aims to prevent task with same classification executed on the same worker at the same time. For example, Worker A execute a HIGH\_MEMORY task. Currently worker A lose a lot of memory due to executing HIGH\_MEMORY task, if worker A execute another HIGH\_MEMORY task it may lead worker A to a failure. The Profiling use variable Worker Resource ( $WR$ ) and Task Resource ( $TR$ ) from the previous step. The following rule used to determine the classification:

- If average completion time of task ( $\overline{TR}_{cpu}$ ) more than 8 s [8], the task is HIGH\_CPU.
- If average memory usage of task ( $\overline{TR}_{mem}$ ) more than average all worker memory ( $\overline{WR}_{mem}$ ), the task is HIGH\_MEM.
- Else the task is LIGHT.

1. **For** task resource in task resource list;  $TR_i$
2. **If**  $\overline{TR}_{cpu} > 8$  s then
3.  $TR_iweight = \text{HIGH\_CPU}$
4. **Else If**  $\overline{TR}_{mem} > \overline{WR}_{mem}$  then
5.  $TR_iweight = \text{HIGH\_MEM}$

6. **Else**
7.  $TR_i weight = LIGHT$
8. **End If;**

Figure 4: Task Profiling

D. Task scheduling

Task scheduling distributes tasks using  $TR$  and  $WR$  as reference. The main idea is to avoid overloaded worker and utilize resource optimally. Scheduling algorithm works as follow

1. **For** task in scenario;  $T_i$
2. Search  $TR_i$  corresponding to  $T_i$
3. Get  $W_j$  from  $TR_i$
4. **If**  $TR_i weight$  not LIGHT
5. **If**  $TR_i weight$  not same as  $W_j current\_task\_weight$
6. Execute  $T_i$
7. Update  $W_j current\_task\_weight$
8. **End If;**
9. Update  $W_j$  and  $TR_i$  resource
10. **Else**
11. Execute  $T_i$
12. **End If;**

Figure 5: Task Profiling Scheduling Algorithm

IV. EXPERIMENT AND IMPLEMENTATION

To evaluate performance of this new scheduling algorithm, we setup the experiment environment. We implement the scheduling algorithm by using python and psutil library. We use virtual machine provide by proxmox virtual environment for worker machine. We design experiment architecture shown in Figure 6.

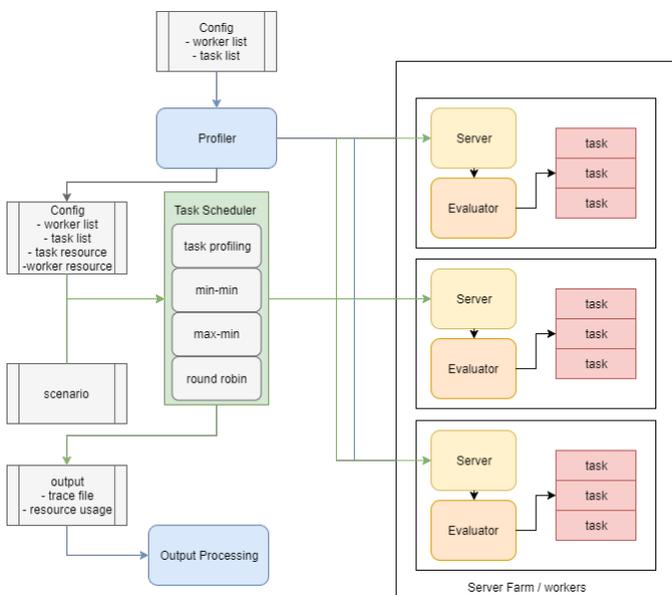


Figure 6: Experiment Architecture

Server farm or workers will run under proxmox virtual environment. Each worker will run server and evaluator. Server waits for incoming connection and execute the task

through evaluator. Evaluator executes the incoming task and get the resource usage and completion time of the task. Before running task scheduler, profiler must be initially executed to get Worker Resource ( $WR$ ) and Task Resource ( $TR$ ). Specification of machine and software are used in experiment as following:

- Python version 2.7 and psutil version 5.4.2
- Proxmox PVE Manager Version pve-manager/5.1-35/722cc488
- Physical server to run proxmox pve with specification:
  - 8 Core CPU 8 x Intel(R) Core(TM) i7-2700K CPU @ 3.50GHz (1 Socket)
  - RAM 16 GB
  - HDD 100 GB

For experiment, we used two scenarios. The first scenario is consisted of homogeneous workers and second scenario is consisted of heterogeneous workers. We use three different tasks for experiment that shown in Table 1.

Table 1: Task for Experiment

Task Name	Descriptions
write_high	Write 20000000 row
read_high	Read 65000000 row of file
read_moderate	Read 5000000 row of file

First scenario uses homogeneous workers with specification as following:

Table 2: Homogenous Workers Scenario

Step	Worker			Task	
	Name	Memory	CPU core	Name	number
1	Wk-1	1024 MB	1	write_high	5
	Wk-2	1024 MB	1	read_high	5
	Wk-3	1024 MB	1	read_moderate	5
2	Wk-1	1024 MB	1	write_high	10
	Wk-2	1024 MB	1	read_high	10
	Wk-3	1024 MB	1	read_moderate	10
3	Wk-1	1024 MB	1	write_high	15
	Wk-2	1024 MB	1	read_high	15
	Wk-3	1024 MB	1	read_moderate	15
4	Wk-1	1024 MB	1	write_high	30
	Wk-2	1024 MB	1	read_high	30
	Wk-3	1024 MB	1	read_moderate	30
5	Wk-1	1024 MB	1	write_high	45
	Wk-2	1024 MB	1	read_high	45
	Wk-3	1024 MB	1	read_moderate	45

Second scenario uses heterogeneous workers with specification as following:

Table 3: Heterogenous Workers Scenario

Step	Worker			Task	
	Name	Memory	CPU core	Name	number
1	Wk-4	512 MB	4	write_high	5
	Wk-5	2048 MB	1	read_high	5

2	Wk-6	2048 MB	4	read_moderate	5
	Wk-4	512 MB	4	write_high	10
	Wk-5	2048 MB	1	read_high	10
	Wk-6	2048 MB	4	read_moderate	10
3	Wk-4	512 MB	4	write_high	15
	Wk-5	2048 MB	1	read_high	15
	Wk-6	2048 MB	4	read_moderate	15
4	Wk-4	512 MB	4	write_high	30
	Wk-5	2048 MB	1	read_high	30
	Wk-6	2048 MB	4	read_moderate	30
5	Wk-4	512 MB	4	write_high	45
	Wk-5	2048 MB	1	read_high	45
	Wk-6	2048 MB	4	read_moderate	45

V. EXPERIMENT RESULT

After running profiling, classification of tasks are shown in Table 4:

Table 4: Task Classification

Task Name	Classification
write_high	HIGH_CPU
read_high	HIGH_MEMORY
read_moderate	LIGHT

Performance of four scheduling algorithm evaluated by completion time and success rate. The lower completion time and higher success rate the better performance of the scheduling algorithm.

In homogenous workers scenario, completion time present in Figure 7 and success rate in Figure 8.

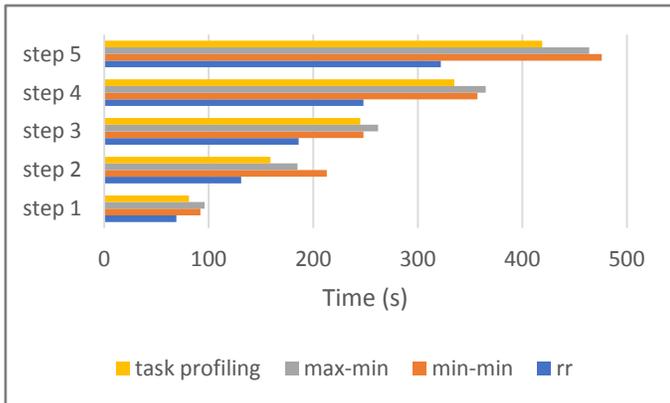


Figure 7: Completion Time Scenario Homogeneous Workers

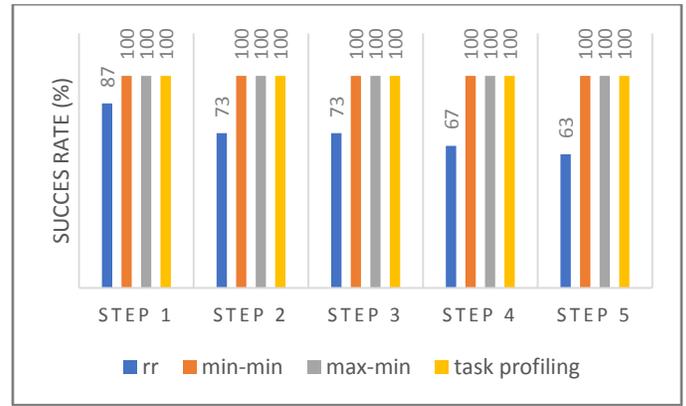


Figure 8: Success Rate Scenario Homogeneous Workers

In Figure 7, round robin algorithm has a lowest completion time because there is so many tasks failed. In Figure 8, round robin algorithm has lower success rate comparing to three others algorithm. In other side, task profiling algorithm lower the completion time and keep success rate high.

In heterogenous workers scenario, completion time present in Figure 9 and success rate in Figure 10.

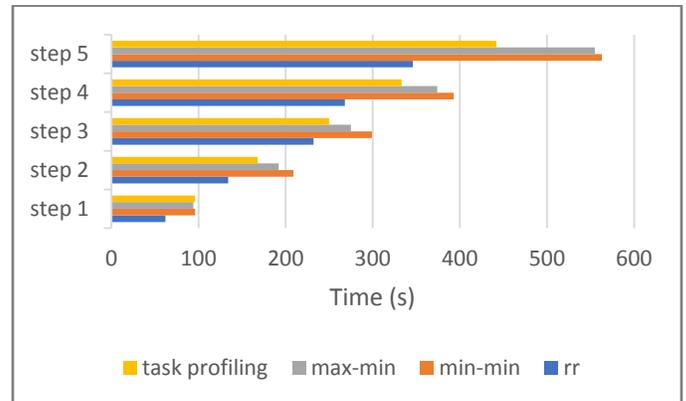


Figure 9: Completion Time Scenario Heterogenous Workers

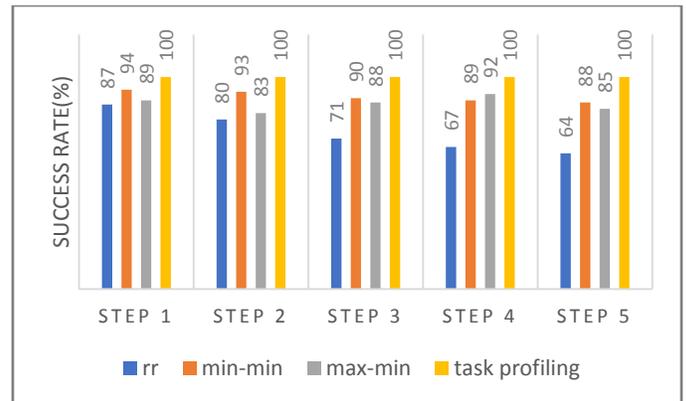


Figure 10: Success Rate Scenario Heterogenous Workers

Same as in homogeneous worker scenario, in heterogenous scenario task profiling algorithm show best performance comparing to another algorithm. In Figure 10, task profiling algorithm can maintain success rate at the highest value when the others algorithm failed.

## VI. CONCLUSION AND FUTURE WORK

In high heterogeneity task environments, scheduling algorithm can't distribute the load in the usual way. Evenly task distribution may overload a worker and lead to a failure. To many failed tasks make a lower success rate and make completion time higher. The proposed task profiling algorithm prove that it suits on high heterogeneity task environments. Task profiling algorithm profiled the task, and distribute task based on task classification to the right resource with available resource. Task profiling algorithm can decrease completion time and maintain success rate.

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# TechTasker: Electronic device repairing digital platform connecting device owner and freelance repairmen

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**Abstract-** The purpose of this paper is to propose a conceptual digital platform where it is possible to connect malfunctioned electronic device owners and the repairmen to get the repairing done. This is a Consumer-to-Consumer (C2C) business model where the malfunctioned electronic device owners will be able to find a repairman to repair their devices. On the other side, for the freelance repairmen this solution will enable them to find clients easily and effectively. As people feel hectic to go shopping in repairing their devices, the proposed digital platform shall become a convenient platform.

**Index Terms-** C2C, digital platform, electronic device, 4 Lenses of Innovation, BMC, VPD.

## I. INTRODUCTION

The world we know is changing every day along with the evolving technologies. There are new electronic devices, new inventions coming everyday everywhere. Everyday lifestyle of people is changing. Technology is here helping us to enrich ourselves and our way of living. People are using the internet, devices in every possible way they can to make the full use of it. There are many things that we can do by just some click which were so hectic 10 years ago. Now life has become easier than ever with the help of hundreds of types of electronic devices that technology gifted us in the last few decades. But the number of malfunctioned devices is also increasing at an alarming rate. People find it hard and painful to go to shops to fix their devices. This is where the need of a digital platform emerges, which will connect the device owner and the freelance repairmen.

## II. BACKGROUND

As using devices in our daily life is increasing, there also many of us who has devices which they seldom use or it has some problem in it. Moreover, there also so many freelancers which people do not know about can actually fix their devices with lower cost than the repair-shops. Currently, there are multiple home services companies in Malaysia who provides home painting services, plumber services etc. but none of them provides services to fix devices like mobile, laptop etc. So, there should be some of a digital platform to solve this issue so that people won't have to go to find a repair shop to repair their devices. By using the platform, device owners can contact and interact with freelancer repairmen and get their devices repaired.

## III. PROBLEM STATEMENT

There are many skilled repairmen who want to do freelance repairing for electronic devices. These repairmen are looking for freelance jobs but they don't always get clients for lack of marketing, communication, and publicity. As a result, they end up working on a repairing workshop and share their income with the workshop. On the other hand, there are device owners who don't always have a trusted destination to go with their malfunctioned device once the warranty, if any, is over. Device owners have always been concerned about getting skilled repairmen and getting jobs done within proper charges. We want to become a trusted media which is required to solve this problem by creating a bridge between these freelance repairmen and device owners.

## IV. LITERATURE REVIEW

### A. ServisHero

ServisHero is a company that provides local services on-demand via a mobile app in Southeast Asia. This company was Founded in June 2015. ServisHero is based in Malaysia but already the service is available in Singapore and Thailand. They wanted to create a more effective way for consumers to find and compare local services in Southeast Asia. ServisHero claims to connect quality(as measured by their review and rating system) service providers via their mobile (including Android and iOS) and web applications. Consumers can use these applications to search and find from thousands of available service providers.

Service providers need buy prepaid credits on the service that will allow them to bid for jobs. Service providers can not bid if there is no credit in the provider's account. Credits do not guarantee a job. That incentives them to keep costs competitive and, as

the company is not receiving any share, there's no extra charges added on. The company recommends leaving job posts and job requests for at least 24 hours to get enough responds. However, most of the time people responds to such postings within hours.

ServiceHero is already receiving big investments from investors like YTL, Golden Gate Ventures, Cradle Seed Ventures, Lelong.my.

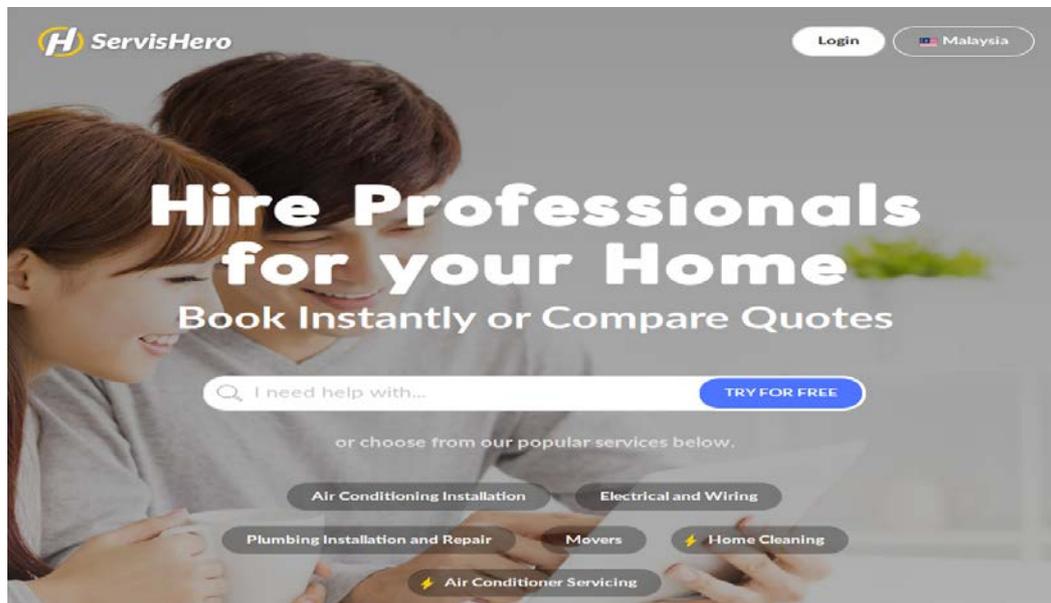


Figure 1: ServisHero website's user interface

### B. Kaodim

The Kaodim group is supported by leading venture capitalists including BEENEXT, East Ventures, KK Fund, 500 Startups and Venturra Capital. Kaodim enables users to find any service professional like a plumber, a wedding photographer, a yoga teacher, or an interior designer. They advertise themselves as the go-to platform helping customers to get the jobs done that are important to their city lives, everything from modeling their homes to photography, learning new skills and so more. At this moment, Kaodim is serving in Malaysia, Philippines, Singapore, and Indonesia. Their monetization model is similar to ServisHero's monetization model.

Kaodim provides a good user experience in their web and mobile applications. In order to book a service, users need to choose the task, select the date and time and check out with payments. Users also have the choice to book for a service in advance via these applications. Kaodim has been using their customer's usage data to understand customer's usage habit to take better business decisions. Kaodim also have both the iOS and Android application as well as a website but the problem is at the point of our inspection their Android app was not working as per several customer reviews in the Google Play store.

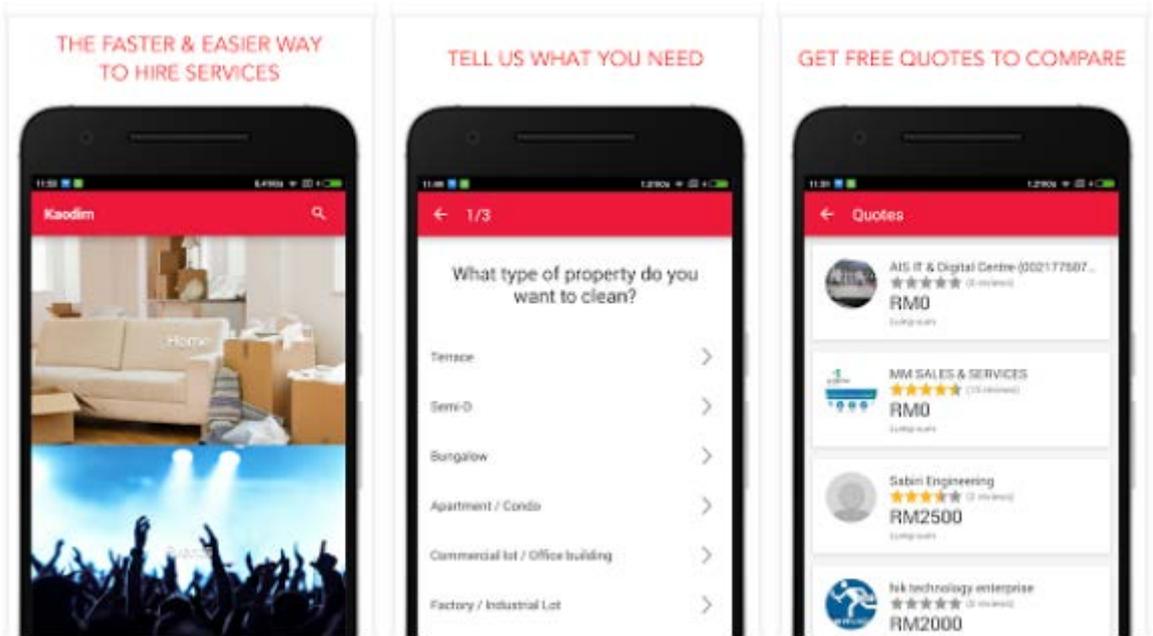


Figure 2: Kaodim android app's user interface

### C. Page Advisor

Page Advisor is an organization similar to ServisHero and Kaodim based on Singapore. Page Advisor was conceptualized and founded by Fabian Lim, famous serial online entrepreneur from Singapore. PageAdvisor also has Android, iOS, and web application to serve their users. Service seekers can find service providers to do gardening, house cleaning, handyman tasks, delivery jobs and so on. Service providers for more creative tasks like graphic designers, photographers and IT support personnel can also be found in the Page Advisors system. PageAdvisor holds the service charge in their system until the job is done, then the service charge is delivered to the service provider. The system will deduct the service fee (15%) which includes Insurance, Handling and and transaction costs in this process.

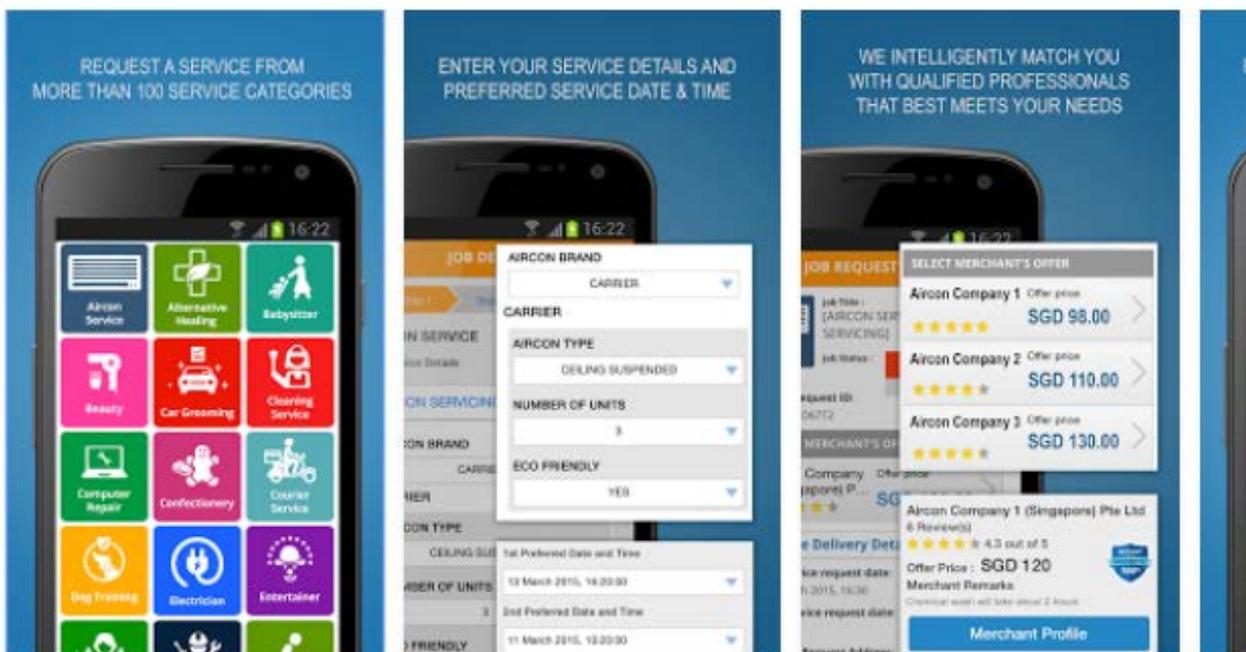


Figure 3: Page Advisor's user interface

Figure 3 shows some example screenshots from Page Advisor’s mobile application’s user interface.

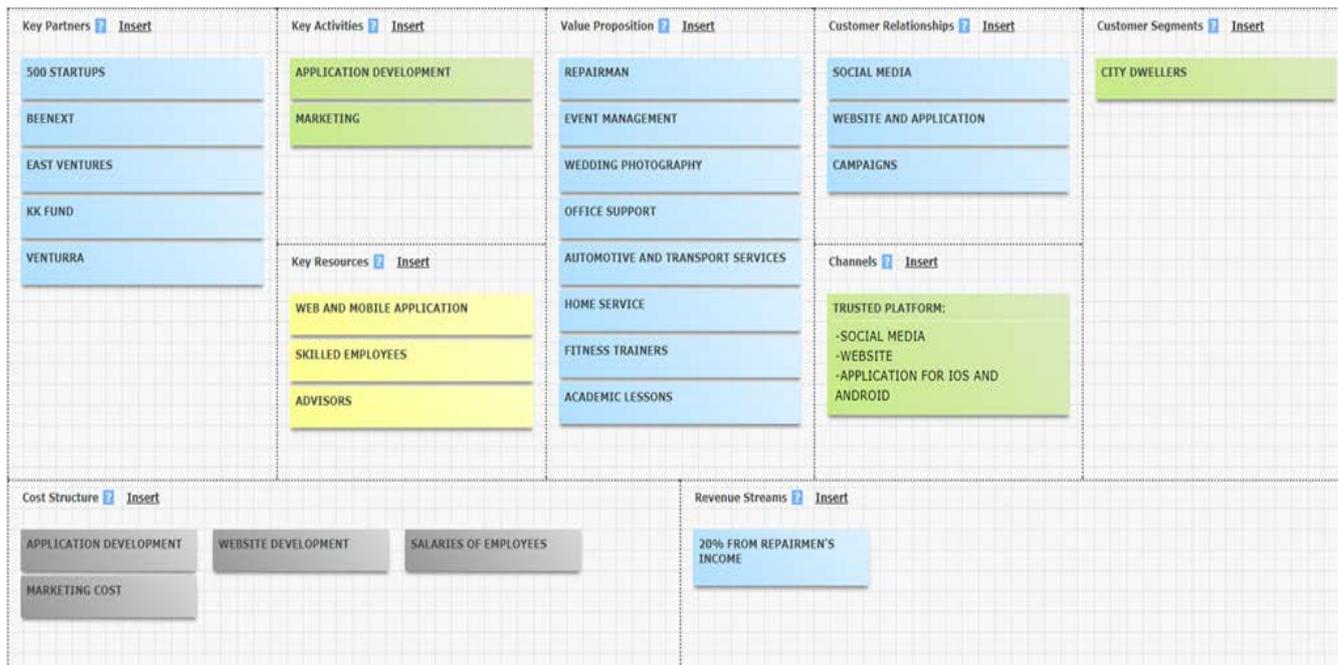


Figure 4: BMC of Page Advisor

Figure 4 shows the business model canvas of Page Advisor using the 9 building blocks of business model.

V. STRATEGY CANVAS



Figure 5: Strategy canvas

Figure 5 shows the strategy canvas that has been applied to create a new market space as well as to make the competition irrelevant between the current systems.

VI. ENVIRONMENT MAP

A. Key trends

According to Guillemain and Patrick (2015), the number of Internet-connected devices surpassed the number of human beings on the planet in 2011, and by 2020, Internet-connected devices are expected to number between 26 billion and 50 billion. For every Internet-connected PC or handset, there will be 5–10 other types of devices sold with native Internet connectivity. Therefore, With the emergence of IoT devices, we will have growing varieties of devices to be worried about and the need for a unified repair-service will arise in no time. On the other hand, according to Frost and Sullivan (2015), “Malaysia to have 125 million connected devices in 2025 with over 58 million mobile subscribers. Ninety-five percent of all Netizens, or internet users, will be active social network users, presenting a huge potential for digital marketing and e-commerce” (p.10); which tells us why reaching to the customers via online is more reasonable. Thus, we can harness the trends we mentioned above and ‘harnessing the trends’ is the second lense of the 4 lenses of innovation.

B. Market forces

A square-trade study shows that nearly 1 out of every 3 laptops fails in a 3-years’ time duration. The malfunction rate alone exceeds 20% at the 3-year mark. There is also a notable acceleration of malfunctions in the second and third years. While fewer than 5% of laptops failed from malfunctions in the first year, an additional 8% fail in each subsequent year. Accidents cause a further 11% of laptops to break over 3 years, making the total failure rate nearly one-third of all units. Generally, consumer laptops are sold with a 3-year warranty period. Therefore, one out of every 3 laptops will require repairing servicing that will not be covered by warranties. According to the Square Trade Survey (2009), the scenario with other electronic devices is not that different. We also need to know customer’s needs in order to give better service. From the statistics, we can understand the demand but we need to know more about customers by doing surveys and getting feedback. We need to learn to live inside the customer’s skin. A few years ago, IBM ran a great ad with the headline, “Stop selling what you have. Start selling what they need.” Understanding needs is the 4th lense of innovation.

C. Macroeconomic forces

The device repairing industry is growing rapidly although it is still in its infant stages. For example, more than two-thirds of smartphone repair shop owners entered the market less than two years ago, most of them have no previous experience specific to the industry. Additionally, most of these repair shops are “one-man shows,” and more than three-quarters have fewer than five employees. This indicates it is relatively easy to enter the smartphone repair industry at this point.

*D. Industry forces*

Device repairing industry has always depended on small local businesses when it comes to products that do not have warranty anymore. There is currently no platform which connects device repairmen and device owners effectively in Malaysia. Thus, TechTasker will not face any direct competitor initially. The domain of electronic device makes TechTasker different from other similar home service platforms.

VII. INITIAL BUSINESS MODEL CANVAS

Business Model Canvas is a strategic management and lean start-up template for developing new or documenting existing business models consisting of 9 building blocks of a business model. (Osterwalder et al. n.d.)

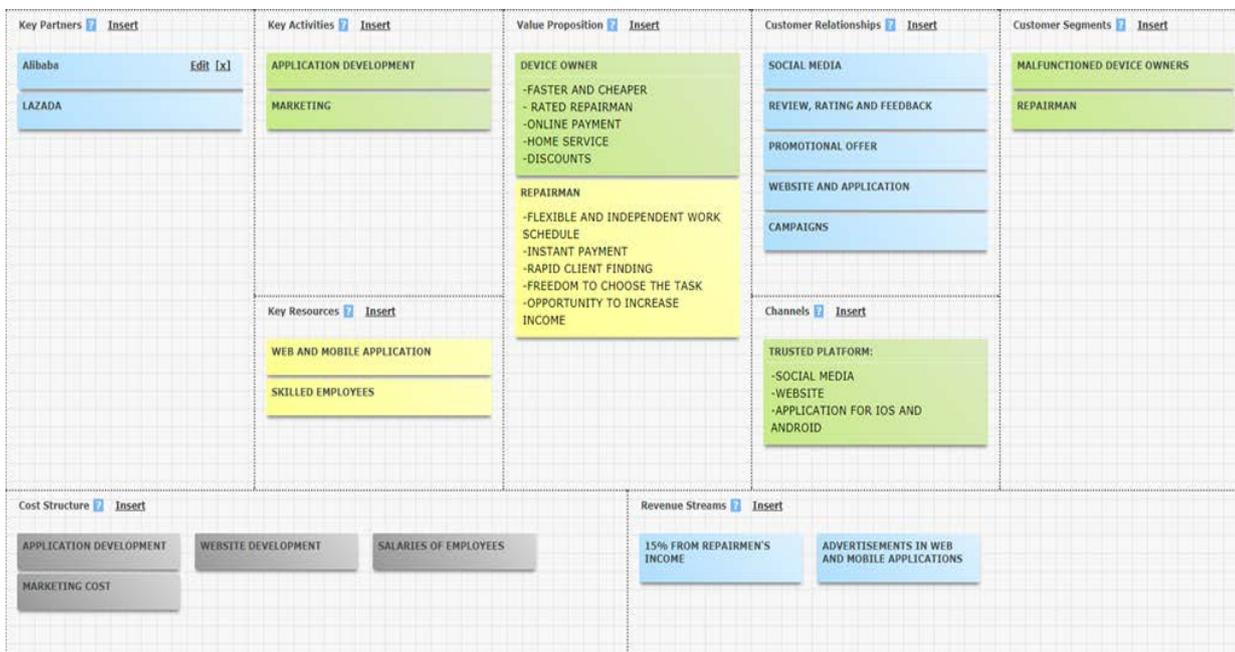


Figure 5: Initial

business model canvas

VIII. INITIAL VALUE PROPOSITION DIAGRAM

The value proposition canvas which consists of value map and customer profile has been created. This canvas is created after systematic analysis of customer’s needs and problem. value proposition canvas helps to visualize the business plan and identify business risk early in the planning phase. Such models are useful to describe how the products and services create value to the customers.

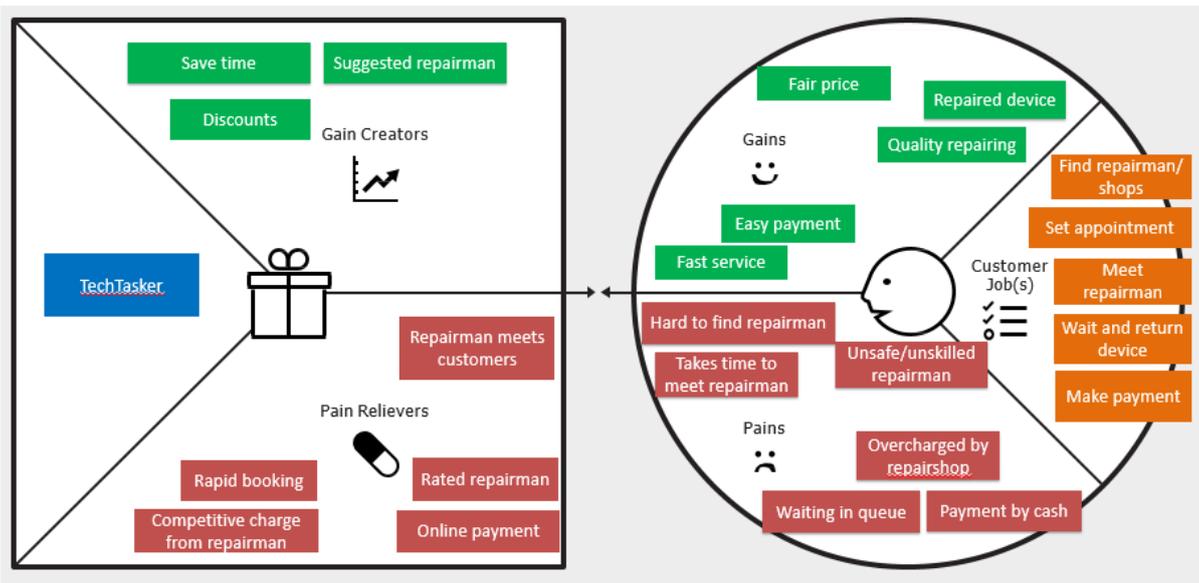


Figure 6: Initial value proposition diagram for client

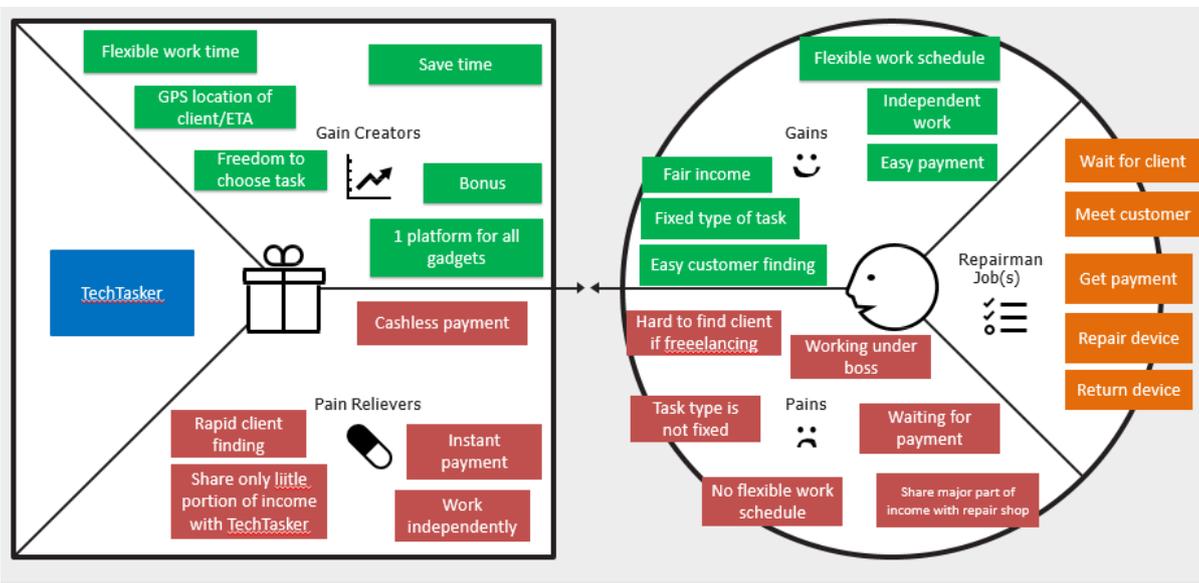


Figure 7: Initial value proposition diagram for repairman

### IX. VALIDATION OF INITIAL BUSINESS MODEL

We have conducted an online survey and interview to validate and refine our business plan. Here we have visually represented the online survey (conducted through google forms) and interview results. According to the survey report below, we can see that 76.4% people who usually visited repair shops to fix their devices. The rest of them are repairmen.

## What is your preferred method to fix a malfunctioned gadget?

55 responses

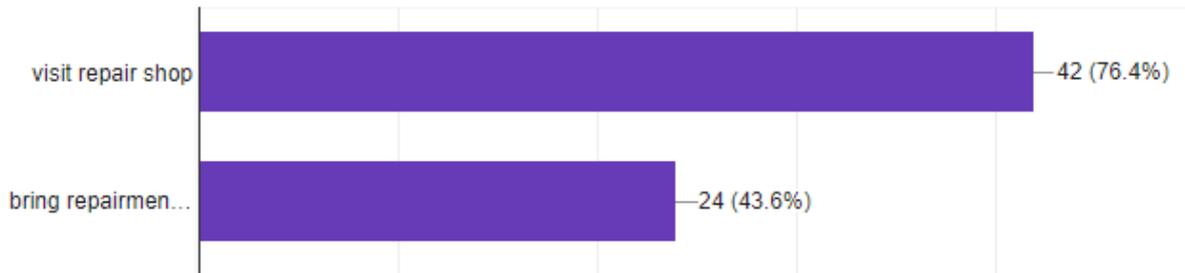


Figure 8: Preferred method of respondents to fix a device

Moreover, we also can see that among 55 people who completed the survey, 46 of them said that they usually fix their smartphone among their electronic devices. Which means percentage is 83.6% which is the highest in the graph. The percentage of repairing laptop is quite similar to repairing smartphone which is 74.5%. By this graph, we understand the demand of repair shop among public.

## What kind of Problems you have faced ?

55 responses

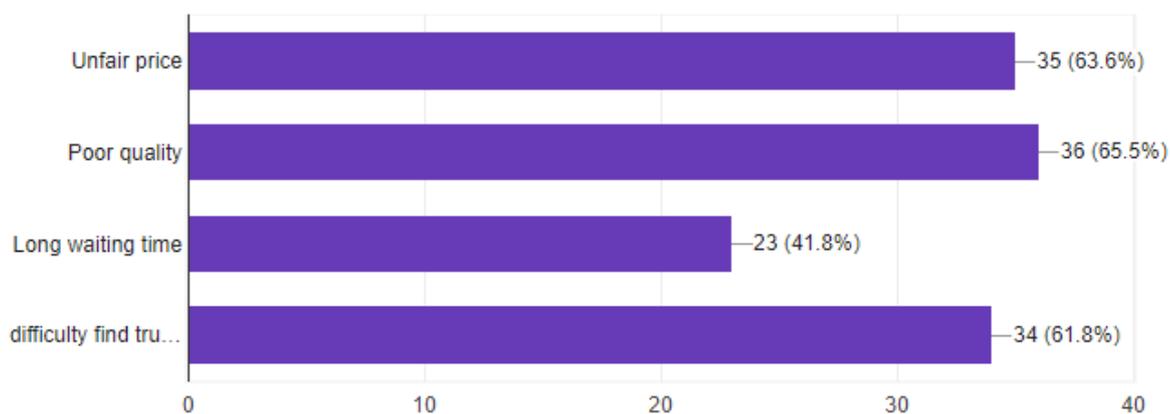


Figure 9: Kinds of problems faced by respondents.

### What kind of malfunctioned gadget you have repaired ?

55 responses

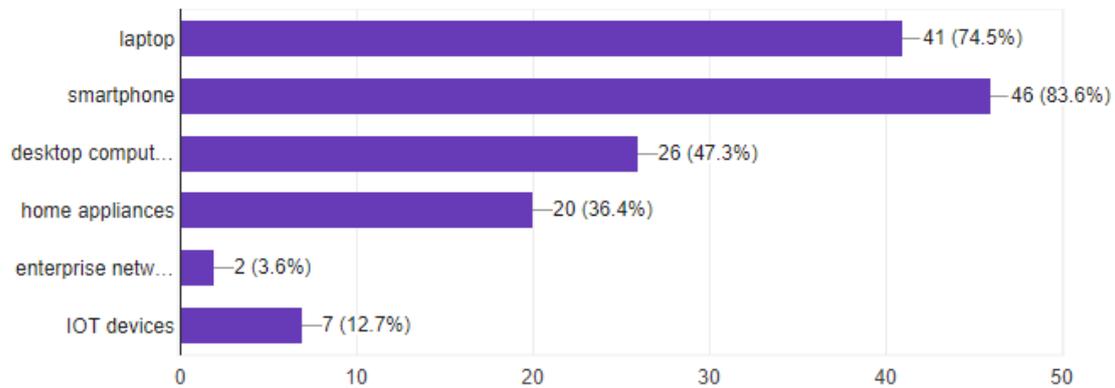


Figure 10: Kinds of gadgets respondents got repaired.

From this graph, we can see the pain people felt when they repaired their devices. Poor quality and unfair service is the most faced problem among the customers. The percentage of feeling these problems are 65.5% and 63.6% accordingly. Again, there are more problems which are felt by customers are long waiting time to get the device repaired in the graph below we can know about people’s demand about what they want in our app. The highest selected feature is review, rate, and feedback. On the second position, there is an option for online payment to make things is easier.

### What features do you want in techtasker ?

55 responses

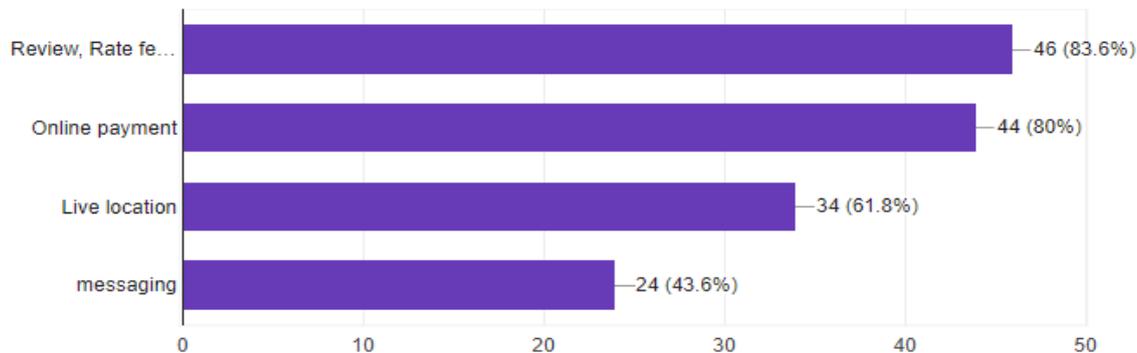


Figure 11: Kinds of features respondents wants.

In the graph below we can know about people’s demand about what they want in our app. The highest selected feature is review, rate, and feedback. On the second position, there is an option for online payment to make things is easier. They also want chat system to communicate easily with the repairman.

## Have you ever used any home service application before ?

55 responses

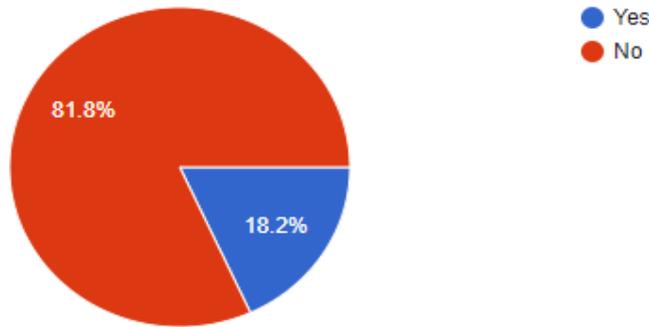


Figure 11: Experience of using home service application of respondents.

We can see that people who didn't use home service application before are above 80%. So, we have good opportunity to make our app a successful project.

### X. CONCEPTUAL SOLUTION

#### ENHANCEMENT BUSINESS MODEL CANVAS

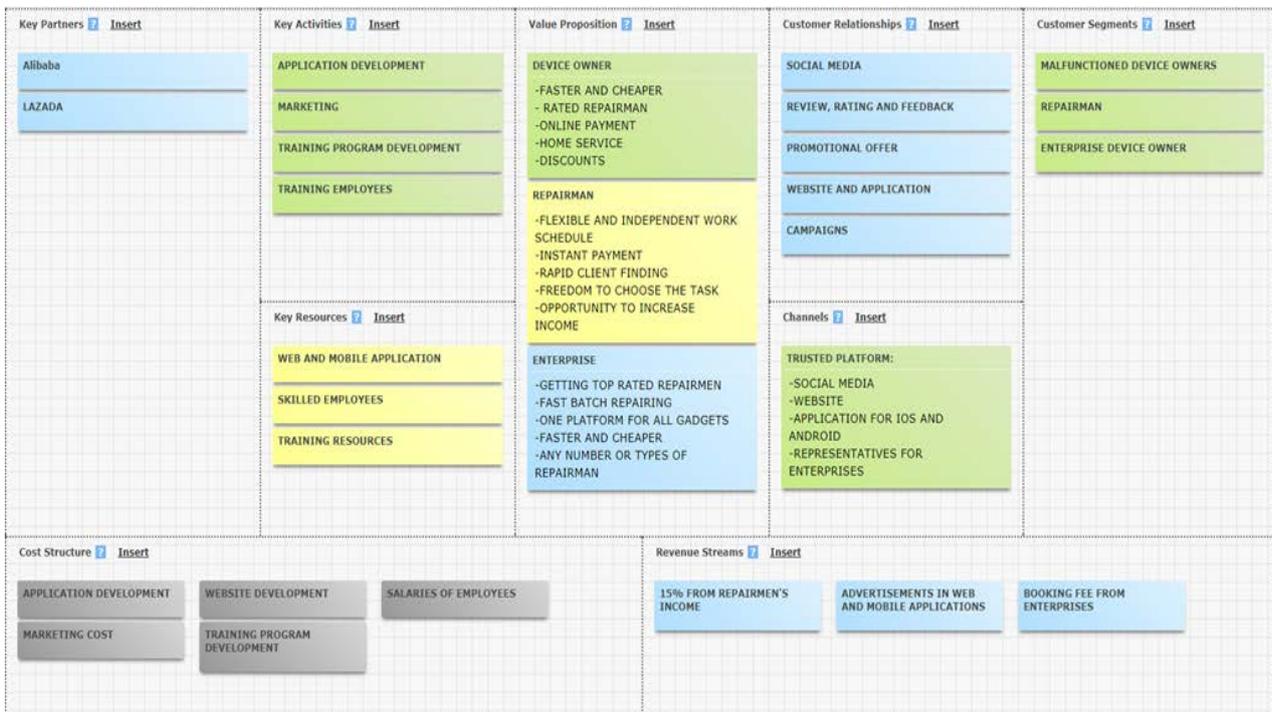


Figure 12: Enhanced business model canvas

**A. Customer Segment:** As in Figure 12, TechTasker adds device owners from enterprises. So, batch repairing can be done by top-rated repairmen in TechTasker's network. Key customer segments are now device owners, the person who repairs, device owner from enterprises.

**B. Value Proposition:** As we add enterprise device owner in the customer segments, here the new entry is that the enterprises can now get the top repairmen from TechTasker to get their batch repairing done.

**C. Channels:** The Five types of channels phases

1. Awareness- Advertising ( Social Media, Website, etc.)
2. Evaluation-Surveys, Reviews on the mobile applications and website
3. Payment- Online payment, hand cash.
4. Delivery- Home delivery
5. After sales- Customer representatives, customer assistance.

**D. Customer Relationship:** Customer relationship maintenance will be basically done by the social media, website and mobile applications. We will also provide loyalty discount for the customers.

**E. Key Resources:** Our key resources are our web and mobile applications developer, our Administrators and the Advisors. We have also plan to recruit repairmen of our own. It will also help people who have any job.

**F. Key Activities:** Key activities are also one of the vital blocks for a company to run successfully. TechTasker will develop web and mobile application for the core business activities and it will be updated time to time to enhance its ability. Marketing, business and partnership development will also be necessary for mass and in targeted enterprise sectors.

**G. Key Partners:** Our key partners will be electrical part-supplier businesses: Alibaba and Lazada.com.my

**H. Cost Structure** Cost structure explains the cost that must be spent by the company in order to maintain the business. For TechTasker, the main costs will be on developing and maintaining the web and mobile applications. We will have to pay our developers, permanent employees and company advisors too.

**I. Revenue stream:** We will generate revenue from booking fees from repairmen, Ads and repairmen booking fees from enterprises.

ENHANCEMENT VALUE PROPOSITION CANVAS

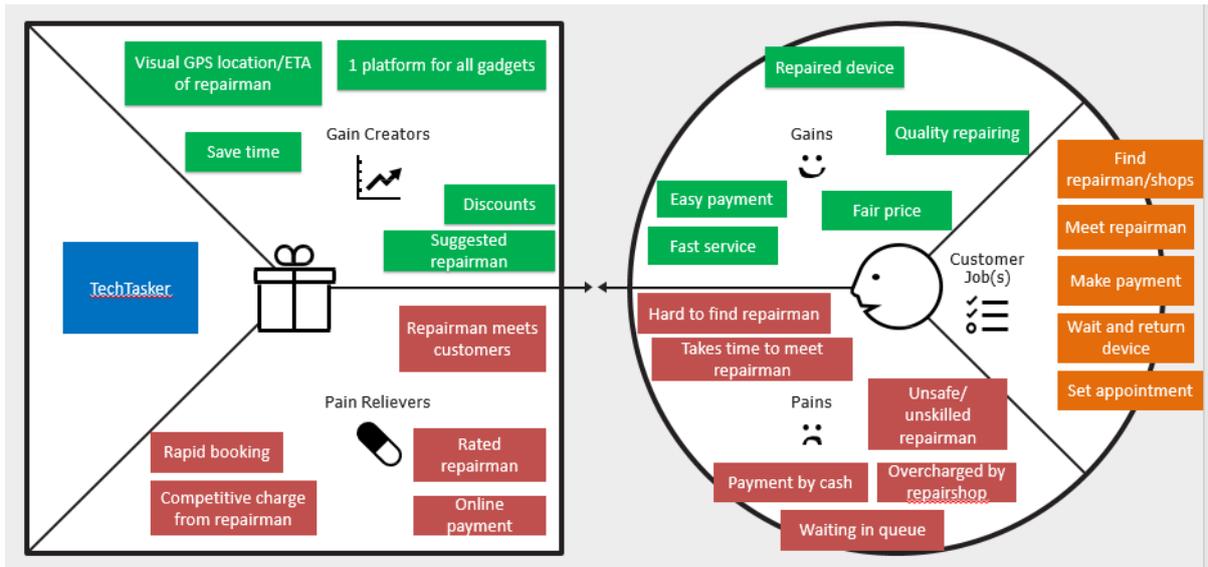


Figure 14: enhanced value proposition diagram for client

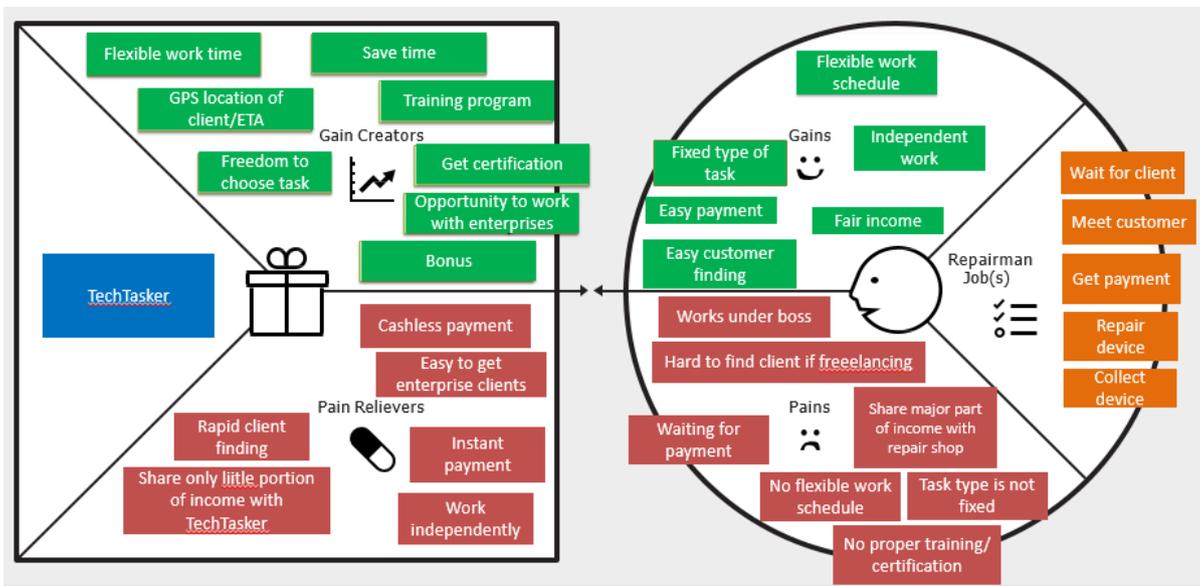


Figure 13: enhanced value proposition diagram for repairman

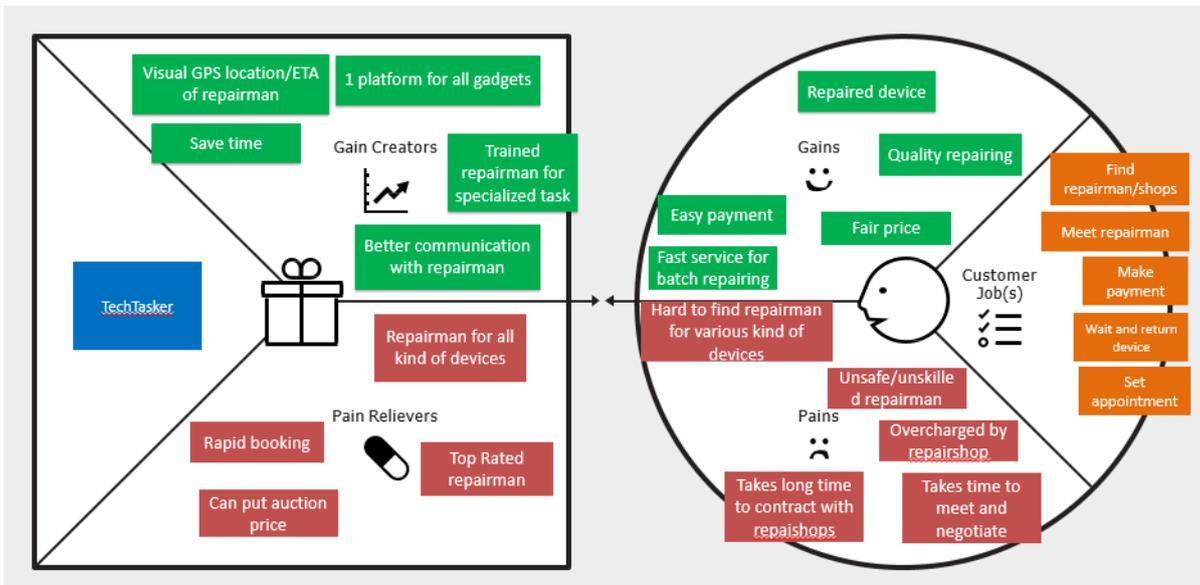


Figure 15: enhanced value proposition diagram for enterprise client

**Product Key Features:**

1. Visual GPS location
2. Online payment
3. Flexible work schedule
4. Portal to develop the communication between customer and repairman
5. Ratings and feedback system

XI. CONCLUSION & FUTURE WORKS

To conclude, this conceptual solution can provide good opportunities to part-time freelance repairmen to earn money online as well as help the malfunctioned device owners to find quality repairmen anytime, anywhere in Malaysia. This may also help to decrease the number of jobless people in the country. As businesses and services are going online, customers are looking for services online more than ever before, platforms like TechTasker will have the opportunity to lead the device repairing industry to adopt business models like C2C(Consumer to Consumer). In future, we have the plan to buy malfunctioned devices, repair them and sell them back to the market. We are also planning to build a E-waste management system with the help of our customer network. Such E-waste management system will help to achieve better profit while making the business more sustainable.

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# *Kampung Dolly* towards Sustainable Senior Housing

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**Abstract-** Tourism is one of the world's fastest growing sectors and is a major source of income for many countries. While tourism development in a sphere of urban housing renewal is necessary through a sustainability concept approach because it becomes a way to minimize the existence of problems that can re-emerged in the post of urban housing renewal. Traditional settlements in Indonesia that also be called as Kampung are potential to be developed into one of many tourism destinations. One of them is Dolly Kampung, which once was a prostitution or red light area that established since 1960's and being the largest prostitution in South East Asia. Because of prostitution business is contrary to the prevailing norms in Indonesia, prostitution activity in Dolly kampung is closed by the City Government in June 2014. But after the closement of the prostitution activity in Dolly kampung, there are a big decline in the amount of residents' income. Prostitution activity which was being the central economic activity for residents was dismissed, so the residents suffer from the significant income degradation because the majority of economic activities there depend on prostitution activity. Several government programs were established there to lift up the Dolly kampung's economic, such as micro enterprises business like batik production, shoes production, and also food production that engage the local residents but it doesn't effectively work to replace economic activity like prostitution business ever did. One alternative to develop Dolly's kampung is to build Senior Housing area. This is because of several reasons, for environmental reason, Dolly Senior Housing can accomodate the reused existing brothel building that have abandoned because of the closement of Dolly's prostitution activity. With several physical improvement, ex brothel building can be improved to be a more decent function as senior housing. For social reason, Dolly's senior housing can lift up new positive image of Dolly's kampung, and also accomodate the abandoned elders all around Surabaya and being one of thematic kampung in Surabaya. While for economic reason, Dolly senior housing can be a generator of new economic existed there that can empower elder people who live there, and also engage other newcomer to generate new business there such as health care economy).

**Index Terms-** Dolly Kampung, Elevated Pedestrian Way, Senior Housing, Sustainable Tourism Development

## I. INTRODUCTION

Tourism is one of the world's fastest growing sectors and is a major source of income for many countries. Being a people-oriented industry, tourism also provides many jobs which have helped revitalise local economies. At local scale, tourism can generate economic growth and population change (Getz, 1986; Ghali, 1976; Gill & Williams, 1994; Smith, 1977). Tourism

development should be directed in line with the principles of sustainable development, highlighting ecology (environment), human (social and cultural), and prosperity (economic) aspects (UN-HABITAT, 2012). While tourism development in a sphere of urban renewal is necessary through a sustainability concept approach because its becomes a way to minimize the existence of problems that can re-emerged in the post of urban renewal.

The commitment of urban and housing development is currently in the spotlight of the world, one of them is with the "New Urban Agenda" summit which held by UN Habitat in 2015. In the conference, there is also a discussion about improving the quality of urban environment and urban economy through sustainable tourism. Where sustainable tourism can be one of the efforts to support the development of urban economy and maintain the sustainability of sustainable development. These efforts can be supported by other additional sectors such as technology, research and innovation, creative industries, cultural conservation, artistic performances and conservation of cultural heritage buildings (New Urban Agenda 2015: article 60).

Traditional settlements in Indonesia that also be called as Kampung are potential to be developed into one of many tourism destinations. It can be said that Kampung is a cultural root of typical informal settlements, in which the residents have various backgrounds and socio-economic status, yet able to survive along with the progress of a city. Even in critical or unfavorable situations, societies living in kampung got their own process to resolve the problem with all their limitedness (Kusyala, 2008). In Indonesia especially Surabaya City, Kampung are being preserved and maintained by the local residents and City Municipal because its contain many cultural heritage and identity of the City itself. One of them is Dolly Kampung, which once was a prostitution or red light area that was established since 1960's and being the largest prostitution area in South East Asia. Even supposedly it can be said that the velocity of money in Dolly can reach 1.2 Billion Rupiah per day that earned from the business of prostitution, drugs, alcohol, gambling, karaoke or other supporting business, such as selling food drinks, parking, laundry and so on. (Basri, 2017)

However, this prostitution business is contrary to the prevailing norms in Indonesia which prohibits prostitution localization. Because of this reason, prostitution activity in Dolly kampung was closed by the City Government in June 2014. Of course it is not an easy job for Surabaya City Government to be able to close the prostitution in Dolly Kampung that have been the largest center of prostitution activities in Southeast Asia. Many efforts had been carried out, such as several cooperation with various elements of society and also developing public awareness of the importance for the closement of Dolly localization. All of these efforts were done in order to gather support from various parties,

including raised sounds of commercial sex workers who have been fostered so far, for many of them who actually became commercial sex workers because of compulsion. Closing Dolly is based on Regulation Letter of East Java Governor Number 460/16474/031/2010 on Prostitution Prevention and Control and Trafficking in Women is explained that closing the localization should be done gradually (Basri, 2017).

After the closement of the prostitution activity in Dolly kampung, there are a big decline in the amount of residents income. Prostitution activity which once was being the central economic activity for residents was dismissed, so the residents suffer from the significant degradation of income because the majority of economic activities there were related to prostitution activity. Several government program was established there, such as micro enterprises business like Batik production, shoes production, and also snack production that engage the local residents but it could not replace the great profit like it was ever achieved from the prostitution business before. Its because the bad image of ex prostitution Dolly Kampung still there and its prevents the development of socio economic of the kampung and the residents.

Therefore, another business activity that already developed there didn't effectively work to replace economic activity like prostitution business did. The most crucial thing is the community doesn't have strong sense of belonging because the majority of them are newcomers (not local people) who came to Dolly years ago to join prostitution business activity for the economic purpose. Also, the trend of local people there is aging population that doesn't really productive anymore. So the main concept to effectively develop Dolly is to change its image into something more positive, then to generate business activity that also engage newcomers and local people.

One alternative to develop Dolly's kampung is to build Senior Housing area. This is because of several reasons, including environmental, socio-cultural, and economic reason. For environmental reason, Dolly Senior Housing can accomodate the reused existing brothel building that have abandoned because of the closement of Dolly's prostitution activity. With several physical improvement, ex brothel building can be improved to be a more decent function as senior housing. For social reason, Dolly's senior housing can lift up new positive image of Dolly's kampung, and also accomodate the abandoned elders all around Surabaya and being one of thematic kampung in Surabaya. While for economic reason, Dolly senior housing can be a generator of new economic existed there that can empower elder people who live there, and also engage other newcomers to generate new business there (health care economy).

## II. LITERATURE STUDY

### *Kampung*

Kampung is a general urban settlement in Indonesia that has its own uniqueness and characteristic (Funo et al, 2002).

Kampung / informal settlement leads to collection of homes of the city that is in poor condition, has limited public facilities, and the majority is occupied by low-income communities (Turner, 1972; Budiharjo 1992; Silas, 1998).

However, kampung conditions in Indonesia could not always be generalized as "slum" or "squatter", because each kampung has their own characteristics, different developmental processes, and attachment to the environment and its respective communities (Herbasuki, et al, 1984; Suchyo, 2010).

The people who live in the kampung bring their identity from their original village to the kampung. As a result, the kampung grows as a residential area that has a multi-dimensional community, ranging from social, cultural, and economic diversity. That is emphasized by Funo et al. (2002) where the kampung has a heterogeneous community and a complex population that usually still holds traditional values. In addition, Raharjo (2010) reveals that kampung shows a strong and urban prehistory relationship that can be traced back to pre colonial times. However, in the context of urban development, kampung sometimes have a negative image due to high density settlements whose infrastructure is still poor and dominated by low-income people (Funo et al 2002).

### *Urban Renewal Aspects*

The challenge that emerging the city, the state and the federal government now is how to renew and revitalise existing urban areas to both make the better use of underproductive land, and create a city that truly reflects the needs and demands of city residents and businesses. Utz Clayton (2014) suggests that basic aspects to be considered in urban renewal development are mentioned as follows:

1. The economic, social and cultural :
  - Site's quality
  - Accessibility
  - Proximity to existing infrastructure.
  - Public policy factors.
  - Local demand
  - Environmental consideration
2. Recognising the Historical and Social context :
  - Using the context to inform the vision, design and planning.
  - Capturing the uniqueness of the context.
  - Re-use historical building.
  - Balancing between:
    - What is already special about a site and embracing new ideas, new contexts and different ways of living.
    - The desire to preserve historic locations and buildings, and the need to satisfy commercial demands.
3. The Actors (Public, Private or Joint Partnership) :
  - Private sector involvement is favourable in situations where the public sector:
    - Seeks private sector innovation, capacity and expertise to deliver a project.
    - Requires private sector financing, either in whole or in part.

- Is looking to transfer responsibility for the design, construction or operation of a project or parts thereof.
- Wants to transfer project risks to private sector.
- From a private sector perspective, urban renewal allows private investors to gain access to prime development sites. For developers, the potential to reposition a site’s use from, for example, an aged industrial facility to a mix of retail, residential apartments and commercial spaces offer significant opportunities to realise an increase in land values.

**Housing for Aging**

The population of the city, sooner or later, will certainly aging. But the fact is the majority of senior housing was built by developers that were not really pay attention to the needs of users. This can because of the designers were not the ones who will be living there and do not consider elder’s perspective about the way they interact with the environment (Idelkope, 2012).

Recognizing senior housing that has been evolved over the years, it surely provide some framework that has been created. Building design for the handicap and aged persons, barrier free design and designing for accessibility as well as providing different types of housing such as independent and assisted living, nursing homes, family homes, veteran’s homes, and adult daycare all should take into account the services that aging persons need (Idelkope, 2012).

Future design for senior housing should focus more on the psychological stresses problem of aging people, and should be able to find solutions for their physical disabilities and degradation. With design techniques such as biophilic architecture, mixed use and warmer materials, senior housing could be less formal, where elder people can feel like they are in new home. The purpose is senior housing design can be comfortable and supportive for their needs (Idelkope, 2012).

**Literature Study**

Here are some designs about elderly housing that exist in various countries. In one area, land use allocation in each country is different based on their needs (table 1).

**Table 1.** Case Study of Elderly Housing

Location	Land use Mapping	*
Stuttgart, Germany	Commercial District	Generationenhaus means built for people of different generations, with the idea of people aging in place and accomodating the aging population.
	Generationenhaus	
	Community Park and Church	
	Residential Neighborhood	

Location	Land use Mapping	*
Rotterdam, Netherlands	Residential Neighborhood	Plussenburgh is an example of combining two types of housing for the elderly which assisted living apartments where residents are able to go about their business privately and independently. However, if they need help with laundry, bathing, food preparation, etc, it is available through what they call the “back door”.
	Plussenburgh	
	Shopping Centre and Commercial District	
	Traffic Circle	
Amsterdam, Netherlands	Protected Open Space	Wazoco was dealing with a restricted zoning ordinance, which forced architect to cantilever eleven units rather than build upward.
	Wazoco	
	Residential Neighborhood	
Brattleboro, Vermont	Residential Neighborhood	Provides assisted living and short-term respite for seniors with diverse facilities.
	Public Park and Highway 91	
	Holton Home	
	Commercial/Industrial Shops	
Brattleboro, Vermont	Commercial/Industrial Area with some Restaurants	Provides assisted living, nursing home, dementia and sub-acute rehabilitation.
	Residential Neighborhood	
	Thompson House	
	Cemetery	
	Hospital	
Brattleboro, Vermont	Commercial/Industrial Area with some Restaurants	Provides nursing home, extended care rehabilitation, assisted living and dementia care.
	Residential Neighborhood	
	Hospital/Health Park	
	Pine Heights Assisted	

Location	Land use Mapping	*
	Living and Thompson House to the west	
	Community Park and Cemetery above	
Amherst, Massachusetts	Commercial/Industrial Area with some Restaurants	Provides assisted living and memory loss care.
	The Arbors Assisted Living	
	Health Centre	
	Recreational Fields	
Amherst, Massachusetts	Hampshire College	Provides amenities, large single and double occupancy units with a personal balcony or first floor patio with garden space.
	Commercial Farmland	
	Applewood Retirement Community	
	Open Space	

From the existing literature study, it was taken synthesis of literature study which will be used in Dolly Senior Housing, which are:

**Table 2.** Land Use Mapping of Literature Study

Land use Mapping	Stuttgart, Germany	Rotterdam, Netherlands	Amsterdam, Netherlands	Brattleboro, Vermont	Amherst,
Community Park and Church	v		v	v	v
Residential Neighborhood	v	v	v	v	v
Shopping Centre and Commercial District & Restaurant	v	v		v	v
Backdoor (laundry, bathing, food preparation, etc)		v		v	
Cemetery				v	
Health Care (Hospital, nursing home, rehabilitation, dementia care, etc)				v	v

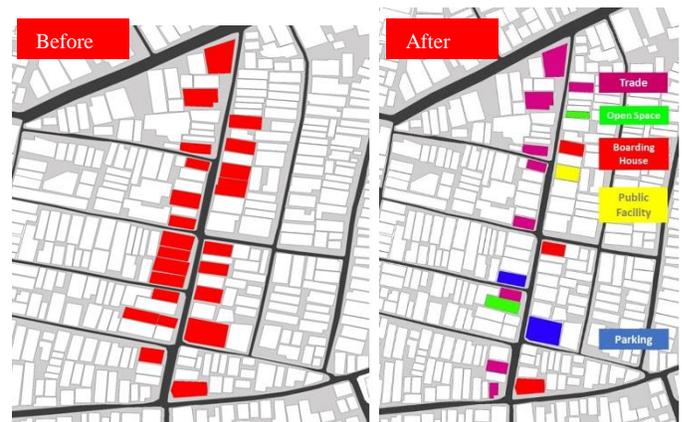
### III. GENERAL DESCRIPTION

Kampung Dolly is a former famous prostitution area, but the long history of this prostitution activity stops in 2014. Surabaya municipality insists to closing this prostitution activity with the basis of regional regulations that prohibit human trafficking and

bad social impacts for children around kampung dolly. This also considered not to be in accordance with the morality of Indonesian culture and religion. Kampung Dolly is located on Kupang Gunung Timur 1, Putat Jaya District Surabaya. The research area is located along the corridor of Kupang Gunung Timur 1 street which is the former core area of prostitution activity. Based on the observations, it can be obtained some potentials and problems of Kampung Dolly according to Utz Clayton (2014). Detailed explanations are presented as follows.

#### a) The Economic, Social and Cultural Aspects

As a former prostitution area, the area is filled with brothels buildings. The brothels building's shape are still the same with the condition before closing but they have changed and adapt their design and function. From the observation, after the closement of Dolly prostitution activity some ex-brothels buildings turned into boarding houses, open space area and coffee shops. BARBARA is the biggest brothel building in dolly prostitution area and was an icon of Dolly. After the closement of Dolly prostitution, BARBARA is taken over by the government and the building is under renovation into a community craft business which produces slippers, shoes and batik (traditional Indonesian fabric). Here is an identification of brothels buildings with 558 whores before Dolly prostitution still active and Dolly's condition now (after the closement of prostitution activity).



**Fig 1.** Site Before and After the Closing of Kampung Dolly (source: writer 2017)

This area is a dense residential area with poor environmental conditions. The lack of greenery area makes the high density of buildings more visible and looks like slums, in which plants are very rarely seen. As a greening counterpart in this area, the government has provided 2 green open spaces in the form of parks and fields (fig 2).

Narrow street conditions also add to the impression of density in this kampung because there are several vehicles parked on the street while the road is a two-way street, so it is not rarely to see congestion on this road especially during peak hours. This condition is absolutely not feasible to be offered as a tourism attraction.



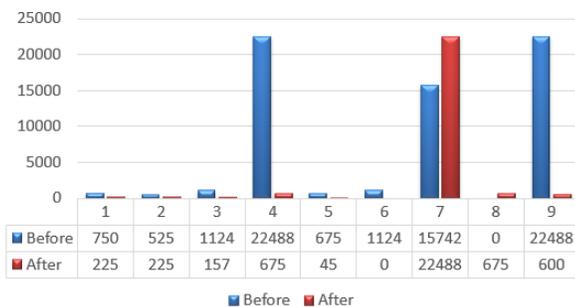
**Fig 2. Lack of Green Area in Kampung Dolly**  
(source: writer 2017)

While the economic condition of Dolly’s kampung after the closing of prostitution area, people lived there are suffer from the great declining of income amount. It is because the community business there was dependent on Dolly’s prostitution activity. Where the list of business in Dolly are mention as follow (fig 3 and 4):

Dependent Business Activity	Interdependent Business Activity
Parking Area	Sound System rental
Warkop (Coffee Shop & Food Stalls)	Billiard Board production
Grocery Shop	Eyeglass pocket
Brothel (Wisma)	Nirvana Cafe
Laundry	Shoes Laundry
	Shoes Factory

**Fig 3. List of Business Activity in Dolly**

While the comparison of omzet income per month before and after the closing of Dolly prostitution activity are mention below:



**Fig 4. Declining People Income Graphic in Dolly** (source: survey 2017)

**b) Recognising the Historical and Social Context**

Ex-brothels building that is not occupied, could be a potential assets in the formation of elderly settlements in this area. Some buildings are formed with a unique architecture that can be used as an object that attracts tourists. There are also murals in several spots in this kampung that content words of moral value as a sign that this area has been released from the activities of prostitution (fig 5 and 6)



**Fig 5. Ex-Borthel with Artistic Design**  
(source: writer 2017)



**Fig 6. Mural on the Wall of BARBARA**  
(source: writer 2017)

Kampung Dolly is a densely populated settlement with a majority of Javanese people. Before the dolly prostitution was closed, the people in this area were mixed between the natives and the migrants. The migrant population consists of prostitutes and business actors. We did not find any community association that empower the society independently. There are common activities such as regular social gathering for women, community service or recitation. After the closing of dolly prostitution, people only depend on the economic activity that the government has provide. But the fact is, the economic activities provided by the government do not attract much the locals and only able to run in a short time. The initiative of the community to manage its environment is severely lacking. They have little reference and education for the management of residential areas other than the prostitution area.

**c) The Actors (Public, Private or Joint Partnership)**

There is an intervention program from the government that is considered less optimal and does not attract local people to join and some people even judge the government's training programs are not effective. Government of Surabaya bought BARBARA building than used it as a training centre that producing slippers or shoes which gained profit around 2999 USD/month. So far only Surabaya city government who run its role as a public actor in Kampung Dolly. Cooperation with

private sector is seen from the efforts of Surabaya city government in finding customers to order shoes / slippers production in Kampung Dolly. This shows that this production has not been able to independently maintain their sustainability (fig 7).



**Fig 7.** Government Intervention

#### IV. RESULT AND DISCUSSION

##### a) Design Criteria

For the design concept of Dolly Senior Housing, the provision that should be there according to the literature study are :

1. Community park and church
2. Residential neighborhood
3. Shopping centre and commercial district & restaurant
4. Backdoor (laundry, bathing, food preparation, etc)
5. Cemetery
6. Health care (hospital, nursing home, rehabilitation, dementia care)

While for Dolly's kampung site, land use mapping is shown below (fig 8):



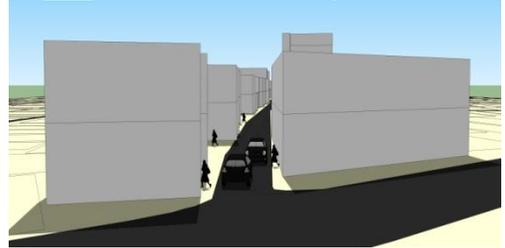
**Fig 8.** Proposal for the Dolly's Site

##### b) Design Concept

For the design concept, there will be several development phase of Dolly Senior Housing, which are:

##### 1. Dolly Site Now

Here is the existing of Dolly kampung now, that mostly have two floor building and functioned as ex brothel housing (fig 9):



**Fig 9.** Doly's Existing Site

##### 2. Greening the Dolly's Area

Because one problem that exist there is the lack of greenery area, the first phase development of Dolly Kampung is greening the existing kampung (fig 10).



**Fig 10.** Greening the Dolly's Area

### 3. Build a Ramp for Vertical Circulation due to Elderly Importance

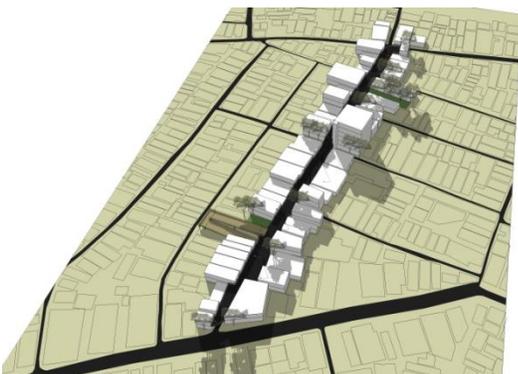
Because mostly buildings in Dolly's kampung have two floors, there should be vertical circulation for elderly there. This vertical circulation is ramp that proposed to be build beside the existing field (fig 11).



**Fig 11.** Proposal for the Ramp

### 4. Build an Elevated Pedestrian Way in the Second Level

Elevated pedestrian way proposed to be built in the Dolly's kampung to make it easier for elders to access the second floor of senior housing. Beside that, it has another purpose such as being social space, commercial space for street vendors, and even tourism space for outsiders who want to visit Dolly kampung (fig 12).



**Fig 12.** Proposal for the Elevated Pedestrian Way

### 5. Build Street Components (Lamp, Bench, Rubbish, etc) and Greening the Second Level Street (Elevated Pedestrian Way)

To make it convenient to users, elevated pedestrian should be planted with some greenery trees that can shade the elevated pedestrian way (fig 13).



**Fig 13.** Proposal for the Street Component and Greening the Second Level Street

### 6. Build additional second floor on the building that still have one floor level

To make some more space, in the final phase will be built additional second floor on the buildings that still have one floor level. It can be functioned as additional senior housing room or another supporting facilities (fig 14).



**Fig 14.** Build Additional Second Floor



Fig 15. Build Additional Second Floor



Fig 16. Elevated Pedestrian Way Design before the additional second floor (above), and after the additional second floor (below)

### 7. Elevated Pedestrian Way Design

In elevated pedestrian way, there are some direct connection to the second floor of senior housing, so that will make it easier to elder people to access the second floor even with wheelchair (fig 17)



Fig 17. Elevated Pedestrian Way Design with Direct Connection to the Second Floor of Residential Neighborhood

Beside ramp, there is also existing lift in ex Barbara's building that can be utilized to be the vertical circulation into the elevated pedestrian way.



Fig 18. Elevated Pedestrian Way Design with Lift that Located in ex Barbara Building

## V. CONCLUSION

Dolly kampung towards sustainable Senior Housing area can become one of thematic kampung in Surabaya. This development is because of several reasons, including environmental, socio-cultural, and economic reasons. For environmental reason, Dolly Senior Housing concept can accommodate to reuse the existing brothel building that have many rooms. Ex brothel building now become abandoned because of the closement of Dolly's prostitution activity. With several physical improvement, ex brothel building can be improved to be a decent senior housing's rooms. For social reason, Dolly's senior housing can lift up new positive image of Dolly's kampung, and also accommodate the abandoned elders all around Surabaya and being one of thematic kampung in the city. While for economic reason, Dolly senior housing can be a generator of new economic there that able to empower elder people who live there, and also engage other newcomers to generate new business there (care economy).

## ACKNOWLEDGMENT

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# Land Settlement Arrangement Based on Sustainable Approach (Case Study: Bhaskara Jaya Housing, Surabaya, Indonesia)

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## Abstract-

There are several land issues in Bhaskara Jaya Housing when it viewed from the sustainable housing development theory, such as environmental, social, cultural, and economic aspects. However this paper concerns fully on the land efficiency which focuses on the environmental aspects. From the environmental aspect, the problems that occur in Bhaskara Housing are flood, lack of green open space and the accessibility problems include access to housing provisions and traffic inside the housing area. Therefore, this study provides recommendations for handling floods in terms of land use, the addition of green open space, the arrangement of trade facilities inside the housing area, and the application of Green and Clean Program in this housing area. The research method is by direct field observation and in depth interview with the residents.

**Keywords :** land, green and clean, site plan

## I. INTRODUCTION

The micro growth of cities in Indonesia gives a positive correlation to the fulfillment of the needs of various facilities, especially for residence in a good neighborhood and healthy areas. Today the problem of urban settlement is not only the limited land but also the settlement arrangement (Fatimah, 2017).

Structuring the Environment/Area is an attempt to repair, change, and reorganize certain environments in accordance with the principle of efficient utilization of space. The existence of a decline in the function of an environment, so that it can not operate optimally to restore the function needs, to be done arrangement. In addition, improving the quality of the housing and economic environment also needs involvement of the potential local community, so that it could become a major force in development (Marwati, 2008).

From the main function of the house as a place to live, according to Silas (1998) a good settlement and arranged will be created if it meets the ideal criteria for physical and non physical aspects. Physical aspects include geographical location, natural environment, and guidance; while non-physical aspects include social, economic, cultural, and psychological (sense of security, pleasure, peace and hope). This theory became one of the factor-makers, which influenced the concept of settlement development, from the physical and non-physical aspects. And according to Lee (2003), urban renewal implementation is necessary to be conducted through a sustainability concept approach that becomes a way to minimize the existence of problems that can be re-emerged in the post of urban renewal.

Undang-undang No. 1 Tahun 2011 (Law about Housing and Settlement in Indonesia) explains that the settlement is a part of a housing unit that has infrastructure, facilities, public utilities,

and other supporting functions of urban areas. The development of settlements need to consider the natural physical conditions and normative policy rules to be applied.

## II. THEORITICAL FRAMEWORK

### II.1. The Basic Requirements or Provisions for a Settlement

SNI 03-1733-2004 regulates the procedures for planning the urban housing environment that contains a detailed description of the principles of urban housing planning. SNI 03-1733-2004 states that the residential area consists of at least 50% of land use composition for settlements, of which 25% for road network, and 25% for public and commercial facilities.

Every guideline in the standard is a matter of concern in the fulfillment of public facilities and infrastructure in a settlement so that the settlements that are formed have a good quality and physically is feasible and inhabitable.

**Table 1.** SNI standart for the provision of housing and settlement

No	Provisions	Service Coverage (person)	Minimum Standart	
			Radius	Location Criteria
1	Education Facility	1250	500 m <sup>2</sup>	Based on district area
2	Health Facility	2500	1000 m <sup>2</sup>	Based on sub-district are
3	Religious Facility	2500	1000 m <sup>2</sup>	Based on Neighbourhood
4	Trade Facility	250	300 m <sup>2</sup>	Based on Neighbourhood
5	Social Facility	250	100 m <sup>2</sup>	Based on Neighbourhood

While the basic requirements or provisions that are good for a settlement (Nasrullah, 2014), are:

1. The location is not distracted by other activities such as factories, which generally could have an impact on air pollution or other environmental pollution.
2. Having access to the center services such as education, health, trade, and others
3. Having a drainage facility, which can drain rainwater quickly and does not lead to a puddle of water even though heavy rains
4. Has the water supply, in the form of a distribution network that is ready to be distributed to each house.
5. Equipped with septic tanks and seepage field for dirty water / faeces that can be made in individual or communal system.

6. The settlements must be served by waste disposal facilities on a regular basis in order to keep a comfortable residential environment
7. Equipped with common facilities such as a children's playground, courts or parks, places of worship, education and health in accordance with the magnitude of settlements scale.
8. It is served by electricity and telephone networks.

## II.2. Site Planning

The objective of the site-planning in the planning-design of residential areas (Prawirto, 2012):

1. the purpose aspects of the use / function,
2. the purpose of structural and engineering aspect, and
3. the purpose of the aesthetic aspect / beauty in a residential area

## III. GENERAL DESCRIPTION

Bhaskara Jaya Housing is included in one of the residential areas in East Surabaya with middle and upper income class. Located in a strategic location as it is adjacent to the education and service trade area, thus enabling population density and housing density in this residential area. Bhaskara Jaya Housing is located in Mulyosari sub-district of 10.5 hectares consists of Bhaskara Jaya 1 to Bhaskara Jaya 5. In the local planning document, this area is planned as a meaningful settlement area based on field observation that there is no deviation of land use.

### III.1. Identify the Accessibility Flow of Bhaskara Jaya Housing

For the accessibility Bhaskara jaya housing, in the morning until the afternoon enacted the entrance rules using the southern gate and the exit is in the northern gate. For this case, two security guards are employed in order to keep each gate. Access flow can be seen in the picture below.

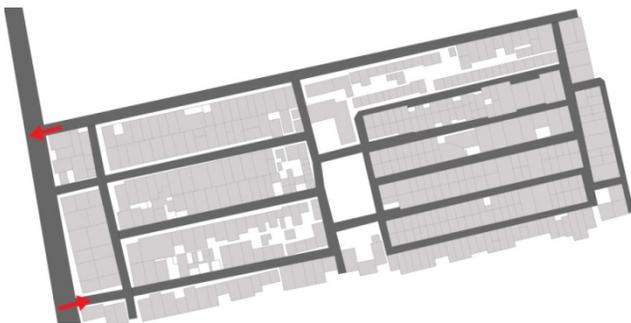


Figure 1. Access to the Housing Area in the morning till evening  
(source: survey, 2017)

The enforcement of this access has just been in effect since January 2017, which is intended to cope with congestion that occurs in the morning until noon due to public and private elementary schools in the housing area. However, the opinion of the community itself is less amenable to the existence of this new regulation due to ineffective access if through the southern

- Because it involves the process of changing site environmental (land) in a residential. There are two important aspects to be taken into consideration of the site splanning activity.
  1. The natural or ecological (environmental) aspect that is physical. And the second,
  2. The socio-cultural aspects that are non-physical. Natural or ecological aspects are aspects of the consideration that is used to predict the environmental conditions of the site (the land) to be used for the purposes of human life. While the socio-cultural aspects are non-physical aspects that are considered in site planning. But this study is focused on land efficiency which considers only the physical aspect.

entrance, because the preferred access to entry is the middle gate which is not opened in the morning until noon.

But unlike in the daytime, access in and out in the night time is only through one gate that is the middle gate this is due to limited security resources (security guards) and streamline security at night. Illustration of access at night can be seen in the following picture.



Figure 2. Access to the Housing Area in the night  
(source: survey, 2017)

### III.2. Identification of Flood Problem

There are significant environmental problems in this housing estate, namely the problem of flooding and puddles that always occur when the rainy season arrives. This because this residential area has proximity to the beach, so the soil level is relatively low and often gets floods water from other higher areas. In addition, poor drainage due to the closed access of darinases in front of residents' houses and the indication of siltation ditches also causing seasonal flooding in this housing area.



Figure 3. Flood in Bhaskara Jaya Housing Area  
(Source : Survey, December 2017)

Like in the picture above, flood problem is quite serious issues in this housing area. Therefore, we identified area that are flooded and not flooded, so with this sign it can be analyzed the required slope level of bhaskara jaya housing.

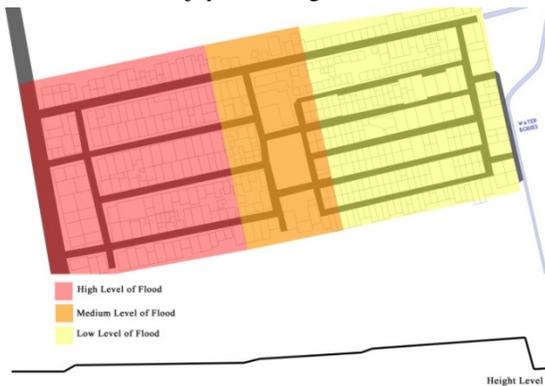


Figure 4. Flood Level of Bhaskara Housing Area (Source : Survey, 2017)

### III.3. Lack of Thematic Green Open Spaces

Another environmental problem is the lack of green open space, where the existing green open land is a field located in the middle of the Bhaskara Jaya housing site. The field is functioned as an open area for playing soccer and other social activities. In this housing there is no thematic green open space that are processed for the needs of the community, such as elderly park or playground for children.



Figure 5. green open space existing (Source: survey, 2017)

### III.4. Identification of Public Facilities of Bhaskara Jaya Housing

In Bhaskara Jaya housing there are public facilities that are not only used by residents in housing but also residents outside the housing. This results in overcrowding of car and motorcycle in Bhaskara Jaya housing at certain hours that resulting in traffic jams. The public facilities include: two primary schools in Bhaskara Jaya housing opposite the Square. The density of vehicles (cars and motorcycles) in the hours of entry and school home comes from this school, and it also resulted in street vendors popping up around the field intended for introduction or pickup.

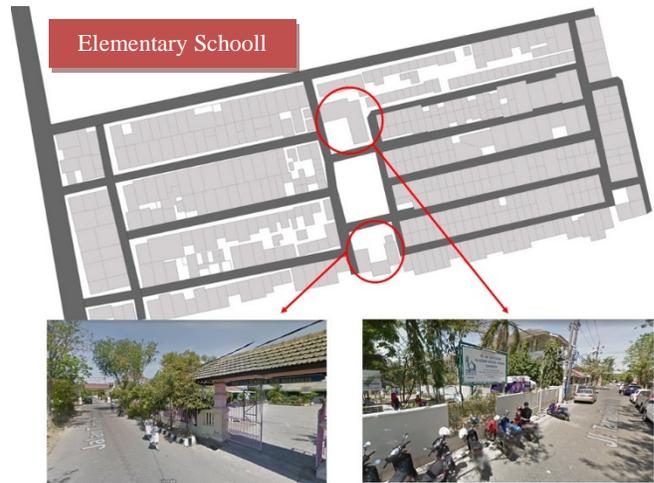


Figure 6. Existing school facilities inside the housing area (source: survey, 2017)

The Bhaskara Jaya housing facility consists of mosque and church. A large mosque that can accommodate 500+ pilgrims is located adjacent to the church, while the church with a capacity of 250+ worshipers is located in the midst of housing residents.

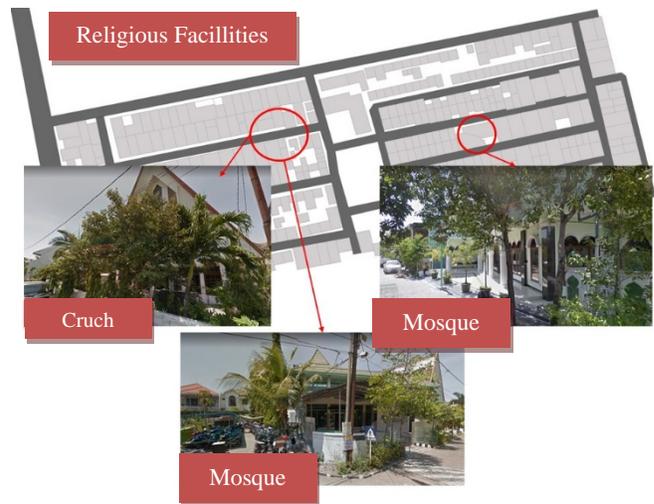


Figure 7. Existing religious facilities inside the housing area (source: survey, 2017)

Other public facilities in Bhaskara Jaya housing are community hall and open space. Citizen halls are often used as local RT and RW meeting venues. While the open space in the form of a field is located adjacent to the school, but unfortunately, greening is less visible in this field.



**Figure 8.** Existing social gathering facilities inside the housing area (source: survey, 2017)



**Figure 9.** Existing green open space inside the housing area (source: survey, 2017)

### III.5. Identify Bhaskara Jaya Housing

In one residential area there are several types of houses. At the entrance of the housing are houses with large type with a lot of plot  $\pm 500$  m<sup>2</sup>. While in the middle is a house with moderate plot and at the back is filled with houses of small plots.



**Figure 10.** Housing form inside the housing area (source: survey, 2017)

## IV. RESEARCH METHOD

Judging from the classification of research based on its purpose this research is included into descriptive research. When viewed from the classification of research based on data collection techniques it is included as survey research and field research.

Sources of data in this study are primary and secondary data. Primary data are obtained through survey (observation), while secondary are data obtained from the relevant literature Data collection techniques intended for data needed as input for each stage of the analysis. The data required are primary and secondary data by collecting as follows:

1. Primary data collection related to environmental conditions, conducted by Direct Observation to location and Interview.
2. Secondary data collection is primary data that has been processed further and presented by the primary data collector or other parties may. This data can be in the form of tables or diagrams. This data is obtained from the results of research, articles, library search and official documents from relevant agencies.

## V. PROPOSAL FOR IMPROVEMENT

Bhaskara Jaya housing is included in Kalisari district. Kalisari district has an area of 213 hectares with a population of 14,580 inhabitants. While Bhaskara Jaya, own housing area of 10 hectares with a population of 729 inhabitants. To find out the requirement of public facility that are not yet owned by Bhaskara Jaya housing, this research analyze facility requirement according to SNI (Indonesian National Standard) on local scale it is found that facilities required in Bhaskara Jaya housing is Green Open Space and trading facility.



**Figure 11.** Land use Bhaskara Housing area (source: survey, 2017)

For green open space it is found that Bhaskara Jaya housing still lacks Green Open Space, after analysis it is found that this housing requires 3 units of green space with an area of approximately 0.0729 hectares. This analysis is based on the number of population divided by the standard of meeting the needs for the Green Open Space. As for trade facilities as it is known that there is an informal sector around the field, it is necessary to allocate the center of the informal sector so that in the future the access will be no longer disturbed and well ordered. Based on the analysis, the area accommodated for this informal sector center is 0,0243 hectares.

From the observation results it is found the density of vehicles in the school area at peak hours. This became one of the resentments of Bhaskara Jaya housing residents because of their

area is often entered by people from outside. To overcome the density of vehicles during peak hours, this study recommends the provision of parking facilities adapted to the size and number of residents for the Bhaskara Jaya housing so that the parking area must be provided in Bhaskara Jaya according to SNI is 0,02916 hectares.

The following analysis is done in accordance with the principle of sustainable settlement:

### V.1. Environmental Aspects

#### a. Improvement of public Facilities in Bhaskara Housing

According to the SNI standart, there are several aspect of facilities that should be improved in this housing area. The aspects include Green Open Spaces facilities, Trade facilities, and Health facilities. The breakdown of each facilities are mentioned below:

##### a) Green Open Space Facilities

For green open space it is found that Bhaskara Jaya housing still lacks Green Open Space, after analysis it is found that this housing requires 3 units of green space with an area of approximately 0.0729 hectares. This analysis is based on the number of population divided by the standard of meeting the needs for the Green Open Space.

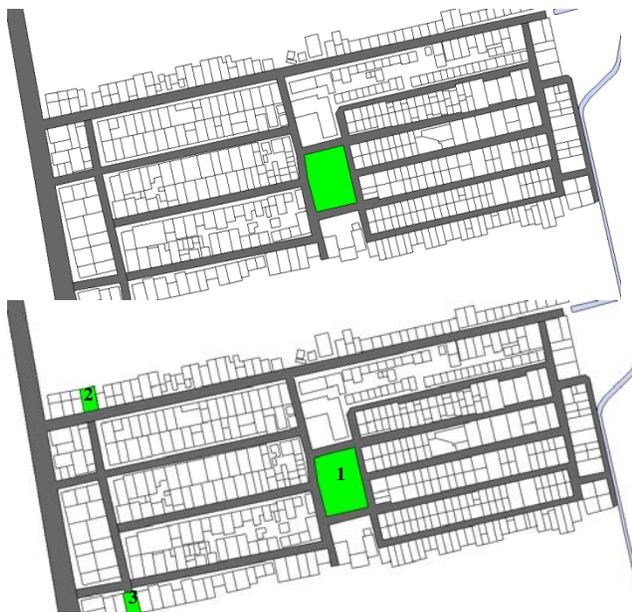


Figure 12. Existing green open space (above); Proposed green open space section 1, 2, and 3 (below) (source: survey, 2017)

The top image is the existing cross section and the bottom image is the cross section proposed, in which there are 2 additional new green open space that functioned as thematic park, that is in the form of elderly park and playground park which is intended for public society.



Figure 13. Proposed design of new green open space for field and jogging track (section 1) (source: writer design, 2017)



Figure 14. Proposed jogging track design of new green open space (section 1) (source: writer design, 2017)



Figure 15. Proposed playground design of new green open space (section 2 & 3) (source: writer design, 2017)

##### b) Trade Facilities

For trade facilities as it is known that there is an informal sector around the field, it is necessary to allocate the center of the informal sector so that in the future it will not disturb the accessibility and well ordered. Based on the analysis, the area accommodated for this informal sector center is 0,0243 hectares.



Figure 16. Existing location of trade facilities inside the housing area (red area) (source: survey, 2017)



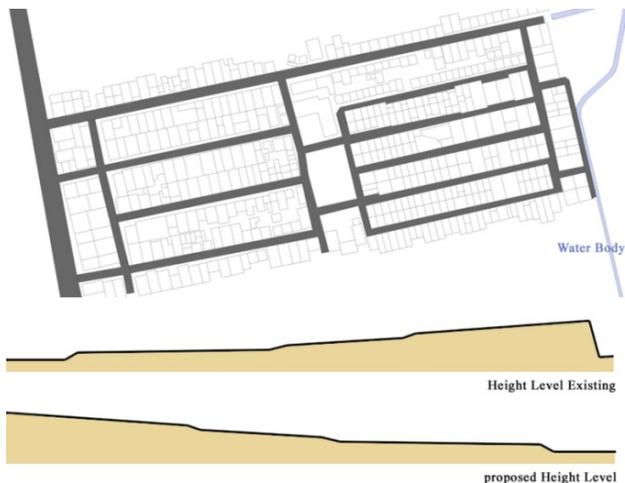
**Figure 17.** Existing trade facilities inside the housing area (illegal) (source: google map, 2017)



**Figure 18.** Proposed design of new trade facilities inside the housing area (planned) (source: writer design, 2017)

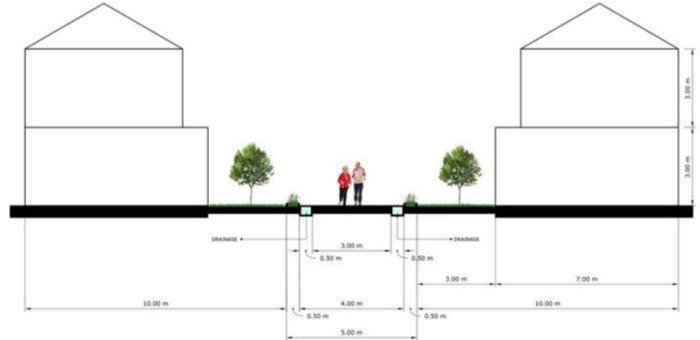
**b. Improvement of Flood Problem**

For flood problems, one of the efforts that can be done is to direct the height of the housing ground level towards the water body that leads to the beach. With that, from existing conditions, it is necessary to improve the elevation of drainage level of residential area on the west side so that it has a higher level than on the east side, because the water body is located on the east side of the housing.



**Figure 17.** Proposed height level of drainage (source: survey, 2017)

Beside that, there is a need to improve the road width in housing neighborhood into 4 meters with 0.5 meter for drainage width. The minimum standard of road width in housing neighborhood based on SNI 03-1733-2004 is 4 meters with 0.5 meter of drainage width. So, the road width on the existing condition still can be utilized optimally to the needs of other facilities such as green open space for sports and park facility



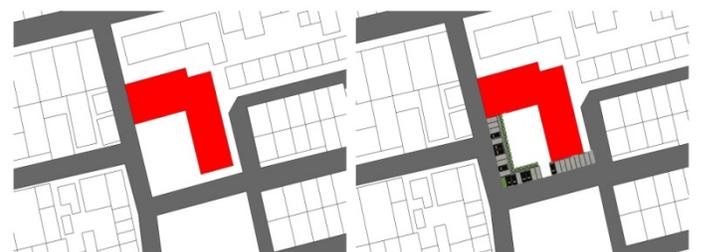
**Figure 20.** Proposed road geometry of Bhaskara Housing (source: survey, 2017)

**c. Improvement of Traffic Problem**

The main problem of Bhaskara housing area is traffic problem that affect to accessibility of the housing area. It is due to the existence of private school inside the housing area that mainly using cars to pick up the students. Beside that, in existing condition, the private school didn't provide the parking area nor drop zone area to prevent the traffic during the school rush hour. It causes cars park offhanded in the body of street and make the traffic around the school in trouble.



**Figure 21.** Existing area of school with no parking area nor dropzone area (source: google map, 2017)



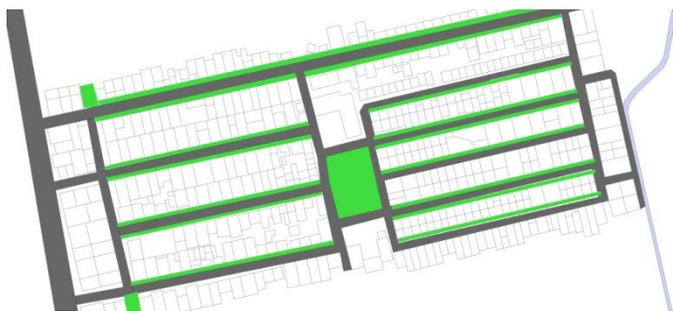
**Figure 22.** Existing area of school with no parking area (left); proposed new parking area of school (right) (source: survey, 2017)



**Figure 23.** Existing area of school with no parking area nor dropzone area (source: writer design, 2017)



**Figure 24.** Proposed parking area of school to solve traffic problem (source: writer design, 2017)



**Figure 25.** Green and clean location in front of the resident's house (source: survey, 2017)

### CONCLUSION

Bhaskara Jaya Housing is housing with decent conditions to live in. There are several land issues when viewed from the theory of sustainable approach as in the environmental aspects of the problems that occur are Flood, lack of green open space and accessibility issues. While other problems that follow are the lack of interaction between neighbors and the existence of gated that

restrict access. Therefore, this study provides recommendations for handling floods in terms of land use and the addition of green space and the application of Green and Clean Program in this housing.

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# Study of some important wild aromatic medicinal plants found in Imphal –West District, Manipur, India.

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**Abstract-** The present field investigation revealed that a total of 45 wild aromatic plants belonging to 19 families were recorded for different ailments viz. skin diseases, asthma, high blood pressure, diabetes, diarrhoea, dysentery, rheumatism etc. *Zingiberaceae* (12) family falls higher no. of species followed by *Asteraceae* (8), *Rutaceae* (6), *Lauraceae* (2). Some important aromatic wild medicinal plants which are widely used by the local healers are *Acorus calamus* Linn., *Aquilaria agallocha* Roxb, *Artocarpus lakoocha* Wall., *Curcuma amada* Rosc., *Cinnamomum tamala* Nees, *Curcuma angustifolia* Roxb, *Kaempferia rotunda*(L), *Citrus ganrhini* Lush, *Curcuma amada* Rosc, *Magnolia champaca* (L) Baill. However, *Cinnamomum tamala* Nees, *Curcuma angustifolia* Roxb, *Kaempferia rotunda*(L), *Curcuma amada* Rosc. are included in Red data list due to deforestation, urbanization and other human activities etc. as a result of which the rich habitats are gradually depleting day by day. Therefore, the conservation of rich biodiversity of bio-resources needs to be conserved for future generation.

**Index Terms-** Aromatic Plants, Conservation, Therapeutic, Biodiversity, Manipur.

## I. INTRODUCTION

Manipur is widely characterized by rich diversity of ethno-medicinal plants as well as a rich heritage of medicinal and aromatic plants. It has two biodiversity hot spots of the world viz., Eastern Himalaya and Indo Myanmar (P.K Singh,2011).The use of wild medicinal plants in curing various diseases is still current, starting with ancient time (Salave *et al.*, 2010).The medicinal plants have value of drug due to the presence of specific chemical substances like alkaloids, glucosides, antioxidants, tannins, vitamins, essential and fatty oils etc. The main constituents of essential oils are mono and sesquiterpenes including carbohydrates, phenols, aldehydes, alcohols, ether and ketones are responsible both for the fragrance and for the biological activities. These plant constituents found in fruits, rhizomes, vegetables that are responsible for human health benefits. Manipur has rich heritage and long history on use of medicinal plants as medicine, cosmetics, health hygiene, toiletries, fragrance and food supplements in improving the

quality of life. Some aromatic plant products having an aromatic or pungent vegetable substances used to flavor food and food products. Conservation resources of medicinal plants have been conducted in different parts of the world (Joy *et al.*, 2001) (Lyle, 2007), (Shankar *et al.* 2010). Some of the note worthy account of the floristic study and the sacred plants species having medicinal and religious importance of Manipur have been reported by Mukherjee (1953), Jain and Shukla (1979), Phukan (1999) and (Khubongmayum,2004).

Medicinal plants are used as therapeutical activities such as diuretic, antiseptic, antihelmintic, stimulant, analgesics and carminative etc. In Manipur, medicinal plants are associated with folk traditions and local healers. Still, about 1200 medicinal plants are used by practitioner in traditional herbal home remedies (Tombiraj 2011). (Vieira *et al.*,1993) and (Jain *et al.*,2007) reported that approximately 85% of villagers consult with traditional medicine preparation involve plants extracts. The ethano-bio logical knowledge of people may help in understanding human environment interactions. In the present investigation, we focus on identification and conservation of wild aromatic plants currently used in the folk medicine.

## II. MATERIALS AND METHODS

An intensive study of wild aromatic plants was carried out in Imphal-west (24014N latitudes and 93011 E longitudes). The present paper was based on the wild aromatic plants used by the indigenous group of communities of Manipur their identification, categorization with locally available materials. The field survey was conducted in the month of Feb-July of this year 2017 in different remote villages of the Imphal West District. Information on the wild aromatic medicinal plants and its products were collected from well-known village headman, many traditional healers regarding the utilities of plants as home remedies through interaction. Voucher specimens were collected from the natural habitat as well as from the markets and maintained were followed for correct identification and nomenclature (Sinha,1996; Brown,1969; Vedaja,1998).

**Table 1. Wild aromatic medicinal plants**

Sl. No.	Botanical name	Common Name	Local Name	Family	Flowering & Fruiting	Parts Used	Medicinal Uses
1.	<i>Artemisia indica</i> Linn	Worm seed	Laibakngau-nakuppi	Asteraceae	Sept-Feb	Whole plant	Stomach pain, anti-septic
2.	<i>Artemisia nilagirica</i> (Clarke) Pamp. Roxb	Indian worm wood fleavane	Laibakngou	Asteraceae	Oct-Jan, Jan-Feb	Whole plant	Tonic, antiseptic, insect repellent
3.	<i>Acorus calamus</i> Linn.	Sweet flag	Oak-hidak	Araceae	Non-flowering	Leaves, Root, Rhizome	Cough, fever, itching
4.	<i>Aquilaria agallocha</i> Roxb.	Eagle-wood	Agor	Rutaceae	May-August	Leaves, wood	Tonic, Diarrhoea, stimulant
5.	<i>Ageratum conyzoides</i> Linn.	Goat weed	Khongjai-napi	Asteraceae	Feb-July	Leaves	Hair care lotion, wound, gastrointestinal diseases
6.	<i>Alpina nigra</i> (Retz.) Rosc.	Shell ginger	Pullei	Zingiberaceae	May-july	Rhizome, leaves, inflorescence	Gout, colic pain, rheumatism, sex diseases
7.	<i>Alpina galanga</i> Wild.	Greater galangal	Kanghoo	Zingiberaceae	May-June	Rhizome, inflorescence	stimulant, carminative
8.	<i>Alpinia officinarum</i> Wild	Small galanga	Pulleimanbi	Zingiberaceae	May-June	Rhizome, inflorescence	Stimulant carminative, spices
9.	<i>Amomum dealbatum</i> Roxb.	Bengal cardamom	Namara	Zingiberaceae	April-May	Rhizome, inflorescence	High B.P, constipation
10.	<i>Artocarpus lakoocha</i> Wall.	Monkey jack tree	Hari-kokthong	Moraceae	July-Aug	Fruit, leaves	skindiseases, tonic, heart diseases
11.	<i>Aegle marmelos</i> (L.) Correa	Indian bael	Hei-khagok	Rutaceae	March-June	Fruit, leaves	Diabetes, dyspepsia, dysentery
12.	<i>Artabotrys hexapetalus</i> (L.F.)	Tai grape	Chini-champra	Amonacea	April-May	Inflorescence, leaves	Insect repellent, cholera, perfume
13.	<i>Blumeopsis flava</i> (D. Don) Merr.	Maiden-hair fern	Haochak	Asteraceae	Oct-Feb	Whole plant	bronchial congestion, skin diseases
14.	<i>Curcuma amada</i> Rosc.	Mango ginger	Heinouyai	Zingiberaceae	Aug-Sept	Rhizome	carminative, healing, sprain
15.	<i>Cucurma angustifolia</i> Rosc.	East Indian arrow root	Yaipal	Zingiberaceae	April-May	Inflorescence	Anti-fungal, anti-bacterial, cough, diarrhea

16.	<i>Cymbopogon flexuosus</i> St	Citronella grass	Houna	Poaceae	Sept-Dec	Leaves	Throat pain, hair care lotion
17.	<i>Carnarium bengalensis</i> Roxb.	East Indian Copal	Mekruk	. Bromeliaceae	May – July, November – January	Leaves, bark	chronic dysentery
18.	<i>Cinnamomum zeylanicum</i> Breyn.	Cinnamon	Ushingsha	Lauraceae	March – April, June – August.	Bark	dyspepsia, cold vomiting, astringent cough.
19.	<i>Cinnamomum tamala</i> (Linn.) Nees and Eberm.	Bayleaf	Tezpata	Lauraceae.	Feb.– June	Leaves	Cold, toothache, liver problem, urinary problem
20.	<i>Citrus laltipes</i> DC.	Khasipapeda	Heiribob	Rutaceae	March, Nov.	Fruit	Anti-dandruff, good complexion, stone case
21.	<i>Citrus ganrhini</i> Lush.	Citron	Heijang	Rutaceae	March – June	Fruit	Flavouring, confectionary
22.	<i>Citrus limethiodes</i> Tanaka	Grape fruit	Heithum	Rutaceae	April-june	Fruit	Flavouring, beverage, confection
23.	<i>Costus Speciosus</i> (K) sm	Male bamboo	Khongbal Takhellei	Zingiberaceae	May-July	Root	purgative, stimulant, tonic
24.	<i>Eryngium foetidum</i> Linn.	False coriander	Awa-phadigom	Myrtaceae	June-Aug, Nov-Jan	Fruit, leaves, root	High B.P, muscle pain stomach ulcer, nerve problem.
25.	<i>Eupatorium odoratum</i> Linn.)	Maiden hair fern	Hanurei	Asteraceae	May-Aug.	Leaves	Stop bleeding, anti-dandruff
26.	<i>Gynura cusimba</i> L.	Silk cotton tree	Terapaibi	Asteraceae	May-Aug	Leaves	Colitis, stimulant, tonic, stomach ulcer
27.	<i>Hedychium aurantiacum</i> Wall.	Cogon grass	Eengellei	Zingiberaceae	Aug-Oct	Inflorescence, rhizome	Bronchitis
28.	<i>Hedychium coronarium</i> Koenig	White ginger lily	Takhellei-angouba	Zingiberaceae	July-Aug	Rhizome	Throat problem, tonic
29.	<i>Hedychium marginatum</i> Clarke. C.B.	Red ginger lily	Takhellei-agangba	Zingiberaceae	July-Sept	Rhizome, leaves	Carminative, bronchitis, tonic
30.	<i>Houttuynia cordata</i> Thunb.	Molucca bean	Tongningkhok	Sauraceae	July-Sept	Leaves, rhizome	Dysentery, gonorrhoea,

							muscular pain, measles
31.	<i>Kaempferia rotunda</i> (L)	Aromatic ginger	Yaithamna-manbi	Zingiberaceae	May-June	Rhizome	Sinusitis, mumps, tumour, high bp.
32.	<i>Lantana camara</i> Linn.	Largeleaf lantana	Nongbanlei	Verbenaceae	Throughout the year	Leaves, fruit	Anti-fungal, diabetes, anthelmintic
33.	<i>Mesuaferrea</i> Linn.	Iron wood	Nageshore	Guttiferae	Oct-Dec	inflorescence	Piles, dysentery, cough, diarrhea
34.	<i>Magnolia champaca</i> (L) Baill	Fragrant champaca	Leihao	Magnoliaceae	May-March	Inflorescence, root	Dyspepsia, gonorrhoea, stomach complain
35.	<i>Paederia foetida</i> L.	Stinkvine	Oi-nam	Rubiaceae	March-Oct	Leaves	Piles, paralysis, rheumatism, dyspepsia
36.	<i>Pogostemon bengalensis</i> Kuntz.	Passion flower	Lamthoiding	Lamiaceae	In cold season	Leaves, root	Hair care lotion, piles
37.	<i>Pogostemon parviflorus</i> Benth	Phangla	Sangbrei	Asteraceae	Oct-Dec, Dec-Jan	Whole plant	Antibiotic to wound & cut, Piles, Hair care lotion
38.	<i>Plectranthus ternifolius</i> Don.	White champa	Khoiju-leikham	Lamiaceae	Sept-Nov, Jan-March	Leaves	Disinfectant, antifungicide
39.	<i>Pinus kesiya</i> Royle ex	Baguio pine	Uchan	Pinaceae	Feb-March	Wood, leaves	Cough, headache, anti bacterial
40.	<i>Scheffleravenulosa</i> C.B. Clarke	Needle wood	Utang	Araliaceae	Feb-Jun	Wood, leaves	Dropsy, paralysis
41.	<i>Spondia spinnata</i> (Linn.f.) Kurtz.	Indian hog plum	Heining	Anacardiaceae	March-June	Fruit, leaves	Piles, hair growth, dysentery, gonorrhoea
42.	<i>Tithonia diversifolia</i>	Mexican sunfloweri	Lam numitle	Asteraceae	Sept-Feb	Leaves, seed	Gastric problem, wound, bruises.
43.	<i>Vitex trifolia</i> (L.)	Chinese chaste tree	Urik-shibi	Verbenaceae	June-Sept	Leaves	Muscular sprain, anti-fungal, anticancer, tuberculosis
44.	<i>Zanthoxylum acanthopodium</i> D.C.	Winged leaf prickly ash	Mukthruhi	Rutaceae	Dec-Feb	Fruit, leaves	chronic fever, indigestion,

							cough, bronchitis
45.	<i>Zingiber cassumunar</i> Roxb.	Wild turmeric	Tekhao-yaikhu	Zingiberaceae	Aug-Sept	Rhizome	Womb related diseases, Irregular menstruatio n

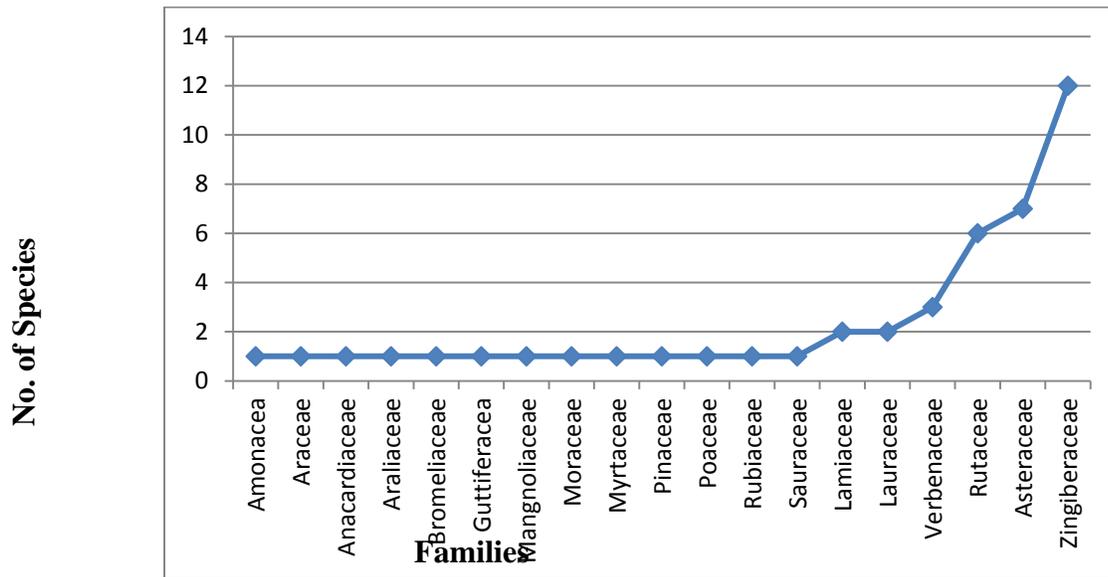


Fig 1: Family dominance curve of the wild aromatic plants.

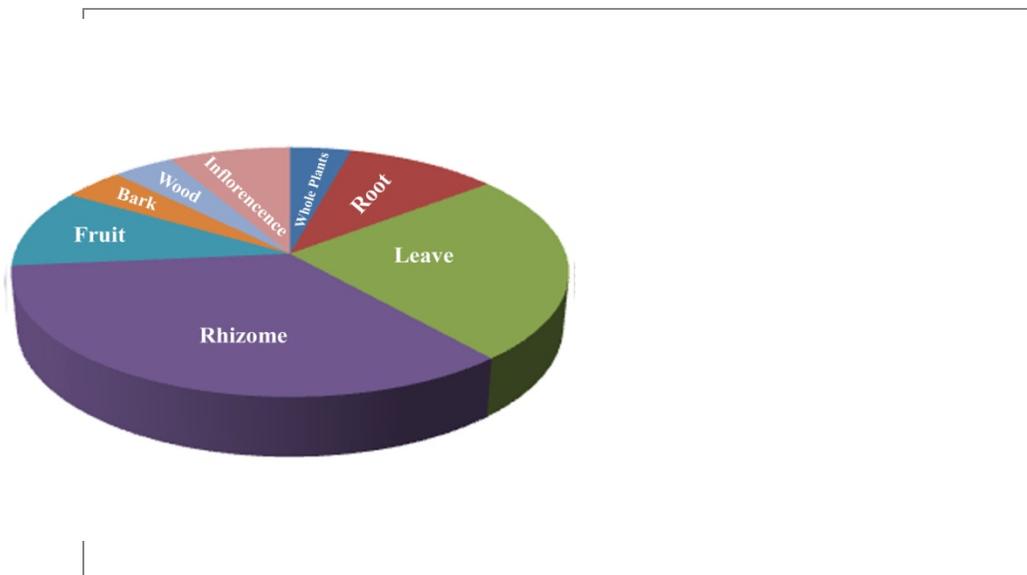


Fig 2: Graphical presentation of plant parts used.

### III. RESULTS AND DISCUSSION

In the present investigation, a total of 45 wild aromatic plants belonging to 19 families were recorded in the Imphal west District, Manipur (Table 1). And the plant species are arranged in alphabetical order. Table 2 Showed that the plant parts used in different ailment. The higher no. of species falls in the *Zingiberaceae* (12) family followed by *Asteraceae* (8),

*Rutaceae* (6), *Lauraceae* (2). Out of the total aromatic plants, four species included in IUCN Red data list viz, *Cinnamomum tamala* Nees, *Curcuma angustifolia* Roxb, *Kaempferia rotunda*(L), *Curcuma amada* Rosc. (Anonymous 2013). The usage of herbal medicine has been increased to many diseases and there is a great demand for therapeutic. The side effect of herbal products are not yet reported in many industries and market. The used of these species plants to enhance the taste of

foods, beverages and drugs is still needed by the communities of Manipur, because of poor socio-economic conditions. Lack of institutional support, unsustainable use, cultural changes have threatened resources and local traditional knowledge (Rajendro et al.,2009). The present investigation suggested that for an urgent need to explore proper domestication research and development of rapid medicinal plant production and new good technologies. Publics should be educated and have scientific knowledge about the herbal products. The rapid increasing interest in the field of medicinal plants, we must require active collaboration amongst Scientists, Technologies ,Government or Private Organization.

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# Cannabis Use and Deviant Behavior among University student: an empirical research

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**Abstract-** During the recent years, few studies have investigated the association between university social context and cannabis use. This study of college students aimed to highlight the possible adoption of deviant behavior, related to cannabis smoking, by university students as a different form of entertainment from cultural and social reference standards. Secondly, we aimed to understand the relationship between CAST (Cannabis Abuse Screening Test) and social context; finally, we explored the possible association between social context and cannabis use. This paper explores the latent structure of cannabis users (especially its invariance towards gender and age) and the psychometric properties of the CAST by the assessment of a university student.

**Index Terms-** Cannabis, CAST, University Student, Deviant Behaviour

## I. INTRODUCTION

The drugs use, as a deviant act, is perceived both as the result of an individual state of social disorganization effect of non-integration between values and purpose of the society, and as the inability to implement effective, coherent tools and functional that can promote social integration. Social disorganization and "demoralization" causes the reduction of social bonds and the weakening of the coercive and conformist social norms power. The use of psychoactive substances exists at many levels of society, this implies that everyone has the ability to become drug's victims. The use of this type of substances therefore becomes a social phenomenon that has significant connections with cultural and, specifically, social origins. The purpose of this research is to highlight the possible adoption of deviant behavior, related to cannabis smoking, by university students as a different form of entertainment from cultural and social reference standards. Secondly, we aimed to understand the relationship between CAST (Cannabis Abuse Screening Test) and social context, including; finally, we explored the possible association between social context and cannabis use. During the years, many studies estimated that about 30% of student consume cannabis during their university life (Johnston, O'Malley, Bachman, & Schulenberg, 2007; Mohler-Kuo, Lee, & Wechsler, 2003). While there are a wide number of research related to the problem of cannabis use by student, few studies have focused on the driver and social factor that may contribute or facilitate this deviant behavior (Beck et al., 2009). According to Sznitman (2016) cannabis use is associated to vary problems depending on age, disorders are higher for young adults (aged 18–24) than for older adults (aged 25+) (Swift, Hall, & Teesson, 2001, Hasin et al., 2015). Recent studies show as frequent cannabis use has been prevalent in younger populations (Solowij & Grenyer, 2002).

## II. LITERATURE REVIEW

In the Chicago School perspective, it is possible to relate drug use with social, ecological and cultural conditions. In this sense, the concentration of population, the low social condition, poverty, would be favorable conditions for activating drug addictions. In the same perspective the use of drugs, as well as delinquency, could correspond to the situation of the lower social classes and the ecological area of the "slums" where there is a real "drug culture", with a dynamic both of learning and transmission. According to Pitch, social disorganization leads to individual disorganization and to the tendency of individuals to associate in a differentiated context, with their own behavioral rules, more or less in conformity with social norms. The peripheral components of social system thus find a way to become competitors again with the most central and strongest sectors of society, forcing the latter to take charge of their problems or choosing a marginal system of life and values, placing itself in a subordinate and often conflictual position. It is in this way that deviance and therefore also the drug-like forms find favorable ground for expansion (Pitch, 1975). In the theoretical perspective of anomia, the drug phenomenon represents the consequence of social changes (Durkheim, 1893) or the inadequacy

between cultural goals and institutional means (Merton, 1938). Drug use would correspond to the condition of renunciation, that is to the refusal of ends and social means. In this sense, drugs consumption would be the result of a leak with respect to the inconsistencies and frustrations generated by the social system. Merton incorporates elements of functionalist analysis, such as cultural ends and institutionalized norms, with respect to which individuals can assume, as adaptation: conformity to cultural purpose or goals, innovation, ritualism, renunciation or rebellion. Following Merton views, the use of drugs could represent a modality of adaptation of individuals who reject both economic success and the means to achieve it (Merton, 1938). The drugs use is due to the notion of subculture in reference to values and attitudes concerning a particular way of dealing with a dominant culture.

Addressing drugs problem in subcultural terms, especially for what concerns young people, presupposes taking into account different levels of interpretation. According to the functionalist model, the subculture is read in terms of nonconformity towards behavior patterns defined by the social system. Three levels of interpretation can be identified: the first identifies in the subcultures some expressions of criminal acts or, more specifically, in the case of drug users, an abstentionist function towards society; the second, glimpses characteristics of "resistance" to social deprivation, derived from its social role (working class); the third defines subcultures as places of identity expression, but incorporates them in a progressive cultural de-fragmentation within the youth world, which brings the appropriation of some subcultural events into mainstream culture as a consequence (Bertolazzi, 2008). Cohen, in *Delinquent Boys*, is interested in the mechanisms which delinquent bands are formed in America and analyzes the emulation processes, as well as the adherence to a complex of subcultural standards. The influence of the "significant other" is evident within the drug addict world, since in this subculture there are three types of dependency: relational (the desire for drugs is satisfied through cooperation with other); material (through other individuals who know the dynamics for finding illegal drugs); moral (the community of drug addicts spreads and shares a culture able to provide meaning to the action of the individual, legitimizing the status and lifestyle that involves the consumption of psychotropic substances) (Cohen, 1955). Cohen asks why the vast majority of drug and alcohol consumers do not become compulsive consumers like alcoholics, the answer is control. The notion of control may appear to be contradictory for those who also see drug loss as a sign of loss of control. Controls are learned within the lifestyles and the environment in which the prohibition of drugs, and the related legal constraints, have become completely irrelevant. As part of lifestyles, drug use is functional and plays a role in the development and maintenance of collective norms (social control), pleasures and identities (Cohen, 1989). Cloward and Ohlin, returning to Merton's theory, argue that drug addicts should be ascribed to the abstentionist subculture, as they are continually dedicated to the pursuit of forbidden pleasure, unable to achieve the approved social goals and therefore the victims of a double failure; however, authors provide a contribution in this regard as they study the subjects not in their individuality, but conceiving the existence of a subculture characterized by a complex of values, social norms and informal rules of conduct that diverge from the dominant culture of a community (Cloward & Ohlin, 1968). The style subcultures try to resist the standardization of mass consumption, proposing itself as a device for reappropriation of consumption following the profound transformations that have affected Western society after World War II. In an effort to achieve this goal, youth groups adhere to a subcultural style that invests clothing, musical preferences, jargon, ritual style and even psychoactive substances consume (Cipolla & Mori, 2009).

According to Goffman, stigmatization plays a very important role in identifying drug addiction or drug use as deviant acts. It is therefore a process through which a new meaning is attributed to drug; a labeling is made towards the drug addict to give him the identity of drug addict, producing some functional and dysfunctional effects also on the deviant's life (Goffman, 1963). Drug addicts, in Goffman's vision, within the paradigms that refer to the approach of social construction of deviant behavior, are similar to homosexuals, delinquents, traitors, whose actions violate the set of rules established and enforced from the reference group (Goffman, 1988). In detail, the majority of drug addicts tend to adopt psychotic behaviors not related to the pharmacological properties of substances, but rather to the fact that the individual is the subject of a process of stigmatization resulting from social control exercised by others; it is defined as one that Goffman calls the moral career of the deviant, e.g. a set of regular changes in themselves and in the image of himself as well as in the judgment that this career involves (Goffman, 1963). Becker opposes the role of "moral entrepreneurs" to those who take drugs in a recreational or experiential context, or in a context of search for excitement and strong emotion, considering them as risky behaviors that break social norm, health and law. Becker was one of the first to analyze drug careers as a social process focused not on personal characteristics of users, but on a series of changes in their conceptual and experiential relationship with cannabis and developed in social interaction. He described three prerequisites in the process of becoming a cannabis smoker: learning to smoke cannabis in the right way; learn to recognize the effects of the drug; learn to enjoy these effects. The motivation to engage in the use of cannabis does not necessarily precede the experimentation of this, but derives from a subcultural learning process in which individual is socialized in certain behaviors and moods (Becker, 1953). In this process, cannabis smokers not only learn to taste drug, but also to consider the use of cannabis as morally acceptable. Becker identifies three stages of cannabis use: the beginner, ie the individual who learns to become a cannabis user; the occasional user, whose cannabis smoke is sporadic; systematic consumer of cannabis (Becker 1955, 1956, 1973). Progression from one stage to another is socially conditioned. If it happens without integration into a network of users and without a loosening of ties with conventional society, users do not start their deviant careers (Becker, 1973). The phases of "user's career" are linked to social control; the various types of social control become progressively less effective as users move from one stage to another. One type of control is linked to the supply: to move from the beginner phase to the occasional and regular phases, users need to find more stable sources of supply compared to random casual encounters with other users. A second control type concerns the need to keep non-users unaware of drug use due to potential negative reactions or sanctions. This secrecy is often maintained through a change in social participation. In fact, the

relationship between drug addicts intensifies when contact with non-consumers is kept to a minimum. A further type of control is linked to the conceptions of cannabis consumers as immoral behavior. In the transition from occasional to regular use, subjects develop what Becker outlines as "the most emancipated sight" on drug: e.g. the author defines the effects of cannabis as more useful than harmful, considering it safer than alcohol and tobacco. In this perspective, "programmed use" is considered as a little problematic use, believing that it is possible to control the substance (Becker, 1955, 1956). In a study on marijuana smokers, Becker traces the deviant career of jazz cannabinoid users reaching innovative conclusions: he recognizes that it is not the deviant motivations that lead to deviant behavior, but the contrary, clarifying that it is the behavior that produces, over time, deviant motivation. The cannabis use is related to the individual's conception of marijuana and its possible uses, this vision develops in relation to the growth of the individual's experience with drugs (Becker 1987). The author has also analyzed how habitual consumers support the neophyte smoker in learning and appreciation of the practice, thus contributing to the progressive advancement in deviant behavior; from this it emerges that many deviant activities derive from socially learned behaviors through individual learning to take part in a subculture organized around a particular deviant activity (Becker, 1987). According to Sutherland, individual will engage deviant activities when he perceives the value of behavior differently from the real consequences of law violation. The Differential Association theory holds that behavior is learned through interaction with others or associations. By applying this theoretical framework to drug addict, it can be concluded that this behavior can also be learned through interaction with other subjects in a communication process within groups. Learning includes, in addition to the techniques of drug use, also motivations, drives, rationalizations and attitudes (Sutherland, 1955). Bandura's social learning theory highlights how learning does not only involve direct contact with objects, but also through indirect experiences, developed through the observation of other people. Social learning theory explains human behavior in terms of continuous reciprocal interaction between cognitive, behavioral, and environmental influences (Bandura, 1997).

Another approach is proposed by Hathaway which, starting from Canadian data analysis, shows how Becker's "career" model requires changes. He suggests that cannabis use is considered tolerable and that use should no longer be associated with subcultural groupings; in fact, drugs use is an independently lifestyle choice by individuals (Hathaway, 1997, 2004). Containment Theory of Reckless argued that there are inner and outer forces of containment that restrain a person from committing a crime: the inner forces stem from moral and religious beliefs as well as from a personal sense of right and wrong; the outer forces come from who influence the individual to some degree. The effectiveness of containment forces can be influenced by external factors such as effective supervision and internal factors such as a good self-concept (Reckless, 1961). Hallstone proposes, instead, a development of Becker's theory: he shows that people do not necessarily have to go through a learning process and a moral transformation to become cannabis users (Hallstone, 2002). Furthermore, he underlines that consumption of cannabis is not static as it is a relative and variable phenomenon; therefore, the "careers" of cannabis users are constantly changing in response to social conditions. Some habitual users are able to exercise control on drugs assumption because they have an interest in conventional life (Hallstone, 2006) or commitments, such as school, work, study, family; other regular cannabinoids users develop a destructive model of consumption that monopolizes their entire existence (Hallstone, 2006). Hirschi applied Becker's theory to interviews cannabis users in Wisconsin, finding some limitations. The study shows that the start of cannabis use is probably less sudden and less dependent on the opinion of other people than that proposed by Becker. The initial phase is usually preceded by a process in which the individual develops the desire to experiment cannabis, and many neophytes do not need other subjects to be instructed on the use of substance (Hirsch, Conforti & Graney 1990). The theory of control starts from the assumption that people will undertake deviant behavior when their "social bond" with society weakened. Hirschi's concept of "social bond" includes four elements: attachment, commitment, involvement, beliefs. Attachment refers to the symbiotic connection between a person and society. According to the author, people with strong and stable attachments to others within society are less likely to violate social norms. Conversely, it is assumed that an individual with weak attachments does not care about desires of others and therefore is inclined to deviate from social expectations. If there is a form of attachment to family, friends and/or community institutions (for example, the church), deviant behavior is less likely. Although people with strong family and community ties can potentially abuse drugs, Hirschi suggested that they are more likely to consider their decision and avoid deviant behavior (Hirschi, 1969). Commitment refers to the investment that a subject has in social and institutional activities. The structure of Hirschi's commitment is based on the premise that there is an association between commitment level and propensity to deviance; therefore, an individual who has invested time, energy and resources to comply with social norms and expectations (for example, pursuing educational goals) is less likely to deviate from those who did not make such investment. Hirschi said that people who are heavily invested in commitments have more to lose (for example, interrupting their career path) than those who are moderately or totally uninvested. As a result, deviant behaviors such as alcohol and drug abuse are less tempting for people with strong commitments. Involvement is the third element of Hirschi's concept of social bond, it states that large amounts of structured time spent in socially approved activities reduce the time available for deviance. Therefore, an individual who is actively engaged in conventional activities (for example, employment) has less time and opportunity to engage deviant activities such as drug abuse. The last element of Hirschi's social link refers to the level of adhesion to shared social norms. For Hirschi everyone could be delinquent if it were not for the link between individual and society. Deviant or criminal behavior depends on social bond that is expressed in: attachment to other individuals (family, friends, school, etc.); involvement in the purposes approved by the community; commitment to conformist activities; belief in social values (Hirschi, 1969). In the normalization theory, outlined by Parker et al., it is argued that for young people, taking drugs has become normal, so, in urban areas, young non-drug users will be a minority group becoming "deviant" with respect to this standardization model. The explanation of drugs use is supported by a subcultural perspective in which the liberal permissiveness of youth is in contrast with the conservative restriction of the adult world (Parker, Aldridge Measham &, 1998).

Coffield and Gofton, trying to understand the individuality of young drug addicts, highlighted how drug intake is integral part of growth process and that drug's use is considered unproblematic by the majority of young people compared to the vision of: parents, teachers and police (Coffield & Gofton, 1994). Hirst and McCamley-Finney stated that young people are constantly surprised by how adults perceive drugs in terms of dangerousness or unusualness, suggesting a re-evaluation of adults reactions to drug use also considering the process of normalization in course (Hirst & McCamley & Finney 1994). According to Sykes and Matza, cannabis smokers would adopt a series of neutralization techniques to justify their conduct to themselves and others; in particular, they emphasize their self-control ability to substance (Sykes & Matza, 1957). In this perspective, the dissonance theory would emerge, a situation in which beliefs, notions, opinions expressed in relation to a theme by a subject are in conflict with each other (Festinger, 1957). Jessor and Jessor, with the theory of problematic behaviors, point out that adolescents have more dangerous habits than individuals of other age groups. This suggests the presence of a plurality of behaviors such as drug use and delinquency (Jessor & Jessor, 1977). Other studies have highlighted the centrality of the adolescent phase, understood as a period in which each individual is more subject to the influence of peer group; this phenomenon is particularly evident in transgressive behavior (Clasen & Brown, 1985). Research related to risk representation shows how people in risk assessment do not rely solely on the frequency of the negative event, but also have a subjective perception (Slovic, 1987). A study on risk perception in adolescents, found that drivers are, on the one hand, participation in certain behaviors and, on the other, the influence of peers, caused by tendency of young people to conform to the group (Benthin, Slovic & Severson 1992). Savadori and Rumiati examined the risk perception in Italian adolescents, confirming the results of Benthin et al., they established that the moral dimension is strongly correlated with the risk assessment; an activity defined immoral is considered, at the same time, very risky. Cultural factors play an active role in risk perception, given the difference between males and females (Savadori & Rumiati, 2000). Gottesfeld oppose the forced drug use from the hedonistic consume (Gottesfeld, Caroff & Liebermann, 1972); Levi distinguishes adolescent from whom drug use is a relaxed and infrequent activity by young people who use it more often, for example, to overcome unpleasant sensations (Levi, 1970); Keniston argue that for many young people the drug's use occupies only a marginal position in their lives and serves to make pleasant and stimulating experiences (so called seekers); a small minority uses drugs more often, as the consume has assumed a dominant position in daily life (heads) (Keniston, 1969). Nowadays, psychoactive substances are widely distributed among the society members. Consumption is not a phenomenon that only affects youth people, although use is more widespread among adolescent. The high presence of drugs and alcohol implies a difficulty in the interpretation of the use, of such substances, as a deviant act resulting from a pathological process or, on the other, the consideration of consumption as a subcultural practice. The profound changes in the social system oriented the analysis as a normalized action thus no longer subjected to stigmatization processes and no longer recognized as deviant (Bertolazzi, 2008).

### III. Method

The data for this study were derived from a study of 901 undergraduate college students, with a focus on understanding the substance use and other deviance behaviors during the university period. Informed consent was obtained for participation in all phases of this study; the participation was totally free and voluntary, no rewards or remuneration were obtained by the student. The research method and questionnaire administered was reviewed and approved by the University of Enna "Kore". All the information was treated in the strictest confidence. The main aspect that was pointed out as particularly important in the validity of the questionnaire was that the students trusted that their responses were anonymous. Data was entered manually in a password protect computer. Our target population was the student of Kore University aged from 18 years and older residing in households in the EU member states. Although the age range of the college population varies widely, the vast majority of college students (87.13%) are aged 18 to 26 years; thus, we focused our analyses on that age group. A self-report questionnaires was administered at the end of lessons, that lasted approximately 1/2 hours and covered a wide range of topics, including demographics, family, substance use, lifestyle, etc. Data were collected between October 2016 and September 2017. Sociodemographic measures included sex, race/ethnicity, nativity, marital status, household composition, place of birth and residence; were also required on their living arrangements and employment status; other socioeconomic measures included family annual income and educational level (refer to ISCED level); the last variable covers formal education or formal training related to a specific job or profession; educational level include only the activity which lead the respondent to gain a formal qualification. In recent years, many screening scales have been developed and tested to assessing problems cannabis use (Beck and Legleye, 2008), one of the most-used is the Cannabis Abuse Screening Test (CAST) (Legleye et al., 2007). Originally designed for adolescents, CAST has been evaluated as an optimal screening scale for identifying patterns of cannabis use leading to negative consequences on a health or social level for the user or others community members. This questionnaire was also used as one of the main module in the European School Survey Project on Alcohol and Other Drugs (ESPAD). CAST questionnaire is a 6-item scale screening for problematic cannabis consume by assessing the frequency of the following events during the past 12 months: "Have you smoked cannabis before midday?", "Have you smoked cannabis when you were alone?", "Have you had memory problems when you smoke cannabis?", "Have friends or family members told you that you should reduce or stop your cannabis consumption?", "Have you tried to reduce or stop your cannabis use without succeeding?", "Have you had problems because of your cannabis use (argument, fight, accident, poor results at school, etc.)?". All items are answered on a 5-point scale (0 'never', 1 'rarely', 2 'from time to time', 3 'quite often', 4 'very often'). The full range of item responses yields a total score ranging from 0 to 24. The validation of the Italian version of CAST, used in this research, (Bastiani et al., 2013) was conducted through a multivariate analysis (Multiple Correspondence Analysis-MCA) for the evaluation of the different alternatives response for each of the

6 items. The total score of the Italian version (CAST-MCA) provides, therefore, an algorithm that adds the weights giving different importance to the different response options. The total score of this version is between 0 and 24, defining problem behavior a total score  $\geq 7$ . As highlighted by Legleye et al. (2015) CAST properties have been assessed in representative samples in France and Italy, good internal and screening properties were also found in small samples of young adults in research conducted in Spain and Hungary. The last section of the questionnaire aims to capture the variety of situations and reasons for using cannabis, each item was followed by the response options of “never” (1), “rarely” (2), “occasionally” (3) and “frequently” (4). The use of any substance, which included use of any drugs (different from cannabis), alcohol or tobacco during the last year. For many substances, the questionnaire contains questions about lifetime use and also age at first use. On one hand, some question are administered in a closed format ad require a dichotomous response, conversely some questions are left completely open to encouraged respondents to give a full explanation. The main characteristics of the sample members were analyzed as frequencies (Chi-square test, test Fischer). Parametric data were analyzed with ANOVA, the changes in categorical data were analyzed with the Chi-square test. The significance values were set for  $p \leq 0.05$ .

Table I: Sample characteristics

	Total (n= 901)	%
<i>Male</i>	371	41.17%
<i>Female</i>	530	58.83%
<i>Age (Mean, SD)</i>	22.4 (3.1)	
<i>Educational Level:</i>		
ISCED 1 – 3	61	6.8%
ISCED 4 – 5	750	83.2%
ISCED 6	90	10.1%
<i>Family income</i>		
0 – 14,000€	63	7%
€ 14,001 - € 28,000	234	26%
€ 28,001 - € 32,000	324	36%
> € 32,000	280	31%
<i>City inhabitants</i>		
< 2,000	36	4%
2,000 – 60,000	285	31.6%
80,000 – 250,000	291	32.3%
250,000 – 500,000	192	21.3%
500,000 – 1,000,000	97	10.7%
<i>Year at university</i>		
First	190	21%
Second	279	31%
Third	252	28%
Forth	99	11%
Fifth	63	7%
Seventh and +	18	2%
<i>Tobacco Smoker</i>	640	71%
<i>Alcohol consume (day per week)</i>		
1 or less	30	3.3%
2 – 3	721	80%
3 – 5	80	8.9%
5 – 7	70	7.8%
<i>Other illicit substances consume</i>	135	15%

#### IV. Results

The response rates were 72.2% (n=650). Informed consent was obtained. The students were instructed, verbally and in writing (on the first page of the questionnaire) that they should not put their names or other identification sign on the questionnaire. Specifically, from the larger sample of 901 students, 650 students (280 males and 370 females) completed the assessment. The remaining participants were excluded because either they did not complete the assessments (n=218), they had partially missing data on cannabis use at one or both assessments (n=33). The proportions of subject that refused to participate differ substantially among the different university department, but the reasons given were usually: lack of time, examination and mobility problem. However, the response rates are deemed to be satisfactory, because a higher rates of sampled students not taking part in the study could increase the risk that the net sample is biased. The majority of the sample self-identified as being White (95.2%).

All analyses were conducted using MathLab 2015a. Although the range age varied from 18-31, the group 19-24 years olds amounting to 72%. The average study age was 22.4 years (SD=3.1). Subjects reported having used cannabis during the previous 12 months were 37.06% (n=334), while respondent used it during the last 30 days was the 45.21% and about 23.4% on a daily basis. From the sample, 55 subjects (70.5%) were dependent and 23 (29.5%) showed abuse. Men were also more likely to smoke cannabis daily (28.1% versus 8.7%), to drink alcohol during the morning (31% versus 9%), while daily tobacco smoking and alcohol use during the weekend was higher for female (59.7% and 43% for men respectively). The proportion of frequently cannabis use is also higher in the younger age group: subject who defined himself as dependent amounted to 36.4% in the 18-22 age group against 11% in 22+ group (p<0.05). There were no significant gender differences in respect of prevalences of dependence, but men were more likely to meet abuse criteria or cannabis use disorder (according the definition of DSM-V). Men reported experiencing more overall negative consequences than women from cannabis use. Regarding the CAST items, the second (have you smoke cannabis when are alone) and the third items were the most commonly endorsed (38.3% and 41.7%), while Item 6 (problems) was only reported by 5.1%. Overall, 49.8% reached a score  $\geq 3$ , 34.2%  $\geq 5$  and 16.0%,  $\geq 8$ . Globally, there were thus fewer differences between gender than different age group. Data shows how there are numerous other problems which cannot be directly related to difficulties in basic activities; this difficulty may be solely due to environmental factors. Participants, in most cases declare it is often a combination of both personal and environmental factors which contribute to cannabis use and a lack of social participation and integration. Only in few cases (n=7) respondents report that a medical condition contributed to their cannabis consume. The purpose of questions related to social support is to try to establish the dependence of cannabis consume and the level to which people have social contact, emotional support and protection; results prove a strictly correlation between the absence those giving an immediate support (i.e. friends, family or colleagues) and the illicit substance use, as it is demonstrated by literature contribution of Hirschi (1969) Cohen (1955). According to the approach suggest by Park and Grant (2005) study on alcohol consume, a bivariate correlational analyses were conducted to examine how cannabis consumption was related to positive and negative consequences in university student. Results indicated that mean levels of experiencing negative consequences were related to higher levels of cannabis consumption for both men and women, conversely the positive consequences are strongly correlated to the lower level. To examine relationships between cannabis consumption and social behavior, two sets of bivariate correlations were conducted between these variables, one for men and one for women (Table 2 – Table 3). Social relational was positive related to cannabis consumption but inversely correlation in registered to negative and positive cannabis consequences (both for men and women). These findings suggest that interventions should focus not only on the potential negative consequences of illicit substances use, but should also on the positive effect.

Table II: Bivariate correlations between total positive and negative consequences by gender of cannabis consumption

	Cannabis Consume		Positive consequences		Negative consequences	
	Men	Female	Men	Female	Men	Female
<b>Social Relational</b>	0.31**	0.22*	0.68***	0.54***	0.37**	0.31***
<b>Positive emotion</b>	0.03	0.08	-0.21*	-0.09	0.21	-0.10

<b>Correct</b>						
<b>Positive affect</b>	0.01	0.02	0.01	0.01	0.02	-0.04
<b>Negative affect</b>	-0.09	0.01	0.09**	0.06**	0.41*	0.19*

\*p<0.10; \*\*p<0.05; \*\*\*p<0.01

Table III: Partial correlations between psychological factors and positive and negative consequences by gender controlling for alcohol consumption

	Positive consequences		Negative consequences	
	Men	Female	Men	Female
<b>Social Relational</b>	0.68***	0.61***	0.34**	0.31*
<b>Positive emotion</b>	-0.29**	-0.07	-0.23	-0.16
<b>Correct</b>				
<b>Positive affect</b>	0.02	0.01	0.02	-0.04
<b>Negative affect</b>	0.29**	0.26**	0.37*	0.19*

\*p<0.10; \*\*p<0.05; \*\*\*p<0.01

## V. Conclusions

This study showed that social context has a relevant effect in cannabis use of college student. Similar to other substance abuse the reason for using cannabis relate to conviviality, social interaction; this finding, supported also by Beck et al. (2008), demonstrate that existed different cannabis use context in university student not related to gender, age or family income. Further investigation will be devoted to the relationship of cannabis use and other form of deviance behavior. Social facilitation is the more important reason to cannabis consumption during the university life, thus is probably linked to psychological reasons; many students who attend college are living away from home, and the indirect family control, for the first time. This experience could be difficult and also faced new challenges as friendship, living arrangements. Future studies should examine the specific transition patterns from non-problematic and problematic cannabis consumption, as well as determine the contextual nature of this transition. This survey was confined to students from a single university, thus the primary findings may not be generalizable to students at other bigger/smaller, public/private institutions. Another limitation is the relatively small number of students that was used in the various statistical analyses. Sampling individual students and individually questionnaire could affect the truthfulness of answers and therefore bias the results of the study. Therefore, these findings should be taken as preliminary until more robust research, with bigger sample and variables, could confirm the estimates obtain or produce new findings. According with the aims of this paper, the early identification and treatment of students who are using cannabis is a critical challenge for universities and to the implementation of social policies. However, as is showed by literature, the most common disorders in college students were alcohol use disorders and nicotine dependence, cannabis use assume important priority in public health. As it is possible to deduce, effective methods to reduce the number of cannabis smokers at university including skills, motivational and personalized interventions in order to reduce this deviant behavior (additional prevention and intervention efforts could be implemented at many levels, including the organizational and institutional). For this reason, this study wants to be a useful tool for identifying students who may be at risk, as well as those likely to become at risk for developing a deviant behavior problem in the future.

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# A Review on Heavy Metals Accumulation in Coastal Bivalves used in Seafood Industry: Guide to Safely consumption of Seafood

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**Abstract-** Bivalve is one of the most nutritionally balanced seafood but is highly correlated with heavy metal toxicity and ultimately causing public health impacts. Several biological and geochemical factors are influencing the uptake and bioaccumulation of heavy metals in bivalves which leads to destroy aquatic ecosystem and becoming risk of food consumption. Cadmium, lead, copper, zinc and mercury are widely reported as trace metals bioaccumulation in bivalves due to industrial wastages and domestic discharges from urbanized areas. Though, a number of studies have performed to identify the presence of heavy metals in different bivalve species, limited researches have exclusively focused on relationship between nutritional composition and available heavy metals in different bivalve species with regards to safe human consumption.

**Keywords-** Bioaccumulation, Bivalve, Heavy metals, Seafood

## I. INTRODUCTION

Pollutants are substances that affect the physical, chemical and biological characteristics of biotic and abiotic components of the ecosystem, thereby, posing a threat to biodiversity [16]. In the sequence, heavy metal is a major pollutant in ecosystems that could be lethal to living organisms including humans [23]. Heavy metals are referred as metals which have an atomic weight higher than sodium and a specific gravity more than 5.0 [28]. They are considered as the most important form of pollution in the aquatic environment because of their toxicity and accumulation by marine organisms.

Molluscs are a very diverse invertebrate that is broadly distributed throughout the world. Among the molluscans, bivalves are highlighted due to their economic values in the world export market and also a well-known for seafood products. Depledge and Rainbow (1990) [4] stated on the significance of trace metal levels with regard to the well-being of marine invertebrates and their use in bio monitoring studies. Though, they are highly characterized in seafood industry and environmental sciences, it has some potentials to cause public health issues by the way of transferring concentrated heavy metals in their tissues to human body as a seafood. Thus, the study on heavy metal bioaccumulation in coastal bivalves provide significant information on the potential impact of seafood on public health to minimize health risks.

## II. NUTRITIOANAL BENETITS OF BIVALVES

The per capita consumption of seafood is rapidly increasing with the fast growth of world population. In the modern world, people have started giving more priority to their health consciousness, so, in order to fulfill the required nutrients, the consumers are initiated to pay additional attention in taking of seafood in view of its nutritional superiority than all other accessible and available food sources [14]. Nevertheless, lack of research studies have been focused on bivalve with regard to their nutritive value for human consumption.

Idayachandiran *et al.* (2014) [14] reported that the tissue of *D. cuneatus* coastal bivalves contain 80.56% of both essential and nonessential amino acids. The total amino acids composition in *Perna viridis*, *C. madrassensis* and *Meretrix casta* was about 95.76, 98.4 and 65.17% respectively. The results revealed that *D. cuneatus* bivalve meat is a potential source for food value due to high quality protein, as well as balanced essential amino acids. Other than proteins and amino acids, the bivalves are rich with fatty acids profile. The total percentage composition of saturated fatty acids (SFA), mono unsaturated fatty acids (MUFA) and poly unsaturated fatty acids (PUFA) was about 35.93, 14.16 and 34.84 % respectively in *D. cuneatus*. Further, C16:0 and C18:0 were found to be predominant fatty acids in *Mytilus plantensis* [14].

Generally, seafood products provide a significant and healthy part of the human diet because it provides an inexpensive source of easily digestible proteins with a high biological value, essential minerals such as iodine and selenium and vitamins including vitamins A, D and B12 [26]. Additionally, the bivalve muscle contains little saturated fat and significant amount of Vitamin C. They are also a good source of minerals such as calcium (Ca), potassium (K), zinc (Zn), iron (Fe), phosphorus (P) and copper (Cu). However, there must be a safety concern related to the consumption of seafood products due to the presence of a wide variety of chemical contaminants especially heavy metals.

## III. IMPORTANCE OF BIVALVES AS BIOINDICATORS

Discharge of untreated domestic sewage primarily from densely populated areas [2], industrial effluents and mining wastes are introduced significant amount of trace metals into marine environment often resulted in vulnerable ecological and environmental degradation [6] [32], ultimately this

circumstance become more threatening to the survival of aquatic organisms. As the consequences, natural habitat of aquatic organisms is widely destructed and their natural occurrence of biodiversity is also dramatically getting depleted<sup>[5] [18]</sup>. The heavy metal concentration of Zn and cadmium (Cd) were reported at the industrial zone in 1147 - 3500 µg/L and 15.2 - 17.9 µg/L individually. This condition was to be possible for induction of synergistic effects on smaller aquatic organisms<sup>[27]</sup>. Thereby, continuous assessment on monitoring processes of pollution problems in the coastal environment become more essential to protect the incredible natural resources, moreover engage with research activities on distribution of heavy metals in the aquatic ecosystem in environmental pollution.

*M. casta* has been commonly used to study about bioaccumulation and toxicity of heavy metals<sup>[19] [30]</sup> and it could also be used as a biological indicator for early detection of pesticide pollution<sup>[5]</sup>. *M. casta* is the only commercially important bivalve in the western and northwestern part of Sri Lanka<sup>[17]</sup>. As well these areas are recently undergone to urbanization, thus, detection of heavy metals in *M. casta* bivalve is more important to prevent public health issues.

Bioaccumulation of contaminants from sediments to benthic organisms and their subsequent transfer through the food web provides an exposure pathway to higher-level organisms. Benthic molluscs have proved as useful bio monitors in marine and estuarine ecosystems<sup>[21]</sup>. Variation of heavy metal concentrations in different bivalve species was assessed in Malaysian coast<sup>[35]</sup>. However, use of benthic invertebrates for an instance bivalve as bioindicator organisms has several advantages because of their limited mobility and shell size<sup>[12]</sup>. Nevertheless, it has also some drawbacks such as most of the benthic organism have short life cycles and have a stronger seasonal cycles in abundance and activities<sup>[12]</sup>. Therefore, the assessment of the levels of heavy metals pollution in bivalves which are used as bioaccumulation indicators has become an important task in preventing risks to public health.

A number of studies have reported that the green mussel (*Perna viridis*) is a potential biomonitoring agent for heavy metals in the aquatic environment<sup>[3] [15] [29] [34]</sup> and there was a significant correlation between mussel and concentration of mercury (Hg) and Cd in sediment. Sediments are an important source of metals to filter feeders, among mussels and oysters<sup>[35]</sup>. Soft mussel tissues of *P. viridis* is suitable to be used as a bioindicator for heavy metal contamination due to its natural capacity to accumulate elevated concentration of Hg, lead (Pb) and Cd.

#### IV. FACTORS INFLUENCE ON HEAVY METALS BIOACCUMULATION

Bivalves have great ability to concentrate heavy metals such as Cd, Pb, Zn and Cu from sea or their food<sup>[22]</sup>. The mechanism of bioaccumulation of trace metals in bivalves are mainly depend on biological and geochemical factors<sup>[1]</sup>. Biological factors include age, size, sex, genotype, phenotype, feeding activity, reproductive state and physiological conditions of the animals whereas geochemical influences are different sampling locations, seasonal fluctuations<sup>[36]</sup>, salinity, temperature, pH, sediment grain

size, dissolved oxygen, water hardness and hydrological features of the system<sup>[9]</sup>. However, researchers were failed to detect the biochemical pathways by which trace metals are concentrated in sea water by organisms.

Climatic changes primarily rise of environmental temperature would enhance accumulation of pollutants such as trace metals and pesticides in aquatic organisms. The concentration of Zn (1.92 - 255.16 mg/kg) in bivalves was very high compared to other metals like chromium (Cr), Cd, Pb, Zn and Cu with maximum concentration during pre-monsoon<sup>[31]</sup>. The similar finding was stated by Eustace, (1974)<sup>[10]</sup>, that accumulation of Zn in mussels and oysters were higher than the permitted limit. High concentrations of Zn, Cu, Fe, manganese (Mn), and Hg in oyster (*Crassostrea madrasensis*) tissues from Cochin harbor indicated that the concentrations were higher during breeding period and also when the salinity is comparatively higher in estuary during October to April<sup>[24] [31]</sup>. Therefore, researchers have introduced culturing of seafood species which can able to withstand in extreme temperature, salinity and low quality water factors.

Moreover, biological activity which emphasizes the uptake and storage of heavy metals by bivalves have sound relationship with the chemical state of heavy metals in the water because past studies have proved through the experimental studies on the uptake of Pb and Cd in mussels (*Mytilus edulis*) in the sea water while in the natural state<sup>[13]</sup>. The study has stated that Pb was densely accumulated mainly in kidneys when Pb was available in the form of labile inorganic complex but when Pb was complexed with citrate a drastic increment of the metal was observed in all the tissues and the highest concentration again found in kidneys. Thus, aggregation of heavy metals in bivalves could be controlled by the way of converting the chemical state of heavy metals into either an inactivated form or inaccessible biological form and the effective application of waste water treatment to industrial pollutants before releasing into the sea.

Sevillano-Morales *et al.* (2015)<sup>[33]</sup> stated that presence of mercury level shows a great variability among marine species by which mercury concentrations were significantly lower in bivalves than other type of marine species though bivalves have filtering diet pattern. Yap *et al.* (2007)<sup>[35]</sup> mentioned that there is also a strong correlation between uptake and accumulation of trace metals in filter-feeders whereas they accumulate metal concentrations in water. Consequently, the aquatic biodiversity is being destroyed due to often disposal of waste materials into coastal areas. As a result, aquatic living organisms become dangerous and threatening organisms to human being in terms of food.

#### V. EFFECT OF CONSUMPTION OF SEAFOOD

Jensin and Jernelov, (1969)<sup>[18]</sup> has reported that hazards to human health are also caused by frequent consumption of seafood due to the high concentration of heavy metals in aquatic environment. Since bivalve molluscs are owned at the top position in aquatic food chain, seafood concentrates high levels of Pb, Hg and Cd like heavy metals in their body<sup>[2] [23]</sup>. Pregnant women, breast feeding mothers and young children are more vulnerable groups who can easily affected

by contaminated food with high toxicity. Thus, the European Food Safety Authority (EFSA) recommends the above-mentioned groups to take account on a different variety of fish species in order to minimize the risk related to Methyl-Hg accumulation to toxic level, but to reduce the predatory fish consumption such as swordfish and tuna as well as seafood products<sup>[8]</sup>.

Pastorelli *et al.*, 2012<sup>[26]</sup> proved that the mean concentrations of Cd in blue mussel and carpet shell clam were 616 mg/kg and 159 mg/kg respectively. The highest level of Cd concentration was observed in blue mussel and amounted to 70% of the maximum limits established for these seafood species. However, Pb concentration was comparatively lower than Cd in blue mussel that was about 166 mg/kg, despite, blue mussel showed higher Pb concentration than carpet shell clam. Therefore, EFSA and the Food and Agriculture Organization/ World Health Organization (FAO/WHO) Joint Expert Committee on Food Additives (JECFA) are specified the tolerable weekly intakes (TWI) and provisional tolerable weekly intakes (PTWIs) for Cd, Pb and Hg in human consumption.

Lakshmanan and Nambisan (1983)<sup>[20]</sup> described the ability of *P. viridis* to concentrate considerable quantities of heavy metals like mercury, copper, zinc and lead from the environmental water in their tissues especially in gills. Dumalagan *et al.* (2010)<sup>[7]</sup> has studied about the presence of trace metals in soft tissues of mussels (*P. viridis*) obtained from selected seafood markets in Manila and reported that highest values were obtained only for copper and lead with of 10.4 mg/kg and 2.3 mg/kg respectively, however, those obtained values are exceeded the Partnerships in Environmental Management for the Seas of East Asia (PEMSEA)<sup>[25]</sup> guideline for safe human consumption and thus, represents a health risk.

Fang *et al.* (2003)<sup>[11]</sup> outlined that the recovery rates of heavy metals in South China bivalves with respect to certified reference values which is represented in Table 1. Significant differences ( $p < 0.05$ ) were observed between highest and lowest values for each metals in oysters, clams and mussels with regards to different coastal sites in South China. Fang *et al.* (2003)<sup>[11]</sup> concluded that although Cd and Cr concentrations in the three bivalve species exceed the local regulatory levels, only Cd levels of oysters collected from the western bank of Lingdingyang waters are higher than both the human daily acceptable limits and the local regulatory levels, therefore, proper precaution should be implemented in consuming a large numbers of oysters for extended periods.

Table 1. Certified values of the standard reference material (Standard Oyster Tissue 1566a) and the recovery percentages of different metals.

	Cd	Cu	Zn	Pb	Ni	Cr
Certified values, µg/g dry weight	4.15 ±0.38	66.30 ±4.30	830 ±57	0.37 ±0.01	2.25 ±0.44	1.43 ±0.46
Concentration found, µg/g dry weight	3.94 ±0.13	60.88 ±2.21	807.8 ±14.9	0.37 ±0.64	2.09 ±0.20	1.43 ±0.25
Recovery	94.85	91.73	96.98	99.40	92.97	100.3

percentage	± 3.1	±1.73	±1.80	±18.4	±8.63	±17.2
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Moreover, *P. viridis* are usually consumed nutrient dissolved in polluted seawater then hazard materials will be accumulated in soft tissues. Putri *et al.* (2011)<sup>[29]</sup> mentioned that there were no significant differences ( $p > 0.05$ ) observed to accumulate heavy metals with respect to their body size. Further, FAO determined that regular intake of human consuming mussels (at 40 µg/100 ml of lead in blood) causes health effect on central nervous system which shows clinical symptoms like fatigue, headache, anemia and paralysis of the nerves. Prolonged exposure may lead to coma, mental retardation and death. Hence, frequent intake of seafood products is not good and recommended for human health. Thus, an awareness program should be performed to the general public regarding the potential hazard associated with consuming metal-contaminate seafood.

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# A review of utilization of Mollusca shell for the removal of contaminants in industrial waste water

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**Abstract-** Bio-sorption is a promising technology for the removal of contaminants like nutrients, textile dyes, organic matter and heavy metals which have hazardous effects on the aquatic ecosystems. In recent years many low cost sorbents such as algae, fungi, bacteria and agricultural byproducts have been investigated for their bio-sorption capacity towards water contaminants. But less attention has obtained my Mollusca shell as a waste material for the utilization of bio- sorbent due to its composition and availability. The studies conducted with the focus of utilizing Mollusca shell has confirmed that the propensity of shells to remove contaminants in waste water as a single component and combinations with other materials.

**Index Terms-** Bio-sorption, Mollusca shell, Contaminants, Removal

## I. INTRODUCTION

The environment is the place in where all the living and non-living beings had been interconnected and interrelated with each other with having little interference to others lives. However, with the emergence of the industrial revolution, urbanization and with the increase in technological development, anthropic activities have resulted in substantial and notable increase of toxic pollutants in the environment. Worldwide consciousness of crisis over environmental pollution problems is spreading and especially countermeasures to solve the environmental pollution come into the limelight as concerns of the entire globe beyond any regions and nations.

Water resources are of paramount and exclusive importance to all ecological communities as well as for the human growth and development. According to a report compiled by the World Economic Forum in collaboration with, Oxford University, University of Pennsylvania, and National University of Singapore, water crisis ranks 3rd in the Global Risks in the year of 2014 (Naik *et al.*,2016). With the view point of 'dilution is the solution for the pollution' water bodies became as one of the prime sources, when contaminated with noxious pollutants like heavy metals, organic toxicants, reactive textile dyes, and fluorides that disrupt and destroy the fragile ecology in where all the living beings are inter-related. Promiscuous discharge of contaminants have resulted in its accumulation in the aquatic biota leading to its bio-magnification which generates and induces health hazards in humans and other living organisms substantially.

Heavy metals are among the conservative pollutants that are unable to undergo a bacterial attract or bacterial digestion or degradation process and they are considered as permanent additions to the marine environment (El-Nady and Atta, 1996). As a result of this, their concentrations often exceed the permissible levels normally found in soil, water ways and sediments. Hence, they find their way up the food pyramid (Igwe and Abia, 2006). When they accumulate in the environment and in food chains, they can profoundly disrupt biological processes. Therefore, a complete understanding about noxious effects caused by the release of toxic metals into the environment and the emergence of more severe environmental protection laws, have encouraged studies about removal/recovery of heavy metals from aqueous solutions using various techniques and technologies.

A variety of technologies such as chemical oxidation, precipitation, ion exchange, reverse osmosis and membrane separation has been adopted for the removal of contaminants in water such as heavy metals, dyes and organic and inorganic substances (Wang and Chen, 2006). However, chemical precipitation and electrochemistry, ion exchange, membrane technologies and activated carbon adsorption are extremely expensive and pave the way to generate secondary pollution and/or produce a large amount of sludge that is difficult to treat. For instance Activated carbon is only able to remove around 30-40 mg/g of Cd, Zn, and Cr in water and is non-regenerable, which is quite costly to wastewater treatment (Babel and Kurniawam, 2003) but also chemical precipitation and electrochemical treatments are ineffective, especially when the metal ion concentration in the aqueous solution is between 1mg/L and 100mg/L (Wang and Chen, 2006).

Adsorption is the ability of the adsorbate to adhere or attach to the adsorbent. It is a well-established separation technique to remove dilute pollutants as well as to recover valuable products from aqueous solutions. In the conventional adsorption process, the particle size of the adsorbent is restricted because of hydrodynamic phenomena such as pressure drop (Chia-Chang and Hwai-Shen, 2000). Adsorption is divided in two categories according to the forces that are made in between adsorbate and adsorbent. First one is generated due to forces of physical nature called van der Waals force which is relatively weak, since they are not sufficiently strong to influence appreciably the reactivity of the molecule adsorbed. The second type is considerably stronger. In there the adsorbed molecules are held to the surface by valence force of the same type as those occurring between bound atoms in molecules. This is known as chemisorption and the heat evolved is of the order 10 to 100 kcal/mole, compared to physisorption which has less than 5 kcal/mole (Motoyuki, 1990).

Adsorptive removal of heavy metals from aqueous effluents which have received much attention in recent years is usually achieved by using activated carbon or activated alumina (Shim et al., 2001; Ouki et al., 1997; Hsisheng and Chien-To, 1998; Monser and Adhoun, 2002). Activated carbon is a porous material with an extremely large surface area which is capable of generating intrinsic adsorption potential with many chemicals. Polymer resins that can form complexes with the heavy metal ions are the best adsorbents (Lu et al., 1994). These are called conventional adsorbents and many others have been reported such as silica gel, active alumina, zeolite and metal oxides (Motoyuki 1990).

Biosorption or bioremediations consists with wide range of applications which involve the detoxification of hazardous substances instead of transferring them from one medium to another by methods of microbes and plants. This process is considered as less disruptive and can be often carried out on site, eliminating the need to transport the toxic, materials to treatment sites (Gavrilescu, 2004). Bio sorbents are prepared from naturally abundant waste biomass. Due to the high uptake capacity and very cost-effective source of the raw material, biosorption is a progression towards a perspective method not only utilization of naturally available materials as emergent need of present and future to reduce the waste generation not only in industrial processes but also from pollution remediation. The use of naturally available materials as biosorbents has many advantages over the aforementioned methods (Wang and chen, 2006) as they are considered as an effective remediation strategy due to its low cost and relatively simple design. To date, many such absorbents have been studied, including chitosan, zeolites, microorganisms, clay, and waste products from industrial operations such as fly ash, coal and oxides (Babel and Kurniawam, 2003).

Bivalve mollusk shells are available and very common by-products during sea food processing, and are very common around the coasts of many coastal countries. Therefore they can be brought free from the local markets and industries. The research application of mollusca shells as a biosorbant for removing contaminants from the environment is judged to be very helpful in preserving eco-systems, preventing the damage of natural landscape and solving health problem. Therefore, new applications for utilizing these wasted Mollusca shells are expected to contribute towards recycling consciousness within the society [Asaoka et al., 2009].

## II. IMPORTANCE OF UTILIZING MOLLUSCA SHELLS FOR WASTE WATER MANAGEMENT

Pertinence of mollusk in both live form and waste shell is very crucial for the waste water management practices due to many reasons. First one is their propensity to remove contaminants through bio- filtration process by live specimens and bio-sorption processes by the shells of mollusks. In here we only consider about the ability of Mollusca shell as a waste or byproduct to remove wastes by bio-sorption process that are generated in industrial processes.

Mollusks include many of the most important seafood such as abalone, clams, mussels, oysters, octopus, squids, scallops and terrestrial snails. From many of these animals only mussel part is consumed as a food. Therefore the shell or skeletal part is removed as wastes or byproduct which is subjected to generate ecological and social problems. For instance, a large amount of oyster shells is a general waste that fishermen should take care of but it seems difficult to handle it effectively due to the problems of securing of landfill sites and collection/transportation of oyster shells [Jung, 2005, 2007]. This waste bulks at coastal areas generate many environmental problems including pollution of coastal fisheries, damage to natural landscape, management of public water surface and health hazards. According to Kim, 2007 generation of oyster shell is estimated on the average at 270,000tons/year and more than 50-70% of them are dumped into waters bodies and reclaimed lands. This pave the way to cause a disagreeable fishy odour by virtue of decomposition of fresh remnant attached to oysters (Kim, 2007; Yoon et al., 2003).

Generally shellfish wastes is classified into category-3 animal byproducts and must be handled and treated to the same standards as other animal byproducts. This means that it should only be treated or disposed of through facilities that are licensed specially to take that category product according to the requirements of Animal Byproduct Regulations (ABPR). Thereupon reusing and recycling has emerge as forthcoming and inevitable issue in mariculture industry. Recycling and reusing of Mollusca shells has various applications including as a construction material (Yoon et al., 2003), as a fertilizer, larval farming (Nippon, 1993), eutrophication control (Kwon et al., 2004), soil conditioner (Lee et al., 2008), sludge conditioner (Lee et al., 2001), catalysts (Nakatani et al., 2009), and desulphurization sorbents (Jung et al., 2000). Apart from these applications, the utilization of Mollusca shell for waste treatment is an upcoming expectation for future because not only it's availability but also its composition.

The Mollusca shell is an organo-mineral composite, where the dominant mineral is aragonite, or calcite, or in particular cases, vaterite. It is internally associated to an organic matrix, which accounts only for 0.1–5% of the shell weight. This matrix represents amalgamate of proteins, glycoproteins, chitin and acidic polysaccharides, secreted by the calcifying tissues during skeletogenesis. This organo- mineral mixture is consequently sealed within the skeleton during their growth. At macroscopic level, the adjunction of organic components to a mineralized structure enhances the mechanical properties to the whole organo-mineral assembly. At molecular level, the matrix plays a key role in the mineralization process (Marin et al, 2008). Metal absorbance is related to elimination of  $Ca^{2+}$  on shell surface and exposure of more functional groups that can bind contaminants specially metal ions to the shell surface.

### E. Sorption potential estimation

A sorption experiment was conducted using 100ml sorption systems that contained 1g of bivalve shell powder and different initial concentrations of metal solutions (Ex; ranging from 100mg/L to 1400 mg/L). The resulting supernatant was then

analyzed for the presence of residual copper by atomic absorption.

### III GENERAL METHODOLOGY

#### A. Pretreatment of the Mollusca shells

Collected shells were washed using water and dried in sun for about 8-10 hours and crushed them using mortar and pestle to form small pieces and these pieces were powdered using mixer. Prior to use as an absorbent, the powdered Mollusca shell were washed for 10 minutes at 100rpm with distilled deionized water and after that they were collected by centrifugation at 2000rpm for 5 min. Then the precipitate of Mollusca shell was dried at room temperature.

#### B. Acid treatment

An aliquot of the dried Mollusca shell precipitate was acid-treated for 60 minutes at 100rpm by soaking the solution in 1M H<sub>2</sub>SO<sub>4</sub>, after which the resulting shell powder was collected by centrifugation. Another aliquot of the dried shell powder precipitate, as a control, was parallel-treated with distilled deionized water

#### C. Base treatment

An aliquot of the dried Mollusca shell precipitate was base-treated for 60 minutes at 100rpm by soaking the solution in 10% of 250mL NaOH solution, then remaining shell precipitate was collected by centrifugation. Same as the acid treatment another aliquot of dried shell powder precipitate was parallel treated with distilled deionized water as a control.

#### D. Sorption experimental procedure for heavy metals

Sorption experiments were conducted in batches in Erlenmeyer flasks (generally 250mL is used) that contained 100mL of solution containing the metal salt(s) or 100mL of the actual wastewater. The required amount of powdered Mollusca shell was added to each flask and sealed with a cap and subsequently shaken for the required time at 200rpm at the indicated temperatures. Then immediately flasks were centrifuged at 4800rpm for 5 minutes in which supernatant was collected which was directed to atomic adsorption analysis. The removal efficiency of specific heavy metal was calculated using following formula,

$$Q = C_0 - C_1 / C_0$$

In where,

Q= The removal efficiency of specific metal (%)

C<sub>0</sub>= Initial concentration of specific metal (mg/L)

C<sub>1</sub>=Residual concentration of specific metal after sorption (mg/L)

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### IV RESEARCH FINDINGS AND FUTURE PROSPECTS

Jatto et al, 2010 conducted a research to investigate the suitability of snail shell (Achatina achatina) as an adsorbent or coagulant in waste water treatment collected water from food industry located Edo state which is specialized in the production of corn flakes

a  
a  
methods for waste water and effluent analysis (Ademoroti, 1996).

Parameter	Results before treatment	Results after treatment
pH	5.42	6.42
Colour	Dark brown	Light brown
Turbidity	332 NTU	133 NTU
Temperature	20 °C	20 °C
Conductivity	0.294 Mscm <sup>-1</sup>	0.164 Mscm <sup>-1</sup>
Total Suspended Solids	0.814 mg/L	0.184 mg/L
Total Dissolved Solids	15600 mg/L	15200 mg/L
Total Solids	15600.8 mg/L	15200.2 mg/L
Ammonium Nitrogen	0.085 mg/L	0.015 mg/L
Nitrate	41.08 mg/L	13.32 mg/L
Sulphate	58.11 mg/L	15.46 mg/L
Phosphate	0.173 mg/L	0.00 mg/L
DO	1.14 mg/L	2.16 mg/L
BOD	29.27 mg/L	19.77 mg/L
COD	872 mg/L	215 mg/L

The increment of pH value after treatment indicates slightly alkaline condition due to presence of Calcium Carbonate in the shell (Aboua, 1995). According to the stability studies conducted shows that snail shell powder was stable for wide range of pH values and according to optimum dosage measurements done by using turbidity and COD as an index shows that 3.3g-3.4g per 100mL of shell had ability to coagulate or treat waste water effectively (Jatto et al, 2010).

Phosphate was completely removed from the treated water sample. This is a result of the presence of calcium ion in the shell. Calcium has the ability to react with phosphate ion resulting in the formation of calcium phosphate and calcium hydrogen phosphate which can be removed by filtration (Jatto et al, 2010).

Many researches were conducted to investigate the efficiency of removing heavy metals and contaminants by using Mollusca shell powder as a bio sorbent. Removing of heavy metals like mercury, Cadmium, Arsenic, Lead, Nickel by using raw materials available in nature like crab shell powder, oyster shell powder and bivalve shell powder as redundant and bio- sorbent was contacted by Naik, 2016. Bivalve shell powder and Oyster shell powder showed 98% to 99% removal for all metals except arsenic for which Bivalve powder showed 91% removal and Oyster powder showed 85% removal. In life cycle assessment

Bivalve powder and Oyster powder showed 100% removal for Cadmium and Lead for all 10 cycles that they conduct the experiment. The adsorption of metals followed the trend: Mercury > Lead > Nickel > Fluoride > Cadmium > Arsenic. Mercury and Lead removal was found to be 100% followed by Lead which showed 99% removal. Nickel and Cadmium showed almost 98%-99% removal for all materials tested (Naik, 2016). Adsorption capacity of metals by adsorbent on acid digestion has dramatically reduced in both Bivalve shell powder and Oyster shell powder for Nickel and Mercury and overall capacity for all metals has declined after acid digestion. Adsorption Capacity of Metals by adsorbents on base digestion has increased for all metals (Naik, 2016).

It has been reported that pretreatments that were conducted for absorbants by physic-chemical processes have ability to ameliorate the propensity of heavy metal removal (Wang and Chen, 2006). For instance acid pretreatment with Sulfuric acid can improve the copper sorption capacity of bivalve molluscan shell powder (Yang et al, 2009).

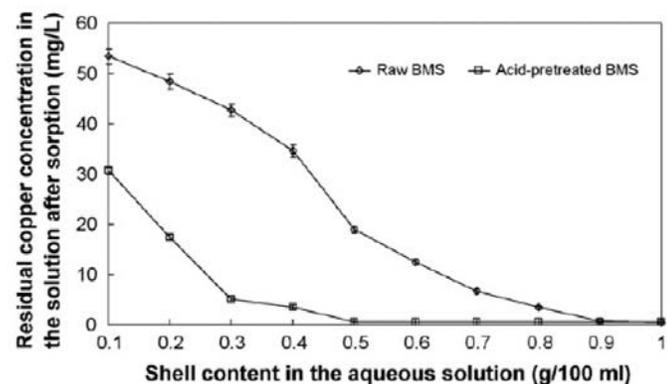


Figure 4.1: Variation in copper removal with bivalve mollusca shell powder dosage in the sorption system

Regardless the nature of the material (raw or acid treated) the copper removal efficiency has increased with the amount of bivalve shell powder increased. Especially copper removal efficiency has increased in expeditious way until a dose of 0.5g/100mL and when dose reach more than 0.5g/100mL the removal efficiency performed by raw bivalve shell powder continued to increased rapidly while acid treated bivalve shell powder become low in its efficiency (Yang et al, 2009). Depending on the absorbent and process employed in most cases alkali and acid treatment of absorbent enhance the metal sorption capacity, whereas acid treatment has almost has no influence on metal sorption (Vianna et al, 2000). For the raw bivalve shell powder, good copper removal efficiencies were observed when the CuSO<sub>4</sub>·5H<sub>2</sub>O concentrations were less than 400mg/L; however, the removal efficiencies declined sharply at higher concentrations (Yang et al, 2009).

It is crucial to optimize the contact time for heavy metal removal in waste water management practices and industry. Both raw and acid treated bivalve shell powder demonstrated high copper removal efficiencies when the contact time is less than 90

minutes and their efficiencies after 90 minutes contact were 99.33% and 99.94%, for raw and acid-pretreated bivalve shell respectively (Yang et al, 2009), indicating a rapid copper sorption similar to the biosorption of fungal biomass (Wang and Chen, 2006)

Physico-chemical parameters like pH and temperature are very important factors of sorption ability of the sorbent.

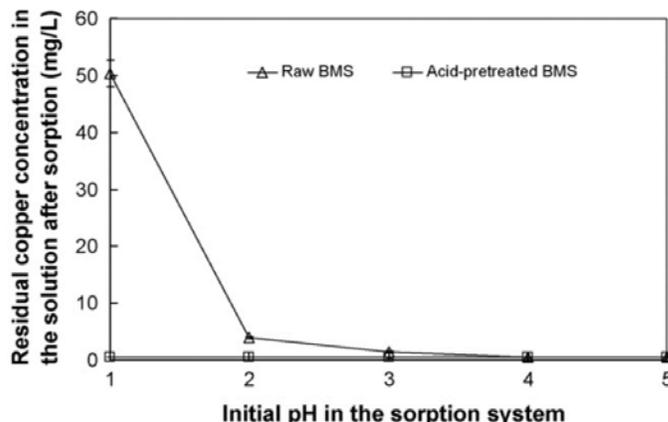


Figure 4.2: Effect of initial pH of the solution on copper removal.

The effect of pH on the removal of heavy metals can usually be explained by strong influences on site dissociation at the surface of the absorbents as well as by the solution chemistry of the heavy metals (Wang and Chen, 2006) and the pH is one of the most important environmental factors. The optimal pH for the sorption of metal ions varies among systems. For example, the optimal pH value for the removal of copper by *Saccharomyces cerevisiae* is 5–9 (Volesky, B, 1990), whereas it is 1.5–9.0 for removal by industrial by-products such as iron/steel slag (Kuniawan et al, 2006). Copper removal efficiency of raw bivalve shell powder was lowest when the pH value was 1 and while increasing the pH value removal efficiency has increased upto 99.5%. Throughout the entire pH range acid treated bivalve shell powder showed high removal efficiencies (Figure 4.2) involved in the sorption of heavy metal ions (Yang et al, 2009).

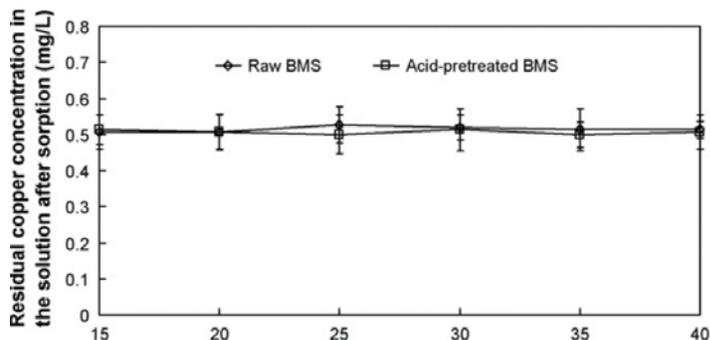


Figure 4.3: Effect of temperature on copper removal

It is believed that sorption reactions are generally exothermic in where bio-sorption capacity increases as temperature decreases (Kapoor and Viraraghavan, 1997). At the same time this decrease in bio-sorption capacity at higher temperatures likely occurs due to damage to the active binding sites in the biomass (Ozar and Ozar, 2003). This difference is mainly dependent on the nature of the adsorbent and/or species of metal. According to Yang et al., 2009 both raw and acid treated bivalve shell powder demonstrated higher and stable copper removal efficiencies in the range of 15°C- 40°C reaching the 99.5% efficiency approximately (Figure 4.3).

Not only as a single bio-sorbent but also Mollusca shell was utilized in combinations with other naturally available materials to obtain higher efficiency. The study was conducted to examine the effectiveness of 4.0–4.75mm crushed shells and *Sphagnum* peat moss as low-cost natural adsorbent filter materials for the removal of cadmium and nickel ions from binary aqueous solutions (Li and Champagne, 2009). Cadmium and nickel were selected as representative heavy metals commonly found in metal rich wastewater such as landfill leachate (El-Gendy et al., 2006). Crushed mollusk shells were found to be a better filter medium for cadmium removal, while the *Sphagnum* peat moss was noted to be the better filter medium for nickel removal. The highest overall cadmium and nickel removal efficiencies were noted to be 47.9% and 42.7%, respectively, in the 10cm diameter fixed-bed column packed with a 15cm depth of mollusk shells, hydraulically loaded with a nickel and cadmium binary solution at a rate of 1.5 mL/min (Li and Champagne, 2009).

As a waste material which is generated in food industry mainly Mollusca shell has high propensity to use for the applications of bioremediation. Though many researches were conducted by using Mollusca shell (mainly bivalve shells) as a bio-sorbent for removing contaminants in water very few number of species were selected for the experiments. Owing to the composition and abundance of shells, Mollusca shell can be tested for various contaminants not only for heavy metals but also for fluorides, dyes and eutrophication responsible nutrients like nitrate and phosphates. By utilizing the combinations of naturally available materials, the absorbance efficiency of contaminants can be increased while considering the specific characteristics of the materials. Limited scope and researches were conducted for air pollutant removal by using Mollusca shell. After pretreating processes low reactive calcium component (in the form of calcium carbonate) can be converted into calcium oxide and calcium hydroxide that readily react with acid gasses.

The application of many kinds of waste shells, which have been dried, crushed and calcined to sorption of contaminants and heavy metals in water is not only economically valuable but also very important in the aspect of waste recycling. This manner of water treatment is highly economically feasible due to not having sludge generation unlike other techniques and these adsorbents, being biological, are easy to dispose of without concerns of degradation. This is one of the green technology where there is an almost insignificant amount of energy consumption at the initial stage for the preparation of bio-adsorbents from raw materials; apart from this, the entire process is passive. The water

obtained after purification can be used for various domestic and agricultural purposes, and with further treatment steps can be obtained potable quality water

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# Contribution of museums, census, mapping, high resolution photographs and audio-recording to the extinction of endangered species

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**Abstract-** To cope with extinction crisis, museums have a crucial role to play in preserving the life of every possible individual. Museum collections provide essential verifiable evidence of species occurrence over time and space and thus permit rigorous taxonomic, biological and ecological investigations. Two of the basic tasks required for census are gathering data on presence and abundance. By placing stickers on the wing of insect with identification information, migration patterns of insect including how far and where they fly is studied. Using mapping and visualization tools, endangered species and their vital habitats are protected. A new computer technology i.e. remote monitoring of wildlife sounds is used to listen multiple bird sounds. Thus, sound changes due to habitat loss or climate change is significant in the present study.

**Index Terms-** Museum, Photographs, Remote monitoring of wildlife sounds, Endangered species, Census

## I. INTRODUCTION

Since time immemorial, it has been a necessary evil for natural history to kill animals (Wheeler,2014). This can, and does, contribute to the extinction of endangered species. To overcome this problem, museums are to be promoted to provide a critical foundation of taxonomy, evolutionary biology, biodiversity research and conservation biology. There are about 1,27,000 species of moths from all over the world (Alfred,1998) and of these, over 5000 species are reported from India (Cotes et.al.,1887-1889). Being largest faunal group play a very important role as agricultural pests (Sharma, 2011), night pollinators (Le Croy et. al., 2013) and indicators of ecological health (Holloway, 1985). As form a major component of the biodiversity of any area, so documentation of this group is indispensable to any scientific study and conservation program. In this light trap, potato trap and fixed time collection methods are used .Via mapping and visualization tool, vital of many invertebrates are protected. Remote sensing of bird sounds helped us to detect sound changes due to habitat loss or climate change .Thus, in present scenario, it has been tried to cope up with this worldwide problem by little and simple efforts.

### Why endangered species?

Although conservation status by IUCN red list category states many animal species which belong to threatened and lower

risk but in the present study the endangered species have been categorised as very likely to become extinct.

### Why so many techniques are studied?

Because of simplicity of these techniques one or two are not enough to combat this worldwide problem. In certain instances, an admixture of two or three are required to justify specific goal.

### What is extinction?

The moment of extinction is generally considered to be the death of the last individual of the species, although the capacity to breed and recover may have been lost before this point.

### Museums: Role in extincting fauna

A lot of research along with museums relies on the collection of wild specimens. It all sounds perfectly reasonable except that almost any taxonomist, ecologist or evolutionary biologist who uses natural history collections for research knows that such solutions would limit the work they could do. Thus, collecting animals for reference and study contribute to the extinction of endangered species.

### How museums play role in conservation?

Museums only had dead stuff because our goal is to share our passion for these beautiful, often misunderstood creatures and draw out the deep and meaningful connections that can be made between our life and theirs. This can introduce ours to the earliest vertebrates on land, the foundation of the food chain and some of the dinosaurs closest cousins.

Traditionally, collecting what scientists call a voucher specimen is considered the gold standard for documenting the presence of a species. These are verifiable and permanent records as they preserve as much of the physical remains of an organism as possible (Glans,1993). Traditional voucher specimen include taxidermied study skins, cleaned skeletal material and spirit specimens.

## MATERIALS AND METHOD

The present study was conducted on village Nawadha Aar located in Sanauli Khurd Block of Panipat District in Haryana, covering a stretch of approximately 1 Km from residential area to crop fields. From May 2014 to April 2016 following opportunistic search, light trap and fixed time, this study was continued. Opportunistic search was carried out in all possible microhabitats i.e. tree bark, leaves, bushes, herbs/shurbs, ceiling/

wall/ floor of houses, on grounds and under street light poles during evening hours of day (6-9 pm). Light trap was also set during the same time period using 160W mercury vapour bulb over a 3x3m<sup>2</sup> white cloth sheet which was hung between two vertical poles. The moth sitting on the white cloth was picked into the killing bottles containing chloroform. Later they were stretched properly using entomological pins and have been kept properly in the insect box for later identification.

**Results and discussion**

During the study 11 species of moth fauna belonging to lepidoptera were recorded from the study area. Lepidopterans

previously reported from this region remained unnoticed and the reason may be that limited area was covered during the study. Similar species reported from Delhi near Dwarka, janakpuri (Paul et. al.,2016) which revealed that among the heteroceran species so far reported from Delhi, 19 species belonging to 17 genera and 6 families are potential agricultural pests of common vegetables and crops of this region. Its highly encouraging to record lepidopteran diversity from this region for the first time. We expect many more species from the area in future through systematic survey species diversity as well as seasonal variations in moth abundance in this region



(A)



(B)



(C)



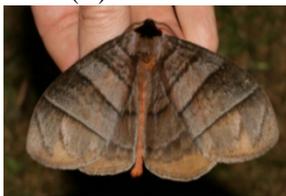
(D)



(E)



(F)



(G)



(H)



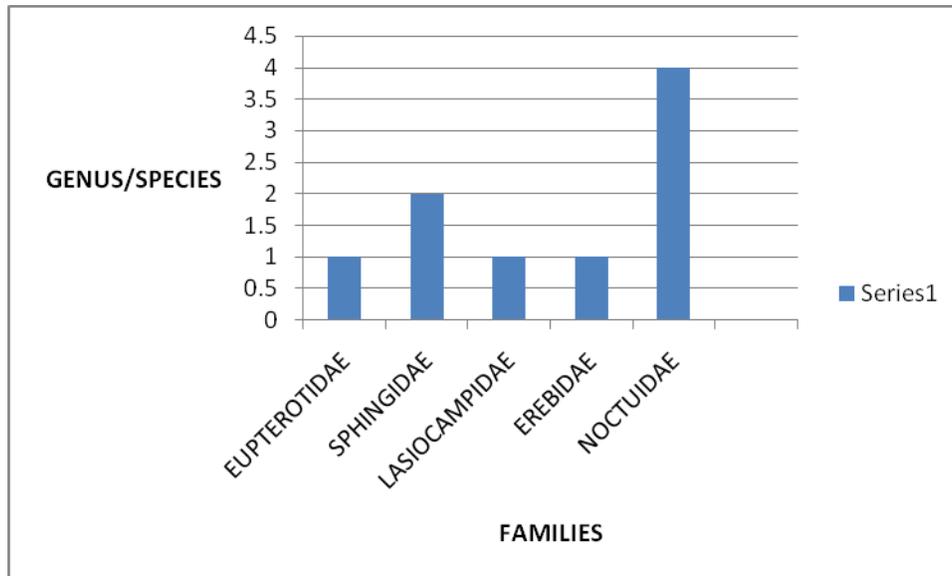
(I)

- A-*Spodoptera exigua*
- B-*Spodoptera litura*
- C-*Helicoverpa armigra*
- D-*Trabala vishnou*
- E-*Agrotis ipsilon*

- F-*Ophiusa triphaenoides*
- G-*Eupterote fabia*
- H-*Theretra oldenlandiae*
- I- *Acherontia styx*

Genus	Common name	Family	Wingspan	Microhabitat
<i>Acherontia styx</i> (Westwood,1887)	Deaths –head hawk moth	Sphingidae	104	Light trap
<i>Agrotis ipsilon</i> (Hufnagel,1766)	Dark sword grass moth	Noctuidae	47-50	Light trap
<i>Eupterote fabia</i> (Cramer,1779)	Monkey moth	Eupterotidae	84	House ceiling
<i>Helicoverpa armigra</i> (Hubner,1809)	Cotton bollworm moth	Noctuidae	35-37	House wall
<i>Ophiusa triphaenoides</i> (Walker,1858)	-	Erebidae	33-41	Grass
<i>Spodoptera litura</i> (Fabricius,1775)	Oriental leafworm moth	Noctuidae	35	Shrub
<i>Spodoptera exiguae</i> (Hubner,1808)	Beet armyworm	Noctuidae	27-30	Light trap

	moth			
<i>Theretra oldenlandiae</i> (Fabricius,1775)	Impatiens hawk moth	Sphingidae	61-70	Light trap
<i>Trabala vishnou</i> (Lefebvre,1827)	-	Lasiocampidae	50	Light trap



**Mapping :What does it mean?**

It was not so long ago that tracking wild animals meant slogging through the forest with a clipboard and binoculars, hoping for a glimpse of an animal or at least a pile of poo. But in recent years, technology has made it possible to track animal movements from a far in more and more detail, whether its albatrosses circling Antarctica, loggerhead turtles migrating across the atlantic or African elephants trying to navigate a landscape increasingly interrupted by human settlements.

Geographer James Cheshire and designer Oliver Uberti (former of national geographic) have dipped into this deluge of data to create 50 beautiful and engaging maps that reveal the wandering of animals captured by satellites, camera traps, drones and other tools. The result is their latest book, “where the animals go” (Miller,2016)

There are many types of indigenous measures to track Nilgai (Meena et.al.2014) such as physical presence of Nilgai in crop fields, use of shinning tapes like video or audio tapes, use of effigy models and scarecrows, live fencing ,use of beating bell.

Nilgai has virtually no Protected Area Status, so there is only a negligible natural habitat left for it. The plantations used by Nilgai as a daytime refuge is only single standing trees. And these areas do not provide much food for the Nilgai except leaves, seeds and fruits of *Acacia tortilis*, *A. nilotica* and in addition, Doob grass, *Cyanodon* sp. . So, a comprehensive strategy is required to conserve and manage the flora and fauna of Nawadha-Aar with the participation of local communities.

**How high resolution photographs can contribute to conservation?**

Conservation and photography appear as two distinct fields, but their combined impact can be profound. According to the acclaimed photographer, Joel Sartore, conservation

photograph shows the same thing, but with a bulldozer coming at it in the background.

Conservation photographs fall into two broad categories, both of which are equally valuable: 1.The snapshot: Upon seeing a striking scene one pulls out a cell phone or point-and-shoot camera, and snaps some quick framed pictures without expanding too much time or effort.2.The carefully crafted image: one sees the same seen, but instead of quickly shooting it and moving on, they take a series of skillfully crafted ,high quality images that tell the story in a more powerful way.

Dramatic framing enhances the influence of a picture.

Some subjects of conservation photography include:

- Destruction/conservation activity inside a protected area
- Habitat fragmentation, ranging from individual tree felling to land clearing for a large hydroelectric project
- Road kills
- Evidence of poaching / hunting such as empty gun shells, snares, jaw traps, skinned carcasses etc.

Thus, in order to create an impact conservation pictures should be put to work for specific causes.

**II. A BENEFICIAL WEAPON FOR HABITAT AND SPECIES CONSERVATION – REMOTE SENSING**

Remote sensing was used in 2009 to identify potential corridors that isolated tiger population could use to travel and connect with each other. A study published in 2012 used remote sensing to locate potential new habitats for critically endangered Cross River Gorillas, which need safe territory in which to bred and expand their numbers. The present study reveals that Nilgai occur in relatively open areas with undulating or flat terrain, avoiding dense forests and preferring scrublands, with low tree

and shrub densities. They are reported to tolerate scarcity of water (Chauhan et. al.,1990)

A future ehabitat will provide tools related to connectivity because connecting two or more habitats allows different, otherwise isolated populations of a species to interact, breed and exchange genetic material, preventing a species from becoming inbred. A new computer technology i.e. remote monitoring of wildlife sounds can listen to multiple bird sounds and sound changes when there is some sort of habitat loss or climate change.

### III. CONCLUSION

After reading, researching and investigating, it is the time to focus on the power of small contribution. To add, if only a drop, of positive momentum to the conservation movements and efforts that have managed to successfully save species all over the world. By constantly applying pressure in the right places and by making examples of the **SAVED** we can keep moving forward in this fight. With the help of unrelenting conservation efforts (driven and maintained by your support and contributions no matter how big or small) various species have been brought back from the brink worldwide.

### ACKNOWLEDGEMENT

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# Unmasking operational supportive Rhetoric in Nigeria: A recipe for national Integration

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**Abstract:** Nigeria is presently overheated with calls for secession and restructuring. This is consequent upon perceived socio-political and economic imbalance, which has bifurcated the polity into the classes of agitators against and beneficiaries of the operative unjust politico-economic system. While those at the receiving end of the imbalance and disequity clamour for re-organization or total renegotiation of the country's unity, the beneficiaries of the present unjust arrangement utilize the mass media to spread their slogans, propaganda and rhetoric. This is done in order to hide the reality of imbalance. This study therefore argues for a demystification of three identified supportive rhetoric operational in Nigeria. It recommends the reawakening and/or raising of critical consciousness among the citizens as a first step towards a praxis of reflection and action, which is hoped to stall this oppressive and manipulative system. The researcher employs the expository and analytical methods of inquiry and further suggests that the unveiling of these rhetoric will encourage transparency and mutual trust, which are prerequisites for national integration and cohesion

**Keywords:** Supportive rhetoric, Polity, National integration, Restructuring

## 1.1 Introduction

An unmasking assignment entails a task to reveal, unveil, disclose or removal of a disguise in order to lay bare a previously hidden phenomenon. This paper aims to uncover nefarious ideologies, which entrench and perpetuate an unjust socio-economic and political system by Nigerian government. By rhetoric here, is meant is an art or discourse that strives to inform, persuade or motivate others to interpret the world, actions or inactions that affect them from a particular perspective. "Aristotle is generally credited with developing the basics of the system of rhetoric that thereafter served as its touchstone" (The Rhetorical.3). However, the power of rhetoric lie in persuasion.

A supportive rhetoric in the context of our discussion delineates all fields of discourse, which are mapped out with established rules, which are legitimated or more correctly, are determined by social practice such that anyone who wants can begin studying, talking and criticizing for all he is worth. As Kelvin Harris explains, "This sort of thing is not merely made available and left at that, people are positively encouraged to engage in the discourse, and so build up a body of rhetoric, provided that they stay within the field, and play according to the rules" (76). The purpose of supportive rhetoric is to make the people see their present states as the best possible world. Supportive rhetoric do not encourage cross border thinking, it is not creative rather, necrophilic. After all, if you keep people jumping all their lives, they might become excellent jumpers, but will never learn to run. This wooly ideology is what informs and underlies the notion of supportive rhetoric. This pernicious type of rhetoric manifests in myriad ways in Nigeria.

Our paper therefore, uncovers the following manifestations of operational supportive rhetoric in Nigeria namely: the clichés of "One Nigeria", "Federal Character Policy", and the present national restructuring propaganda". We intend to expose in what manner the foregoing constitute supportive rhetoric and how they impinge on equity and the unity of the different ethnicities that make up the country, Nigeria. We will conclude by suggesting a pragmatic orientation namely, of critical consciousness as a pathway towards a praxis of reflection and action, which are necessary tools that nurture the spirit of national integration, which in turn, is germane to the practice of true federalism.

## 1.2 The Nature of Supportive Rhetoric

Supportive rhetoric is composed of interest serving ideologies, which through the process of mystification, disguises itself as an instrument which serve to make things seem as they are not. This is done in order to hide intent or divert attention away from central issues, which form the concern of the led and without which their secured livelihood becomes a farce. It is the nature of supportive rhetoric to deify cognitive inertia and received views, which promote the 'status quo ante'. It serves the interests of the ruling class, who in turn ensures that such rhetoric prevail. Such rhetoric not only disguises the imposed nature of the received view, it, as well allows people through critical discourse; to internalize that view as if it were their own or at least to champion their own slight variations of it" (Harris 81). These rhetoric are harped by government media and promoted by formal education, which transmit certain pernicious type of ignorance and at best, presents a distorted world. Education in such an acclaimed "liberal democratic capitalistic society" as Nigeria, embroidered by supportive rhetoric is concerned to transmit knowledge that distorts people's worldview, thereby creating satisfied pigs in the persons of those certified under this system. Such education, does not overcome ignorance rather as Helvetius submits, "children (under its system- additions mine) are born ignorant, not stupid, it is (such – addition, mine) education that makes them stupid (Ravi 29). Supportive rhetoric, which colour such education so occupies people's time and energy that they become incapacitated and unable to criticize from other perspectives. Is this not why most Nigerians still see a golden future for our seemingly failing state? Those immersed into supportive rhetoric cannot see behind the veil under which they are enclosed. They either fail to recognize that there could be other perspectives, or they have no time to explore them.

In order to break free from such enslaving rhetoric, there is the need to recognize interest serving ideologies, which are promoted as values but are discriminatory and repressive. This identification can be done, if we deliberately search governmental actions, statements and positions on national issues for implicit values, for distortion, which serve particular interests, that is, if we examine also the social dimension in both their production and functions in the society. In doing this, false consciousness, which consists in seeing oneself, the world and one's relationship to the world in a distorted way is unveiled. Such consciousness is responsible for the feeling by some persons in Nigeria that they are better equipped for rulership or for other positions of authority and responsibility than the rest. When internal contradictions, which characterize such distorted worldview surface as it is the case in present Nigeria, a near war situation arises. Hence, to avert a full-fledged war, a re-interpretation of situations and a confrontation of these internal contradictions becomes the Hobson's choice to liberation and national cohesion.

These confrontations have arisen in Nigeria context in form of Socio-religious upheavals, intractable corruption and crime, wanton destruction of lives and property, violence occasioned by injustice; militancy and calls for secession, disintegration and / or restructuring. What these indicate is that there is now the need for a paradigm shift, which must muscle away repressive ideologies and all supportive rhetorics that have stalled transformation, reformation and growth. As Paulo Freire observes, "it is a farce to affirm that men and women are ...persons and as persons should be free, and yet to do nothing tangible to make this affirmation a reality" (Pedagogy 26). We will now proceed to identify few of these supportive rhetoric that are peddled in Nigeria.

## 1.3 Some Supportive Rhetoric in Nigeria

### a. The Notion of One Nigeria:

"One Nigeria" is pretentiously intended to promote "unity". However, monolithic unity can never be a good servant to a diversified society such as ours hence, "One Nigeria has become a calculated lie directed towards justifying forced amalgamation of disagreeable ethnicities of present Nigeria by Sir Lord Lugard and in the year 1914. To promote the supportive rhetoric of "One Nigeria", beneficiaries of the unjust politico-economic system operative at the center in Nigeria have tried in vain to locate a commonality in cultures of the different peoples of Nigeria. The attempt to evolve the 'WAZOBIA' language as Nigeria 'lingua franca' has turned an abysmal failure. The echo of one Nigeria", which often fill the air in times of political campaigns, when people from a different ethnicity visit states other than theirs, is only meant to be a big deceit directed towards extraction of people's votes either by force, cash or crook. Regrettably, it is only during football matches that Nigerians unite but only as transient as those matches last.

A true "One Nigeria" must necessarily entail a symbiotic relationship among all ethnicities that make up the polity. Such relationship would see the North complementarily make up for food shortages in the South. The south in the same symbiotic spirit, will in return supply their naturally endowed oil to make up for the shortcomings of the rest of the country. The West, with their manpower and economic knowhow and enlightenment will have brought these to bear on the national economy whereas the ever pragmatic and business oriented East, will have done the same. Such arrangement when equitably arranged would have fostered the right spirit of federalism. Unfortunately, this dream has been truncated by tribalism, greed, ignorance and the false spirit of superiority of certain parts of the country over the rest.

The history of injustice in revenue sharing between the North and South since 1900 buttresses the glaring facts of injustice. For instance, the period covering 1900 – 1913 shows that the South surpassed the North in revenue that, perhaps the amalgamation may have been done to enable the Northern protectorate overcome revenue deficit. During the said period, the Southern protectorate enjoyed revenue surplus hence, the North relied on the South for fiscal cash whereas the South relied of the north for edible crops and other agricultural produce. The annual reports of the colonies, 1914 lay credence to our foregoing claim as could be seen below:

**Northern Nigeria Protectorate Revenue (Local) and Expenditure (1900 – 1913). See table 10, below**

S/No.	Year	Local Revenue (in £s)	Expenditure (in £s)	Surplus/Deficit	% of Deficit Against Revenue
1	1900 -1	2,179.14	96,457.00	(94,277.86)	-98%
2	1901 – 2	4,424.02	298,519.60	(296,340.46)	-99%
3	1902 – 3	15,316.11	389,391.18	(384,967.16)	-99%
4	1903 – 4	53,726.17	498,986.41	(483,670.30)	-97%
5	1904 – 5	95,026.00	505,282.00	(451,555.83)	-89%
6	1905 – 6	110,544.11	498,259.16	(404,233.16)	-81%
7	1906 – 7	142,087.60	498,848.60	(356,761.00)	-72%
8	1907 – 8	143,005.00	498,302.00	(355,297.00)	-71%
9	1908 - 9	178,444.00	540,644.00	(362,300.00)	-67%
10	1909 – 10	213,436.00	566,843.00	(353,407.00)	-62%
11	1910 – 11	274,989.00	565,760.00	(290,771.00)	-51%
12	1911 – 12	348,366.00	827,939.00	(479,573.00)	-58%
13	1912-13	658,309.00	820,490.00	(162,181.00)	-20%
		<b>1,158,240.00</b>	<b>2,999,488.00</b>	<b>(1,841,248.00)</b>	<b>-61%</b>
		<b>231,648.00</b>	<b>599,897.60</b>	<b>(368,249.60)</b>	<b>-61%</b>

**Source:** Carland 1985, pp. 130 (Colonial Office and Nigeria, 1898-1914) and annual report of the colonies. Northern Nigeria, 1904, pp. 101, 135, 136 & 137, & Annual Report of the Colonies, Northern Nigeria, 1906-07, pp. 92-94.

Exports Having Their Source of Origin Wholly or Mainly in Southern Nigeria (1911-1913) Before Amalgamation, See table 9, below:

**Export Products/Produce (in £)**

S/No.	Year	Palm Kernels (in £s)	Palm Oil (in £s)	Cocoa (in £s)	Lint Cotton (in £s)
1	1911	2,574,405.00	1,696,875.00	164,664.00	66,935.00
2	1912	2,797,411.00	1,654,933.00	130,542.00	102,932.00
2	1913	3,109,818.00	1,854,384.00	157,480.00	159,223.00
		<b>8,481,634.00</b>	<b>5,206,192.00</b>	<b>452,686.00</b>	<b>329,090.00</b>
		<b>2,827,211.33</b>	<b>1,735,397.33</b>	<b>150,895.33</b>	<b>109,696.67</b>

**Source:** Annual Report of the Colonies, Southern Nigeria 1913.

**Data Analysis:**

From the Data on table 9 above, the main export earner for the south, was palm Kernel Contributing 59%, with a total value of £8,481.634.00.

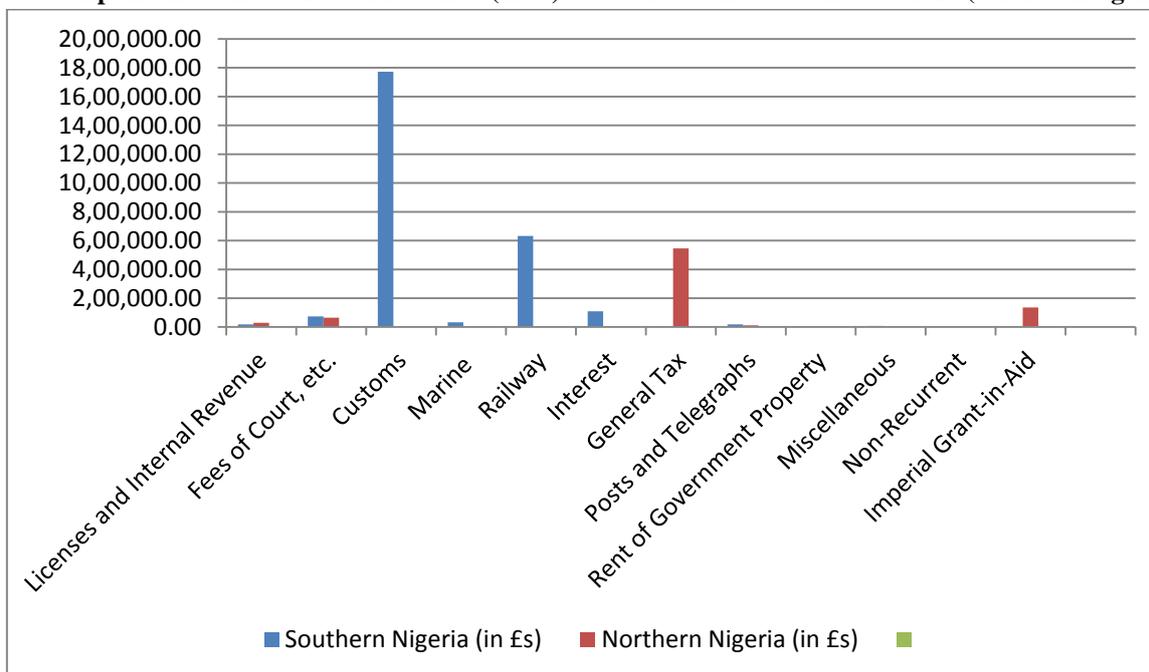
**Comprehensive and Comparative Sources of Revenue for Year 1913 (Northern and Southern Nigeria) See Table 13, below**

S/No.	Heads of Revenue	Southern Nigeria (in £s)	Northern Nigeria (in £s)	Total Amount (in £s)
1	Licenses and Internal Revenue	18,012.00	29,281.00	47,293.00
2	Fees of Court, etc.	74,168.00	65,029.00	139,197.00
3	Customs	1,772,619.00	-	1,772,619.00
4	Marine	32,129.00	-	32,129.00

5	Railway	632,130.00	-	632,130.00
6	Interest	109,544.00	-	109,544.00
7	General Tax	-	545,902.00	545,902.00
8	Posts and Telegraphs	18,651.00	11,566.00	30,217.00
9	Rent of Government Property	3,265.00	3,832.00	7,097.00
10	Miscellaneous	7,519.00	2,700.00	10,219.00
11	Non-Recurrent	160.00	-	160.00
12	Imperial Grant-in-Aid	-	136,000.00	136,000.00
<b>Source: Annual Report of the Colonies, Nigeria 1914, pp 4.</b>		<b>2,668,197.00</b>	<b>794,310.00</b>	<b>3,462,507.00</b>

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**Chart 4: Comparison of All Sources of Revenue (in £s) between North & South as at 1913 (before amalgamation).**



These statistics speak for themselves and their sources are indicated within them to avoid doubts.

Now, the intent of our argument is not to emphasize the advantageous position of any part of the country over the other but to show that the lost opportunity of harnessing complementary roles different parts of the country could have played in the making of a formidable Nigeria is chiefly responsible for the injustice that has given birth to Nigeria’s hydra-headed socio-economic cum politico-religious problems. It is consequent upon the foregoing state of affairs that the present Emir of Kano, Sanusi Lamido Sanusi, who was formerly the Central Bank Governor of Nigeria submits that:

Tribalism is not our problem. Tribalism and religion are artificial problems created by selfish leaders for their own personal interests. There are only two major tribes in Nigeria. The Elites and the Masses. Once you make lots of money, you belong to the elite tribe, when you are a commoner or suffering, you belong to the tribe of the Masses. If you are an elite, and you need more power, or elective position, you sow seed of tribalism and religion, among the masses, so as to sway their emotion for your personal victory. ...unfortunately, after the election when they have won and joined their "sworn enemies" to drink and party, the gullible masses continue to fight each other. ([www.nigerianbulletin.com](http://www.nigerianbulletin.com)>threads).

Considering the foregoing, one can now personally adjudge whether the notion of "One Nigeria" has all the trappings of a dangerous supportive rhetoric or not.

### **b. Federal Character Policy**

It was Margaret Fuller who once said that "Harmony exists no less in difference than in likeness, if only the same keynote govern both parts". ([wikiquotehttps://en.m. wikiquote.org>wiki>marg...](https://en.m.wikipedia.org/wiki/Margaret_Fuller)). The ethnic, religious, cultural and language diversities and differences in Nigeria inform the quest for National integration, which M.L. Bello explains as covering "a vast range of human relationships and attitudes ... the integration of diverse and discrete cultural loyalties and the development of a sense of nationality; the integration of the rulers and the ruled and the integration of the citizens into a common political process" (5). In order to foster the much required unity of the federating states and peoples of Nigeria, the constitution drafting committee (1976), defined the federal character principle as "The distinctive desire of the people of Nigeria to promote national unity, foster national loyalty and give every citizen of Nigeria a sense of belonging to the National (notwithstanding the diversities of the ethnic origin, which may exist and which it is their desire to nourish and harness to the enrichment of the Federal Republic of Nigeria)" (Seelin. 14(3)).

However, the bracketed aspect of the foregoing purpose of Federal Character was substituted in the 1979 constitution hence, its section 14(3) spelt out the mode of operation of the Federal Character principles thus:

The composition of the government of the federation or any of its agencies be carried out in such a manner as to reflect the Federal Character of Nigeria and the need to promote national unity and also to command loyalty thereby ensuring that there shall be no predominance of persons from a few ethnic or other sectional groups in that government or any of its agencies (*The Constitution of The Federal Republic of Nigeria*1979).

To ensure the effectiveness and enforcement of this constitutional provisions, the Federal Character Commission (came to be established by Act 34 of 1996) with the aims of ensuring principles of fairness and equity in distributing public posts and socio-economic infrastructures among the various federal units of the Federal Republic of Nigeria.

Now, how this policy, which is meant to sustain the unity of the assemblage of ethnicities called Nigeria has been pursued with levity has become a grand divisive instrument in the hands of crafty politicians. This has rendered the entire policy, a support rhetoric. This rhetoric is directed to camouflage the oppressive inclinations of some ethnic groups over others. The consequence of this, is the birth of mutual distrust, unpatriotic attitude, hate speeches, inter and intra ethnic communal conflicts, sprouting of innumerable militant and agitating groups and the latest call for restructuring and/or disintegration of the ailing country called Nigeria. For want of space, we will cite an instance which betrays the utopic nature of the Federal Character.

"Nigeria is a country with an estimated population of 140 million people" (Bello 16). Otite reports that "Nigeria has a total of 374 ethnic groups... which are broadly divided into ethnic "majorities" and ethnic minorities. In such a country with 104 Federal 'Unity schools, "The Rising Sun" news of 29<sup>th</sup> March, 2017 report puts the cut off marks by states for 2017 admissions into Unity federal government schools thus:

Abia – Male(130) Female (130), Adamawa – Male (62) Female (123), Akwa Ibom – Male (123) Female (123), Anambra – Male (139) Female (139), Bauchi – Male (35) Female (35), Bayelsa – Male (72) Female (72), Benue – Male (111) Female (111), Borno – Male (45) Female (45), Cross River– Male (45) Female (97), Delta – Male (131) Female (131), Ebonyi – Male (112) Female (112), Edo – Male (127) Female (127), Ekiti – Male (119) Female (119), Gombe – Male (58) Female (58), Imo – Male and Female (138), Jigawa – Male and Female (44), Kaduna – Male and Female (91), Kano – Male and Female (67), Kastina – Male and Female (60), Kebbi - Male (9) Female (20), Kogi – Male and Female (119), Kwara - Male (123) Female (123), Lagos – Male and Female (133), Nassarawa – Male and Female

(58), Niger – Male and Female (58), Ogun – Male and Female (131), Ondo – Male and Female (131), Osun – Male and Female (127), Oyo – Male and Female (127), Plateau – Male and Female (97), Rivers – Male and Female (118), Sokoto – Male (9) Female (13), Taraba – Male (3) Female (11), Yobe – Male (2) Female (27), Zamfara – Male (4) Female (2), FCT Abuja – Male (90) Female (90) (<https://www.nigerianin>).

Similar discrepant allocation of cut off marks also hold true in admissions into Tertiary Institutions and Universities across the country. The 2017 Budgetary allocations to states and even the ratio given to states in Federal appointments are also open invitations to National disintegration yet, “Federal Character” is nominally harped about as Nigeria’s standard approved criterion for maintaining equity and fairness. These acts of discrimination, nepotism, oppression, subjugation, mediocrity, and democratic dehumanizations only prepare the ground for national disintegration.

### **c. The Call for Restructuring from Historical Perspective**

Restructuring in the context of this paper entails organizing differently the political and economic situations of the nation. The call for restructuring championed by the former Vice President, Alhaji Atiku Abubakar and former Head of State, General Ibrahim Babangida shows that something is fundamentally wrong with the present structure of Nigeria. It is also a subtle proposal that plausibly seem to be suggesting a vent out of the present political imbroglio. However, a closer scrutiny at this call shows that it is at best, an interest serving ideology - which has been invented to ensure that the gold mine, Nigeria, from where the big miners draw their sources of opulence and ostentatious lives, remains intact for further exploitation and impoverishment of the already poor masses. If any true intent is involved in the call, it is only the avoidance of an all out war. That too, will to enable the benefactors of Nigeria’s economic woes cow their growing opposition and the agitators for secession into submission. The facts on the ground indicate that, without sheathing of the presently drawn swords, a bloody revolution or outright war may be imminent.

Without a tincture of bias, restructuring, which actually entails “effecting changes to our current federal structure (to bring it closer to what our founding fathers erected in order to address the very issues and challenges that led them to opt for a less centralized system), means devolution of powers to the federating units with the accompanying resources, and it would involve greater control by the federating units of the resources in their areas”. (*Premium Times* July 14, 2017). It is a call by Federalists and is embarked upon to address lopsidedness in governmental structure, which when left unattended to, may have grievous destructive backlashes. If there were elements of transparency in this call, it would have brought about true Federalism in Nigeria but the Nigerian senate, peopled by beneficiaries of the present unjust system is positioned against it.

Historically, however, Nigeria has had her share of fiscal restructuring, which more often than not, had revenue sharing as the pivot or veneer gear propelling such agenda. It could be recalled that, Lugard for reasons of politico-economic and administrative convenience restructured the different peoples of Nigeria into its present supposedly Federal State. An extract from the book, *Niger Delta: the Economic Life of Nigeria* reveals that: “Then in 1946 Hick Philipson’s Commission economically restructured Nigeria through the awarding of 46% of National revenue to the North, 30% to the West and 24% to the East. In 1953, Chick’s Commission version of restructuring differentiated between import and export duties and provided the criteria for sharing them. Besides, in 1958, Sir, Jeremy Raisman’s commission introduced Distributable Pools Accent (DPA) and included population, which now became one of the most novel criterion for regional revenue sharing. Then came Binns’ Fiscal Commission of 1964, which recognized the DPA, which is presently baptized and known as National Coffers or Sate Treasury. But in 1967, states were created hence, Decree 15, advocated that population be considered as a yardstick for sharing the National cake whereas that of the North be equally allocated among the six states of the North.

Again, Dina’s commission of 1968 was another attempt at restructuring which ended up establishing the offshore/onshore dichotomy. In 1977, Prof. Ayobade headed version of restructuring prescribed 60% revenue for Federal, 30% for States and 10% for Local governments. It could also be recalled that the Retired General and former head of state, namely, Ibrahim Badamosi Babangida’s Mobilization and fiscal commission (NRMAFC) in 1989 vested the power of vertical allocation formula on the National Assembly and considered equity of states, population, material revenue proceeds and social development factors as indices for allocation of revenue. This move happens to be one of the best Nigeria has ever seen hence, Babangida despite his many shortcomings, is still considered a political maestro.

From the foregoing, we can see that each of these commissions made attempts though differently and right from the Colonial through the Post Colonial era, to restructure Nigeria. Yet, the latest is a call for the reorganization of the same worrisome structure. What is sort for presently is definitely unclear at this point, is it fiscal federalism, which entails a partial restructuring or

true federalism, which would entail the total restructuring of the nation? In what seems like an answer to the above query, a renowned Nigeria Legal Luminary and Elder statesman, Aare Afe Babalole traces this call to a backlash or import of the system of government being run in the country. In his words, “people are agitating for the restructuring of this country... because what we have is called federal government but it is indeed a unitary government, where states only go begging for money at the end of every month and no development of any kind is taking place” (*Daily Post* July 31, 2017).

The former Vice president of Nigeria, Alhaji Abubakar Atiku outlining the advantages of restructuring in his article titled, “Restructuring Nigeria for National Cohesion and Good Governance” submits that: “Restructuring will ensure greater accountability, people are more likely to hold their states and local governments to account once those governments are no longer able to consciously blame the central governments for their shortcoming (Premium Times July 14, 2017). It really seems that their suggestions tilt towards total restructuring of the country, which will usher in true federalism.

Now, with all these lofty ideas, which presently fill the air, one wonders why no serious attention has been given to this call. Ralph McJulius in his article “Restructuring Nigeria: Who’s afraid and Who’s Against, and Why” asks the question, “Why is it that with the plethora of support or endorsement pouring from both the Northern and Southern parts of Nigeria and lately from the ruling party, All Progressive Congress at the center, why is it that “everybody is endorsing restructuring, nothing is being done about it?”... Could all this support be just a lip service, a case of campaign and a political strategy to appeal to the sensitivity of proponents of restructuring in order to get votes and win election?” (9News July 13, 2017). Why is it that Chief Ahmed Bola Tinubu, a politician and former governor of Lagos State, who was prior to this period, a strong proponent of restructuring, now opposes the agenda? Why did he jettison the key and all important progressive philosophy of true federalism? The answer could be found in Prof. Ango Abdullahi’s misconceived and parochial argument that the agitation for secession and restructuring is absurd. He argues that “the whole agitation about restructuring is targeted at the North, describing it as nothing other than crass politics.” Nigeria is such that whatever that negatively affects the Abdullahis’ is discountenanced. As Emmanuel Wisdom in his “Nigeria Restructuring: An Outdated Hoax” observes, “restructuring is a term, whose meaning is as diverse as the diversity of those calling for it to the extent that smart politicians have capitalized on it to hoodwink gullible followers into supporting it...” (biafranews.blogspot.com.ng). With this mist clouding over restructuring, does one need a political avatar to tell us that all these are mere rhetoric?

The foregoing arguments support our thesis that the restructuring agenda is another dangerous supportive rhetoric, which should be carefully watched. All the definitive features of a propaganda are found around the restructuring agenda. Every supportive rhetoric as this presents another dimension of the theory of antidiological action, which is manipulative. As Friere avers: “It is not our role to speak to people about our own view on them, but rather to dialogue with the people about their views and ours” (Pedagogy. 68). Now, the restructuring agenda is not a negotiated proposal hence, it fails as a product of dialogue. Rather, it is prescriptive and every prescription is a strategy for manipulation, division and conquest. If it fails to ensure the entrenchment of the “status quo ante”, it becomes disagreeable with all opposing ideologies thereby metamorphosing itself into an imposition. Until such manipulative impositions and prescriptions of an utopian possibility in the Nigeria context is divested of its wooliness, its deceptive nature (as a supportive rhetoric) will hardly come to the fore and be seen for what it truly is.

## **2.1 Critical Consciousness as an Alternative paradigmatic Action For True Federalism and National Integration**

In the context of the present politically polarized Nigeria, which is witnessing incessant calls for secession and restructuring, there arises the need to carry out a demystification of our national challenges, which seem to be shrouded in a web of politico-religious and economic supportive rhetoric and this is where philosophy comes in as a good servant. It is a historic truism that problems deferred have their ways of revisitation and in a more sophisticated manner, which more often than not, become difficult to solve. Hence, to fashion a formulae for national integration, which would engender patriotism in the citizenry becomes a task that needs urgently be done. In this wise, what is needed now is not much of theorizing but a praxis. To surmount this unjust oppressive situation, a pragmatic approach is needed which must uncover the disguises of this supportive rhetoric in order to expose, understand and embark on a transformative praxis, which makes for fuller equity and a humane national integration process.

The inhuman treatment of Nigerians by her leaders has so conditioned the citizenry to see their plight amongst the wretched of the earth as their best possible existential state. Paulo Freire was therefore right and asserts in his *Pedagogy of the Oppressed* that; “Oppression is domesticating... to no longer be prey to its force, one must emerge from it and turn upon it... this can be done only by means of the praxis, reflection and action upon the world in order to transform it” (26). This paper therefore locates such praxis in our idea of creating initial critical consciousness in the citizenry. This approach is hinged on our belief that unless

national problems are identified in clear terms (just as laboratory scientists do diseases), their solutions may not come in handy and timely enough to prevent disintegration. This is what is called here, the raising or task of creating critical consciousness.

Our critical consciousness proposal is a praxis, which manifests in two stages. The first stage entails a recognition of the motives behind the suffocating monologues, sloganeering, propaganda, and all supportive rhetoric, which aim to domesticate the citizenry into submission to an unjust system. Our study reveals that, behind these tools of deception are the very causes of the unjust system, (which their beneficiaries go all out to hide. After the causes of the unjust system, (which informs the calls for secession and restructuring and the use of supportive rhetoric) are laid bare, the next stage, demands that the citizens themselves embark on a transforming action in order to create a new situation devoid of dehumanization and injustice.

However, to overcome Nigeria's unjust structure, is not a task that can be achieved in idealistic terms neither by brigandage. Rather, the citizenry must perceive the reality on ground not as a closed but an escapable world. To no longer be prey to injustice, one must emerge from it and turn upon it. This calls for the praxis of reflection and action upon such reality in order to confront and transform it. To confront this reality, the unjustly treated must critically confront reality and at the same time, objectifying and acting upon that reality. As Lukac's cited in Friere puts it "action is only human when it is not merely an occupation but also a pre-occupation, that is when it is not dichotomized from reflection" (28). To successfully bring about reasonable action that is a product of rational reflection, the process of conscientization must first take place. Conscientization involves thematic investigations into the causes of our national problems. It does not stop at a mere subjective level or perception of a situation but through subsequent actions, the citizens are prepared for action against the obstacles to their greater humanization in a justly ordered society.

The correct approach to a better structured Nigeria therefore cannot consist in a libertarian propaganda, neither can any leadership implant (forcefully by suppression or otherwise) in the citizens, a belief that all is presently well. All political actions at this stage must be authentically pedagogical, which necessarily entails humility on all constituent ethnicities of the country towards a national dialogue. This is no more a time to merely discourse on the present situation and abandon results of such pallies like the 2014 National Conference. It is not a time to provide people with programmes, which have peripheral impact on their socio-economic lives. It is a time to consider their common pre-occupations, doubts, hopes and fears. It is rather a time to realize that their views of the reality on ground counts. This demands that dialogue be established with all the ethnicities in Nigeria to reflect on the situation of the polity.

A critical analysis of this reality must help sieve out appropriate actions from inappropriate ones. The supposedly appropriate actions found to be unfeasible for the times, could be shelved and substituted with more pertinent actions, which scratch where it itches. Such pertinent actions must do away with any form of manipulations, sloganeering, depositing, regimentation, prescription and in fact, all strands of supportive rhetoric. All antidialogical ideologies must be replaced by reasonable actions. This researcher hopes that the time is now to create this critical consciousness in Nigeria citizenry, when that is achieved, we together and in solidarity with one another could go into the next stage of reasonable actions. That way, unnecessary bloodshed will be averted and national integration and cohesion ensured.

## **2.2 Conclusion**

This study has to an appreciable length exposed different manifestations of supportive rhetoric in Nigeria context. Much of the slogans, which rent the Nigeria air on daily basis such as the "One Nigeria dictum", much fuss about "Federal Character Policy", and "the latest calls for national re-structuring", which should have been instruments of unity are found to contain features of propagandist disguises, which are described here as supportive rhetoric. These interest serving rhetoric are unleashed on the ignorant citizens in order to maintain the disequity in the polity by a calculated perpetuation of the "status quo ante".

Our paper therefore traces the calls for secession, disintegration or re-negotiation of our national unity, and the clamour for national restructuring as backlashes of our national socio-economic cum political disequilibrium. This paper therefore made a strong case for a critical consciousness re-orientation. This latest suggestion is considered as an instrument of praxis involving a careful reflection and subsequent action on the reality of the worrisome national imbalance, which is at the heart of the outcry for national disintegration. The researcher hopes that when a proper unmasking of these oppressive rhetoric are successfully carried out, governance will be decentralized, transparency, mutual trust encouraged and the spirit of patriotism engendered. These are however, the basic elements of not only national integration but also, the practice of true federalism.

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# Certification model of Sustainable forest management in a Forest Management Unit (FMU) in Bangkalan East Java Indonesia

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**Abstract-**The objectives of this study are to describe implementation of sustainable forest management with certification program, to describe strategy of maintaining sustainable forest management and to reveal role of the patrons. Data collection was conducted through focus group discussions of farmer groups as well as forest owners, assessment of forest management documents, relevant secondary data collection from various related agencies, field observations and in-depth interviews with informants from both local formal and informal leaders. Forest Management Unit of Gerbang Lestari (FMUGL) in Bangkalan District passed the certification of Sustainable Community Sustainable Forest Management. Total of 30 indicators used in this assessment, 14 indicators were considered as Good, 13 indicators were considered as Fair and 3 indicators were considered as Bad. In order to overcome the weakness, the recommendation were suggested, those consisted of quickly establish a chain-of-custody system followed by training both at board and member level and cooperation with merchants; arrangement of logging permits and logging records starting at the village level, enhancing the joint purchase of timber with the company; involves organizational processes with multi-stakeholders; improved management information system; enable agencies or regulatory bodies. Community leaders, especially clerics, play an important role in transforming idea about environmental conservation. The clerics can play a role in conserving the environment and the forest by providing examples or role models to the students, the surrounding community and the environment in which they live.

**Key words-** cleric role, Indonesia, strategy, sustainable forest management, wood certification

## I. INTRODUCTION

Tropical forests in Southeast Asia and Oceania are valuable for their high economic value and biodiversity. The high economic potential of forests along with global economic demand for tropical timber has sparked enormous environments problems, including deforestation, forest degradation and biodiversity loss [1]. Deforestation and forest degradation has occurred globally including in Indonesia. It is said that Indonesia lost approximately 1.5 million hectares of forest each year in the 80s and 90s [2]. The World Bank warns that the island of Sumatra will be

denuded of forest by 2005, and Kalimantan by 2010, if no countermeasures are taken.

During the last decade, forest certification has gained momentum as a market-based conservation strategy in tropical forest countries. Certification has been promoted to enhance forest management in countries where governance capacities are insufficient to adequately manage natural resources and enforce pertinent regulations, given that certification relies largely on non-governmental organizations and private businesses. However, at present there are few tropical countries with large areas of certified forests [3].

In 1990, the first ever developing country certification was carried out in Indonesia, when SmartWood certified Perum Perhutani's teak forest operation on the island of Java. In response to this and other NGO pressure, the Government of Indonesia established its own forest certification scheme – Lembaga Ekolabel Indonesia (LEI) – in 1993. In 1998, LEI was officially established as a foundation and since then has conducted several certification assessments. The LEI and FSC have also developed a Joint Certification Protocol (JCP) that obliges FSC to use both LEI and FSC criteria and indicators when conducting an assessment of a forest management operation [1].

In line with the multi-stakeholder initiative to encourage community-based forest management in Indonesia, a certification system for Sustainable Community Based Forest Management (SCBFM) has been developed since 2000 [4]. The SCBFM certification is an assessment and labeling activity aimed at stating that forest products derived from forests managed by a community forest have been through a sustainable management. The SCBFM itself is a management system by individuals or groups of a community, whether in state forests, communal land or customary land (individual / household) that aims to meet the needs of individuals / households and communities, either commercially or simply for subsistence.

This study places the issue of forest certification in forest conservation as the subject of discussion. Sustainable forest conservation is more focused on SCBFM in Forest Management Unit of Gerbang Lestari (FMUGL), Bangkalan District, East Java, Indonesia. The SCBFM Certification is a new phenomenon in Indonesia. The objectives of this study are to describe implementation of sustainable forest management with certification program, to reveal role of the

patrons, and to describe strategy of maintaining sustainable forest management.

## II. MATERIAL AND METHOD

The study was conducted in Bangkalan District, East Java Province, covering 3 villages in Geger sub-district. Site selection is based on the condition of the location that has passed the certification of SCBFM as well as taking into account the development potential of the development area in the spatial area. The study was conducted 8 months from June 2017 to November 2017.

The selected villages include Kombang Village, Geger Village, and Togubang Village. In the area has been established Forest Management Unit (FMU) with the name of FMUGL, which is a combination of forest farmer groups from the 3 villages. The number of members of FMUGL Lestari is 7,473 households, with forest area managed by 3,427.11 Ha (consisted of yard of 349.91 Ha and Farm of 3,077.21 Ha). The dominant tree species are Acacia, Albizia, Teak, and Mahogany (Table 1). Understory plants are composed of medicinal and food herbs. The selection of these 3 villages for certification implementation is due to the closure condition of the timber canopy relatively tight compared to other villages, as well as the location of the adjoining village, and the water catchment area for Geger sub-district.

Table 1. Wide of forest area and number of householder in the study sites

Location	Wide of area (Ha)			Number of householder
	Farm	Yard	Total	
Geger	692.45	226.56	919.01	1,691
Kombang	899.72	24.82	924.54	2,421
Togubang	994.84	50.90	1,045.74	2,698
Miscellaneous	490.19	47.63	527.82	663.00
Total	3,077.21	349.91	3,427.11	7,473

The preparatory process of FMUGL started in 2006 and in 2010 the FMUGL passed the certification of SCBFM by Certification Agency. The graduation of FMUGL is a Certification Agency acknowledgment that the forest management has fulfilled the criteria and indicator requirements of production aspect, ecological aspect, and social aspect.

The analysis of the performance of community forest management used LEI-5003 [4] standard for C scheme, which is commercial forest in land owned by property rights. Data collection for each indicator was done in each village, where each village is considered as a unit of forest management. Data collection was conducted through focus group discussions of farmer groups as well as owners, assessment of forest management documents, relevant secondary data collection from various related agencies, field observations and in-depth interviews with informants from both local formal and informal leaders.

## III. RESULT AND DISCUSSION

Typology of SCBFM of FMUGL is unit that utilizes or produces commercially timber in non-forestry cultivation area because the community forest area is managed by FMUGL based on Map of Forest and Water Area Appointment from Ministry of Forestry and Map of Province Spatial Plan of East Java. The site is located in

Non-Forestry Cultivation Area. The orientation of forest management conducted by the community has been commercial, and the land ownership status was controlled individually.

The results of the assessment of production aspect indicators on community forest management in the working area of FMUGL are presented in Table 2. The production sustainability function was met with 3 criteria specified in 17 indicators. From the assessment results there were 7 indicators considered as Good, 7 indicators considered as Fair and 3 indicators that need improvement. Good-sized production sustainability indicators were resource sustainability criteria with clear status indicators and boundaries of land, forest maintenance management, and silvicultural systems according to the carrying capacity of the land; sustainability criteria with indicators of forest management area management, forest utilization efficiency, and forest infrastructure; criteria of business sustainability with contributing indicators on improving local social and economic conditions. Indicators that get Fair value were the criterion of resource sustainability with indicator of change of land area which is overgrown with plants; sustainability criteria with indicators of certainty of potential production to be harvested sustainably, yield arrangements, and forest benefit arrangements; as well as sustainability criteria with business health indicators, available skilled labor, and investment and reinvestment for forest management. Meanwhile, the indicators that still need improvement due to Bad value are sustainability criteria were indicators of the legality of the chain of custody system in the forest; and sustainability criteria with indicators of market access ability, and management information systems (Table 2).

Table 2. Assessment of production aspect indicators

Indicators	Indicator achievement		
	Good	Fair	Bad
Status and boundaries of land	√		
Changes in forest land area		√	
Forest maintenance	√		
Silviculture system	√		
Arrangement of forest management area	√		
Sustainable harvest potential		√	
Result setting		√	
Efficiency of forest utilization	√		
Chain-of-custody system			√
Forest infrastructure	√		
Setting benefit		√	
Business health		√	
Market access capability			√
Management information system			√
Human resources		√	
Investment and reinvestment of forests		√	
Contributions to the local economy	√		

The sustainable logging system data is presented in Table 3. Result showed that acacia is the species with the highest amount and volume followed by the teak. Allotment for acacia was also highest compared to other species.

Table 3. Recapitulation of sustainable felling on several tree species

Tree species	Number of log	Volume (m <sup>3</sup> )	Cycle/age of cut (year old)	Cut quota

Teak	139.47	29,429.15	20	2,942.92
Mahogany	78.48	12,656.80	15	1,687.57
Acacia	780.08	143,661.68	12	23,943.61
Albizia	78.11	16,395.18	15	2,186.02
<b>Total</b>	1.076.14	202.142,81		30.760,13

The ecological sustainability principle has had a criterion: the stability of forest ecosystems that can be maintained from disruptions. This criterion was outlined in 3 indicators. Result of ecological aspect assessment was an indicator considered as Good and 2 indicators considered as Fair (Table 4). The Good indicator was the existence of effective environmental management activities. While the indicator with Fair is the availability of production management rules that minimize disruption to the integrity of the environment and the availability of information and documentation of the impact of production management activities on the environment.

Table 4. Result of assessment of ecological aspect indicators.

Indicators	Indicator achievement		
	Good	Fair	Bad
Production management rules		√	
Information and documentation		√	
Environmental Management	√		

The results of the assessment of indicators of the preservation of social function were presented in Table 5. The function of social sustainability principle was met with 4 criteria described in 10 indicators. The results of social aspect assessment were as follows: 6 indicators considered as Good and 4 indicators considered as Fair. The Good indicators were Community forest managers; forest managers are landowners; non-dispute land status; dispute resolution mechanism; community economic resources; and the pattern of established social relationships. Indicators that considered as Fair were clear area boundaries; production technology; the division of authority; and compensation for community losses.

Table 5. Assessment results of social aspects indicators

Indicators	Indicator achievement		
	Good	Fair	Bad
Community forest managers	√		
Forest managers are landowners	√		
Non-dispute land status	√		
Clear area boundaries		√	
Dispute resolution mechanism	√		
Community economic resources	√		
Production technology		√	
The pattern of established social relationships	√		
The division of authority		√	
Compensation for community losses		√	

Based on the overall indicator used, the calculation of graduation calculation was presented in Table 6.

Table 6. Calculation of certification passing indicators

	∑ Good value	∑ Fair value	∑ Bad value	Total (n)
Production Aspects	7	7	3	17
Ecological Aspects	1	2	0	3
Social Aspects	6	4	0	10
<b>Total</b>	14	13	3	30

Total indicators used in this assessment were 30 indicators consist of 14 Good indicators, 13 Fair indicators and 3 Bad indicators. In accordance with the justification of the Decision Making Panel Team of the FMUGL was stated "Passed with note" certification because the score of Good indicators was 46.67% while the Fair indicators were 43.33%. It was recommended to Certification Bodies to issue a SCBFM certificate for FMUGL. To overcome the indicator with Bad value, this study recommends several actions, presented in Table 7.

Table 7. Recommendations to overcome of bad indicators

Indicator	Improving area	Action
Chain-of-custody system	Marking on stumps and log	Quickly established system of chain of custody from tree stump, and log. Therefore, it is necessary to design a chain tracking system at individual level and FMU.
	Records of merchant collectors (basket)	To support the implementation of chain-of-custody in the field, training needs to be done at both the board and members level.
	Certificate of logging from the village	Quickly established cooperation with merchants to be actively involved in the implementation of chain-of-custody system.
Market access capability	The growth of the number of buyers.	Arrangement of logging permits and logging records starting at the village level.
Management information System	Decision-making process within the organization.	The government together with the FMU enhanced the joint purchase of timber with the company.
	Availability and feasibility of archive files and data on SCBFM activities	Documentation of decision-making processes undertaken by organizations involving multi-stakeholders processes.
	Structure of the internal controller of the activities of the SCBFM organization	Improvement of information system management and control of group documentation (member book, cash book, guest book, activity book or monthly or quarterly report)

The recommendation consisted of quickly establish a chain-of-custody system followed by training both at board and member level and cooperation with merchants; arrangement of logging permits and logging records starting at the village level, enhancing the joint purchase of timber with the company; involves organizational processes with multi-stakeholders; improved management information system; enable agencies or regulatory bodies.

Community leaders, especially cleric, play an important role in making environmental changes. According to Irham

Rofii, Head of Pondok Pesantren Darul Ittihad, Campor Village, Geger Sub-district, Bangkalan Regency, East Java, the clerics can play a role in conserving the environment and the forest by providing examples or role models to the students, the surrounding community and the environment in which they live. The clerics delivered suggestion or recommendation to the surrounding community when speaking. They lead the prayer in the celebration or commemoration of the big day of Islam and other activities; making seeds of plants in the program of making the Community Seed Garden, Village Seed Garden or Seed Voluntary Garden; delivering a religious message about love for the environment and forests is part of religion and faith.

#### IV. DISCUSSION

The main objective of eco-labeling is to assist achieve market transformation by communicating verifiable, accurate information, on environmental aspects of products [5]. Market transformation means increasing the market share of products with lesser environmental impacts, thereby stimulating the potential for market-driven continual environmental improvement [6]. The objective of eco-labels then is to provide guidance to consumers making purchasing decisions.

From a consumer standpoint, certification shows their concern in the use of green products. In this context, consumers require internal processes, production factors, packaging processes. Consumers need symbols or labels that indicate the product they choose has gone through an environmentally friendly production process. Indications or symbols are then known as ecolabel (ecolabelling). Ecolabel provides information on quality standards.

International markets do not apply the distinction to timber and non-timber consumed. This applies also to timber and non-timber forest products derived from community-based management forests (Community-Based Forest Management). In line with various parties to encourage community-based forest management in Indonesia, a certification system for Sustainable Community Based Forest Management has been developed since 2000 [4].

Sustainable forest management can be assessed based on ecological, social, economic and institutional aspects [7]. Certification is believed to have had many benefits to community and positive impacts to environment [8] and some of these impacts have already been identified to benefit biodiversity in managed forests [9]. In Indonesia a study reported that certification may reduce firewood dependence (by 33%), respiratory infections (by 32%) and malnutrition (by 1 person) on average [10].

This study reveals the important role of the clerics. The role of patrons in maintaining leadership in forest conservation efforts is a form of trust between leaders (clerics) and followers. The root of the certification word is "to make sure" [11]. In this context, the role of clerics as the agents to transform environmental conservation efforts is important. This is because they have gained trust from the community.

#### IV. CONCLUSION

Forest Management Unit of Gerbang Lestari (FMUGL) in Bangkalan District passed the certification of Sustainable Community Sustainable Forest Management. Total of 30 indicators used in this assessment, 14 indicators were considered as Good, 13 indicators were considered as Fair and 3 indicators were considered as Bad. In order to overcome the weakness, the recommendation were suggested, those consisted of quickly establish a chain-of-custody system followed by training both at board and member level and cooperation with merchants; arrangement of logging permits and logging records starting at the village level, enhancing the joint purchase of timber with the company; involves organizational processes with multi-stakeholders; improved management information system; enable agencies or regulatory bodies.

Community leaders, especially clerics, play an important role in transforming idea about environmental conservation. The clerics can play a role in conserving the environment and the forest by providing examples or role models to the students, the surrounding community and the environment in which they live. The clerics delivered suggestion or recommendation to the surrounding community when speaking.

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# INTERNATIONALIZATION STRATEGY OF ENGINEERING CONSULTING FIRM IN INDONESIA

## CASE STUDY OF PT XYZ

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**Abstract:** *The price collapse of global oil price that started 2012 has hampered development of oil and gas industry and triggered a massive change of business process and total reduction of capital expenditure. Lack of new development plan slashed demand of engineering services automatically. This condition also affected domestic oil and gas condition in Indonesia and it's engineering service market. PT. XYZ as domestic market leader over the last five years suffered a significant reduction of its revenues. However global shifting of energy utilization to gas and recent recovery of oil price has shown a significant hope of price rebound that could restore to a better condition. A great deal of movement in development activity started in Papua New Guinea as well as Houston as the capital of world oil and gas industry. This open fresh opportunity for domestic company to internationalize its services to overseas market. This paper main objective are to formulate an internationalization strategy to enter Papua New Guinea and Houston market. Data is collected using questionnaire and in-depth interview for both internal and external subject, and analyzed using SWOT and QSPM matrix. Assessment of influencing factors recommended exporting, strategic alliance and joint venture as entry mode strategy to multiple markets.*

**Keywords:** *Internationalization, Strategy, Papua Nugini, Houston, SWOT, QSPM, entry mode*

### I. BACKGROUND

Globalization which is an expanding process that connects various elements between countries is growing very fast nowadays. Trend of globalization has sparked the development of high inter-boundary activity around the world, giving rise to business opportunities that create an environment with highly competitive business competition.

Globalization eliminates regulatory, cultural and linguistic restrictions that have been a barrier to inter-state activity, and encourage the development of an era of free trade between countries. These is further supported by development of information technology which further facilitates the relationship between countries, and create new opportunities for every organization to conduct international cooperation across the country by maximizing competitive advantage.

Internationalization as an impact of globalization is a process by which companies move from domestic market to international markets (O'Farrell *et al.* 1996). Internationalization can also be seen as one of the indicators of corporate growth by expanding into international markets (Dunning and Lundan 2008).

Internalization is not only about opportunities (Carvalho and Lima 2010), it brings challenges as well (Ischenko 2011). Research by London (2010) identified four variables of internalization process starting with decision to internationalize, market selection, entry mode and factors influencing market entry mode.

PT XYZ is a market leader of Indonesia engineering consulting market in oil and gas industry. PT XYZ started its operations in 1973 and has grown from few engineers to hundreds of experts, from small firm to successful big-size enterprise operating in Indonesia market.

Table 1 Engineering Consulting Market Share (Indonesia) 2012 – 2016

Companies	Market Share (IDR)	Market Share (%)
PT XYZ	759,245,149,975	44.59
PT A	376,018,412,600	22.08
PT B	282,063,848,270	16.57
PT C	95,808,340,000	5.63
PT D	75,051,133,150	4.41
Others (7 Companies)	114,565,401,241	6.37
<b>Total</b>	<b>1,702,752,285,236</b>	<b>100.00</b>

The declines of oil prices into its lowest level US\$ 27 in the last five years slammed global oil and gas and its supporting industry. PT XYZ has been one of the victims of the rapid derivation of domestic engineering services demand. Domestic market decline 13.34% annually since 2012, resulting in a drastic fall of PT XYZ revenue of 68% from 2015 to 2016.

This unfavorable condition forced company to seek other markets outside Indonesia. According to trustworthy reports and findings, Papua New Guinea as one of the emerging markets and Houston as world capital of oil and gas industry show some hopeful progress of new opportunities. These locations selections are based on recommendation from several clients who have worked with PT. XYZ in domestic market.

The purpose of this research is to formulate an entry mode strategy for PT. XYZ to Papua New Guinea and Houston market by analyzing internal and external factors.

## II. METHODOLOGY

This research focuses on PT XYZ having headquarters in Jakarta, Indonesia. Qualitative case study approach that examined internal and external factors was applied to obtain useful findings and understanding of company behavior. Research conducted by direct questionnaire and in-depth interview personally by author. Purposive sampling technique applied and interviews conducted with high ranking officials and decision maker within the company consist of Board of Directors member, Vice President of Marketing, Head of Business Development, External Relation Managers, Contract and Legal Manager. External opinions are also considered and interviews with representatives of related association and industry stakeholder was conducted to have balanced data and broader perspective.

Secondary data represent market condition of Houston and Papua New Guinea collected through literature study of journal, book, website and publication. Data analyzed using internal factor evaluation (IFE), external factor evaluation (EFE), SWOT matrix and QSPM (Quantitative Strategic Planning Matrix).

## III. RESULTS

### Market Analysis

Over the last five years engineering market in oil and gas industry in Houston and Papua New Guinea is growing rapidly. Engineering news record data (2017) show a market share of US\$ 4,500 million in Houston with annual growth rate almost 100%, contested by more than 30 multinational companies. Some of them are big names in the industry such as S&B Engineers and Constructors, Hatch Mott McDonald, Parsons Brinchkerhoff, Furgo, Atkins and many more. Over the past year Texas oil companies have hired more than 30,000 workers with total number of oil and gas workers reached more than 222,000 which equal to 16% rise in the same month last year (Eaton 2017).

Papua New Guinea market is even more appealing compare to Houston market. Total market of approximately US\$ 36,400 million year 2012 - 2016 is a sign of just how big and rapid oil and gas industry development in the country. The big market controlled by four major international players originally from US and Australia namely, GHD, SMEC, Kramer Ausenco and Wood Group. Expansion and commercialization of several gas reserves and field will increase both production and net exports double over 10-year forecast period and place Papua New Guinea as the third largest net exporter of LNG in the Asia-Pacific region (BMI research 2017). However instability of national political condition and high levels of corruption and crime can be a threat to investment and business activities.

### Internal and External Factor Evaluation

Identification and analysis of internal and external factors is the first step to formulate a strategic plan. Internal factor identified strength and weakness factors of organization while external factors identified opportunities that can be exploited and threats that may occur. Internal and external factors obtained from observation and direct interviews with related respondent. Then, by involving respondent each strategic factors are weighted and rated with paired comparison method.

From internal factor analysis, engineering construction and project management capability found as major strength of the company (0.243) while lack of experience and inability to demonstrate capability to deliver full cycle of project development and limited international experience are the main weakness (0.099).

External factor analysis identified leveraging experience with international clients & partners to enter international market (0.162) is main opportunity that should be maximize by company, while direct competition from fellow Asian consulting firms (0.162) is major threat that need to proper response.

Table 2 Internal Factor Evaluation (IFE) Matrix

No	Internal Strategic Factors – Strength	Weight	Rating	Score
1	Engineering, construction and project management capability	0.243	3.00	0.730
2	Competitive price structure	0.108	3.25	0.351

3	Experience in engineering and EPC project with high international standard	0.081	3.75	0.304
4	Strong communication skill	0.054	3.25	0.176
5	Reputation within oil & gas market with international clients and partners	0.054	3.50	0.189
6	Strong ethic and compliance standard	0.063	3.00	0.189
No	Internal Strategic Factors – Weakness	Weight	Rating	Total Score
1	Not highly recognize execution and delivery system	0.072	1.75	0.126
2	Lack of experience and inability to demonstrate capability to deliver full cycle of project development	0.099	1.75	0.173
3	Limited experience working in international market	0.099	1.00	0.099
4	Inability to retain highly capable and skillful resources and develop resources with regards to succession planning	0.063	1.75	0.110
5	Unrecognized among client specifically operated in international market outside Indonesia	0.063	1.50	0.095
<b>Total Score</b>				<b>2.543</b>

Table 3 External Factor Evaluation (EFE) Matrix

No	External Strategic Factors – Opportunities	Weight	Rating	Score
1	Leverage experience with international clients & partners to enter international markets	0.162	3.75	0.608
2	International growing market seeking more competitive option with present low price of commodity market	0.153	3.00	0.459
3	Availability of abundance Indonesian engineering resources	0.081	2.25	0.182
4	Local partnership to enhance adaptation and networking process	0.126	2.25	0.284
No	External Strategic Factors – Threat	Weight	Rating	Total Score
1	Direct competition from fellow Asian consulting firm (India, Malaysia, Singapore, Philippines) with strong engineering capability and lower cost	0.162	4.00	0.649
2	International market perception of Indonesia's poor engineering capability	0.081	3.00	0.243
3	Resistance from local stakeholders and competition from existing market player	0.135	2.75	0.372
4	Bilateral relation between countries	0.099	2.50	0.248
<b>Total Score</b>				<b>3.045</b>

Strategic implications of each matrix are different; therefore IE matrix is developed to formulate alternative strategies. This matrix positioned company into a matrix of nine quadrants that divided into three major regions that have different strategy implications namely *grow and build*, *hold and maintain*, *harvest or digest* (David 2009).

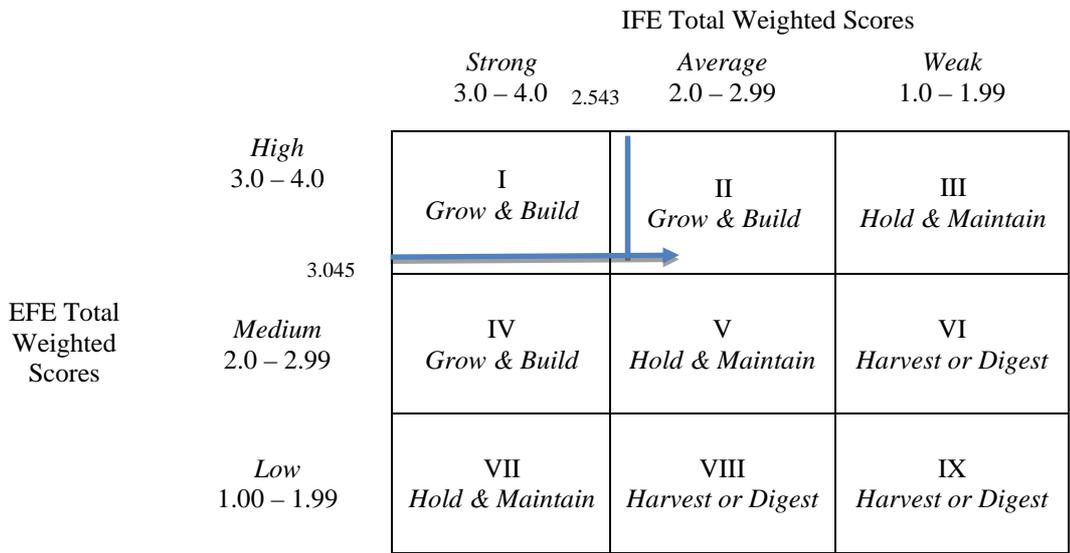


Figure 1 Internal External (IE) Matrix

Figure 1 show combination of EFE total weighted score (3.045) and IFE total weighted score (2.543) positioned PT XYZ in quadrant II which means present condition can be managed best with *grow and build* strategies whereas the commonly employed strategies for these types are forward and backward integration, horizontal integration, market development, market penetration and product development (David 2009).

This means company internal position is in average level where major strength needs to be increased to overcome weakness. While external position in high level shows that company has provided a strong response in exploiting existing opportunities and managing upcoming threat.

**Strategic Planning**

Internal and external environmental analysis thoroughly done to acquired complete definitions and understanding of company and market condition. SWOT analysis provides identification of multiple factors systematically to formulate company strategy which is based on logic to maximize strength and opportunity and at the same time minimize weakness and threat.

David (2009) described SWOT matrix as an important matching tool provides help to managers in developing four type of strategy which is SO (Strength – Opportunities), WO (Weakness – Opportunities), ST (Strength – Threat) and WT (Weakness – Threat).

SO (Strength – Opportunities) strategy leverages company internal strengths to harvest available external opportunities. When confronted with major threat, company will strive as much as possible to avoid and focus on the existing opportunities. WO (Weakness – Opportunities) strategy aim to improve internal weakness by taking advantage of external opportunities and ST (Strength – Threat) strategy optimized company strength to avoid or reduce impact of external threat, while WT (Weakness – Threat) strategy is a defensive tactic to overcome internal weakness and avoid external threat.

Wheelen and Hunger (2004) argue that SWOT analysis should not only result in the identification of corporation’s distinctive competencies but also in the identification of opportunities that the firm is not currently able to take advantage due to a lack of appropriate resources.

SWOT analysis performed internally and externally. First step completed by author to internal respondent and second time by author and collaborators to obtain detail information internally synergized with an objective external viewpoint to avoid any kind of subjectivism of final results (Ischenko 2011).

	Strength (S)	Weakness (W)
Opportunities (O)	<p><b>SO Strategy</b></p> <p>Enter developing international markets of Papua New Guinea and Houston where regular clients operating by exporting strategy or establishing cooperation with local and international partners by strategic alliance or joint venture strategy and maximize utilization of Indonesia engineering experts to reduce production cost</p>	<p><b>WO Strategy</b></p> <p>Enter international markets of Papua New Guinea and Houston by developing new man power recruitment and human resources development program by conducting training and benchmarking activities with international clients and partners to improve project planning and execution knowledge</p>

Threats (T)	ST Strategy	WT Strategy
	Enter international markets of Papua New Guinea and Houston by establishing a better and regular communication to improve relationships with local stakeholder and government as well as government of Indonesia representatives in overseas country (embassy, consulate, etc.)	Enter international market of Papua New Guinea and Houston by enhancing marketing and branding activities as well as the possibility of cooperating with other services provider who is looking to penetrate the markets

Figure 2 SWOT Matrix

Figure 2 describe four alternative strategies obtained from SWOT approach, namely:

**SO Strategy**

PT XYZ strength in basic engineering skill and competitive price structure becomes the major strength. Combined with international standard experience and excellent communication skills to tap into emerging international markets and seek an alternative of a more competitive service provider. In addition, availability of abundance Indonesian engineering experts is one of opportunities that can be optimized to form the service value in a competitive manner.

**ST Strategy**

Experience working with international clients and partners is not necessarily enough to penetrate the international market. Strict competition from both existing market players and other challengers who also want to enter new markets can not only be faced with technical capabilities. Good relationships with local stakeholders, especially local government and Indonesian government representatives in international markets are one of the key to entering new markets. Good adaptation and networking processes in the marketplace will make it easier for companies to embrace new markets

**WO Strategy**

Human resources are an important factor in business continuity and success. Similarly in engineering consultants services which focus on providing advisory services by individuals experts within it. To ensure the availability of qualified human resources, a new recruitment program is required and at the same time conducting a regeneration program within the company. In addition regular training and benchmarking to partners or clients will help to increase the competence of experts to have value and capabilities that can be offered to the international market.

**WT Strategy**

The organizational structure of clients separately operating between countries positioned PT XYZ only recognized by international clients operating domestically in Indonesia. This needs to be addressed by building network activities and building a well-structured and well-planned communication business to raise awareness of PT XYZ present in the market in order to enter the international market. In addition, the possibility to cooperate with other companies that want to penetrate the market will increase the possibility to share the risk and at the same time lower the level of competition.

In addition to various analytical methods used to identify factors that influence corporate strategy and obtain alternative of strategies, quantitative strategic planning matrix (QSPM) method is used to objectively determine the priority strategy.

This technique is one of strategic tools in the final stage of strategic planning that uses input analysis from the first stage which is the IFE matrix and the EFE matrix and the matching result of the second stage analysis which is the SWOT matrix, and then used in preparing a strategy priority based on good intuitive judgment. QSPM method determines total attractiveness score which will determine the priority strategy.

Alternative Strategies	Weight	S-O		S-T		W-O		W-T	
		AS	TAS	AS	TAS	AS	TAS	AS	TAS
<b>Strength (S)</b>									
S1	0.243	4	0.973	1	0.243	2	0.486	3	0.730
S2	0.108	4	0.432	1	0.108	3	0.324	2	0.216
S3	0.081	4	0.324	2	0.162	1	0.081	3	0.243
S4	0.054	2	0.108	3	0.162	1	0.054	4	0.216
S5	0.054	2	0.108	3	0.162	1	0.054	4	0.216
S6	0.063	-	-	-	-	-	-	-	-
<b>Weakness (W)</b>									
W1	0.072	3	0.216	1	0.072	4	0.288	2	0.144

W2	0.099	3	0.297	1	0.099	4	0.396	2	0.198
W3	0.099	3	0.297	2	0.198	1	0.099	4	0.396
W4	0.063	3	0.189	1	0.063	4	0.252	2	0.126
W5	0.063	2	0.126	4	0.252	1	0.063	3	0.189
<b>Opportunities (O)</b>									
O1	0.162	4	0.649	3	0.486	2	0.324	3	0.486
O2	0.153	4	0.613	2	0.306	1	0.153	3	0.459
O3	0.081	3	0.243	1	0.081	4	0.324	2	0.162
O4	0.126	3	0.378	4	0.505	1	0.126	2	0.252
<b>Threat (T)</b>									
T1	0.162	3	0.486	2	0.324	1	0.162	4	0.649
T2	0.081	2	0.162	3	0.243	1	0.081	4	0.324
T3	0.135	2	0.270	4	0.541	1	0.135	3	0.405
T4	0.099	-	-	-	-	-	-	-	-
<b>Total</b>			5.874		4.009		3.405		5.414

Figure 3 QSPM Matrix

Figure 3 described from four alternative strategies, SO strategy is the first priority strategy with total attractiveness score 5.874. And follow sequentially by WT strategy (5.414), ST strategy (4.009) and WO strategy (3.405).

SO strategy as main priority strategy describes good cooperative relationships with clients in the domestic market will open an opportunity to re-cooperate in international markets. This international market of Papua New Guinea and Houston can be entered with several options of entry mode such as exporting by sending technical experts to target market periodically or by developing strategic alliance cooperation method with other international partners to form a shared capability that becomes a selling value to client. In addition, client demand for service providers with competitive prices coupled with high market competition posse a challenge to company to be able to formulate a competitive production cost structure. One way to achieve this is to optimize the use of local Indonesian experts who have proven capability in accordance with the international standards but with a cheaper cost compared with other foreign experts. This competitive cost structure will ensure company existence in the market and provide good profitability level.

### Market Entry Mode

Data collection and analysis of Papua New Guinea and Houston show a large and growing engineering consulting market and attractive to international companies. In order to enter a particular international market it is imperative to structure a specific entry strategy that adapts the market condition. However, large and growing market share is not solely enough to be determinant of specific entry mode strategy which is appropriate to use.

Many factors have direct and indirect influence in the selection of market entry mode. Some factors identified influencing selection of entry mode to Papua New Guinea and Houston markets are:

#### 1. Market size and growth rate

This is one of the key factors which are a key parameter in determining the decision of entering strategy. The larger the size and growth rate of the market, the more attractive it will be. Total market size of Papua New Guinea US\$ 36,400 million and Houston US\$ 4,500 million in the last five years is very big compared to Indonesian market of only US\$ 120 million.

#### 2. Client preference

Good cooperative relationships between company and clients on previous projects become an opportunity. This is due to client confidence of company capabilities which make no hesitation inviting company to other projects in overseas markets. In this particular case, PT XYZ has a good relationship with one of international client, ExxonMobil in Indonesia, which is the main reason for the client to invite PT XYZ to Papua New Guinea and Houston market.

#### 3. Market competition level

Big market means high level of competition. Saturated markets tend to be very difficult to penetrate. Thus, market challengers must be very highly competitive which may impact on the possibility of loss to the company. Specific for Houston market, more than 30 multinational engineering companies are in the market which is a sign of high competition level.

#### 4. Production cost

Company level of competitiveness also depends on how the company is able to develop good delivery system and formulate a competitive production cost structure in accordance with cost, schedule, and quality standards. Average engineer salary in Indonesia (US\$ 685/month) is lower than Papua New Guinea (US\$ 1,375/month) and Houston (US\$ 7,234/month), which is an advantage for PT XYZ to offer a competitive proposal.

#### 5. Human resources

The availability of qualified human resources is mandatory to enter the international market. Moreover, the qualified individuals should be supported with reliable system. PT XYZ possesses highly qualified human resources and with good technical capability, however limited experience in international projects is still a challenge.

#### 6. Political Conditions

Country political condition is one of the main factors that have a major influence on economic stability and national security. Security guarantees are essential to ensure proper business activity. Houston political conditions are very stable and

conductive; this is inversely proportional to the conditions in Papua New Guinea that are still vulnerable to the threat of political turmoil and riots.

#### **7. Ease of doing business and government support**

Ease of business establishment and government regulation support of foreign direct investment and will greatly influence the decision entry mode chosen by the company. In this particular case, Houston has a better level of ease of doing business where the establishment process can be done within one day. While Papua New Guinea has a more complicated procedure and requires 40-70 days of process (World Bank 2017)

#### **8. Company flexibility**

Another important factor is the flexibility of the company in the mode of business operation, where flexibility ability to switch from a certain strategy or mode of entry to adjust to market needs. PT XYZ has strong and rich experience cooperating with numerous international companies in the domestic market. This model of cooperation can be the basis of cooperation in Papua New Guinea and Houston market.

Thorough analysis of Papua New Guinea market resulted in entry mode recommendation of exporting. This strategy will be executed by assigning engineering team in temporary basis type. Project implementation strategy divided into three phases; initial planning, implementation and completion. At the initial planning stage, project team will be assign and place in Papua New Guinea to attend kick-off meeting and collecting all necessary data. Once all data required has been obtained, project implementation process will be conducted in Indonesia. This is a possible method as client did not require consultant presence on daily basis, while information exchange and project progress report along with arise issues and problems can be communicate through email and share file media. The final phase of project completion will be undertake in Papua New Guinea, where team of engineers consist of team leader and support by engineers of each related discipline deployed in short period for final delivery of the project to client.

This exporting strategy will becomes a feasible option due to instability of political condition, threat of security and difficulties in business establishment in Papua New Guinea. In addition, even though company has an advantage on lower experts cost, establishing an office with its entire associated cost will increase total production cost which only lead to company losing its advantage and becoming uncompetitive.

Strategic alliance or joint venture mode with international partners is another recommended long-term strategy. The cooperation model will increase company capability and competitiveness and open a possibility to work on larger scale projects. However, based on expert opinion this model is feasible when PT XYZ reached early level of sustainability with two or three ongoing projects at the same time which lead company to economic of scale where total cost can be distributed into service cost proposed to clients.

Recommended entry mode strategy for Houston market is strategic alliance or joint venture scheme on long-term basis depending on project preferences and requirements. Several potential international partners identified are Chiyoda (Japan), Saipem (Italy) and SNC Lavalin (Canada) which is the parent company of Atkins. These three companies have been working together with PT XYZ in Indonesia market and have a common memorandum of understanding to develop engineering market in Indonesia.

Average engineer salary rate in Houston is quite high above PT XYZ engineers' salary. This puts company in a fairly good position of competitiveness in terms of market value. In addition, political stability and government support in ease of doing business create a good conducive business climate in Houston.

One main concern is high level of competition due to big market size and high growth rate. Saturated market coupled with aggressiveness of several multinational companies looking to penetrate Houston market.

Moreover, United States also has a fairly rigorous security selection process of individuals who will enter the country, which will be one of the obstacles in establishing business in Houston.

## **IV. CONCLUSION**

Papua New Guinea and Houston market proved to be a potential international market to enter. PT XYZ sound engineering construction and project management capability is found as major strength of the company while good relation with international clients and partners could be an prospective opportunities to leverage. Company lack of international experience and full cycle project development capabilities is main weakness that need to be properly address while threat of direct competition from Asian consulting firms must be responded cautiously

SWOT and QSPM matrix provides precise strategy alternative and priority for company to choose. Exporting in short-term is recommended entry mode to enter Papua New Guinea market, while strategic alliance or joint venture could be a possible option in long-term. Conducive market of Houston provide better guarantee and ease of investment, therefore choice of first entry mode strategy with higher risk such as strategic alliance or joint venture is still a feasible mode to execute.

Further research on financial and taxes treatment and risk of Papua New Guinea and Houston market and analysis of financial capability of PT XYZ to develop project profiling base on value is needed to obtain a more highly precise analysis and appropriate selection of entry mode.

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# Study of Security and Public Order Control Strategy in North Luwu Regency

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**ABSTRACT** : Security and public order is one of the demanding that must be fulfil. It is due the security and order is one of dynamic situation that government may able to conduct the daily activities. Norms and regulation that become signs in living society need to control by the law in order to protect the living society. Strategy and the policy for the security control is important and crucial to do in North Luwu, in order to control the security and order, divided into two which are pre-emptif act (Like socialization about law by Police officers to society whether formal and non-formal, also addressed the member of police officer in the place that vulnerable to conflict like traditional market, midnight maret, wedding reception, etc.) and preventif act

**KEYWORDS**: Security, order, conflict, North Luwu, strategic and control.

## I. INTRODUCTION

Security and public order is one of society necessities that require to be fulfilled. This is because security and public order are dynamic situation that allows government and society to perform daily activities. In order for this relationship to work properly requires rules or principles to protect their interests, respect for their interests and the rights of other people and provides a sense of security, order and peace in the life of society and state.

If the order and security can be realized properly as expected, the Society will be able to work properly in fulfilling their daily needs in order to improve their welfare.

The rules or principles that become the signs in the life of the society need to be controlled by law and regulation that can maintain peace and order as well to provide protection in the life of the society.

Law Number 23 Year 2014 on Regional Government, Article 25, states that the general government affairs which become the authority of the President as Head of Government are implemented by the regents / mayors in their respective working areas. Public governance affairs according to the provisions include the fostering of national insight, fostering harmony between tribes and intra-tribes, religious, races, and other groups in order to realize the stability of local security and the handling of social conflicts in accordance with legislation.

Heterogeneity is part of the socio-cultural features of the people of North Luwu today. Although the population is relatively small, 302,687 people in 2015 (BPS data), compared to the area, but the people of North Luwu Regency have multifarious ethnic, culture and custom.

From an economic point of view, the historicalism is certainly beneficial for the economic development in North Luwu along with the increasing mobility of the population and the opening of various business opportunities. But from a social point of view, this potential can bring a threat or potentially negative, namely the emergence of friction interests and competition by a number of fundamental social changes that cause security disturbances, peace and order (Kantramtib) in the midst of society itself. These disturbances can include conflicts and social conflicts, whether they are interests or groups or ethnic backgrounds, religions, races and groups (SARA).

Based on the most recent two-year conflict-prone data, issued by the National Unity, Politics and Linmas Agency of North Luwu Regency, it shows that most of the sub-districts in North Luwu Regency is in a conflict-prone red zone, although the distribution of incidents is not evenly distributed throughout the North Luwu region.

Therefore, reflecting on previous Regional Medium Term Development Program (RPJMD) 2011-2016, strategies for handling and preventing Kantramtib disturbances such as social conflicts, mostly perpetrators of these young people, therefore, according to the Seventh Mission in the RPJMD of North Luwu Regency 2016-2021, Government of North Luwu Regency is determined and targeting to reduce these social conflicts from 19 (nineteen) incidents to 12 (twelve) incidents by 2018 or even no longer occur at the end of RPJMD period.

Therefore, a study of a proper strategic policy is implemented in controlling all forms of Kantramtibnas disturbance in North Luwu Regency.

Based on the explanation above, then the problem in this study is how measure and strategic policy that are considered to be effective, both intermediate and long term to prevent the Kantramtibnas disturbance in the form of repeated and declining inter-youth conflicts to the next generation (new perpetrators) at the potential conflict location? And how are the steps and

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strategic policies in innovative and creative ways to prevent the Kantramtibnas disturbance in the form of conflict among youth in other village areas? and what are the tactical, integrated and deterrent action and control measures in handling Kantramtibnas disturbance, both in the incident and after the incident?. As for the purpose of this study is

1. To determine the causes of the tendency of society, especially among youth activities that have the potential to trigger the occurrence of quarrel/conflict between youth.
2. To find strategic measures and policies that are considered effective, both intermediate and long term to prevent Kantramtibnas disturbance in the form of repeated and declining inter-youth conflicts to the next generation (new perpetrators) in conflict-prone locations.
3. To find innovative and creative strategic measures and policies to prevent/minimize Kantramtibnas disturbance of youth conflicts in other village areas (non-conflict-prone).

## II. RESEARCH METHODS

This research was conducted in North Luwu Regency South Sulawesi Province from April to July 2017. Data collection was conducted by using two stages: First phase, survey activity to determine Kantramtibnas control strategy. This stage was implemented by monitoring as well as field observation about the existing condition of Kantramtibnas control strategy. In the second phase, first hand sources were conducted on various sources through Focus Group Discussion (FGD) activities, among others with related bodies/ institutions, economic actors, community leaders and decision makers in the regional government structure of North Luwu Regency at various levels. The interviews were conducted to find out the aspirations and needs of the society against the Kantramtibnas control strategy. Required information such as; function and role of each stakeholder in Kantramtibnas control strategy, institutional form needed for Kantramtibnas control strategy, model and form of cooperation between actors/players in Kantramtibnas control strategy, and design of Kantramtibnas control strategy. Then the data obtained were analyzed by using a set of analytical tools that is Analytical Hierarchy Process (AHP) and SWOT Analysis.

## III. RESULTS AND DISCUSSION

### A. Existing Condition of Security, Peace and Public Order in North Luwu Regency

#### A.1. Common Criminality Number

Crime as an element of criminality above sociologically has two elements, namely: (1) The crime is economically and psychologically harmful; (2) The crime hurts the immoral feelings of a group of people.

The common criminality number presented here is a non-conflict crime or non-fights group that occurs in the North Luwu Regency in each month of every year. It describes the average in a month, there are a number of criminal acts for various categories of crimes such as *curanmor* (motorcycle theft), murder, rape, and so forth. The common criminality number in North Luwu Regency was very fluctuating because in 2011 the criminality rate ratio was 11.19 and it increased in 2012 by 13.77 and it was the highest criminality rate in five years. However, in 2013, there was a decline of 9.89 and continuously decreased until the year 2014 with 7.93 or the lowest in the year 2011-2015. However, in 2015, it encountered another increase with 8.92 (Table 1.4).

Table 1.4.  
Criminality Number Ratio per 10.000 Inhabitants  
in North Luwu Regency (2011 – 2015)

No.	Criminal Type	Year				
		2011	2012	2013	2014	2015
1.	Total of Drug Cases	3	7	6	9	31
2.	Total of Murder Cases	7	4	8	2	3
3.	Total of Sexual Assault Cases	6	6	14	3	12
4.	Total of Persecution Cases	240	268	213	170	163
5.	Total of Theft Cases	28	67	23	38	103
6.	Total of Fraud Cases	40	51	30	16	10
7.	Total of Money Conterfeiting Cases	1	0	0	0	1
8.	Total of Criminal Act Cases for 1(one) year	325	403	294	238	323
9.	Total of Inhabitants	290.365	292.525	297.313	299.989	362.143
10.	Criminality Number	11,19	13,77	9,89	7,93	8,93

Source: Processed Data of Regional MediumTerm Development Program of North Luwu Regency 2016-2021 and The Unity of the Nation and Politics Body (Badan Kesbangpol) of North Luwu Regency 2015

This criminality indicator provides an overview of the level of society security. The lower the criminal rate, the higher the level of society security will be. Table 1.4 shows that in 2011, the number of crimes amounted to 325 cases from various cases such as drugs, murder, sexual offenses, battering, theft, and fraud. In 2012, the number of criminals increased to 403 cases. But in 2013, there was a decrease to 294 cases. The year 2014 had decreased again to 238 cases. However, in 2015, it increased to 323 cases.

Security, order and criminality prevention is one of the main priorities for realizing the stability of governance especially in the regions.

Table 1.5.  
 The Amount of Criminal Act According to Police District in North Luwu Regency (2013-2015)

Police District (Polsek)	Year		
	2013	2014	2015
Sabbang	77	55	63
Baebunta	85	73	66
Malangke	10	20	18
Malangke Barat	29	31	26
Sukamaju	0	0	17
Bone-Bone	99	98	84
Tanalili	NA	NA	NA
Masamba	426	338	260
Mappedeceng	27	16	15
Rampi	NA	NA	NA
Limbong	0	2	2
Seko	NA	NA	NA
<b>North Luwu</b>	<b>753</b>	<b>633</b>	<b>551</b>

Source: North Luwu Regency in Number, 2016.

Criminal acts that occurred in North Luwu Regency in 2015 were located in the Masamba Sub-district with 260 cases and the smallest was in Rongkong Sub-district with 2 cases. In tendency manner, the number of criminal acts occurred in North Luwu Regency had decreased from 753 cases in 2013 to 551 cases in 2015 (Table 1.5).

#### A.2. Number of Conflict or Youth Group Fight

Static facts are necessary to obtain an idea of the extent of the incidence of conflict or fights between youth groups in North Luwu Regency over a period of time. This description of incidents is used as supporting data in analyzing the effectiveness of a policy or action in handling, reducing or tackling incidents to the expected conditions. To know the existence of conflict intensity or group fights from 2011 to 2017 in North Luwu Regency can be described as follows:

Table 1.6  
 Number of Inter-Youth Fights  
 in North Luwu Regency from 2011-2017

No	Year	Total
1.	2011	9
2.	2012	8
3.	2013	11
4.	2014	24
5.	2015	12
6.	2016	0
7.	2017*	4
	Sum	68

Source: Processed Data according to Basis Data Police District of North Luwu Regency and Badan Kesbangpol of North Luwu Regency 2016/2017.

\*February 2017.

In early 2017, North Luwu Regency Police has classified areas in North Luwu into 2 (two) classifications based on conflict-prone levels. These two classifications are called red zones and yellow zones, where red zones are considered more prone

than those of the yellow zone. There are 3 (three) areas referred to as red zones or conflict-prone areas that lead to high crime rates in the region. These areas are[1]:

- a) Sabbang Sub-district
- b) Mappedeceng Sub-district
- c) Bone-bone Sub-district

As for the yellow zone, the areas classified in this zone are:

- a) Malangke Sub-district
- b) West Malangke Sub-district
- c) Sukamaju Sub-district
- d) Baebunta Sub-district
- e) Masamba Sub-district

### A.3. Institution of Security Provider, Peace and Public Order

#### A.3.1. Implementation of Security and Public Order by the Civil Service Police

The Civil Service Police is one of the regional tools of North Luwu Regency in the form of a regional technical agency which carries out the duty to enforce the Regional Regulations and other legal products relating to the maintenance and administration of peace and public order. The number of civil service police of North Luwu Regency from year to year is decreasing. In 2012, there were 75 civil service police and continue to be reduced in 2013 to 63 civil service police. In 2014, there was an increase to 67 civil service police but in 2015 there was a decline again as many as 61 civil service police.

#### A.3.2. Society Protection Unit (Linmas)

Society Protection (Linmas) is a unit that has the general task of maintaining public order and peace. According to the Regulation of the Minister of Home Affairs of the Republic of Indonesia Number 84 Year 2014 on the Implementation of Society Protection, the Society Protection Unit hereinafter called Satlinmas is an organization formed by the village government and members of the Society prepared and equipped with knowledge and skills to carry out disaster management activities in order to reduce and minimize the impact of disasters, and participate in maintaining security, peace and public order as well social activities. This unit has an important role in public order at large.

The number of Satlinmas members in North Luwu Regency was stagnant and had not increased since 2011 as many as 1,710 people and until 2015 was still 1,710 people. With the number of Linmas that never grows annually, it causes the ratio of Satlinmas to the population is getting smaller and decreasing every year. Data in 2011, the ratio of 58.89 decreased to 58.43 in 2012. There was a further decline in 2013 to 57.52 and finally in 2015, the ratio per population to 47.22 (Table 1.17).

Table 1.7.  
 Ratio of Satlinmas Members' Number per 10.000 Inhabitants  
 in North Luwu Regency (2011 – 2015)

No.	Description	Tahun				
		2011	2012	2013	2014	2015
1.	Number of Linmas	1.710	1.710	1.710	1.710	1.710
2.	Number of Inhabitant	290.365	292.765	297.313	299.989	302.687
3.	Ratio of Linmas' Number per 10.000 Inhabitants	58,89	58,43	57,52	57,00	47,22

Source: RPJMD North Luwu Regency Document 2016 – 2021.

#### A.3.3. Environmental Security System (Siskamling)

In Government Regulation Number 43 Year 2012 on Procedures for the Implementation of Coordination, Supervision and Technical Guidance on Special Police, Civil Servant Investigators and Security Forms of Self-Funded (Swakarsa), it is mentioned that Pam Swakarsa is one of the auxiliaries of the Indonesian National Police in carrying out the functions of state government in the field of maintaining security and public order. In carrying out its duties, the police coordinate with Pam Swakarsa through the following activities:

- Potential Empowerment of Pam Swakarsa
- Guidance of Pam Swakarsa system

Furthermore, in Article 10 paragraph 3 stated that the guidance of Pam Swakarsa system is conducted through: (a) improvement of the capability of Environmental Security System (Siskamling); (b) improvement capability and patrols of environment. In connection with the guidance of the Pam Swakarsa system through the improvement of the Siskamling capability, it is necessary to look at the extent to which the existing Siskamling is formed in the Siskamling Post formula in North Luwu Regency.

In quantity, the number of Siskamling Post is increasing every year. It has been seen since 2011, the number of 306 Siskamling Post in North Luwu Regency has grown to 473 in 2012 and continued to grow to 639 in 2013. In 2014 the development is very large to 805 posts and in 2015 to 971 posts.

Nevertheless, the linearity relationship of increasing ratio of the formation of Siskamling Post with the decrease of the incidence of conflict or group fight among the inhabitants is invisible. In the sense that the increase of Siskamling Post ratio in the villages did not have a strong effect on the decrease in the intensity of conflict or group fight. It also cannot be explained clearly why there is no consistent linear trend between increasing formation of Siskamling Post with decreasing conflict in the last four years.

**A.3.4. The Existence of TNI/Polri Personnel**

Nationally, the number of police and military personnel in 2011 to 2016 has not been comparable with the number of inhabitants. The ratio of the number of police personnel to the current population is 1:750, which should be 1: 300. The ratio also applies in the area of North Luwu Regency. This condition is one of the obstacles for the police in optimizing the monitoring, control and prevention of group fights by patrolling to prone areas in order to increase the sense of security and peace in the midst of society.

**A.3.5. Regional Regulations and Other Regulations related to the Implementation of Security and Order**

Since its establishment in 1999, the Government of North Luwu Regency has only one regulation in the form of regional regulation relating to the implementation of security and order, namely the Regional Regulation of North Luwu Regency Number 3 Year 2013 on Alcoholic Beverages. The regulations related directly to the prevention and control of Kantramtibnas disturbance until 2017 does not yet exist.

Based on the information and field data obtained from the police and Indonesian National Soldier (TNI), one of the triggers of conflict or group fights that are often become the cause is crowded incidents organized by the society that are not coordinated with the police. Thus, in order to prevent the occurrence of disturbance Kantramtib resulting from the crowd, the need for regulation in the area that governs the implementation of the crowd.

**A.3.6. Society Policing (Polmas)**

In 2005 in Bone-bone Sub-district, for the first time, a model of police and society partnership was implemented in maintaining security and public order in self-supporting in the form of Society Policing or Policing of the Society (Polmas) at that time. By 2015, the concept of Society Policing was regulated by National Police Regulation Number 3 Year 2015 on Society Policing. Particularly in Bone Bone Sub-district as one of the areas prone to group fights, Polmas is played by someone from police element as Bhabinkantibmas. This is in contrast to the Polmas concept when it was first established in 2005 in which the Polmas was represented by its own society which was considered to be capable of assisting police tasks, mainly in handling group fights and placed at posts prone to fights of youth groups. Therefore, the concept of Society Policing which involves the society in self-supporting need to be re-implemented with due to the competence and capability of the society concerned.

**B. Factors Causing Youth Fights**

Based on the results of interviews and incident data from relevant agencies, in this case the North Luwu Police and Badan Kesbangpol of North Luwu Regency, the factors causing group fights can be divided into two types:

1. Factors that are directly related to the perpetrator's self or internal factors;
2. Factors that are not directly related to the perpetrator (background) or external factors.

**B.1. Internal Factors of Perpetrator**

The following is cumulatively described several factors that directly relate to group fights or internal factors by prone locations (referring to incidents data 2011 - 2017):

Table 5.19.  
 Internal Factor by Prone Location of Youth Group Fight

No	Sub-district	Cause
1.	Sabbang	Revenge, misunderstanding, booze and possession of sharp weapons
2.	Baebunta	Hurt, booze, irritation in the youth crowd
3.	Masamba	The influence of drugs, booze and irritation in the middle of the youth crowd (traditional dance "Dero")
4.	Mappedeceng	Offended, possession of sharp weapon, booze
5.	Bone Bone and Tana Lili	Revenge, misunderstanding, irritation and booze, the influence of drugs

Based on the data above, it can be concluded that the dominant factors triggering group fights at the time of the incident, among others, by factors of revenge, offended, misunderstanding, the influence of alcohol and the influence of drugs. The trigger factors arise spontaneously and instantaneously, sometimes even less rationally because of emotional impulses. The offense of "SARA" background (Tribe, Religion, Race and Interfaith) was not found during the observation and data retrieval process through interviews with the police and related parties.

**B.2. External Factors of Perpetrator**

Causal factors that are not directly related to group fight or external factors can be described as follows:

- a. Lack of employment and high unemployment among youth.

From a number of group fight incidents, it is obtained an information that the average age of the perpetrator is about 15 years and above or age of high school and above and not married. Although in some cases there are involving under 15 years of age, some even over the age of 40 years but in all occasions, no one becomes the main actor. (Data details about age of perpetrator per incident have not been obtained).

The perpetrators aged over 40 years are the perpetrator's parents who help to prepare the equipment used in fights such as weapons and other assemblies.

Viewed from the economic status, most of the perpetrators are young people who do not have a permanent job, do not work or are classified as open unemployed and are in a group of job seekers. Some of them are farmer families who only work at harvest time.

b. Less development of units of village economic institutions such as farmer cooperatives and Village Owned Enterprises (BUMDes)

Village economic institutions are underdeveloped and poorly managed so that youth socio-economic participation is still low. Village governments have not been able to manage their local potential optimally in providing productive economic activities, either due to a lack of knowledge and minimal skills as well as the feelings of shame and prestige among youth. Village Owned Enterprises (BUMDes) that are being developed in villages are considered to be able to increase youth activities in the socio-economic field because of the economic-based rural society.

c. Distribution and use of booze is still dispersed in a number of locations and public entertainment events.

North Luwu Regency Government has owned Local Regulation Number 3 Year 2013 on Alcoholic Beverages but it has not been optimally implemented with the discovery of the drink in some conflict areas such as Bone Bone Sub-district, Sabbang Sub-district and Baebunta Sub-district.

In the opinion of some communities the main cause of the conflict is not due to social jealousy, employment and income because the incomes of society are sufficiently equitable, but that the conflict is due to increased juvenile delinquency due to the lack of optimal government control of booze, including among the authorities themselves. Booze is usually simultaneously present in entertainment events or crowds accompanied by traditional dances "Dero" which often a part of entertainment in the middle of the event attended by most of the youth.

d. Low level of education

The low level of average education of youth in some prone conflict villages is a social factor that causes high open unemployment rates. This resulted in the youth spending more time with youth gathering without clear and positive activities. Many of them only finish their education until elementary school (SD) never even go to school. Data from the Central Bureau of Statistics 2016 showed that by 2015 in Sabbang Sub-district the number of elementary students had decreased by 4.6% from 2014.

The high drop-out rate somewhere can lead to several things :

1. The power of deterrence to negative environmental influences is very low. Low-educated youth tend to influence children who are still in school.
2. The norms of society are ignored, those who are unemployed tend to be lazy to work, and *hura-hura* such as drinking, no counseling and doing arbitrarily (amoral).

e. The doctrine of "territorial ego" and the effect of negative regeneration.

From the results of interviews with police officers who handle the group fighters, it is found that the group fighters are divided into two categories: old and new actors. New actors are usually younger than the old perpetrators. The doctrine of the "territorial ego" takes place through the interlinking of youth in a village, and their interactions are largely unknown to their respective parents, in the sense that the parents in this case do not know much about what their children do outside the home. Unemployed youth and school dropouts are particularly prone to engage in such doctrine, but it is also possible that unemployed youth may affect children and adolescents who are still in school if caring and parental supervision of children is very weak. Likewise, on the other hand, it is found that parents actually considered it necessary to instill this "territorial ego" to their children.

f. Circulation and use of drugs, narcotics and hazardous substances

The use of drugs of an increasingly diverse type is an indirect factor that causes the youths to push toward deviant behavior, including those that undermine and disturb order and peace. In several sub-districts, police officers acknowledge that there are many potential places to transact and consume drugs in North Luwu Regency. Even these types of drugs are increasingly varied with increasingly promising psychological effects.

Variations in the use of drugs and certain substances are also increasingly widespread in the presence of a type of herb or concoction of drugs found in one area of the police sector in the Mappedeceng Sub-district. Based on interviews with police officers in the region, it is found that youths who consume drugs or certain substances obtained the formula of medicines from sources such as: (1) pharmacist; (2) social media; and (3) friends. The type of medicines that are mixed is a class of drugs list "G" a type of antidepressant and pain relievers. One of the biological effects of the use of these drugs is a feeling immune to all the clashes and belting of hard objects so that the user has a high confidence.

g. Lack of certainty and law enforcement

The pledge of peace and the threat of customary sanction imposition for those who violate, especially the perpetrators of group fights considered not to have a deterrent effect and not yet effective. The peace pledge has been made as a form of non-formal settlement of inter-youth fight since 2012. But data indicates that cases of group fights still occur at the same location in Bone Bone and Sabbang sub-districts until 2015. While the threat of customary sanction imposition begins to take effect in 2014, during a major clash in Dusun Kopi Kopi of Banyuurip Village with Dusun Karang of Bantimurung Village in Bone Bone Sub-district, but not yet implemented because of unclear mechanism and various legal obstacles.

Inter-group fights in October 2014 in Bone Bone Sub-Regency were the peak of cases of group fights of 24 cases that occurred in 2014. This incident resulted in 18 houses on fire, 2 houses heavily damaged, 677 displaced persons and 18 residents whose average youth was processed law to court.

Since the incidents of 2014, law enforcement through the deterrent effect method with the threat of "shoot in place" by the police could reduce the intensity of incidents in 2015 to 12 incidents and in 2016 to 0 incident.

Another factor on the weakness of legal certainty that is not directly related to group fights is the weak affirmation of administrative boundaries between villages that have the potential to trigger conflicts and become the root of inter-village conflict. This kind of conflict has the potential to involve youth in handling their cases. This indication, among others, can be seen in the case of the boundary of Radda Village, Baebunta Sub-district with Kappuna Village, Masamba Sub-district.

h. Lack of exemplary and caring of parents and apparatus

Parental awareness can be shown in the form of attention and cooperation with the police in handling youths involved in group fights. In one case, information was obtained that the parent's perpetrator or certain citizen sometimes deliberately did not provide information to the police about the whereabouts of the perpetrator and the evidence required by law enforcement. In addition to the concern of parents, the process of moral transformation between parents and the perpetrators themselves is still very low. Most police officers who have dealt with the perpetrator's youth have admitted that the offender's parents have little control over and care about their children's behavior outside the home.

i. Issue and Unfair News

At the time of the conflict, the most frequent issue was the news of preparations for attacking a neighboring village. The issue of assault made the neighboring village prepare for possible threats. Local issues of attacking neighboring villages are often heated up due to news or from mouth to mouth as well other unfair and accurate media.

j. Lack of space to gather and self-actualization

Another factor that becomes indirect cause of high number of group fights in North Luwu Regency is the lack of space to gather and self-actualization.

It is added with the lack of means for self-actualization, the potentials of each society, especially the youth being confined in which they then transited to negative self-actualization spaces, such as engaging in group fights and conflicts.

**C. Other Potential Factor of Group Fight Causes**

In addition to the factors above, other potential factors are identified which can lead to friction between groups in North Luwu Regency as follows:

1. Primordialism/Tribalism

Reinforcement of concentrated tribes' identification of in certain villages can also be a potential trigger for inter-group fights. Moreover, the villages are side by side or adjacent. Identification that is stronger by origin as in the villages of Baebunta, Kaluku and Dandang which are mostly inhabited by indigenous people, while Kampung Baru Village, Salassa Village mostly occupied by migrants from Rongkong, Toraja or Bastem. Similarly, Dusun Kopi Kopi of Banyuurip Village and Dusun Karangan of Bantimurung Village in Bone Bone Sub-district have a tribal homogeneity that is stronger and different from each other. This is deemed to be a potential root cause of conflict and group fights because the issue of SARA is easily blown to hit groups or other parties. Although tribal issues are very potential in the region, the reality is that the main trigger of conflict is not purely caused by ethnic or primordial factors.

2. The Weakness of Leadership of Customary and Governmental Leaders

All villages have complex leadership figures, powerful government, customs, professions, organizations, and individuals can be described as follows:

- a) Kampung Baru village at the top of its leadership is *Tomakaka* (named *pakondongan*), pastor, and village head. While at the middle level mentioned already very less individuals who are charismatic. At the lower level mentioned some hamlet leaders of youth leaders (from youth leaders of mosques and churches as well as heads of other youth organizations) whose role is only a centrist organization nature.
- b) Dandang village's formal figures dominate the very top of the leadership hierarchy. Sub-district head is placed at the top of the leadership pyramid with the Village Head. Nevertheless, in society experience all that is said to be the top of hierarchical leadership, it is worth noting.
- c) Salassa and Baebunta villages are not much different. From those of the two villages above only in Salassa and Baebunta villages where there is no lower level leadership. Government figures (formal leaders) are at the highest hierarchy with some professional groups, such as teachers, police, and soldiers. They place customary leaders on middle-level leadership.
- d) Kaluku Village tends to identify elements and leadership roles of formal figures and far from their environment such as presidents, ministers, governors.

Therefore it can be concluded that the leadership problem in the case of the loss of charismatic leader or the absence of unifying figure (role model) can be a potential trigger horizontal friction in society.

3. Youth are uninterested to cultures and traditions of local wisdom

In all villages there are many customary norms that are unpracticed. Many local traditions are rarely implemented, such as *mengasapi buah padi baru* (fumigate rice grain) and *ma'tompa bessi arajang*. Customary institutions are unpopular among youths in disseminating customary information and finding solutions to existing problems. Youth prefer to access information and communication technology such as social media to look for problem solving references rather than asking for blessings or advice from parents and traditional leaders.

Although nowadays there is some effort to revive the importance of preserving local cultural values, such as rituals, ceremonies and customary law, but the participation level of citizens and youth is very low and not infrequently the clash happened among law enforcement, religion and state law.

#### **D. Factors supporting conflict prevention or fighting between groups**

From interviews with some traditional leaders in the location of group fights, among others, Kampung Baru Village, Baebunta Village and Kaluku Village, society leaders explained that there are several potential factors that can prevent conflict and group fights in North Luwu which need to be known, among others:

##### **1. Knowledge and Comprehension Conflict as Negative Behavior**

From seven villages: Dandang Village, Kaluku Village, Baebunta Village, Salassa Village, Kampung Baru Village, Balebo Village, Bone Tua Village, Mappedeceng Village and Baliase Village, apparently there is no correlation between education and organizational experience with knowledge of conflict, almost entire society putting the definition of conflict as a physical clash, in general society understand conflict as something negative, even tend to be criminal, from nine villages, none of the society see that conflict is something common to a society that is heading for change.

##### **2. The root of very strong religion and religiosity of society**

Based on research literature and researcher observation, North Luwu Regency is one of the areas that became the center of Islam dissemination in Tana Luwu. Besides having strong cultural ties, it also has a strong religious system since the entry of Islam in Tana Luwu brought by Dato 'Sulaiman (Datuk Pattimang). The strength of religious life in North Luwu Regency can be seen from the development of Islam adherents in the last five years and the development of religious facilities (mosque and mushollah). Between 2012 and 2016, the number of mosques and mushollahs built increased from 702 to 772 units or 9.7%, while the church (Protestant and Catholic) which was the second largest religion actually decreased from 258 to 256 units or 0.7% in that period.

##### **3. Cultural openness**

In terms of ethnic and cultural origins in some sub-districts, it appears that conflict-prone sub-districts such as Bone Bone Sub-district, Sabbang Sub-district and Baebunta Sub-district, have higher levels of society heterogeneity than non-conflict-prone sub-district, such as Malangke and West Malangke. Nevertheless, as a former of the oldest and largest kingdom in South Sulawesi, the culture of the Luwu society is highly democratic and open to outside cultures. One proof is that almost all major kingdoms in South Sulawesi have descendants of Luwu Kingdom so that the culture of Luwu is very easy to assimilate with other cultures in South Sulawesi. Other evidence is that the North Luwu Regency became the first destination for transmigrants from Bali and Java outside Java Island in the 1980s because of its society is open to accept change.

#### **E. Government Efforts and Non-Government Participation on Kantramtibnas Disturbance Control in North Luwu Regency**

The problem of crime is not new even though the place and time are different but still the modus is assessed same. The crime in the capital and other big cities is increasing even in some areas in the villages. Crime prevention efforts have been carried out by all parties, both government and society in general. Various programs and activities have been done while continuing to find the most appropriate and effective way to solve the problem.

The social conflict in the form of fights between youth groups that occurred in North Luwu Regency is not new. Long before becoming one of the second-level regions in South Sulawesi Province, North Luwu Regency has indeed become one of conflict-prone areas. Various efforts made by the previous government had been proven to reduce conflict, of course with the help of law enforcement officers in this case is the police.

Based on the data that the authors obtained from various sources it can be seen that the North Luwu Regency government is overwhelmed in dealing with conflicts in the North Luwu Regency. One of the points in Presidential Instruction Number 2 Year 2013 on the Handling of Domestic Security Disturbance stated that "Conducting post-conflict recovery efforts that include refugee handling, reconciliation, rehabilitation and reconstruction hence people can gain a sense of security and can perform activities as usual". In the face of the high intensity of conflicts that have occurred in North Luwu Regency that resulted in riots, various efforts have been made by the North Luwu Regency Government and the police.

Based on the results of interviews related to the efforts of police officers and other parties in the handling and control of Kantramtibnas disturbance, including fights between youth groups, therefore in general the actions taken can be described as follows:

##### **1. Structural Handling Measures**

The intended handling measures are structural in ways that promote more severe sanctions and use weapons and prison instruments. To impose a stable situation is placed several police posts in prone places, such as on the border between Dandang Village and Kampung Baru Village, the border of Salassa Village-Baebunta Village, and the Border of Mappedeceng Village-Baliase Village.

##### **2. Preventive action**

The preventive action is by firing warning shots during the ongoing conflict of other preventive actions by destroying or managing the causes of conflict, such as booze, drug abuse, and youth gangs.

##### **3. Persuasive Action**

This has been conducted by the police in cooperation with the government of North Luwu Regency by reconciling with mediation and negotiation of the conflicting parties by putting forward the prevailing customs in society. This is in accordance with the mandate of Law Number 7 Year 2012 on Handling of Social Conflict in Article 37 mentioned: Government and Regional Government reconcile between the parties by:

- a) peaceful negotiations;
- b) granting restitution; and/or
- c) forgiveness.

Among them such as conduct a meeting with conflicting villages by giving advice, direction and warning and even presenting society leaders. From these efforts, the police and the government hopes to reduce the conflict back to the surface.

#### 4. Repressive Measures

After taking various preventive and persuasive measures, one of the actions that can be taken to stop the conflict is by taking repressive action. Repressive actions are perpetrated by capturing the perpetrators in the conflict.

Legal actions by the police against perpetrators of conflict in North Luwu Regency are still on gray track, preventive, persuasive and repressive action conducted by the police are still considered lacking by intellectuals. The Police are considered to be half-handled in handling and resolving the roots of fights between youth groups, this is reflected in the intensity of stagnant incidents and the lack of early prevention efforts undertaken by the police against the symptoms and potential for conflict in North Luwu Regency. However, this general assumption may illustrate that the police have failed in performing its functions, as in Article 2 of Law Number 2 Year 2002 on Indonesian National Police where the police hold one of the functions of state administration in the field of maintaining public order and security, law enforcement, protection, shelter, and service to the society.

Preventive action should be carried out by the police by using the intelligence function, in accordance with Article 4 of Law Number 17 Year 2011 on State Intelligence which states State Intelligence to perform effort, work, activity and action for early detection and early warning in the framework of prevention, deterrence, and countermeasures against any threatening nature that may arise and threaten national interests and security.

In the post-crime, it needs a strategy or repressive action to control the crime in order to prevent the occurrence of repetition of crime. Therefore, law enforcement in North Luwu Regency carries out various repressive actions to control crimes committed in the region. These actions include[2]:

- a) Accepting and taking action against the crime report.
- b) Conducting a series of investigative and investigative actions against a crime
- c) Conducting arrest, detention, and investigation.

#### F. Strategy and Policy of Kantramtibnas Disturbance Control as Fighting among Youth Groups in North Luwu

Strategy is a process of determining a plan that focuses on long-term goals with the preparation of a way or effort how to achieve the goals.

Barnest and Teeters show several ways to tackle crime, such as[3]:

1. Recognizing that there will be needs to develop social impulses or social pressures and economic pressures that may affect a person's behavior toward wicked behavior.
2. Focusing on individuals who exhibit criminal or social potentiality, even if the potentiality is due to biological and psychological disturbances or lack of adequate social economic opportunities so as to constitute a harmonious unity.

Effort or policy to conduct crime prevention and handling is included in criminal policy field. Crime prevention policy is carried out by means of "penal" (criminal law), the criminal law policy especially at the stage of judicial policy should pay attention and lead to the achievement of the goals of the social policy in the form of "social welfare" and "social defense"[4].

Control of security, peace, and order (Kantramtib) is very important and crucial thing to do. In developing this control strategy, it is necessary to analyze the factors of the situation and conditions that affect the achievement of the objectives based on their input and contribution factors using the SWOT Analysis (Strengths, Weaknesses, Opportunities and Threats) as described in the previous chapter. This analysis converts the accumulative supporting factors, causal factors and trigger factors as strengths, weaknesses, opportunities and threats.

##### 1. Internal Factor

Strength:

##### a. Regional government

1. There is a commitment of regional government to create a conducive Kantramtibnas as the mission and target of regional performance as stated in RPJMD 2016-2021.
2. There is an existence of regional apparatus organizations (OPD) and work units that have duties and functions in the field of public governance, fostering the integration/unity of the nation, security and order and enforcement of regional regulation/head of regency regulation.
3. There is an existence of regional apparatus organizations (OPD) and work units that have duties and functions in the field of youth and welfare of the people.
4. The number of Environmental Security System Post (Siskamling) shows an increase in the ratio from year to year.
5. The existence of a society policing program that had been implemented by the local government in 2005 - 2006 in Bone Bone Sub-district.
6. Establishment of Regional Intelligence Society (KOMINDA), one of its duties is to conduct early detection of the symptoms of existing conflict.
7. The establishment of Interfaith Harmony Forum (FKAUB) which serves as a forum of dialogue and deliberation to maintain harmony among religious people and prevent friction from religious background.
8. The coordination relationship between regional leaders is quite harmonious

##### b. Society

1. The absolute majority of the populations are Muslims.

2. The strong public perception that conflict or fights between youth groups is a negative and intolerable social act
  3. The strong root of religiosity because it became one of the central areas of the spread of Islam in Tana Luwu and local cultural roots of the society, among others, with the existence of customary institutions.
  4. The opening of intercultural interactions in the midst of society (cultural assimilation is quite flexible between indigenous tribes and immigrants).
  5. The existence of proper knowledge of society of the first step that must be done if there is a conflict in the environment.
  6. The skills of a group of youth in making/assembling traditional weapon equipment such as *papporo*.
  7. The high expectation of the society towards the sense of security, peace and order in the village/ environment.
- c. Security Institution
1. Police institution at the level Police Sector and TNI at the level of Koramil are present in almost every sub-district
  2. Communication relationship of institutional and personal between elements of police, public figures and regional government is still considered good
  3. The image of the police in public is still good
  4. Police personally settle (mingle) in the midst of the population

Weakness:

1. The absence of regional regulations issued by the Government of North Luwu on efforts to prevent and control Kantramtibnas disturbance which among others regulate the implementation of the crowd that contains entertainment event such as Dero Dance (Ma'dero).
  2. There are still certain groups of people who are free to sell booze that is not in accordance with the provisions.
  3. Not properly managed Environmental Security System (Siskamling) in every village.
  4. Unequal numbers of police and military personnel with population and area to be fostered. The current ratio is 1: 750, it should be 1: 300.
  5. Regional Intelligence System to village level and hamlet/RT/RW (neighborhood association) is not properly in function.
  6. The large percentage of productive age group with low education (below senior high school).
  7. Lack of legal certainty in terms of village boundary arrangement in one sub-district and between sub-districts.
  8. The existence of adjacent or neighboring villages with a high level of homogeneity of ethnic and religious aspects.
  9. Law enforcement is weak in the handling of legal proceedings against group or conflict fighters
  10. Customary law enforcement is weak in handling group fighters.
  11. Ineffective implementation of the "Pledge of Peace" of each conflict handling.
  12. Not yet implemented optimally enforcement of Regional Regulation Number 3 Year 2013 on Alcoholic Beverages.
  13. Lack of youth involvement in the implementation of local wisdom practices that allow youth involvement in togetherness such as cut grain rituals.
  14. The high rate of unemployment in the productive age group.
  15. Unformed society policing (Polmas) in every sub-district.
  16. Lack of control and concern of parents on the behavior of their children outside the home.
  17. Lack of functioning authority of sub-district government and village government in terms of coordination of peace and order counseling, especially among youth.
  18. Lack of intensity and incentives of strategic activities such as counseling/socialization of legal awareness and nationalistic dialogue among youth, especially unemployed youth.
  19. The lack of space for gathering and the development of youth skills such as studio and theater.
2. External Factors

Opportunities:

1. There is a national policy on domestic security of disturbance handling system.
2. There is a draft national policy on youth service index.
3. There is a draft government policy, in this case the Ministry of Internal Affairs to reactivate Siskamling.
4. The development of communication and information technology infrastructure.
5. The existence of national policy related to improving the performance of police and military duties.
6. The existence of a national policy related to the increased synergy of police and TNI with society.
7. The development of the world's Islamic religious groups to the regions.

Threat:

1. Extensive network of international drug trafficking to the regions.
2. The rapid development of social media technology that facilitates communication and access to negative information such as misuse of dangerous drugs, addictive substances and other dangerous/illicit materials.
3. Number of violent shows and news, including group fight in big cities.
4. The growing nature of consumerism and materialism as global economic progress erodes the joints and values of family and mutual cooperation on the one hand and strengthens individualism on another.

Based on the SWOT conversion and identification above, we can formulate the interaction of the combination of each factor (internal and external) in the form of strategy as follows:

a. Formulation of S-O Strategy

1. To make regulation about system of control and handling of Kantramtibnas disturbance in regional area, which contains about:
    - a. Standard procedure of handling and control in case of Kantramtibnas disturbance such as conflict, mass riot and other Kantramtibnas disturbance that disturb society.
    - b. Relationship and synergy of organization/institution that play a role in the creation of Kantramtibnas and security stability in the region in handling Kantramtibnas disturbance areas such as:
      - Police / TNI
      - Organization of regional apparatus with duties and functions (Tusi) of general governance, security and order, enforcement of regional regulations/head of regency regulation, national unity, people's welfare
      - Regional Intelligence Society (KOMINDA)
      - Interfaith Communications Forum (FKAUB)
      - Youth Organization
      - Siskamling Officer
      - Society Policing (Polmas)
  2. Optimizing the role and function of Society Policing (Polmas) by involving unemployed youth or underemployment as security auxiliaries.
  3. Improving the quality of Siskamling by updating society-based, semi-professional management by empowering unemployed youths, both open and closed unemployed.
  4. Synergizing Siskamling between villages by utilizing communication and information technology in order to prevent Kantramtibnas disturbance and early detection of conflict symptoms.
  5. Enabling institutions of Islamic religious organizations in mosques involving youth and young Muslims such as teenage mosques, congregational groups, and so forth.
  6. Making leaflets or pamphlets or other public communications media thematically on information that contains motivation, encouragement and zeal to prevent group fights, crimes and social offenses, such as the slogan "Pemuda Pemersatu Bangsa" (Youth is nation's unifier), "Pemuda Stabilisator Desa" (Youth is village's stabilization) and others.
  7. Reinforcing the handling of legal proceeding against group fighters
  8. Establishing cooperation with the police for the deployment of security personnel at places considered prone or crowded places such as traditional markets, night markets, wedding receptions and so on.
  9. Conducting joint patrol (Polri, TNI, Local Government, Community) up to 3 times a day, or based on hazardous hours, certain areas of crime and society diseases (PEKAT), adjusted for time and area characteristics.
  10. Establishing guard posts in places considered prone to maintain public peace.
  11. Establishing effective communication between society components and security forces by intensifying the implementation of regional visits or patrols and "*sidak malam*" (night watch) regularly/periodically by involving the components of the local society.
- b. Formulation of S-T Strategy
1. Establishing a system of prevention and co-management between security forces and regional government through regulations that tighten the organization of the crowds to prevent quarrel/friction, potentially abused narcotics/ drugs and youth gathering places that have activities and unclear objectives. The regulation also limits the hours of youth gathering in certain places.
  2. Optimizing the implementation and enforcement of Local Regulation Number 3 Year 2013 on Alcoholic Beverages.
  3. Increasing cooperation of social activities between regional government and Police/TNI by facilitating artistic, cultural and sports activities by involving youth as the main actors.
  4. Providing a deterrent effect by the security forces against perpetrators of the conflict or brawl with the threat of "shoot in place", especially in areas prone to conflict of red zone with high intensity.
- c. Formulation of W-O Strategy
1. Optimizing the authority of sub-district and village government to coordinate security and order by involving youth, among others through the management of Siskamling.
  2. Facilitating partnership development of national and religious insight between elements of education, youth organizations, religious organizations and local governments among youth and students through religious, cross-group, cross-regional and integrated religious activities, in order to reduce false practices of solidarity.
  3. Establishing youth cadres on legal awareness, peace and security.
  4. Creating sustainable modeling of Kantramtibnas maintenance system and prevention of criminal acts, either territorially or institutionally. For example the Best Siskamling Competition, "Village/Dusun Sahabat Kantramtibnas" by providing operational incentives Siskamling such as Kantramtibnas youth coaching.
  5. Improving the safety and comfort of the environment by utilizing Head elements of RT/RW/Dusun (neighborhood association) supported by unemployment and drop out youth databases (early youth and mature youth) who are potentially involved in group fights/Security and Public Order disturbance.
  6. Adding facilities and infrastructure of art, culture and sport as a container for the distribution of interests and talents as well as self-actualization of youth.
  7. Involving as many youth as possible in local agrarian wisdom practices such as rice cutting, and such.
- d. Formulation of W-T Strategy
1. Building understanding to the society of North Luwu Regency that sense of security, peace and order is a shared need by involving non-formal institutions.

2. Conducting legal counseling by the police team to the public both formal and non-formal.
3. Providing supporting facilities for operational facilities and infrastructure of the security apparatus according to the authority of the regional government
4. Providing supporting facilities to improve the welfare of the security apparatus according to the authority of the regional government.
5. Facilitating the formation/expansion of Polsek and Koramil in the mountains coverage.
6. Supporting the proposed addition of Polri and TNI personnel to an ideal level of 1:300, or one police officer handling 300 residents.
7. Reinforcing administrative boundaries between villages to prevent inter-village conflicts with border and land conflicts.

#### IV. CONCLUSION

The conclusion of the results of the exposure above is as follows:

1. The cause of the tendency of society, especially among youth to perform actions or activities that potentially disturb Kantramtibnas is divided into two factors, namely internal and external.
2. Seen from its potential weight, the improvement on external factors is considered more urgent and important, requiring certain strategies and policy efforts that are more comprehensive and involving many parties than on internal causal factors.
3. The number of crime on non-fighting groups or individuals who are part of the element of Kantramtibnas disturbance can be relegated from social effects by suppressing the intensity of conflict incidents or group fights up to the index 0.00 (low) so that indirectly support the achievement of RPJMD targets in order to realize security and public order.
4. The control strategy of Kantramtibnas disturbance is directed to strengthen security, peace and order of society through real and sustained efforts that are expected to eliminate the zone division of prone conflict or youth group fights (red and yellow) in certain areas into a whole safe zone.
5. Based on the SWOT analysis, the strategies and policies of control that are considered effective, innovative, tactical and integrated can be divided into three, namely pre-emptive, preventive and repressive strategies.
6. Pre-emptive strategy is directed to the efforts of character building, moral and mental prevention of Kantramtibnas disturbance, including to prevent the decreasing incidence to other actors such as through the formation of the Youth Cadre on Law Awareness, Peace and Security. Preventive strategies are directed to technical and tactical efforts and actions in order to prevent the occurrence of symptoms and minimize the impact of conflicts in an integrated manner. While repressive strategy is an effective effort that needs to be conducted to give effect to the impression of force hence the perpetrators do not repeat their actions that disturb Kantramtibnas.

#### V. RECOMMENDATION

Based on these conclusions, several things can be recommended as follows:

1. The regional government of North Luwu Regency as an element of the local government must play an active role in formulating and issuing policy on security and order control in North Luwu, so that the implementation of development and government can be conducive, safe, peaceful and orderly.
2. In the formulation and implementation of the control strategy, it is recommended that the regional government involve all stakeholders outside the regional government institutions such as Polri/TNI, other law enforcement, youth, society leaders (customs) and society organizations in an integrated and sustainable manner.
3. A more detailed strategy formulation that needs to be undertaken by related parties is outlined in the recommendation section of the Executive Summary.

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# MICROFINANCE – REACHING THE UN-REACH THROUGH PARTNERSHIP MODEL

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**Abstract-** The increased focus of central banks on financial inclusion has prompted banks to explore innovative means of reaching out the financially excluded section. In that process, various banks propose to adopt several models to reach the unreached. One of the most successful model is partnership approach by collaborating with credible and efficient financial intermediaries (interchangeably referred to as BC/Partner) to deliver the much needed micro-credit services to the said segment. The current document on “Partnership model”, attempts to give an understanding of the partnership model, the products that can be offered, various risks associated and mitigation techniques, the technology and monitoring system adopted by various countries.

**Index Terms-** *United States, India, Financial inclusion, Inclusive banking, Micro Finance, Banking for the poor, Elimination of poverty*

## **The term Microfinance:**

Timely delivery of financial services , which include savings, credit, Insurance, remittances etc at an affordable cost to the vast sections of disadvantaged and low income groups is the goal of Financial Inclusion Plan.

## **Financial Services includes**

- Savings
- Credit
- Insurance
- Remittance facilities etc.

## **Who are excluded?**

- Marginal Farmers
- Landless Farmers
- Oral Lessees
- Self Employed
- Urban slum developers
- Migrants
- Minorities
- Social excluded groups
- Senior citizens
- Women

## **Research Elaborations**

### **The Vision Applied – United States**

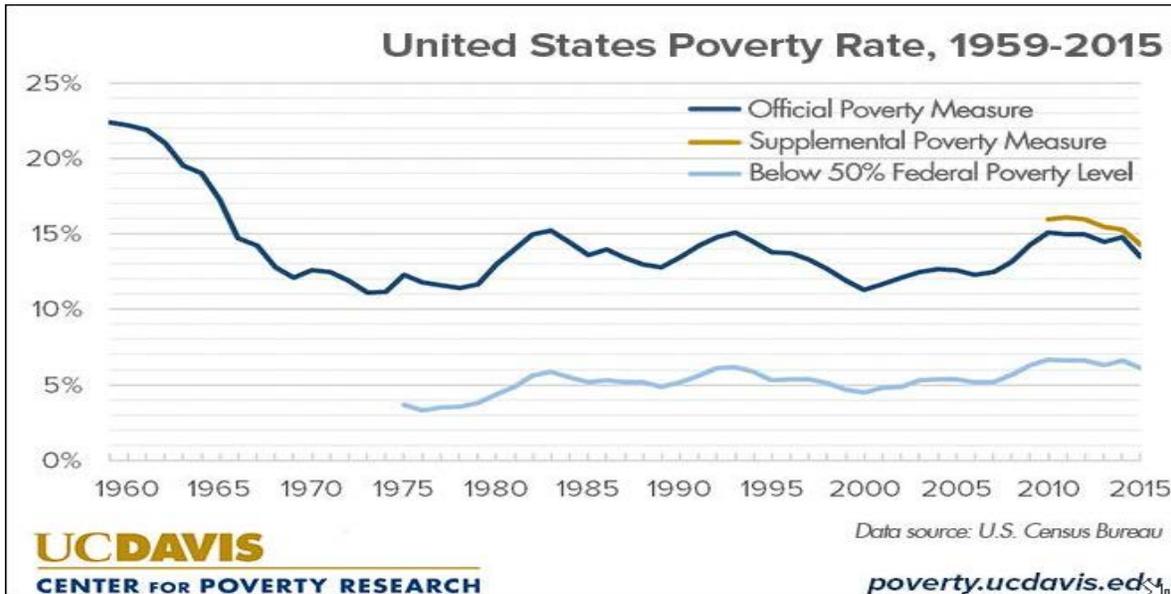
Financial Inclusion is one of the key challenges the Central Banks are trying to mull it over the past several decades.

With the dramatic increase of microfinance programs across various countries, like Bangladesh, Bolivia, India, Indonesia, and other developing countries, United States started to address the key issues with the weaker section or unreached section of the nation by welcoming few microfinance organizations. It is also evident that the difficulties for the microfinance institutes to expand the business in the United States than the rest of the developing countries.

In the United States; the official poverty rate is 13.5 percent, based on the U.S. Census Bureau's 2015 estimates. That year, an estimated 43.1 million Americans lived in poverty according to the official measure. According to supplemental poverty measure, the poverty rate was 14.3 percent. In the year 1959, the poverty rate in the United States had ranged from a high of 22.4% to a low of 11.1% in 1973.

(Source: <https://poverty.ucdavis.edu/faq/what-current-poverty-rate-united-states>)

The country realized the impact of financially excluded sections of the economy and rapidly introduced several poverty elimination programs during and after 1964 and evidenced a fluctuation of 11 to 15% in the poverty rate.



(Source : <https://poverty.ucdavis.edu/faq/what-current-poverty-rate-united-states> )

There is lots of Microfinance organizations across the globe are working constantly to reach out to the unreached by various models under the umbrella of Microfinance.

**Differences in the Microfinance organizations:**

In the United States the microfinance organizations operate in a different manner compared to the other developing countries; Bangladesh, India. It is not easy for “Self-employment in the United States as compared to the other countries in the study”. The below table exhibits the various types of microfinance organizations in the United States and in the developing countries.

Table 1. *Examples of types of microenterprises in the United States and the developing world*

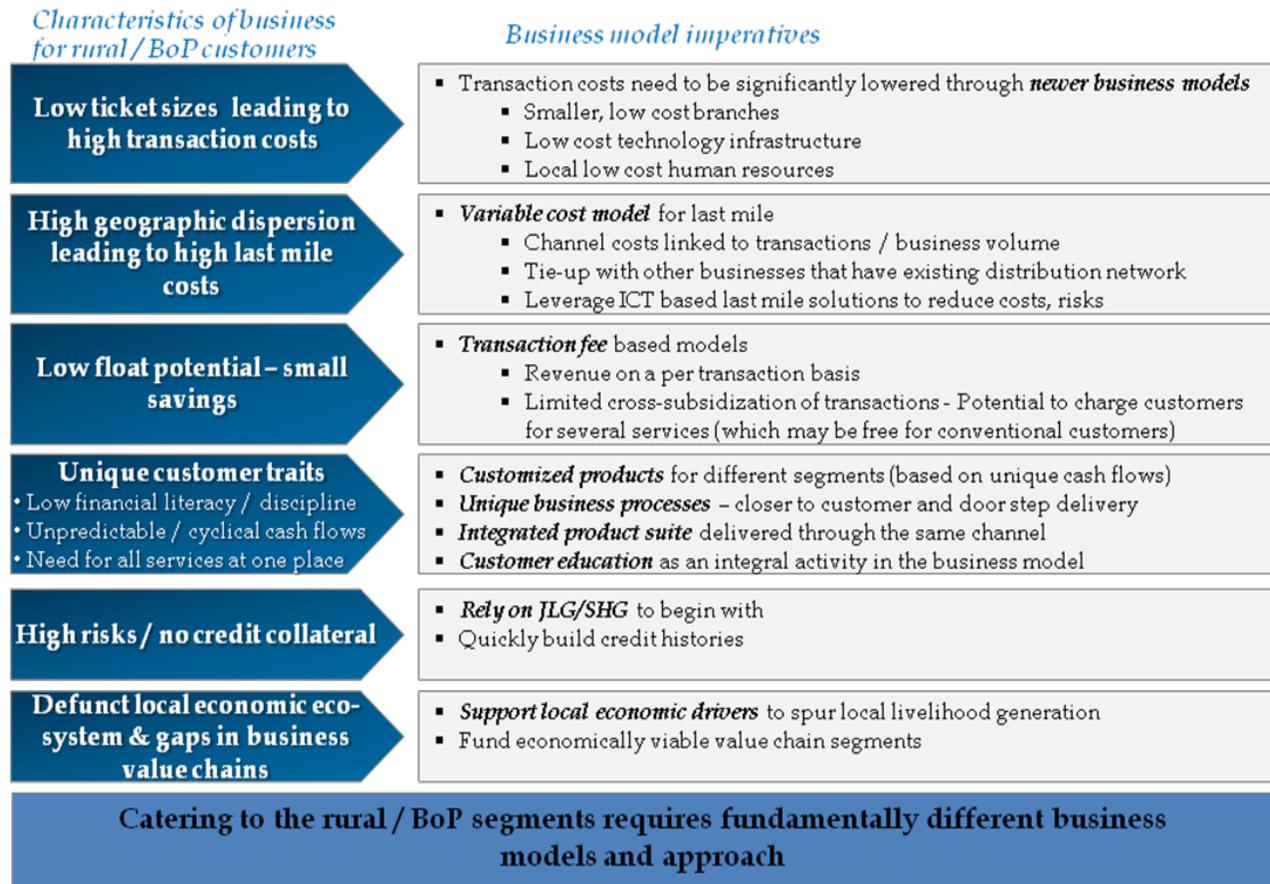
United States	Developing world
—Care for children or pets	—Plant crops and fatten livestock
—Cut hair or polish nails	—Do odd jobs, especially on farms
—Cook food and sell drinks at festivals	—Cook food and sell drinks on the street
—Sell Avon, Amway, or Mary Kay	—Petty trade in food, clothes, or toiletries
—Clean homes, cars, or offices	—Take in laundry
—Trade and/or repair clothes or cars	—Make and/or repair clothes or cars
—Paint or repair houses	—Build or repair houses
—Cut grass or trim branches	—Collect and sell wood, charcoal, or water
—Kill pests	—Carry loads or messages
—Repossess cars	—Drive a bus or truck
—Work with wood	—Work with wood or metal
—Rent video tapes	—Show movies from video tapes
—Deejay parties	—Play in a band
—Drive cabs	—Run a rickshaw
—Quilt or knit blankets	—Husk rice or shell peanuts
—Sling newspapers or brochures	—Sell newspapers or lottery tickets
—Make and sell arts and crafts	—Scavenge for things to recycle
—Make and sell fake jewelry	—Make and sell baskets or rope
—Buy and sell drugs	—Shine or repair shoes

In several researches it is found that access to credit is a major constraint for the US entrepreneurs. Racism, Good Credit History check for immigrants etc are the main limitations for the microfinance organizations to tumble in the United States. It is still understood that access to credit is a major challenge due to the fact that the lenders always require some sort of security as collateral, which needs savings. Several housing finance corporations need an initial payment, corporate financing companies / banks need the entrepreneurs to bring initial capital of their own, besides the loan capital, at risk.

In the United States, microfinance organizations generally have a reach to the loans. It is well known that 25 percent of the clients of microenterprises in the United States are either bankrupt or used the monies to pay off the previous debts. In the United States with a good credit history and salaried person can get a credit card without any hurdles. Almost all microfinance entrepreneurs and/ or the spouses have a salaried job and thus meet most demand loans through the usage of credit cards.

Even though the pricing of credit card financing is high, the transactions costs and low in total costs attract the financing through Credit cards in the United States. Similarly, loans from pawn brokers, check cashing outlets, Payday Lenders and rent to own stores charge a huge interest rate but the overall costs associated will be low. Eventually banks started focusing on financial exclusion areas to extend financial support through various means of microfinance models. It is evident from the developing countries that the best microfinance programs can make profit out of lending and sustain the business for long term than working as a non-profit organization with a limited resources and limitations in financing to the weaker sections of the society. The objective of the paper is to differentiate between the United States strategies on micro lending programs with other developing countries. The methodology adopted by developing countries to make a sustainable growth in micro lending and making the reachability to the poor and creating employment through the means of micro finance through partnership model. It is observed that in the United States, microfinance organizations cannot compete with regular commercial banks. In order to make a success in micro lending to the poor, Central govt should come up with a strategy and bring up new policies and regulations, like the central banks in the other developing countries made it mandatory for the banks to lend a part or certain percentage of their loan portfolio to micro lending through different models of micro finance. It is also observed that the banks alone cannot reach to the weaker sections of the society and hence there are several micro-lending models available and adopted by developing countries to reach the ultimate weaker section are remarkable. United States need to acknowledge and adopt these proven and successful models to reach the unreached, educate and create sustainability in the lives of poor.

### **The Vision Applied – India**



Source: BCG India Banking 2020

Over 430 million people, or 37% (as per Tendulkar report) of the population in India, live below the poverty line (BPL). The vast majority of Indian households with an annual income less than INR 150,000 (USD 3,260), a total of 700 million people, though not necessarily of BPL status, still lack access to essential financial services like credit, insurance, and savings facilities, and therefore constitute the potential target client base for microfinance services. The annual micro-credit demand for the above population is given as under.

	No. of Target HH	Total Credit Demand (in Rs Millions)	Average Credit Demand per HH (in Rs)
<b>Urban</b>	24,712,703	718,320	29,067
<b>Rural</b>	117,508,000	2,582,170	21,974
<b>Total</b>	<b>142,220,703</b>	<b>3,300,490</b>	<b>23,207</b>

**What makes this segment different to be served?**

Despite many efforts, Banks have not been able to serve this segment because of peculiar Characteristics of this segment calling for newer business models as explained below:

**What would it require to succeed in Banking with the poor?**

The key for succeeding in the partnership initiative is given below:

Key Success Factors	Description
<b>Strong channel/ distribution model</b>	<ul style="list-style-type: none"> <li>▪ Strong distribution network to reach, acquire and service a large customer base</li> <li>▪ Large and mature distribution/ channel management team structure</li> <li>▪ Effective channel training to help them deal with financial services</li> </ul>
<b>Robust product strategy</b>	<ul style="list-style-type: none"> <li>▪ Products suited to the unique needs of the customer segment; customization as per unique regional / segment needs vital to ensure relevance</li> <li>▪ Offer the complete suite of multiple products required by the customers</li> <li>▪ Services to be delivered in an easy to use manner at convenient outlet environment / other convenient delivery channels yielding a good overall customer experience</li> </ul>
<b>Effective marketing and branding</b>	<ul style="list-style-type: none"> <li>▪ High on the ground BTL activities near the outlets designed to attract consumers to enroll &amp; transact</li> <li>▪ Focused efforts to establish a brand identity connoting "trust" and "good customer service"</li> <li>▪ Use of innovative marketing media to control costs while attracting a wide customer base</li> </ul>
<b>Robust technology platform</b>	<ul style="list-style-type: none"> <li>▪ Good overall customer experience in technology usage - simple, easy to use and reliable front-end technology platform</li> <li>▪ Ability to offer real-time transactions through strong backend integration with existing CBS</li> <li>▪ Low capex requirements and cost per transaction</li> </ul>
<b>Financial Literacy</b>	<ul style="list-style-type: none"> <li>▪ Focused efforts on customer education and train them on financial planning methodologies</li> <li>▪ Active wealth management services / guidance to the customers to help them choose the appropriate products and services</li> </ul>
<b>Risk management &amp; compliance framework</b>	<ul style="list-style-type: none"> <li>▪ Robust processes &amp; systems to ensure adequate supervision and compliance at field level</li> <li>▪ Strong cash planning and management</li> <li>▪ Risk management policies and framework</li> </ul>
<b>Financing</b>	<ul style="list-style-type: none"> <li>▪ Funding for setting up the wide distribution network and for financial literacy programs</li> <li>▪ Financing to meet capex and setup requirements</li> </ul>
<b>Bank can rapidly build these relevant competencies with the assistance of appropriate partners</b>	

**Who could be the potential partners?**

- a.) Micro Finance Institutions-Largely NBFCs
- b.) Business Correspondents

**Enabling regulatory changes**

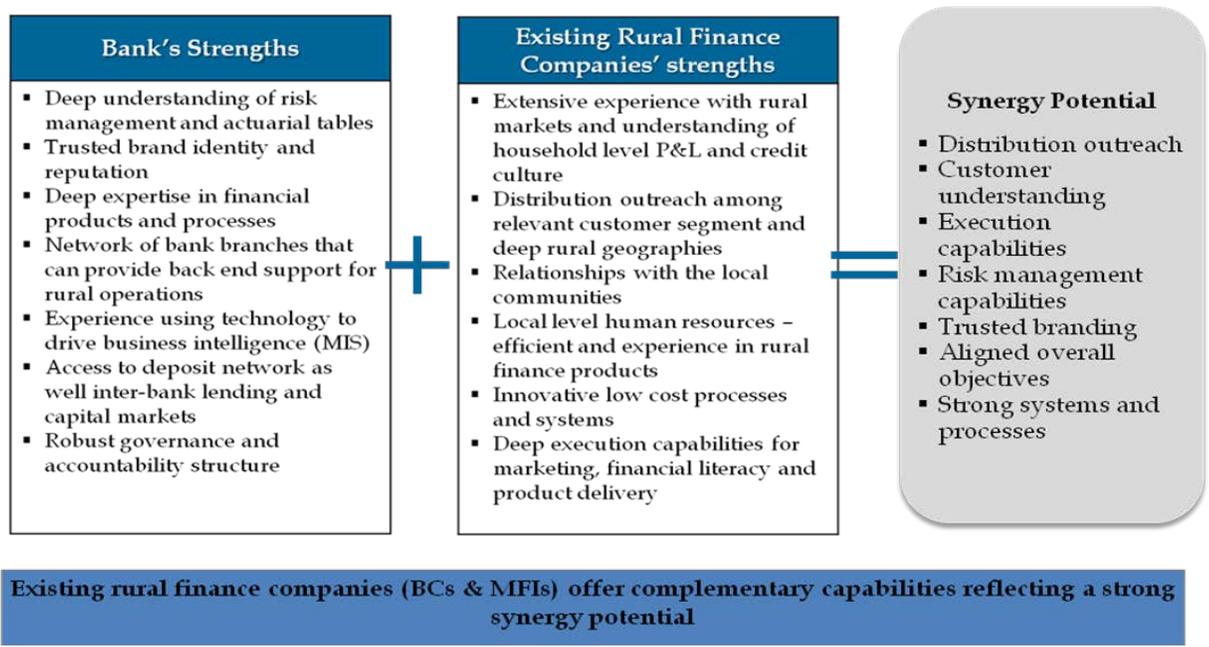
Up on recommendations of Mr.H.R.Khan Committee (Deputy Governor of the Reserve Bank of India) and also drawing from the advancement in technology (resulting in significant reduction in transaction costs) with proven delivery models, RBI has come up with circular (Jan'06) on appointing Business Correspondents/Business Facilitators (BC/BF) on carrying out the basic banking services on behalf of the bank. RBI also made lending to such excluded sections mandatory under Priority Sector Lending obligations of the banks.

As per the guidelines BC/BF can originate both liability and asset business for the bank. But, among the list of eligible entities to be a BC/BF (given in text box), NBFCs were excluded.

However, NBFCs are permitted to conduct the asset business for the bank and hence can become a potential business **partner** in delivering micro-credit services which is one of the key components of financial inclusion.

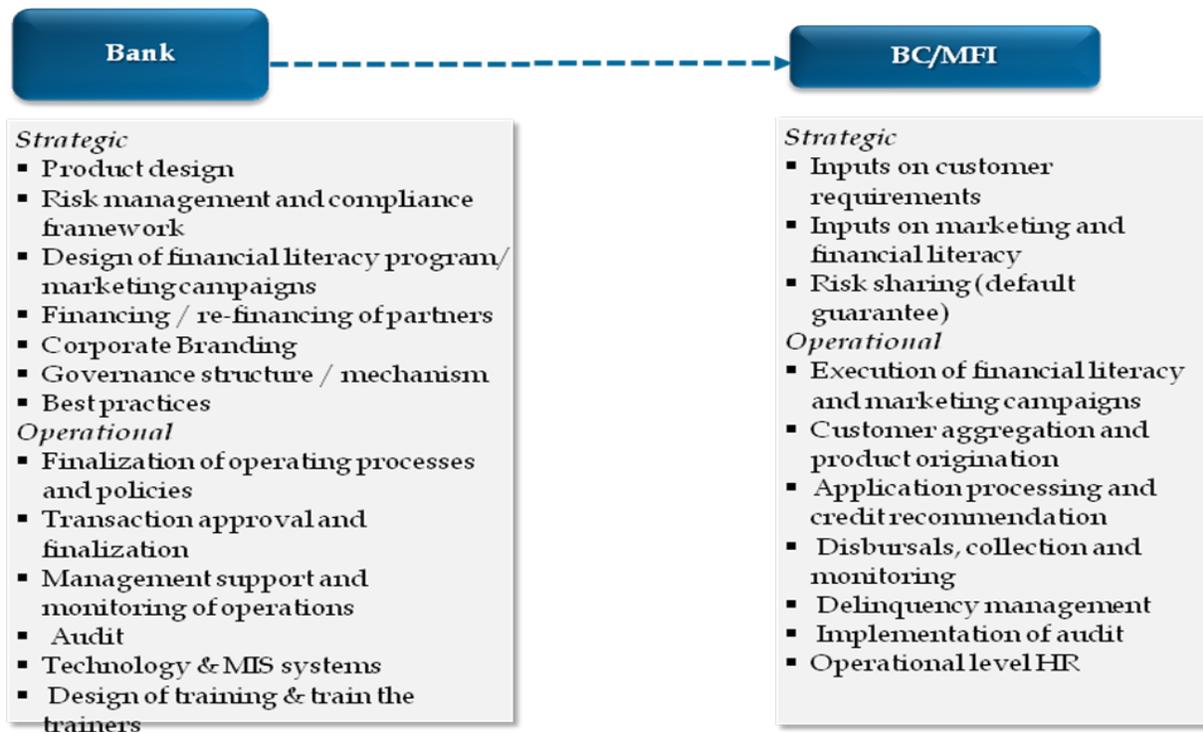
The approach of collaborating with the NBFC (partner)/BC (interchangeably used in this document) for delivering the **micro-credit** services is termed as **partnership model**. The scope of activities under this model are **loan origination, follow up, monitoring, recovery etc.** and also to **facilitate basic banking services** to the un/under banked segments on bank's behalf.

**What can a partner bring to table?**



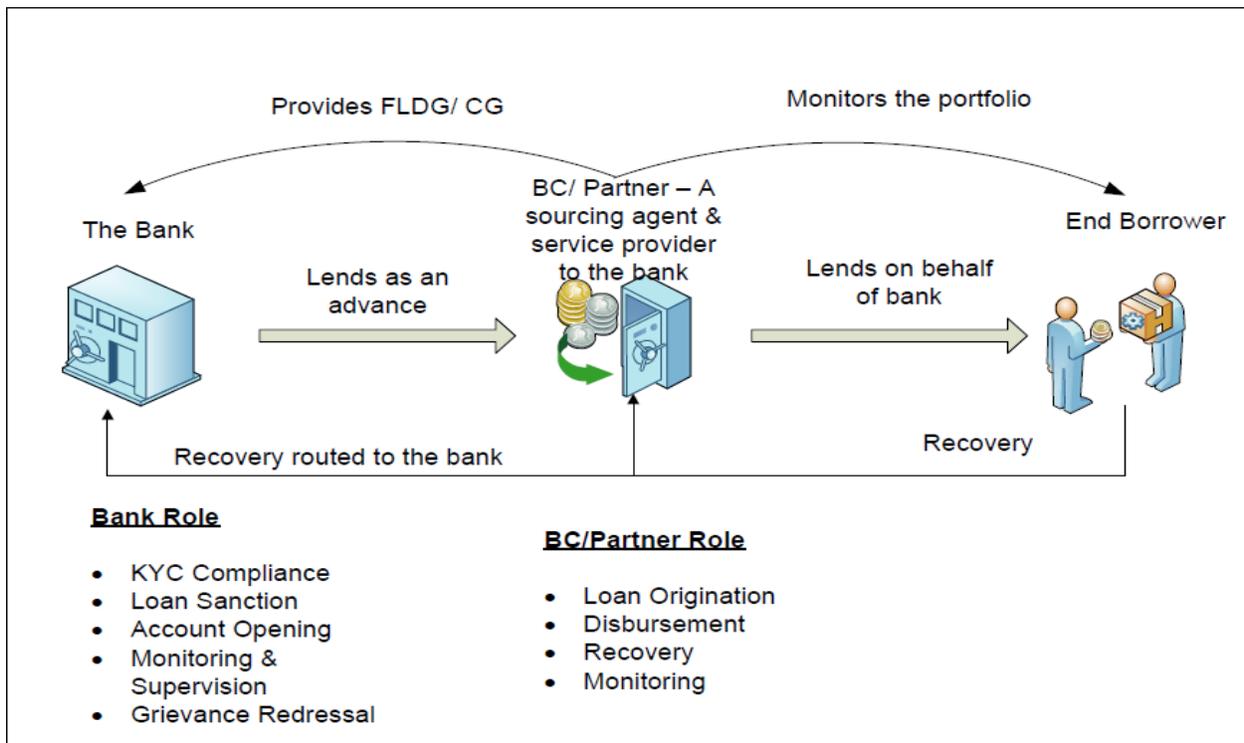
The BC/Partner provides the services to end customers/borrowers on behalf of the bank on a commission basis/revenue sharing basis (details of engagement covered under separate section on 'Management of the BC/Partner'). While the intermediation is carried out by BC/partner, the ownership of the portfolio lies with the Bank. Hence to safeguard the portfolio from various risks, credit enhancements (in the form of first loss default guarantee) & tight monitoring & control mechanisms are put in place.

**What could be the operating model of the partner/BC**



**How does the model work?**

The Partnership model is depicted pictorially below.



**Benefits of Partnership model**

Apart from the above benefits and operational ease offered by adopting BC / Partner model, it also provides the bank with some of the key strategic advantages:-

- Helps leverage the strong geographical/physical outreach of entities and scale up the direct portfolio of our banks in different parts of the country with limited resource allocation
- Will enable us to offer products which are customized to the local requirement with minimal effort in an economically viable and sustainable manner
- Helps better control on the operations compared to term loans given by us for on-lending.
- Gives better yield than both terms loans and pure buy outs.
- Helps meet the sub targets under the overall PSL i.e Direct Agri and Weaker. This would be very crucial keeping in view the growing uncertainty on the classification of the MFI lending/ portfolio buyouts for PSL reporting.
- Can extend to full-fledged Business Correspondent Services including for liability products going forward.

Considering into account the merits of appointing a Partner/BC, it is preferable for the banks to adopt a partnership approach to cater to the financially excluded segment rather than directly carry out the operations in the field.

**CONCLUSION:**

Complete Financial inclusion by the year 2020 could be within sight in most of the countries. It is in appropriate to conclude that Financial Inclusion is not a success factor in United States, rather the strategies adopted and discussed above should be looked upon and evaluation should be done before adopting the strategy in the United States. The Partnership Model of Microfinance is a key success in the developing countries India, Bangladesh and Indonesia. Traditional bankers in the United States need to be involved, so they are part of the microfinance chain reaction. The community reinvestment act was passed in 1977 by congress to encourage commercial banks to meet the credit needs of all sectors of their community, including low to moderate income neighborhoods. The opportunity that exists for banks today is that they were willing to invest in providing grants to microfinance institutions to help provide the capital that can be dispersed to budding entrepreneurs in the community; that is a room that could receive positive consideration for community reinvestment act credit on the banks behalf. In addition to that there is an opportunity to partner right so these microfinance institutions most of them are non-profit and a very few are for profit in the United States. In order for the country as a whole to achieve a goal of making good to the weaker sections of the community, local banks in the United States need to partner

with the microfinance institutions and seek their support in reaching the un-reach, rather than waiting on customers to come to the bank and seek for financial help for their lively hood. The Govt should make financial inclusion as a goal and set aside some targets to the banks by fixing a year to achieve a certain amount of financial inclusion.

### Abbreviations

BC	: Business Correspondent
FLDG	: First Loss Default Guarantee
SLDG	: Second Loss Default Guarantee
RBI	: Reserve Bank of India
MFI	: Micro Finance Institution
BPL	: Below Poverty Line
SHG	: Self Help Group
SHGBLP	: Self Help Group Bank Linkage Program
PSL	: Priority Sector Lending
NGO	: Non Govt Organisation
KYC	: Know Your Customer
CSP	: Customer Service Point

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# “Corporate Strategy and Foreign Direct Investments”

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## Abstract

Many developed economies consider foreign direct investment as a vital source for their economic and social development. This paper explores the role and importance of multinational corporations as well as the impact of FDI on the economic development and growth of the Republic of Macedonia during the period 2002-2011. This paper will also analyze the conditions and motives that encourage multinational corporations to penetrate foreign markets. There is a large number of theoretical and empirical researches in an effort to identify whether FDI has played a positive role in economic development, or whether the country's economic development levels have encouraged foreign direct investment.

In addition to analyzing the relationship between GDP and FDI, this research will be enriched with other factors in order to study the links in a multivariate context. Additional variables include exports and employment, expected to be theoretically linked to FDI and economic development. In this context, the main conclusion of this paper is that foreign investment is considered to have had a modest role in rebuilding the country's economy, moving from the planned economy to the market economy.

**Keywords:** *FDI, multinational corporations, economic development, RM.*

## I. INTRODUCTION

The purpose of this paper is to emphasize the importance of multinational societies as societies extending their activity outside the borders of respective states. At present, such societies really represent a very advanced activity that has to do with the whole network of international relations. The activity of multinational companies is by no means a recent phenomenon. Genesis have in the economies of developed countries.

Multinational corporations are the main actors of contemporary international business in the world. These are the main providers of intensification of economic growth and international trade development. They use a number of methods for international business, such as: international trade, licensing, franchising, joint venture enterprises, the acquisition of existing economic activities and the creation of new affiliates abroad. The main purpose of multinational companies is to maximize the wealth of shareholders and increase the value of society, one of the most effective strategies for achieving these goals is the creation of new affiliates abroad. A subsidiary of a foreign company implies the establishment and the exercise of new economic activities by trading companies in other countries. As such, this method requires larger amounts of investment in order to reach the company's strategic goals in the near future, in the place of establishment of the subsidiary. This process is realized mainly through direct investments, which in other countries are called *foreign direct investments*.

The treatment of foreign direct investments in correlation with economic development in general and especially within a country is of a multi-dimensional importance. For the Republic of Macedonia, such a linkage between FDI and economic development is of particular importance because FDI is usually listed among the most important factors affecting economic growth, especially those countries that faced deep structural overtures during transition phase transition.

Since the Republic of Macedonia is considered a poor country and still faces transitional reforms, we consider that multinational corporations through foreign direct investment have a crucial effect on economic development and overcoming the current situation in the country. Precisely because of these arguments, the role of foreign direct investment in the economic development of the country is also motivated for the realization of such research.

**The research hypotheses of this investigation are::**

(H<sub>0</sub>) *Foreign direct investment has a positive effect on the economic development of the Republic of Macedonia.*

(H<sub>1</sub>) *There are various barriers to FDI so low in the Macedonian economy.*

(H<sub>2</sub>) *There are benefits from FDI to improve the current situation in the country.*

## II. REVIEW OF LITERATURE

The connection between FDI and economic development has been the subject of many-year debates among various scholars. According to a group of authors [1]; [2]; [3], FDI accelerates the economic growth of the host country, while some other authors [4],[5] consider that FDI has bad effects with regard to the economic development of the countries.

In this context, the main mechanisms through which FDI impact on economic growth are: the transfer of sophisticated technology and service and know-how, training of employees, the creation of new jobs, the increase of productivity and competitiveness, the faster access to the global market, the creation of connection between foreign and domestic firms etc. On the other hand, foreign direct investment is considered to have adverse effects for several reasons: job losses due to sophisticated and contemporary technology, bankruptcy and lack of support from domestic firms, deterioration of the balance of payments, the spread of economic problems around the world (the problems of a branch in a country can be transferred to another branch in another country).

Several earlier studies argue that there is a positive correlation between FDI and economic growth, while some other studies pose a negative correlation between these two issues. However there is a widespread belief among economists and policymakers that FDI generates positive effects on the productivity of host countries. The main channels through which these positive effects are achieved are: the transfer of modern technology, increased productivity and competitiveness, the opening up of new jobs, cooperation between foreign and domestic firms, and so on. These benefits together with direct capital financing predict that FDI can play an important role in modernizing the national economy and fostering economic growth[6].

Some research has pointed out that the impact of FDI on economic growth varies depending on the ability of a country to absorb new technology. The reason is because domestic firms need a certain absorbent capacity before they can take advantage of new technologies brought by foreign firms. At the macro level, the absorption capacity analysis is done by examining the economy, legislation, political stability, human resources, institutional and financial absorbing capacity, balance of payments, and the size of the domestic market for goods produced through foreign investment [7].

Economic reforms in Macedonia have been moving steadily, but some phenomena have negatively impacted the economic growth of the country. These include: corruption, lack of finance and an ambiguous regulatory environment, which also negatively affected the flow of foreign direct investment and at the same time resulted in high levels of unemployment. If we compare foreign direct investments that have been realized in recent years in Macedonia with FDI in the region, we will see that it holds the last place. Reasons for this situation are numerous, but an indisputable fact is that Macedonia is not a suitable place for foreign investors. Vaknin suggests that GDP, inflation rates and interest rates, living standards, available infrastructure, and the banking system are not the first issue to be demanded by foreign investors. Instead, foreign investors should know about property rights, state and court roles, legislation in force, crime rates, people's characteristics, officials and politicians, bureaucracy, ease of doing business, and similar, that will affect the decisions of foreign investors. However, with the recent economic reforms, Macedonia has created the most attractive tax package in Europe. These reforms include the introduction of a 10% flat tax on personal and corporate income, which simplifies the tax system and stimulates successful companies to further improve operations and increase profitability[8]. Despite the need for foreign investment, Macedonia is one of the transition countries that has attracted low levels of foreign investment compared to other transition economies, especially Southeastern Europe which also started from the zero level of FDI in the year 1990 and with almost the same political and economic conditions.

Withdrawal of high FDI inflows into Macedonia has stagnated for years. Only in 2001, the share of foreign investments in Macedonia was over 10% of the country's GDP, so since the privatization process started, the flow rose sharply, reaching a peak of \$ 447 million in 2001. Medium inflows FDI net in the Macedonian economy over the period 1999-2010 were about 4% of GDP, which is relatively low compared to some other transition economies [9].

According to the Statistical Bureau and the National Bank of the Republic of Macedonia, the cumulative value of FDI in the Republic of Macedonia at the end of 2002 was equivalent to about USD 106 million. The trend showed steady growth until 2004 reaching \$ 323 million. In 2005, a \$ 97 million FDI inflow was recorded. The trend returns dramatically in 2006 to \$ 225 million, mainly due to the sale of the electricity company. In 2007, FDI inflow rose to \$ 699 million, followed by sharp decline in later years.

Based on the data above, we can freely say that foreign direct investments seem to be statistically significant and have a positive impact on the country's economic growth. FDI flows continue to be an important component of private sector development and a condition for the economic development of the Republic of Macedonia.[10]

At a macroeconomic level, FDI affects the key disturbing variables for policymakers: balance of payments, employment, gross domestic investment and international trade. FDI is generally believed to have a positive effect on each of these variables, but there are still theoretical considerations that show counterbalancing effects. However, these effects are often indirect and need to be empirically studied.

### III. THEORETICAL ASPECTS OF MULTINATIONAL CORPORATIONS

#### a. DEFINITION OF MULTINATIONAL CORPORATIONS

There are different definitions in multinational corporations in economic literature. One of the main causes of the diversity of definitions comes from changes in the importance attributed to the characteristics of companies operating in the international arena as well as the reasons why firms are engaged in international business.

In the 70s of the twentieth century, the United Nations defined it as "multinational corporations are all those enterprises that control their assets - factories, mines, affiliates and sales, in two or more countries" .

According to Aheron, the definitions of multinational companies can be made through:

- Structural criteria and
- Business performance.

From the aspect of the structural criterion, multinational corporations can be seen in a narrow and broad sense. The broad understanding of multinational companies is the form that has developed activities in many countries that use license and franchise as various forms of co-operation, joint investment or direct investment in the outside world. While in the narrow sense, multinational corporations are tied only to the multinational character of ownership or multinational placement character.

The definition of multinational corporations according to the performance relates to the volume of sales, property, capital, number of employees, realized income. There are many companies that export to some foreign markets, but they do not mean they have the treatment of multinational companies. Income and wealth represent the criteria by which corporations can rank in the multinational corporation family.

Multinational corporations have a global strategy in production, investment, research and distribution. In their potential there are reserves of knowledge, science, and innovations. Multinational corporations have the whole motive of successful business, expansion across territories and multiple markets in profit. In their politics there is no dominance of patriotism, or nationalisms that have to do with profitable interests outside profit. Thomas Jefferson said: "Traders do not have their own homeland. Wherever they are, they are not connected to the ground. They only care about the source of profit. "

In a sublime way, we can say that a multinational corporation represents a large size enterprise with headquarters in the country of origin and spread across many parts of the world through its affiliates and operating and controlling against a claimed profit or in the national market, or in a defined geographical area, or around the world.

#### b. TRAINING METHODS FOR FOREIGN TRADE

We can mention some of the most popular methods:

1. **International trade** - is an early and traditional method used by societies to intervene in the markets of other countries through exports as well as to provide low-cost raw materials through imports. In this method, the company operates at a low risk, as it does not use its capital but simply follows the performance of exports and imports by reacting towards lowering or termination of certain exports or imports and increasing this activity in other countries.
2. **Licensing** – is a method by which the company grants the (technology) right to license, sell or sell a company in another country in exchange for payments or other forms of profit. The license may be for different rights such as advertising rights, sales, patents, trademarks, authors, trading emirs, etc.
3. **Francis** – is a business method whereby a society through a common plan (defined by bilateral agreement) with foreign companies and accompanied by technical assistance or an initial investment enables the latter to extend their activity without investing gave me.
4. **Joint venture**- are created by the joint venture of two or more companies. This business method, in addition to the ability to raise capital, has the advantage of gaining new experience, high technology, more effective management of the established enterprise and the reputation that society or foreign companies can have.
5. **Acquisition of existing economic activities** – this method consists of buying from foreign companies of the economic activity of local companies. This gives the opportunity to increase the operating markets and widen the range of different products or services. In some cases, this purchase may be incomplete and thus exposes the foreign company to a lesser risk to a particular country.
6. **Creating new branches abroad** – this method consists in the investments of foreign companies to create new branches in other countries in order to produce and sell their products. The branch of a foreign company implies the establishment and the exercise of new economic activities by commercial companies in other countries. As such, this approach requires large amounts of investment so that in the near future, society can achieve its strategic goals in the country of establishment[11].
- 7.

#### c. STRATEGIC MOTIONS FOR PENALTIES IN FOREIGN TRADE

There are several strategic motives for a society to become multilateral:

- Market research as one of the main conditions for the existence of multinational companies is related to the lack of market perfection
- Raw Materials Research
- Efficient product searches
- Search for security

Keeping and transferring competitive advantages is an important basis for multinational companies' action. Competitive advantage may be related to firm's strengths, the level of transferability, and the power to compete with firms that have potential barriers to operating abroad. It stipulates that a multinational corporation has one or several of the following elements that give local competencies to exploit market opportunities.

The supremacy of a multinational society comes from the existence of several factors among which we can mention:

- Economy of the scale
- The superiority of marketing direction
- Technological advantage
- Financial strength

In maintaining competitive advantages, a primary role is the internal market in which the level of competition can increase the advantage of operating abroad. The latter may refer to the four factors of national priorities:

- a) Validity of production factors
- b) The terms of the request; consumer demands increase marketing and quality control tools
- c) Supporting industries.

#### d. WHO AND HOW INVESTMENTS MULTIPLE SOCIETIES

Theoretically, a multinational corporation will seek the best place in the world to take advantage of its inexperienced markets and take advantage of its competitive advantages. There are two theoretical interpretations regarding the choice of where to invest a multinational corporation:

- The first interpretation relates to the behavioral theory according to which a multinational corporation attempts to invest firstly in countries that are not far away in psychological aspects, which implies cultural, legal and institutional environments.
- The second interpretation is based on the concept of the international network: every corporation is considered as a member of the international network that has a connecting branch with the subordinate subsidiary being in competition with other societies and influencing strategic decisions and reinvestment.

So, the basics of internationalization of a multinational society can be summarized as follows:

- Multinational society provides lower costs for the production of new products
- Reducing uncertainty and costs associated with market transactions and protecting product-related advantages (technology, brand, craft etc.)
- The means of creating or favoring monopolistic advantages
- Multinational society achieves economies of scale in production and research.

### IV. DATA AND METHODOLOGY

#### 4.1 DATA AND METHOD OF EXPLANATION OF LITERATURE

The hypothesis put forward will be tested on the World Bank data on FDI inflows in the economy growth rate of RM, export and employment during the period 2002-2011. To accomplish the objectives of this research project is undertaken reviewing a wide literature to explain in detail the FDIs and their main characteristics. Meanwhile, the secondary data collected have helped to understand and understand key issues and key elements related to FDI and their impact on the development of the domestic economy. The purpose of this paper is to elaborate the relationship between such indicators as: \* IHD, GDP, EX and PU. For Macedonia, FDI flows depend heavily on the completion of the process privatization, therefore privatization has been an important variable to be considered for these countries.

Table no.1 **Ten year data for reviewed variables**

Year	GDP	FDI	EX	PU
2002	3791306757.66	105574579.42	1112146132.41	561341
2003	4756221628.61	117759613.23	1362654779.80	545108
2004	5514253043.38	323027158.54	1674852220.20	522995
2005	5985809059.97	145329601.53	2040579354.70	545253
2006	6560546900.04	427444589.27	2410722210.91	570404
2007	8159825620.39	733466879.00	3391492598.55	590234
2008	9834038366.89	611688378.61	3983278354.30	609015
2009	9313573964.98	259530321.49	2702264512.05	629901
2010	9137543772.87	300734840.71	3345040889.66	637855

2011	10165373218.11	495098343.61	4428853866.23	645085
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Source: World Bank

#### 4.2 RESEARCH METHODOLOGY

The correlation between FDI and economic growth is tested in three different ways in order to achieve deeper results:

- Relationship between FDI and the rate of economic growth
- Relationship between FDI and export
- Relationship between FDI and employment.

In the present case, in the analysis we have a partial correlation between FDI and GDP assuming constant variables. In our research, the model of partial correlation takes the form of the following:

$$\ln(\text{GDP}) = \beta_0 + \beta_1 \ln(\text{IHD}) + \mu$$

Where: GDP is the dependent variable, FDI is the independent variable,  $\beta_0$  is the intercept parameter,  $\beta_1$  is the slope parameter, and  $\mu$  represents the error term that includes all other factors that may affect the dependent variables that are not included on the model.

Source	SS	df	MS	Number of obs = 10		
Model	.609987081	1	.609987081	F( 1, 8) =	11.31	
Residual	.431634096	8	.053954262	Prob > F =	0.0099	
				R-squared =	0.5856	
				Adj R-squared =	0.5338	
Total	1.04162118	9	.115735686	Root MSE =	.23228	

ln gdp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ln ihd	.3815337	.1134712	3.36	0.010	.1198688	.6431987
_cons	15.22966	2.212564	6.88	0.000	10.12748	20.33185

Results derived from regression between GDP and FDI variables show a R<sup>2</sup> (determination coefficient) of 0.5856. This means that close to 59% of GDP change is caused by the change in the independent FDI variable. This means that FDI fluctuation is a good determinant of GDP.

F- the value is 11.31 which is greater than the critical value F which is 3.14 and we can confirm that there is an important relationship between the dependent variables of GDP and the independent variable of FDI.

The estimated FDI ratio is positive, indicating that there is a positive relationship between FDI and GDP. This means that when FDI grows simultaneously we will also have GDP growth. So in the concrete case if FDI will increase by 1%, GDP will increase by about 0.39%. Results are statistically significant and consistent with economic theory.

Similarly, there are similarities between FDI, export and employment in the RM. This part of the analysis aims to assess FDI effects on exports and to answer the question of whether FDI has stimulated exports. Although the accumulated FDI in Macedonia is lower compared to other transition economies, export developments point out that FDI has made a significant contribution to export promotion. It will also analyze the effects of FDI on employment, assuming that foreign investment will have a positive effect on job creation.

Table no. 2 Results from regression between EX and FDI variables as well as PU and FDI.

Variables	Coefficients	Standart Error	t-statistic	p-values
Export	0.5698254	0.1318397	4.32	0.003
Employment	0.0519397	0.0335453	2.55	0.001

Source: Authors' calculations

The export-assessed coefficient is positive, indicating that there is a positive relationship between expo and FDI. This means that when FDI grows simultaneously, we will also have an increase in exports. So in the concrete case if FDI will increase by 1%, export will increase by about 0.57%.

The estimated coefficient for employment is positive, indicating that there is a positive relationship between employment and FDI. This means that as FDI increases, we will also have an increase in employment. So, in the concrete case, if FDI will increase by 1%, GDP will increase by about 0.051%.

## V. CONCLUSIONS AND RECOMMENDATIONS

Following are the main conclusions of the research, listed below:

- ✓ Foreign direct investment has a modest positive impact on the economic development of the Republic of Macedonia for the period 2002-2011;
- ✓ Average FDI inflows in the Macedonian economy are relatively low compared to some other transition economies;
- ✓ FDI is a very important factor for GDP growth, export promotion to Macedonia's economy, reduction of unemployment rate and improvement of the country's macroeconomic performance.

Before we submit the recommendations, we should first examine what are the reasons for such a low presence of IHD in Macedonia. In this context, among the most important reasons we can count:

- The stagnation in realizing the structural reforms of the economy
- Failure to implement reforms in the legislative sector
- Failure to function properly and the inadequacy of the judiciary
- The presence of organized crime and corruption
- Insecurity and unstable political situation,
- Not providing business climate in the country, etc.,[12].

Consequently, based on the research and the conclusions, we suggest adequate recommendations for country policy makers:

- ✓ It should focus on attracting more foreign investment across the various sectors, which will contribute to alleviating unemployment as one of the worst problems facing the country's economy.
- ✓ Cooperation between domestic and foreign companies should be promoted to improve the economic and social well-being of the population.
- ✓ Main sectors of interest should be identified which have the highest potential to contribute to economic growth, while FDI should be channeled and integrated according to the country's economic flows.

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# Neurocognitive Complications of Cerebral Malaria: A Literature Review and Recommendations for Improving Outcomes

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**Abstract-** Malaria is a major cause of morbidity and mortality amongst infants and children less than 5 years of age, and current research suggest that cerebral malaria-a manifestation of severe malaria is associated with long-term neurodevelopmental sequelae in some survivors. The long term neurocognitive complications of cerebral malaria is currently under reported, with little or no established policy platforms to follow up survivors who suffer from its debilitating consequences. The resultant effect of this unmet public health need, is an increased odds of victims growing up with disabling neurocognitive manifestations, which may lead to future economic and societal burdens a region of the world already plunged by poverty and deprivation. In this paper, we present recommendations that could mitigate the long term neurocognitive decline reported in some CM survivors. We advocate the use of preventive strategies of disease- primordial, primary, secondary and tertiary preventions to address this unmet public health need.

**Index Terms-** Cerebral Malaria, Plasmodium Falciparum, Pathogenesis, Pathology, Neurocognitive complications, Outcomes, Prevention, Sub-Saharan Africa

## I. MALARIA PATHOGENESIS AND EPIDEMIOLOGY

The World Health Organization's media center describes Malaria as a life-threatening disease caused by parasites transmitted to people through the bites of infected female Anopheles mosquitoes [1]. According to the latest World malaria Report of 2017, the global tally of malaria in 2016 was 216 million cases and 445,000 deaths [2]. Most of the cases in 2016 were in the WHO African Region (90%), followed by the WHO South-East Asia Region (7%) and the WHO Eastern Mediterranean Region (2%) [2]. The degree of endemicity varies between countries and even between different areas in the same country [3]. Malaria is a protozoan disease transmitted by the female Anopheles mosquito [4]. Most cases are caused by either *Plasmodium falciparum* or *Plasmodium vivax*, but human infections can also be caused by *Plasmodium ovale*, *Plasmodium malariae*, and, in parts of southeast Asia, the monkey malaria *Plasmodium knowlesi* [4]. Almost all deaths are caused by falciparum malaria [4]. Research has revealed that malaria is a

major cause of morbidity and mortality amongst infants and children less than 5 years of age. Malaria was more prevalent throughout the globe, but has been widely eradicated from the USA, Canada, Europe and Russia [4]. However, malaria still remains a major public health problem in Sub Sahara Africa and South East Asia. Uncomplicated malaria presents mainly with fever, prostration, vomiting and lethargy. In some cases however, malaria can often become complicated; especially that caused by *Plasmodium falciparum*. Complicated malaria often presents as cerebral malaria, severe anemia, acidosis and hypoglycemia, pulmonary edema, acute kidney injury, jaundice, and interaction with other infections [4]. This paper will be focusing on the detrimental neurocognitive disabilities resulting from a complication of malaria, cerebral malaria.

## II. CEREBRAL MALARIA

Cerebral malaria is a medical emergency demanding urgent clinical assessment and treatment [5]. The World Health Organization (WHO) defines CM as an otherwise unexplained coma in a patient with malarial parasitemia. Worldwide, CM occurs primarily in African children and Asian adults, with the vast majority (greater than 90%) of cases occurring in children 5 years old or younger in sub-Saharan Africa [6]. The pathophysiology of the disease is complex and involves infected erythrocyte sequestration, cerebral inflammation, and breakdown of the blood brain barrier (BBB) [6]. Brain imaging may show neuropathology around the caudate and putamen [5]. Mortality is high [5] and some surviving patients have an increased risk of neurological and cognitive deficits, behavioural difficulties and epilepsy, making cerebral malaria a leading cause of childhood neurodisability in the malaria transmission area [7]. Despite several international campaigns targeted at eradicating malaria as a disease in itself, little or no efforts are being channelled towards addressing the debilitating effects of a catastrophic complication of severe malaria-cerebral malaria. The resultant effect of the current malaria eradication approach may have future economic and societal implications in terms of missed school days, suboptimal cognitive and economic function, and a diminished workforce. Despite decades of research, cerebral malaria still remains one of the most serious complications of

*Plasmodium* infection and is a significant burden in Sub-Saharan Africa, where, despite effective antiparasitic treatment, survivors develop long-term neurological sequelae [8]. Even though there is still a lot unknown about the pathogenesis of cerebral malaria, the *American Journal of Pathology* has been pivotal in presenting original research from both human and experimental models [8]. Information stemming from their work has thrown more insight into the pathogenesis of the vascular damage that occurs in this devastating disease [8].

### III. CEREBRAL MALARIA PATHOGENESIS

The pathogenesis of cerebral malaria is due to damaged vascular endothelium by parasite sequestration, inflammatory cytokine production and vascular leakage, which result in brain hypoxia, as indicated by increased lactate and alanine concentrations [5]. The way these pathological mechanisms are linked and how they are influenced by host and parasite factors remains to be elucidated. In addition, the reasons why circulating cytokines, coagulation factors, or parasitized red blood cells specifically target only the brain in African children, and the brain as well as other organs in Southeast Asian adults, are still unclear [9]. The levels of the biomarkers' histidine-rich protein II, angiopoietin-Tie-2 system and plasma osteoprotegerin serve as diagnostic and prognostic markers [5].

The BBB is a selectively permeable structure responsible for regulating ion and nutrient transport into the brain. It serves as a key interface between the central nervous system and the blood, restricting the free flow of physiological molecules between the bloodstream and parenchyma [8]. The BBB is composed of specialized endothelial cells (ECs) that line cerebral blood vessels [8]. The BBB is a highly complex structure, consisting of many cell types and possessing multiple functions [8]. Disruptions of the integrity of the BBB can lead to the passage of potentially harmful substances into the brain, which may subsequently cause disease [8]. Vascular compromise with major disruptions to the BBB has been implicated in the pathogenesis of Cerebral Malaria [6].

Globally, of all the population at risk of acquiring falciparum malaria, children ages 5 years or younger are at a greater risk of developing severe malaria, in the form of cerebral malaria [10]. This population is associated with a staggering 90% of CM-related fatalities [10]. CM that occurs in young children, also termed pediatric CM, is characterized by impaired consciousness, severe anemia, hypoglycemia, fever, and neurological sequelae [10]. Cerebral malaria is considered a leading cause of neurodisability in Sub-Saharan Africa among children and about 25% of survivors have long-term neurological and cognitive deficits or epilepsy [11]. Their development was reported to be associated with protracted seizures, deep and prolonged coma [11].

The burden of the long lasting effects of cerebral malaria on survivors is adjudged to be under estimated, as a framework to guide global health practitioners in preventing the neurocognitive complications of the disease as well as, adequate follow up of survivors is currently not in place. Following apparent recovery from a diagnosis of CM, a lack of information or misinformation may not motivate caregivers to follow up with clinicians should they notice a change from baseline in the behaviours of their

wards after the period of convalescence. Some of the mood and behavioural residual effects of cerebral malaria such as unexplained anxiety, attention deficits, hypersensitivity, and hyperactivity may be regarded as typical childhood behaviour by caregivers who are often uninformed about the potential of the disease to cause these neurocognitive changes. In more profound circumstances where CM survivors experience epileptic feets and learning disabilities, cultural and societal norms may preclude the need to seek further medical management. Therefore, survivors may not benefit from timely interventions, which could predispose them to lifelong disabilities. Consequently, a frame work to improve the long term neurocognitive outcomes in CM survivors is imperative, to empower practitioners in providing the support needed to this patient population which may enhance their chances towards the attainment of their fullest potentials.

### IV. LITERATURE FINDINGS

We did a systematic PubMed search between June and July of 2017, using keywords and reviewed several studies from the past 15 years on the neurocognitive outcomes of CM that documented at least a 6 month follow up of CM survivors.

A study by C. John et al, reveals that cerebral malaria is associated with an increased frequency of cognitive impairment 6 months after the initial malaria episode [12]. A follow up study by C. John et al to determine the long term effect of cerebral malaria on the cognitive function of the affected children, revealed that 1 in 4 survivors suffered impairments more than 6 months after the original episode of cerebral malaria [12]. Another review by Kihara *et al* on post malarial cognitive impairment concluded that a significant proportion of children with cerebral malaria and severe falciparum malaria are at risk of subsequent cognitive impairment [13]. This impairment in cognitive abilities was seen in all cognitive spheres; language, attention, memory, visuospatial skills and executive functions [14,15]. A strong indicator of academic performance is an assessment of the cognitive ability of an individual and P. Bangirana et al. in their study of 62 Ugandan children cerebral malaria survivors concluded that working memory, visual spatial skills, and learning combined together, stood out as the best combination to predict this performance [16]. A study by M. Boivin et al carried out with an objective to assess the developmental outcomes in children with retinopathy positive cerebral malaria, concluded that children with retinopathy positive cerebral malaria had a higher odds of language delays using local standardized test scores compared with controls [17]. The conclusion by Boivin et al [17] corresponds to the result of a similar study conducted by J. Carter et al which also concluded that children who had suffered from cerebral malaria had greater odds of developing language impairment, compared with matched controls [18]. A prospective cohort study done by G. Birbeck et al to establish whether retinopathy positive cerebral malaria was a risk factor for epilepsy or other neurodisabilities, concluded that cerebral malaria survivors had greater odds of developing both epilepsy and new neurodisabilities [19]. D. Postels et al, in trying to ascertain if there was any difference in neurocognitive outcomes between retinopathy positive and retinopathy negative cerebral malaria survivors, concluded that both groups had equal odds of developing adverse neurologic

outcomes, which was higher than the control group [20]. S. Christensen et al conducted a meta-analysis to quantitatively assess the association between CM and the development of long-term neurologic impairment, and concluded that CM was associated with an increased risk of epilepsy, Intelligent Quotient impairment, neurodisabilities and behavioral disorders [21]. The conclusions drawn from these studies indicate the need to channel public health resources towards addressing this current unmet need in areas of the globe affected by the malaria epidemic. The current global fight against malaria should therefore employ a holistic cost effective approach towards addressing the complications of malaria, including cerebral malaria. More needs to be done to tackle this public health scourge especially in Sub Saharan Africa where resources are already limited, in order to limit the long lasting effects of neurocognitive compromise in CM survivors. A change in current management strategies could start with an all-inclusive policy adjustment and prioritization. Global organizations currently involved in spearheading the fight against malaria should adopt an encompassing strategy to also address the silent catastrophes of the neurodevelopmental complications of cerebral malaria, so as to give CM survivors a fair chance at conquering the odds against them.

## V. DISCUSSION

Cerebral malaria is the most severe neurological complication of infection with *Plasmodium falciparum* [22]. With >575,000 cases annually, children in Sub-Saharan Africa are the most affected [22]. Surviving patients have an increased risk of neurological and cognitive deficits, behavioral difficulties, and epilepsy making cerebral malaria a leading cause of childhood neurodisability in the region [22]. The pathogenesis of neurocognitive sequelae is poorly understood: coma develops through multiple mechanisms and there may be several mechanisms of brain injury [22]. Understanding these mechanisms is important to develop appropriate neuroprotective interventions [22] to mitigate against the long lasting neurocognitive consequences of CM. This is a public health problem afflicting people in a region of the world plunged by poverty, depravity and unsustainable health policies. Efforts to address and manage this under reported global health problem should be promoted. Effective stakeholder analysis should be done in order to encourage the buy-ins of all policy and decision makers in the regions of the world affected. CM survivors currently suffering neurocognitive complications of the disease including epilepsy should be given the opportunity to live to their full potentials in society. In order to tackle this public health unmet need, we employ the preventive strategies of disease and suggest strategies that could be adopted for global impact.

### **Primordial Prevention**

The aim of Primordial prevention is to avoid the emergence and establishment of the social, economic and cultural patterns of living that are known to contribute to an elevated risk of disease [23]. Primordial prevention consists of actions to minimize future hazards to health and hence inhibits the establishment of factors which are known to increase the risk of disease [24]. It addresses broad health determinants rather than preventing personal

exposure to risk factors, which is the goal of primary prevention [24]. Primordial prevention can be employed at the level of the government or policy makers, to curb the factors which predispose to the development of neurodevelopmental complications from CM. This may be achieved by:

### ***Championing Focused Research***

More emphasis should be placed on the conduct of focused pre-clinical and clinical research. Several studies have indicated that many children afflicted with cerebral malaria go on to achieve full neurological recovery 6 months to 1 year after the initial insult. However, many studies have also reported a fraction of CM survivors developing disabling neurologic complications including epilepsy, several years after the episode of CM. Unfortunately, the long term effects of impairments resulting from CM are poorly characterized, and their importance to the overall burden of malaria are rarely discussed [25]. The fundamental question that needs to be asked is why do some CM survivors recover completely from the neuronal insult; while others go on to develop long term neuro disabilities? Are there unidentified environmental or genetic factors that play a role in this divergent outcome? Are there other predisposing factors for long term neurocognitive complications other than the severity or duration of coma? Could prior nutritional status, baseline health conditions or other co-morbidities be contributing factors to this subtle menace? Focused research aimed at answering some of these questions may throw more light on the complexities leading to the neurocognitive complications experienced by some CM survivors. In addition to campaigns aimed at combating the global malarial burden, efforts should also be targeted at research with the aim of revealing vulnerability indices of this under reported public health burden.

### ***Policy Prioritization***

Directly stemming from the above point is policy prioritization by local institutions and government entities. With current global attention focused on the eradication of malaria in endemic regions, little efforts if any is being channeled towards addressing the complications, survivors of severe malaria experience. A big cause of this neglect of this affected cohort is a dearth of policy that targets this group of CM survivors. With current government policies facilitating the distribution of insecticide treated bed nets and the provision of effective anti-malaria therapies to combat *falciparum* malaria, there is need for diversification of existing policies to capture the complications associated with severe malaria. Raising awareness on the long lasting neurocognitive complications associated with CM should be prioritized by public health agencies. The few long term follow up studies of childhood survivors of CM have reported impairments in 3-31% of children [26-29], with a weighted mean of 10.9% [30]. Malaria is still considered the number one cause of morbidity and mortality in Sub Sahara Africa. While the current anti-malaria international and local campaigns are laudable, efforts to address the complications resulting from the disease should also be championed. CM has the potential of depriving a subset of survivors from attaining their full economic and cognitive potentials. Policies favoring long term follow up of survivors and reporting of cases should be instituted. International organizations and governmental agencies currently

involved in spearheading campaigns against malaria eradication should also channel resources towards focused research and the management of CM survivors suffering long term neurocognitive disabilities.

### **Primary Prevention**

Primary prevention seeks to prevent the onset of specific diseases via risk reduction by altering behaviors or exposures that can lead to disease or by enhancing resistance to the effects of exposure to a disease agent [24]. Primary prevention efforts should be aimed at targeting susceptible CM survivors in order to prevent or reduce the incidence of neurocognitive complications resulting from the disease. Primary prevention is a step lower than primordial prevention, as it employs strategies that are closer to the target population. Primary prevention efforts are more hands on, and require a buy in from all stake holders, which should include the health care providers, as well as the patients. Primary prevention efforts may include:

#### ***Establish guidelines for follow up of CM survivors***

Several published literature indicate that many CM survivors experience a full recovery 6 months after the initial insult. However, studies that do provide information about the CM survivors who do not make full neurological recovery hardly indicate established follow up patterns for this cohort of survivors. There should be structured follow up guidelines for all CM survivors. Physicians, nurses and other health care workers involved with the management of patients should be educated on the long term neurocognitive complications of CM. Well established follow up schedules should be instituted, so that survivors who are more at risk of the long term neurological complications can be identified on time, with appropriate management strategies employed. CM survivors should be followed beyond the 6 month mark, which is what is currently reported in some regions, while some other regions have no established follow up regimens. The few long term follow up studies of childhood survivors of CM have reported impairments in 3-31% of children [26-29]. Only one report has offered a comprehensive analysis of long term impairments associated with CM [31], but followed up a selected group of children (n=452) for 18 months only. Their findings suggest that a broad range of developmental deficits may persist after recovery. Follow up guidelines should include timed comprehensive neurocognitive evaluations, to identify at-risk CM survivors prone to developing long term neurological and developmental sequelae. Regular follow up of CM survivors may detect early those more prone to developing neurocognitive complications, and instituting appropriate follow-up measures to limit disability.

#### ***Physician/ Health worker education:***

Physicians and health workers in poor resource countries with a huge burden of malaria and its consequences need to be educated on the debilitating consequences CM survivors may experience. This awareness is imperative, as a key step to improving outcomes in these survivors, is trained health personnel equipped with the tools and knowledge of identifying at risk patients, and referring them for proper follow up services.

### **Secondary and Tertiary Preventions**

Secondary prevention includes procedures that detect and treat pathological changes and thereby control disease progression [24]. Screening procedures are often the first step, leading to early interventions that are more cost effective than intervening once symptoms appear [24]. Once the disease has developed and has been treated in its acute clinical phase, tertiary prevention seeks to soften the impact caused by the disease on the patient's function, longevity, and quality-of-life [24]. For reversible conditions, tertiary prevention will reduce the population prevalence, whereas for incurable conditions it may increase the prevalence if it prolongs survival [24]. However, if the condition is not reversible, tertiary prevention minimizes the effects of disability and disease by surveillance and maintenance activities aimed at preventing complications and deterioration [32]. Tertiary prevention focuses on rehabilitation to help people attain and retain an optimal level of functioning regardless of their disabling condition [32]. The objective is to return an affected individual to a useful place in society, maximize remaining capacity or both [32]. Secondary and tertiary preventions target both asymptomatic and symptomatic CM survivors to reduce the prevalence of neurodevelopmental complications, or mitigate the complications resulting from disability. These prevention strategies should target the families and caregivers who provide support for this patient population, as well as provide resources to manage neurodisabilities from CM sequelae. Such strategies should include:

#### ***Caregiver education***

Caregiver education should also be prioritized as part of efforts towards combating this public health scourge. Caregivers involved in the care of CM survivors, more often than not, may be the first to observe any changes from baseline in the neurodevelopmental presentation of their wards. In Sub Sahara Africa where the levels of literacy do not match that of industrialized nations, tightly held cultural and religious beliefs may preclude the need to seek medical care in the early phases of observable neurocognitive impairments. Survivors of CM who suffer neurocognitive insults including epilepsy following a bout of CM, may be regarded as being possessed by witchcrafts or other evil spirits. These strongly held beliefs may lead to consultations with exorcists and other cultural norms, rather than with medical personnel. Unfortunately, the lag time between the onset of neurocognitive decline and the institution of any form of therapies may play a role in the clinical outcomes of CM survivors. Therefore, health education campaigns should also be targeted at caregivers on recognizing the neurocognitive complications of CM and seeking medical help in a timely manner, should they arise. All stakeholders, including local community leaders and especially caregivers should be educated on recognizing the symptoms associated with cognitive impairments resulting from CM, and advised to promptly seek medical expertise in such situations.

#### ***Family support and Advocacy***

Families of CM survivors should be provided with the support that they need in order to easily access services to mitigate neurodisabilities resulting from the disease. This would involve the coordinated efforts of advocacy support groups, as well as local indigenous partners. Families need to be made

aware of accessible services and be motivated to access them. They need to know that it is the priority of global and local partners in ensuring that CM survivors achieve their societal potentials, in the most uncompromising way. This support is imperative, because other than educating these families of the neurodisabilities CM can cause, caregivers need to be informed of the services that they may employ for their wards, in order to increase their chances of living disability free lives.

### Provision of early intervention services

Early intervention strategies should be implemented for CM survivors identified as “at-risk” of long term neurocognitive complications. Global and local partners should ascribe budgetary relevance to this strategy, as part of targeted efforts at reducing the neurocognitive complications of CM. Early intervention service providers ranging from speech and language pathologists, physical therapists, occupational therapists, psychologists, audiologists, vision therapists and developmental therapists should be employed in addressing the challenges that survivors of CM face, in order to give them an opportunity to integrate fully into society. At the core of this solution, is providing caregivers and families with the resources and advocacy that they need to limit disabilities, and improve the quality of life for CM survivors.

## VI. CONCLUSION

Cerebral malaria is a medical emergency demanding urgent clinical assessment and treatment [5]. Mortality is high [5] and some surviving patients have an increased risk of neurological and cognitive deficits, behavioural difficulties and epilepsy, making cerebral malaria a leading cause of childhood neurodisability in the malaria transmission area [7]. Current international and local efforts targeted at eradicating malaria, rarely address the long term neurocognitive complications that survivors of CM experience, which may predispose this cohort to unsuccessfully achieving their full economic and societal potentials. This is a public health problem that should be approached in a holistic manner in order to meet this unmet need. A change in current global health strategies is warranted in tackling this problem.

### Author Contributions

All authors reviewed and agreed upon the relevance of the topic to current public health initiatives. All authors contributed significantly to the manuscript and approve of it in its final format.

### Disclosures

The authors have no potential conflicts of interest to disclose.

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# Culture Introduction through Monopoly Game for Early Childhood

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**Abstract** - Culture is an inheritance of a nation that must be preserved. Culture introduction can be instilled early on through some kinds of methods. One of methods that can attract children's attention is method of playing. Playing is children's need and they can play traditional games or modern games. One of popular modern games in the world is Monopoly which its contents have been customized for young children. So that, they can get to know Indonesian culture more. Multicultural monopoly game with educative contents can be a tool to introduce culture to children.

**Index Terms** - Culture, Monopoly Game, Early Childhood

## I. INTRODUCTION

Every country has different culture. Indonesia is an archipelago country that has diverse cultures, ethnic groups, language, customs, and arts. These diversity becomes characteristic of Indonesia in global world. Many foreigners come to Indonesia because they are interested in Indonesian culture. Therefore, Indonesian must continue to preserve their culture as an identity of the country.

Nowadays, one of Indonesian's problems is the presence of foreign culture, such as songs, dances, culinary, and fashions. Because of globalization, there are some effects that cannot be adapted properly by Indonesia citizens. Moreover, sometimes they feel more proud with other countries' culture. Therefore, a solution that can be taken to prevent an excessive influence of the globalization is getting to know Indonesian culture first. Culture introduction can be instilled since at very young age of children in order to be the next generation without losing their nation identity.

Giving culture comprehension for early childhood is not easy because children accept information concretely and still cannot think abstract yet. Consequently, proper strategy and concrete method can help children to understand the meaning of culture. Culture introduction in early childhood is an effort to preserve Indonesian culture as Peraturan Menteri

Pendidikan dan Kebudayaan Republik Indonesia Nomor 10 Tahun 2014 about Tradition Conservation Guidance states. Tradition Conservation is an effort of protection, development, and utilization of a custom of cultural support community group that its distribution and heredity take place from generation to generation

Before delivering understanding to early childhood, teachers must have knowledge about Indonesian culture. However, some teachers are still experiencing difficulties in gaining knowledge about Indonesian culture, as a result, they still apply a method based on text books that are less recorded and too monotonous. In fact, in studying Indonesian culture, teachers cannot only apply based-on-books method, but there are discussions that require explanation and introduction of the culture, such as interaction. Interaction between teachers and students in the classroom is very important to create a comfortable class, so that students can follow the learning activities with a happy atmosphere.

## II. RESEARCH ELABORATIONS

Culture is all things related to all aspects of human life and is shared together. The word culture means mind, reason, and results. According to the science of Anthropology conveyed by Koentjaraningrat, culture is the whole human ability based on their thoughts, reflected on the behaviour and object of their works, and obtained by way of learning. Thus, culture is a human creation. Koentjaraningrat explains that culture has 3 forms, they are:

- 1) Form of culture as a complex of ideas, thoughts, values, norms, and rules. It is in the mind of people in which the culture is alive.
- 2) Form of culture as a complex of activities and patterned actions of human in society. This second form consists of human activities that interact, relate, and socialize with each other from time to time according to certain pattern based on the customs of conduct.

3) Form of culture as objects of human works. This third form is also called physical culture, the form of all physical results of activities, deeds and works of human in society, then the most concrete, and in the form of objects or things that can be touched, seen, and photographed.

The three forms of culture above cannot be separated in community life. Ideal culture and customs leads to human actions and works. Ideas, actions, and works of humans result cultural objects.

There are seven elements of culture that can be found in all the nations in the world. The seven elements that we can call as main content of each culture in the world are language, art, religion, technology system, social system or kinship or community, knowledge system, and livelihood system. Each element of culture incarnate in the three form of culture, namely as form of culture system, social system, and elements of physical culture.

Culture introduction can be delivered by various methods as Gita Widya LS states that by visiting National Museum on weekends, children can watch some activities such as story telling about historical relics, culture, and cultural introduction which are then recorded and uploaded to social media so that it can be useful for community, especially local communities (outside Jakarta) who are interested in the Indonesian culture features in National Museum. Visiting the museum can also enrich knowledge about the history and culture of Indonesia.

Another medium used to introduce culture to children is to use Pop-UP book by Adiza Belva, *et.al*, titled "POBUNDO (Pop-Up Budaya Indonesia) as a Culture-based Media for 4<sup>th</sup> Grade of Elementary School Students". The results of this study show that two classes experienced a significant between pre-test and after being treated. So that, the Pop-Up Budaya Indonesia is a culture-based learning media that is feasible, interesting, and effective to introduce Indonesian culture. Interesting media can increase children's attention in learning and understanding Indonesian culture.

In addition to culture introduction, games can be applied to improve children's understanding of culture as it attracts children's interest. Learning while playing is a great way to inculcate something new or good habits in early

childhood because early childhood is a time when children love to play. Early childhood can easily absorb provided information, especially if the information is presented attractively through a game. Games can make children quickly understand given materials as Karsono et al research shows that a quartet card game can increase children's understanding of art diversity of 92.33% of complete evaluation. The research presents that children can get many benefits from the quartet card game. In addition to understand the material about understanding of archipelago tradition arts, children can also improve their social development because this game requires team work among them in a group.

Playing is one of methods in teaching and learning activities. The method is used to realize strategy that has been set. Therefore, it can be said that the method is a way that can be used to implement the strategy. This is in line with Eveline Siregar and Hartini Nara who state that method is an approach to achieve goals. In other words, method means a way which is used to accomplish something. The usual method used by teachers in learning is commonly called as method of learning. Learning method is the way in which teachers create a fun teaching situation and support for a smooth learning process and achieve satisfactory learning achievement. In line with this, Eveline Siregar and Hartini Nara argued that method of learning is a way that teachers use, so that in its function, the method is a tool to achieve learning objectives. Based on these definitions, it can be concluded that the method of learning is the way used by teachers in creating a fun teaching situation for the achievement of learning objectives.

The world of children is a world of playing. Through playing, children can get many lessons that contain cognitive development aspect, social, emotional, and motor development skills both gross and fine motor skills. Playing can stimulate children to develop in general either development of thinking, emotion, or social. Children aged 2-8 years old are children at the preoperational stage. According to Piaget, the main characteristic of development at this stage is the use of symbol or sign language, and the development of intuitive concepts. One of games that can help children to increase their potential is educative game. Educative game is an activity that is very fun and can be a medium which is educational and useful to improve speaking ability, to think, and to socialize with

environment or to strengthen and train limbs, develop personality, make closer relationship between educator and learner, facilitate student activities and so on.

Educative game can also mean a form of activity undertaken to derive pleasure from a method or media used in playing activities, whether consciously or unconsciously, have educational content which is useful developing learners themselves. Furthermore, educative game is a form of educational activity which is performed with educational method or media. In addition, according to Hapidin and Yehina, implementation of traditional educative game models can effectively improve the character of early childhood, develop various aspects holistically and integrated, and build some positive characters. Educative game media can also develop a variety of children potential. Not only traditional educative games, modern educative games can also help children in their development stage.

One of the most popular modern games in the world is Monopoly. Until these days, Monopoly game is favored and played by society. This game is performed using money toys, so that children can recognize money in early stage and help them in improving financial intelligence. As has been observed by Nik Amah, a game named Poly Fund (Monopoly Fund) is one of the educative game to cultivate financial intelligence. Poli Dana uses the story line of a market for its buying and selling transactions such as buying fruit or selling vegetables and so on. Sale and purchase transactions are very helpful for children in understanding how to use money, because children can think when and how much nominal money should be received and purchased.

In addition to improving financial intelligence, monopoly game can develop a better team work among team mates or how to socialize with peers. According to David A. Goslin, socialization is a process of learning that is experienced by someone to acquire knowledge of skills, values, and norms, so that he can participate as a member in a community. Children can gain benefits from socialization, such as knowing each other and understand what kind of behavior should be had, so that it can help in the forming of children's character.

### III. RESULTS OR FINDINGS

Games can provide many benefits for early childhood development such as can shape character, develop children potential, and increase sense of curiosity. Designing monopoly game based on Indonesian culture can be a solution to introduce the culture to children. Different from monopoly game in general, multi-cultural monopoly game contains various Indonesian culture features, such as dance, folk songs, culinary, and tourist attractions. By playing this game, children can be more familiar with and understand Indonesian culture.

This cultural monopoly contains 24 boxes with different areas, such as Rendang (beef cuisine) from Padang, Saman dance from Aceh, Cublak Suweng Song from Central Java, and Bunaken Marine Park located in Manado. This game does not include all provinces in Indonesia because of limited memory capability of children to remember something new. If it is too much to be remembered, it will be not effective for children to play. In addition, number of songs and dances contents is more than other contents because children is faster in recognizing something new through sound and movement.

How to play the game is almost same with monopoly in general and the following is the rules of the cultural monopoly game:

- 1) In the learning activities, learners are divided into four groups with 4-5 members each group.
- 2) Each group will get a one-off turn to play the game in a single round. Each member of the groups will get a turn in turn.
- 3) Every child who gets a turn to play will throw the dice and will move according to the number shown in dice.
- 4) Children respond to the picture shown in the game column. When one of the group members stops at the image of songs and dances, he and other members have to sing and dance. Whereas when they get into culinary or tourist attraction parts, they have to buy the food or pay the entrance fee according to price listed on the column.
- 5) Children who throw the dice and get into "Take a Card" column have to take a card containing a question of cultural material or a challenge.
- 6) If the group cannot respond, the card can be transferred to other groups who can do it.

- 7) Children who throw the dice and get into column of "I Love Indonesia" are free to choose any column they like.
- 8) Every group gets toy money worth Rp 200,000 which should be shared equally among the members, so that each member has initial balance worth Rp 40,000 or Rp 50,000.
- 9) Every group that can responds to images on columns and cards containing challenges and questions will get score.
- 10) The winner is the group that can manage to get the highest score and earn the highest amount of money when a group run out their money altogether.
- 11) One member of each group is asked to conclude what the result of observation of the learning activity using monopoly game is.
- 12) Each group will get a star as a reward according to color and size.

Before play the game, teachers can do a pre-test in a form of questions of Indonesian culture. After that, teachers can give direction to children how to play the multi-cultural monopoly game, so that children can implement directly how to play the game. When the game is over, teachers can assess or evaluate children by giving question according to the cultural contents in the monopoly game.

Early childhood education has a thematic curriculum in its learning process which means that the learning process integrates all aspects of development in one theme. One of the themes given is "My Homeland". "My Homeland" theme that usually learns about national anthem, independence day, and names of heroes can be added contents from the multi-cultural monopoly. The multi-cultural monopoly game can be used as a media for teachers in learning and teaching activities in schools. Creative content and good innovation can create an educative monopoly game that children love to play.

This cultural monopoly game can be an alternative media used by teachers in learning and teaching activity. Nowadays, one of booming songs and dances that is favored by Indonesia comes from foreign country, namely "Baby Shark". This energetic song and dance is very easy to be remembered and practiced. The cultural monopoly game is expected to attract children to get to know their own culture.

Children as the next generation should be able to understand and have knowledge about Indonesian culture in order to preserve it.

Furthermore, benefit in term of economic aspect can be gain from this game because the game does not require a high cost in making and performing it, so that all schools can apply the game as a media in learning and teaching activity. In addition to affordable cost, this cultural monopoly game is not a one-time use media, but can be used continuously. If there is change in curriculum or children are bored with the existing material on cultural monopoly, the contents on the game can be modified with contents from other areas that have never been known before by children, so that their interest or learning motivation to learn remains high.

#### IV. CONCLUSION

Culture is very important to be instilled to children in early age. Early childhood cannot learn through abstract things but rather concrete or real things. Through the media of multi-cultural based monopoly game, children can recognize the culture of their home country, so that they will not lose their identity as the next generation. Multicultural-based monopoly game media has cultural contents such as introducing songs, folk dances, culinary, and tourist attractions. With this multi-cultural monopoly game, children can recognize and understand various culture in Indonesia. This game has many benefits such as improving financial intelligence when using money toys as a tool of transactions, team work, ability to socialize with peers, and so on.

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# Local Wisdom Implementation In Laa Tahzan Islamic School Cirebon

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**Abstract-** The values of local wisdom have begun to fade in the dimensions of people's lives today. Local wisdom can be introduced as early as possible in early childhood education. The process value of local wisdom is very synergistic with characters since early childhood. Because the true value of local wisdom of Indonesian society is a good cultural character values that have always been ad and deeply rooted in society. The purpose of this study is to describe local wisdom learning process implementation carried out in Laa Tahzan Islamic School Cirebon. This research is a qualitative descriptive study. The main data sources of this research is the principal, teachers, and students in Play group and Kindergarten Laa Tahzan Islamic School Cirebon. Collecting data using the method of observation, interview, and documentation. Data analysis techniques with interactive analysis model. Validation data using triangulation of data or sources, which collects data similar or equal to several different data sources as those in front and triangulation methods: interview, observation, document analysis. Implementation this learning process are applying habituation-conditioning caring and cultured, special time to play traditional games called "traditional games day" for every weeks.

**Index Terms-** local wisdom, character, learning process, traditional games day, culture

## I. INTRODUCTION

In reality the conduction of early childhood education in the community is thriving, in accordance with the level of parents understanding about its importance that shall be given to children earlier. While the study conducted in early childhood education is about learning to build a foundation and to instill character values. Educators and parents are to be gentle and courteous to children at pre-school age or toddlers, because it is a big influence in the success of the educational process and is the subsequent formation of the children's personality [1]

Instilling the character values in early childhood learning process is impossible to do when the children feel uncomfortable. Character values can be found in local wisdom that can be incorporated into the learning process. These efforts should be carried out by teachers of early childhood education so that children feel comfortable following their teaching and learning activities. Teachers as learning technical implementator are expected to create a friendly and fun learning design, so that children can grow

and develop in accordance with their development phase. As it stated and written on Constitution of Indonesia Number 20, 2003 on National Education System article 1 number 14 which states that "Early Childhood Education (ECD) is a development efforts aimed at children from birth to the age of six years old, that are accomplished by providing educative stimulus to assist the children's growth and development physically and mentally in order to have the readiness to enter further education". [2]

The reception of students in the morning is done by teachers when they arrive at school will make them much appreciated and feel comfortable. In this case, when the student arrives at school of course the parents are not allowed to wait because if the student attended by his parents in the school, the target achievement of independence would be difficult to succeed. Therefore, teachers and parents must work together to create a conducive situation, including the moment since they arrive at school in the morning.

## II. IDENTIFY, RESEARCH AND COLLECT IDEA

This research was conducted in Cirebon Laa Tahzan Islamic School. The participants were teachers and students of the school academic year 2016/2017. The research method used was a descriptive study. Descriptive Study is a research method that seeks to describe and to interpret the object in accordance with what is observed [3]. Data collection techniques used was interviews, documentary studies, and observations. The instruments used were in the form of interview guidelines, observation guidelines, and documentation guidelines.

Geographically, Cirebon Laa Tahzan Islamic School is located in Jadimulya Village, District of Gunung Jati, Cirebon. As for the parents who send their children to the playgroup generally come from rural areas or different districts in Cirebon, thus requiring a considerable distance for them to send their children. This supports the parents who are also workers being unable to wait and take care their children during the learning process at school. With homey-like concepts school or home-schooling it is also expected to create comfortable conditions for children. Supporting factors in creating friendly and fun learning design for children should be kept well to the stimulating optimization given to early childhood that can match the objectives of the early childhood education system nationwide

### III. FINDINGS AND DISCUSSION

As stated in the National Education Standards (NES) that implementation of standards-based process child-friendly school that learning process, interactive, inspiring, fun, challenging, motivating the students to take as active role, providing enough space for innovation, creativity, and independence in accordance with flair, interest, physical and psychological development of learners. [4] Learners are conditioned with a very comfortable and pleasant to gain knowledge and experience in school.

Implementation of local wisdom in learning process at Laa Tahzan Islamic School Cirebon that are play traditional games day every Friday. Traditional games Which is usually played by playing rubber jumps, playing hide and seek, playing cat and mouse, and gobak sodor. This process is followed by application based approach scientific are active, Creative and Fun in school. Teachers as facilitators of learning invites students to actively with scientific approach. The approach that touches three areas: attitudes, knowledge and skills. The scientific approach are in learning activities include observing, ask, reasoning, tried, forming networks for all subject.

The traditional game is a game that is very fun to play but the existence of the traditional game now is already replaced by any modern game play that is not required in complex media just as the traditional game play. [5]

Form of implementation of scientifically-based joyful learning seen since lesson plans created by teachers before teaching that the draft education program. Explicitly, in the learning activities of teachers has drawn scientific activities modified by variety of fun strategy.

The learning activities are carried out also accommodate the needs of individual learners and groups. Technique used by teachers when teaching with brainstorming showed that the students individual needs are met. In addition to needs of individuals who have served, teachers also never left the discussion with engineering methods both small and large groups. This is done in addition to providing services to the needs of learners in groups as well in order to foster a culture of working together and sharing knowledge and knowledge possessed by each individual.

A Variety local wisdom in traditional games presented by the school for the development of their interest, talent, innovation, and creativity of learners. Traditional games include indoor and outdoor activities. The whole of local wisdom handpicked according to the field of specialization and talent of the student.

Children's right to learn with fun in local wisdom especially traditional games was included in one of the school identifier, therefore a variety of programs that can be fun students conducted by school. Various strategies of active learning fun to be done varied, so that if one strategy does not contain a specific character values, can be supplemented with other strategies contains a more complex character value [6]. Enjoyable learning when students play traditional games is also in line with indicators apply care habits and culture in the learning environment.

Child friendly school indicators associated with the certainty of communication and dialogue when learning take place is realized in the form of making a deal at the beginning of the semester meeting between students and teachers. Making a deal which contain the consequences of the actions of these students was

recently implemented since in nursery and kindergarten. This is done in accordance with the psychological development.

At the time of learning process of local wisdom in traditional games, teachers also apply habituation-conditioning expected character becomes a habit and culture for students. This form of habituation among other things: shake hand to the teachers, lining up, apologize if you make mistakes, empathy and respect each other friends, speak good or quiet, listening to the opinion of friends and did not laugh if there is an error. Habituation is carried out every day with a reward if the child is doing well and orderly.

The implementation of local wisdom to build the character within the traditional games activities did not necessarily concern on the specific aspects needing to be enhanced. This could be through mapping the universal moral values that are allowed to be expanded to the kindergarten's student before further realizing them by means of arranging the lesson plan of learning process. The instructional patterns in moral and character educations were to be integrated within the traditional games activities and not allowed to be discretely.

In general, the behaviors of kindergarten students in getting moral and character that are local wisdom in Indonesia have been capable to implement the characters in accordance with their ages. The syllabus arrangement of character based on local wisdom has been clearly branded in the moral values having been taught particularly on certain themes and weekly programs, kinds of programs, integrated programs, the successfully planned daily programs, integrated programs, denoting the moral values, and containing the essence of child independency development.

Apart from the absence of mapping process by the teachers on the local wisdom that character values universally, they have already implemented all of those values if they were administered to comprehend the list of universal values. Logically, there was no difference between kindergarten and the distinctive visions and mission. In essence, all of the teachers confessed that there were universally accepted local wisdom apart from the various kinds of kindergarten's visions and missions to which the religion and cultures admitted the truth and assistances.

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# Measuring the Intensity of Competition among Rice Exporters to Saudi Arabia<sup>1</sup>

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**Abstract:** The objective of this research is to estimate the residual demand elasticity that rice exporters face in Saudi Arabia. The inverse residual demand methods as proposed by Reed and Saghaian 2004, for rice exporters to Saudi Arabia during the period 1993-2014, was specified and estimated. The results show that India had the largest market share and penetration rate compared to another exporter. Estimation results of the elasticities of the residual demand indicate that Australia, India, and Pakistan, enjoy market power.

**Keywords:** inverse demand, residual demand, Saudi Arabia, imperfect competition, rice, market share.

## I. INTRODUCTION

Rice is one of the major crops in the world, and regarding area planted and production, it is ranked third in importance after wheat and corn crops, where it is estimated that more than 470 million metric tons of rice were consumed in 2015 (USDA DATA, 2016). The most important countries in the world in rice production are China, India, and Indonesia, as they accounted for 59% of the global rice production in 2013. The global rice production was increased by 108% during the period 2009-2013, from 686.9 million tons to 740.96 million tons (FAO, 2016).

The world rice export is concentrated within five exporting countries which are namely, India, Thailand, Vietnam, Pakistan and the United States, accounting for 70% of the world's rice exportation in 2013. During the period of 2009-2013, the global rice exports increased 123% from 30.2 million tons to 37.1 million tons (FAO, 2016). Moreover, the global rice imports also increased 129% from 29.3 million tons in 2009 to 37.8 Million tons in 2013.

Saudi Arabia was the seventh main destination of rice imports in the world (3%) and accounted for 1.26 million tons in 2013 (FAO, 2016). Rice cultivation is unsuitable in Saudi Arabia because of the climate, and this has necessitated the import of all of her rice from abroad. The imports quantity accounted for 4% of the total world imports (1.6 million tons) in 2015 (USDA DATA, 2016). For the period from 2009-2013, Saudi Arabia ranked fourth among the global rice importers (4%), and was also ranked second for the value of the world rice imports (5%). This demonstrates the high-quality rice required for consumption in Saudi Arabia, where it ranked the second highest rice- price imports for the same period compared to other countries in the world.

Rice is the primary food in Saudi Arabia. From the data, it is shown that rice consumption quantity is one of the highest compared to other crops. It accounted for 1.6 million tons (8%) of the total crop consumption in Saudi Arabia in 2015 (USDA DATA, 2016). In the Saudi market, the aromatic thin, long-grained product, which is known as Basmati, is the most popular rice variety. The American long

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parboiled grain rice imported from the U.S. and medium grain Calrose rice imported from the U.S. and Australia come in second and third, respectively (USDA, FAS 2015). The objective of this study is to analyze the intensity of competition among the main rice exporting countries to Saudi Arabia.

## II. THE SAUDI ARABIAN RICE MARKET

In 2014, the total rice consumption in Saudi Arabia reached 45kg per capita. On average, each Saudi consumed 12 kg more compared to 1995 (USDA and World Bank). Table 1 shows the amount of rice volume and value imports are, on average, around 952.47 thousand tons and 2752.18 million Saudi Riyals (\$733.9 million), and have an annual growth rate of 1.0% and 1.086%, respectively. The volume and value of rice imports increased annually by an estimated 41.41 thousand tons and 235.25 million Saudi Riyals (\$62.73 million) (figure 1).

Import rice price increased fluctuated during the study period, on an average of around 2664.15 Saudi Riyals/ton (\$710.44/ton), having an annual growth rate of 1.039%. The price of rice import is also increased annually by an estimated 115.69 Saudi Riyals/ton (\$30.85/ton).

Table 1: Rice imports in Saudi Arabia during the period (1993 -2014)

	Quantity 1000 Ton	Value Million Saudi Riyals	Price Saudi Riyals/Ton
Average	952.47	2752.18	2664.15
Annual growth rate	1.043	1.086	1.039
Annual change rate	4%	9%	4%

Source: Central Department of Statistics & Information (CDSI). Ministry of Economy and Planning Annual Statistics Book. Saudi Arabia

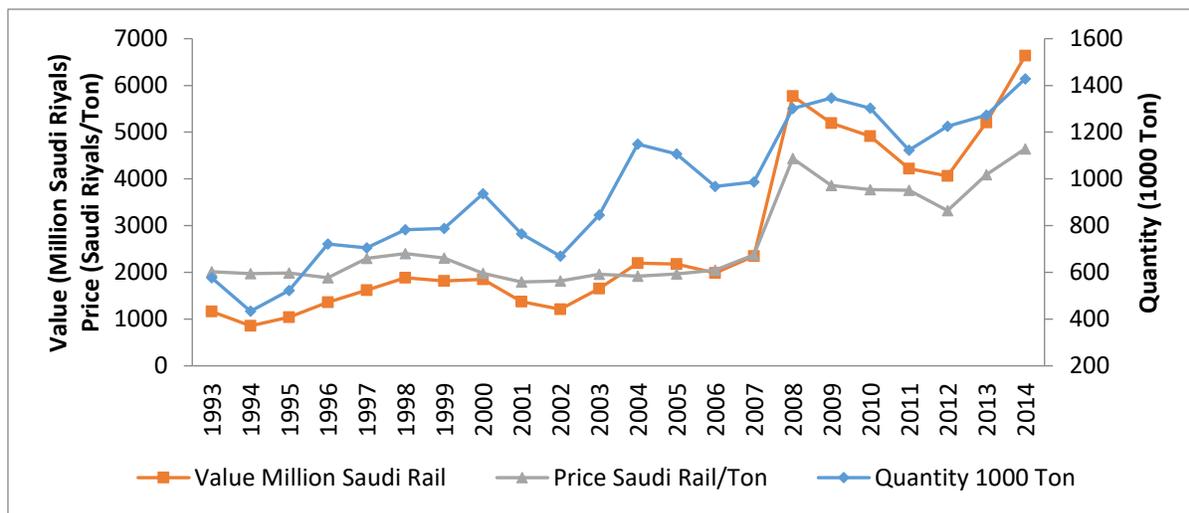


Figure 1: Trend of rice imported quantity, value, and price in Saudi Arabia during the period 1993-2014

The amount of Saudi Arabia's rice imports from India, the U.S., Pakistan, Thailand, and Australian rice, which was characterized by fluctuation and relative instability trend increased during the period 1993 -2014 (table 2). On average, it accounted for about 64.4%, 12.5%, 10.9%, 8.4%, and 2.2% of the total rice imports to Saudi Arabia, and the growth rates reached 1.54%, 1.1%, 1.2%, 1%, and 1%,

respectively. Meanwhile, it accounted about 68.6%, 12.6%, 9.2%, 6%, and 2.3% of the average value of rice imports to Saudi Arabia and a growth rate of 1.75%, 1.40%, 1.44%, 1.35%, and 1.29% respectively.

The price of Indian rice exported to Saudi market rose from 2454.7 Saudi Riyals per ton in 1993 (\$654.6/ton) to around 5301.7 Saudi Riyals per ton in 2014 (\$1413.8/ton). The price jumped during the period from 2007- 2008 to around 6824 Saudi Riyals per ton (\$1819.7/ton) (table 2). The price of the American rice exported to Saudi market also rose from 1916.12 Saudi Riyals per ton in 1993 (\$510.96/ton) to around 3753.87 Saudi Riyals per ton in 2014 (\$1001.03/ton). Moreover, the price of Pakistani rice exported to Saudi market increased from 1624.67 Saudi Riyals per ton in 1993 (\$433.25/ton) to around 3505 Saudi Riyals per ton in 2014 (\$934.7/ton). Also, the price of Thai rice exported to Saudi market rose from 1266 Riyals per ton in 1993 (\$337.6/ton) to around 3084 Saudi Riyals per ton in 2014 (\$822.4/ton). Australian rice export to the Saudi market had increased from 1866 Saudi Riyals per ton in 1993 (\$497.6/ton) to around 4566 Saudi Riyals per ton in 2014 (\$1217.6/ton).

In 2014, India had the greater share rice imports quantity, as it reached 73.55% of the total amount of rice imports. Pakistani rice is ranked second with 10.62%, then the U.S. with 7.32%, followed by Thailand, Australia, Vietnam, and Brazil are represented with the rates of 5.3%, 1.73%, 0.58%, 0.51%, respectively. (GASTAT, 2016)

During 2014, most of the import value of Saudi Arabia went to India, which accounts for about 79.9% of the total rice imports' value to Saudi Arabia. Pakistani rice comes in the second rank with 8.02%, the United States is third, and it represents about 5.92% of the total rice imports. Thailand, Australia, Vietnam, and Brazil being represented with 3.52%, 1.70%, 0.3%, 0.27%, respectively.

Table 2: Saudi Arabia imports of rice from the main countries during 1993-2014

Average rice import	Indian	American	Pakistan	Thailand	Australian
Quantity (thousand Ton)	625.9	108.1	104.5	78.7	18.3
%	64.4	12.5	10.9	8.4	2.2
Annual Growth	1.54	1.14	1.16	1.01	1.05
Value (Million Saudi Riyals)	1952.53	293.6	252.6	169.4	46.7
%	68.6	12.6	9.2	6	2.3
Annual Growth	1.75	1.4	1.44	1.35	1.29
Price (Saudi Riyals/ton)	2861.7	2645.96	2241.14	1943.33	2602.29

Source: General Authority for Statistics, Minister of Economy and Planning, Saudi Arabia.

### I. Rice Varieties

Three main groups of preferred rice varieties in Saudi Arabia are Basmati rice, Parboiled rice, and Round grain rice. In 2003, the Saudi Central Department of Statistics and information changed the old classification of rice, to the new classifications, which are Rice in the husk (paddy or rough), Husked (brown) rice, Simi-milled or wholly milled rice whether polished or glazed and Broken

Rice. (Consulate General of Pakistan, 2013; USDA, FAS 2015; CDSI, 2016; GASTAT, 2015; Ismaiel and Al-rwis, 2009; Baazeem, 2007)

In this paper, we use this new classification. Also, we choose the six largest rice exporting countries to Saudi Arabia during the period 2009 to 2013. 65% of all rice imported by Saudi Arabia is from India, Pakistan is 13%, the USA 10%, Thailand 9%, Egypt 1% and Australia 1% (We have deliberately omitted Egypt from our model because of lack of data for the study period).

## II. RESEARCH METHODOLOGY

### A. Market Power and Measurable Standards

This study adopted the following methods in achieving its objectives for both descriptive and quantitative analysis:

1-Market share: is a competitive indicator, expressing increasing foreign sales volume of the country of the commodity and thus showing the higher competitive position of that country. Market share index shows the proportion of the exporter countries of particular goods to total imports for that market of that commodity.

It is calculated by the following equation:

$$MSH_{ji} = \left( \frac{EX_{jci}}{IM_{ci}} \right)$$

Where  $MSH_{ji}$ : market share of the country j of commodity i in a particular market

$EX_{jci}$ : An exporter country's j to the country c of commodity i

$IM_{ci}$ : A total imports Country c of commodity i

j represents the competitive countries such as Australia, Egypt, India, Pakistan, Thailand, and the USA. i represents rice and c represents Saudi Arabia

2-Market penetration rate: is the most general competitive measurement standards rate and can be defined as a ratio between imports of a particular country of any commodity from the other country and apparent consumption of that commodity rate, and market penetration coefficient measured as the following equation:

$$MPr_{ij} = \frac{EX_{ij}}{Pr_{ci} + IM_{ci} + EX_{ci}}$$

Where:

$MPr_{ij}$ = penetration rate of the most important markets of the commodity i

$EX_{ij}$ = Exporter country export of the commodity i

$Pr_{ci}$ = importer country production of the commodity i

$IM_{ci}$ = importer country imports of the commodity i

$EX_{ci}$ = importer country export of the commodity i

### B. Conceptual Framework

Many studies measure market power for different countries in both domestic and global markets as shown in table 3. The lack of data in the international market is having marginal cost available. Because of the imperfectly competitive market, the extent of competition is expressed as the relative markup of price over marginal cost (Lerner index).

Table 3: Literature review focus on the inverse residual demand

Author name	Market	Import country	Export country	Data	Methods	Markup result
Evans & Ballen 2015	Green Skin Avocado	The USA	The Dominican Republic	Monthly Jan 2004 - Dec 2013	IVGMM Instrumental Variable Generalized Method of Moments	-0.245
Pall et al.J 2014	Wheat	Albania Azerbaijan Egypt Georgia Greece Lebanon Mongolia Syria	Russia	Quarterly 2002-2009	IVPLM Instrumental Variable Poisson Pseudo Maximum-Likelihood Estimator	-0.09 -0.17 -0.005 -0.07 -0.05 -0.06 -0.25 -0.05
Tasdogan et al. 2005	Olive Oil	EU	Greece Italy Spain	Annually 1970-2001	2SLS Two-Stage Least Square	-0.079 -0.36 -0.157
Reed and Saghalian 2004	Beef segmented by (chuck, loin, and ribs), and each cut is separately analyzed on a chilled and frozen basis	Japan	Australia Canada New Zealand The USA	Monthly Feb 2002-Aug 2000	2SLS	The highest belongs to U.S. frozen ribs. Canada has limited market power. Australia and New Zealand enjoy some market power, including five chilled beef categories.
Goldberg and Knetter 1999	Beer	The USA Canada France The UK	Germany	Annually 1975-1993	3SLS	-0.065 -0.14 -0.44 -0.21
Baker and Bresnahan 1988	Beer	France Domestic- three firms: 1. Anheuser-Busch 2. Pabst 3. Coors		Annually 1962-1982	3SLS	-0.31 -0.06 -0.31

For the purpose of maximizing profit, marginal revenue (MR) equals marginal cost (MC):  $MR = MC$ . It is known as:  $MR = P(1 + \frac{1}{E})$

Thus, the Lerner index follows (Lerner, 1934):

$$\frac{P - MR}{P} = \frac{P - P\left(1 + \frac{1}{E}\right)}{P} = 1 - \left(1 + \frac{1}{E}\right) = -\frac{1}{E}$$

where P is the price and E is price elasticity.

The results from Lerner index are:

1. In the case of perfect competition, Lerner index equal to zero.
2. Lerner index increases with increased market power.
3. Lerner index varies inversely with the elasticity of demand.

Goldberg and Knetter (1999) developed a method that solves the problem of calculating the unknown marginal costs by measuring market power in the international market for an exporter. They used double log inverse residual demand (the difference between the market demand and the competitive fringe's supply curves) to capture the exporter's market power through the elasticity.

The double-log inverse residual demand function developed by Goldberg and Knetter (1999) is as follows:

$$\ln P_{mt}^{ex} = \lambda_m + \eta_m \ln \hat{Q}_{mt}^{ex} + \alpha'_m \ln Y_{mt} + \beta' \ln W_{mt}^N + \varepsilon_{mt}$$

Where m denotes a specific destination market, and t indicates the number of competitors an exporter faces in that market. The vector  $Y_m$  denotes the demand shifters and consists of a combination of a time trend, real income, and the price level for the destination market.  $W_m^N$  indicates the cost shifts for the n competitors the export group faces in a specific destination market the measures of input prices. Exchange rate movements offer ideal cost shifters in international markets because they move the relative costs of the exporting countries. The price charged by the exporter group  $P_m^{ex}$  and the demand shifters are expressed in the destination market currency. The coefficient of  $\eta_m$  can be interpreted directly as the residual demand elasticity. If the estimated value of  $\eta_m$  is not significantly different from zero, the exporter group operates in a perfectly competitive market and faces a perfectly elastic curve in the destination market. In this specification, export unit prices and demand shifters are expressed in units of the destination currency. The error term is assumed to be independent and identically distributed.

$\hat{Q}$  (Import quantity) is endogenous because it is determined with the import price and correlated with error term  $\varepsilon$  because of simultaneity of price and quantity (endogeneity bias  $E(\hat{\beta}) \neq \beta$ ) and needs to be instrumented as suggested by Goldberg and Knetter (1999). An instrumental variable is used to determine the (Q) endogenous regressor, but only affects the dependent variable through its effect on the independent variables.

So, we will regress  $Q$  with all the exogenous variables

$$Q = \alpha_0 + \alpha_1 Z + \alpha_2 W + \alpha_3 Y + u$$

where  $Z$  is instrumental variables.  $W$  denotes cost shifters such as exchange rates.  $Y$  is the vector of exogenous variables affecting the demand such as time trend, real income, the price level for the destination market. We can apply IV estimations because IV is used to cut correlations between the error term and independent variables. The endogenous variables are just identified of  $\eta$ , when we have the same number of endogenous and IV's. However, the endogenous variables are over-identified of  $\eta$ , when we have more IV's than endogenous variables. We need to test instrumental variables using the F-test. The null hypothesis that the coefficients on the  $Z$  in the first stage are zero. After IV, we will find  $\hat{Q}$  that is an unbiased estimate of price and uncorrelated with  $\varepsilon_t$ . Then we plug the  $\hat{Q}$  in our model and we will find that  $\hat{\eta}$  is an unbiased estimate

### C. The Empirical Model

This paper will estimate the residual demand model for rice exporter to Saudi Arabia as used by Saghaian and Reed (2004) as follows:

$$\ln P_t^i = \lambda + \eta \ln \hat{Q}_t^i + \alpha T_t + \beta \ln \left( \frac{DY_t}{CPI_t} \right) + \sum_{j \neq i} \delta^j \ln e_t^j + \varepsilon_t$$

Where  $\ln$  is Natural Logarithm,  $P$  is import price measured by Saudi Riyals,  $\eta$  is the residual demand elasticity,  $Q$  is the quantity of import rice,  $t$  index time,  $i$  and  $j$  are *index* countries that Saudi Arabia imported from,  $T$  is denoting time trend,  $e$  is the bilateral exchange rate,  $DY$  is Saudi Arabia nominal disposable income, and  $CPI$  is cost of living index.

In this study, we assume the Saudi Arabia rice market to be different by country of origin. Also, that each exporting country faces a residual demand curve that is downward sloping. The main point of the parameters is the coefficient on quantities imported represents the inverse of the residual demand elasticity. The null hypothesis that each country that exports rice to Saudi Arabia faces a perfectly elastic residual demand. The null hypothesis of estimated residual inverse demand elasticities at the different type of rice equal to zero. It means we reject the null hypothesis that we have a perfect competition in the market, and there is no market power.

The Two-Stage Least Squares (2SLS) were used to estimate the model, but after testing for heteroskedasticity and autocorrelation, we suffer from these problems. Note that whereas asymptotic theory gave the result that the 2SLSE is (asymptotically) unbiased, small-sample theory indicates that it is in fact biased. From  $\varepsilon(\hat{\alpha} - \alpha) \approx \frac{\sigma_{uv}}{\pi' X' X \pi} (K - 2)$ , this bias decrease as the sample size  $n$  increases, but increases as  $k$ , the number of excluded exogenous variables, increases. (Bowden and Darrel, 1984).

### III. DATA DESCRIPTION

The inverse residual model was estimated using annual data from 1993 to 2014. The main challenge of this paper was the lack of data for Saudi Arabia. We used different sources to fix this problem. Data on the import and export of rice was collected from various countries. The various sources are listed below:

- 1- National Economy and Finance ministries and other official authorities in Saudi Arabia.
- 2- United States Department of Agriculture (USDA), UN Comtrade Database from United Nations Statistics Division and Food and Agriculture Organization (FAO) of the United Nations-Statistics Division websites 1993-2013.
- 3-The Government of Pakistan, Statistics Division-Pakistan Bureau of Statistics data for the year 1997.

The nominal disposable income and CPI are based on available secondary data from the Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC), as well as, World Development Indicators- World Data Bank. However, Exchange rate data is from the World Development Indicators.

#### IV. RESULTS AND DISCUSSION

##### *A. Market Share in Saudi Arabia Rice Imports*

The study clarifies the relative importance of the most important import market rice for Saudi Arabia in stating that the import quantity is concentrated in six countries, which are namely, India, Pakistan, Thailand, USA, Australia, and Egypt. The market shares of those markets to Saudi markets show that the Saudi market absorbs the largest share of India’s rice which was estimated at 13% on average from the period (2009-2013), followed by Australia at 7% and then Egypt 5% (table 4). From (Al-Rwis, 2004) found that the imports rice demand from India reached price inelastic, and it represents necessary goods. Also, he found a competitive relationship between the rice imports from India and the rice imported from the US, while price trends and imports trends of rice have similarities from Pakistan and Thailand.

Table 4: Market share indices for Saudi rice imports during the period (2009 - 2013)

Country	Total Export quantity in Ton	Export quantity to Saudi Arabia in Ton	Market share%	Market Penetration rate
India	6229609	805,866.4	13%	0.657
Australia	251 868	17169.25	7%	0.014
Egypt	354 211	16310.5	5%	0.013
Pakistan	3517348	155 982	4%	0.127
USA	3253811	117 230	4%	0.096
Thailand	8332793	122,574.8	1%	0.100

Source: FAO site: [www.fao.org](http://www.fao.org)

##### *B. Market Penetration Rate in Saudi Arabia Imports of Rice*

Whenever the rate of market penetration increase indicates market expansion, easy to entry and vice versa. A result from table 4 showing a rise in the Saudi Arabia market penetration of both India and Pakistan. It had reached a maximum value of this indicator for India, reaching 0.66 and minimum rate for Egypt, where it was about 0.013.

##### *C. Market Share in Saudi Arabia imports for each type of rice*

India, Pakistan, Thailand, the United States, Egypt, and Australia, are the leading rice exporters to Saudi Arabia. India ranked at the forefront in the supply of all types of rice acquisition of (Husk 73%, Brown 65%, Simi-milled or wholly milled 70%, Broken 45%) in

comparison with the six other largest exporting countries of rice to Saudi Arabia. Also, it followed by the USA in rice type of Husk 13%, Brown 22% and Broken 39%. However, Pakistan is competitive with India in the preferred type of rice in Saudi Arabia that is Simi-milled or wholly milled rice by the acquisition of 11%, in the average period 2012-2014 (Table 5).

Table 5: Market share in Saudi Arabia imports for each type of rice, during the period (2012 - 2014), in percentage.

Country	Rice in the husk (paddy or rough)		Husked (brown) rice		Semi-milled or wholly milled rice whether or not polished or glaze		Broken rice	
	Import Quantity	Import Value	Import Quantity	Import Value	Import Quantity	Import Value	Import Quantity	Import Value
Pakistan	3%	2%	6%	6%	11%	9%	9%	6%
India	73%	77%	65%	66%	70%	75%	45%	47%
Thailand	5%	5%	3%	2%	6%	5%	3%	2%
U.S.A	13%	10%	22%	22%	9%	8%	39%	41%
Egypt	6%	5%	0%	0%	0%	0%	4%	4%
Australia	0%	0%	0%	0%	2%	2%	0%	0%
Other Countries	1%	1%	4%	4%	1%	1%	1%	1%

Source: compiled and calculated by:  
 USDA(FAS) Website: <http://apps.fas.usda.gov/gats/ExpressQuery1.aspx>  
 UKComtrade Website: <http://comtrade.un.org/data/>

*D. The Inverse Residual Demand Estimation*

Because of the lack of data, the study tried to reach the best estimates of the residual demand model of rice exporting countries to Saudi Arabia. However, since the objective of this study is to examine the market power of the rice exporter to Saudi Arabia, inverse residual demand was estimated to determine which countries have market power.

Table (6) display the estimated parameters of rice imports of the residual demand model from the leading exporting countries to Saudi Arabia in the double logarithmic during the period 1993-2014. We applied instrumental variable estimations because IV is used to cut correlation between the error term and independent variables. We also included the total of Pakistan and the U.S.A rice export to the world as instrumental variables for Australia and Thailand. In the case of India, we included the total of Pakistan and US rice export to the world. In the case of Pakistan and the US, we included the total US rice production as an instrument.

We tested for whether variable Q is endogenous by using the Hausman test, the result showed that we failed to reject the null hypothesis for exporter countries at the 5% level of significance, except the India model. So, the OLS estimation applied to estimate the residual demand equation for all exporting rice countries to Saudi Arabia except India, we also applied the two-stage least squares 2SLS. We used the two-stage least square (2SLS) in India model rather than OLS (Q correlated with  $\epsilon_t$  and  $E(\hat{\beta}) \neq \beta$  bias estimate) because of endogeneity problem.

According to the result that the estimated residual model for each exporter was significant at 1% level for India, Pakistan, and the USA, and significant at 5% level for Australia and Thailand. In all inverse residual demand model, R-square indicates the percentage of the

dependent variable (rice import price) as explained by independent variables. Moreover, F statistic tests are significant at the 1% significance level (F-stat - below .01 for 99% confidence in the ability of the model to explain the dependent variable).

After we tested for whether India model is over-identification using Sargan test (Interments> endogenous regressor), we failed to reject the null hypothesis; then we had a good instrumentals variable. In all models, we did not find any problem with heteroskedastic or autocorrelation.

The negative sign of the quantity coefficient reflects the elasticity of the residual demand match with the economic logic and the existence of market power for Australia, India, and Pakistan on the Saudi rice market, reaching of -0.14, -0.66, -0.23, respectively, and are statistically significant at the level of 0.01, 0.05, 0.05, respectively.

Table 6: the inverse residual demand model

	Australia	India	Pakistan	Thailand	The USA
Intercept	0.66 (0.27)	1.83 (0.46)	-8.70 (-3.10)**	-2.67 (-1.45)	-6.31 (-2.65)**
Import Quantity	-0.14 (-3.57)**	-0.66 (-1.97)*	-0.23 (-1.86)*	0.28 (2.91)**	0.34 (2.51)**
ExgAUS	-0.52 (-2.31)**	--	--	--	1.13 (2.36)**
ExgIND	2.36 (3.27)**	--	2.17 (4.45)**	1.74 (3.59)**	0.64 (3.17)**
ExgPAK	-0.87 (-1.78)*	1.14 (2.41)**		-0.79 (-2.28)**	
PPIAU	-0.37 (-2.17)**	0.49 (1.68)	0.85 (3.96)**		0.64 (3.17)**
PPIIN	--	-0.18 (-0.53)	--	--	--
PPITH	--	-0.03 (-0.08)	--	--	--
PPIUS	--	--	--	0.45 (4.94)**	--
IPC	0.48 (2.38)**	0.53 (1.11)	0.87 (4.33)**	0.43 (2.57)**	0.71 (4.33)**
Time	--	--	-0.60 (-4.02)**	--	-0.37 (2.57)**
F-test	28.02**	5.68**	13.21**	63.20**	13.83**
R <sup>2</sup>	0.92	0.71	0.81	0.95	0.81
Huasman test <sup>1</sup>	0.19	0.05*	0.86	0.899	0.92
Sargan Test					
Overidentification <sup>2</sup>	--	7.56*	---	--	--
Test for Hetro <sup>1</sup>	0.61	0.41	0.71	0.73	0.40
Test for Auto	1.64	1.07	1.85	2.04	1.39

<sup>1</sup> p-value

<sup>2</sup> Chi-sq=N\*R2=21\*0.36=7.56 (IV=3)

t-statistics are in parentheses

\* Significant at 5% level

\*\* Significant at 1% level

The estimated import quantity from Thailand and the US were significant but had a positive sign which is against economic logic and demonstrates no market power of the rice imported. This result corresponds to Al-Rwais study in 2004, which addressed the demand

Saudi rice imported of analysis pattern from India was an inelastic price. As well as Ismail and Al-Rwais study in 2009, which showed that each of India and Pakistan had market power in the rice export to Saudi Arabia. The elasticity of the residual demand in both countries - 0.13, and were statistically significant at the 0.05 level, while the US, Australia, Thailand, and Egypt face a perfectly elastic demand.

## V. CONCLUSIONS

The Saudi Arabia rice imports increased annually by 14 thousand ton of rice during the study period. Saudi rice imports are concentrated in six rice exporting countries of India, Pakistan, the US, Thailand, Australia, and Egypt, and it accounted for about 66%, 12%, 10%, 9%, 1% and 1% of the total Saudi rice imports respectively from the period 2010 to 2014. Saudi rice imports are concentrated in 4 main rice varieties, Rice in the husk (paddy or rough), Husked (brown) rice, Simi-milled or wholly milled rice and Broken Rice.

The objective of the Study is to analyze the intensity of competition among the main rice exporting countries to Saudi Arabia. To achieve the objective of this study the structure and trends of Saudi rice imports were measured. Market share and penetration were analyzed. Finally, the inverse residual demand rice imports from competitive rice exporters to the Saudi were estimated to indicate the extent of market power.

The inverse residual model was estimated using the annual data from 1993 to 2014. Data imported quantity from different countries and import price was collected from various sources such as National Economy and Finance ministries, other official authorities in Saudi Arabia, USDA, UN Comtrade Database from United Nations Statistics Division and Food and Agriculture Organization of the United Nations-Statistics Division websites 1993-2014. Nominal disposable income and CPI will be based on available secondary data from The Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC), as well as, World Development Indicators- World Data Bank. However, Exchange rates will be from the World Development Indicators.

The value of Saudi Arabia rice import represents about 7% of the value of agriculture imports over the average period of 2009-2014.

The study result shows that India received the highest increase rate among competitive countries in quantity, value, and import price.

The largest market share of the exporter countries to Saudi Arabia was India by 13% then Australia, Egypt, Pakistan, US, and Thailand on the average period from 2009-2014. There was a rise in market penetration of both India and Pakistan due to the type of Basmati rice that is preferred to the Saudi consumers. When we study the market share of the four types of rice, the result shows that India still has the largest impact comparing to another exporter.

The results of the residual-demand models for rice exporters to Saudi Arabia, specifically the estimated inverse residual demand elasticities of all competitive rice exporters to Saudi Arabia, approximates the markup of price over marginal cost or Lerner index, indicate that Australia, India, and Pakistan enjoy market power in Saudi rice importing market. The inverse residual demand for

countries was estimated and amounted to -0.14, -0.66 and -0.23 respectively, and statistically significant at the 0.05 level. However, Thailand and the US face a perfectly elastic demand.

Based on of the above, the study recommends doing another study on importing companies to anticipate the possibility of the existence of agreements for joint optimization of the monopolistic profits. As well as diversifying the base countries that Saudi import from, in order to reduce the concentration of imports in certain countries.

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# Health and Safety Challenges on Construction Sites of Bauchi Metropolis

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**Abstract-** *The Construction industry is the most risky of all industries in terms of health and safety hazards. Construction workers on site should have the knowledge of health and safety and apply the knowledge while working on the site. The fact that a construction task or work environment is considered risky and hazardous does not mean that its susceptibility to accident and is not controllable; this largely depends on "Work station" which is humanly controllable. Safety records in most advanced countries have proven this to be true (Samuel, 2014). Death tolls, permanent disability, partial disability and some other severe environmental threats are on the increase due to collapse of buildings and major operational accidents. Statistics have indicated that at least 4% of construction workers have lost their lives or injured at their jobsites (Stephen Wright, 2016). Most construction site workers in developing countries like Nigeria do not follow the health and safety measures on sites. Bauchi state, having the literacy rate of just 34.1% (UNESCO, 2012) and due to the absence of strong legislation is considered a state that lacks health and safety culture. This research examines occupational health and safety challenges on construction sites within Bauchi metropolis and discovered construction workers were exposed to different health and safety hazards and this are attributed to non-compliance with guidelines on sites, ignorance and non-training of workers on health and safety including non-integration of improved methods of health and safety on construction sites. The study concluded that there is need to review health and safety practices, legislation, integration and application; and finally the need to make a financial allowance for all residual risk items.*

**Index Terms-** Challenges, Construction, Occupational Health, Safety, Sites

## I. BACKGROUND OF THE STUDY

Health and Safety is an inevitable aspect of construction due to its nature of being made up of the conglomerations of people from diverse backgrounds and disciplines with each individual's output determining the level of success to be recorded at each construction stage (Dodo, 2014). Occupational health and safety is an interdisciplinary area that involves protecting the health, safety and welfare of people in the work place (Kelajaiye, 2013), and others that may be affected directly or indirectly by the activities at the workplace. Construction site is a place where a building is being built or repaired (MacMillan Dictionary, 2017). The Nigerian construction industry is one of the largest markets of construction products in Africa. With over

140 million population, 969,000km<sup>2</sup> landmass and 5.6% Gross Domestic Product growth; the construction industry is responsible for an average of 5-7% improvement of the GDP growth and over 42% of the fixed capital formation over the last 4 decades (Olatunji and Bashorun, 2006). The importance of providing safe workplace has been reiterated by various related studies because of the intrinsic hazard and risk factors that undoubtedly underlie every work situation and their negative impact on a company's overall performance (Olutuase, 2014).

Health and safety is relevant to all branches of industry, it is particularly important for the construction industry. It has always. The construction industry has been identified with the highest occurrence rate of accidents compared to any other industry (Olatunji et al., 2007; Orji, Nwachukwu and Enebe 2016). In the recent past, death tolls, permanent disability, partial disability and some other severe environmental threat had increasingly been on the rise through collapse et al., 2007 of buildings and other major operational accidents (Orji, Nwachukwu and Enebe 2016).

Due to the nature of work, construction sector is considered very complex and dynamic. There are several phases in construction like viability, design, plan, execution, decommissioning, demolition and clearance. Similarly, plumbing, electrical wiring and carpentry are also linked with construction. Various contractors have different nature of work and different working protocols, and they work in same working area. Contractors often replace their workers and since it's an open environment, workers are prone to diseases (Hassan, 2012).

One in six fatal accidents at work occurs in a construction site (ILO, 2011). Although an analysis of the patterns and causation of accidents provides the basic information for safety planning. It is not sufficient for predicting when and where they will occur. Such prediction needs coordination with other branches of project management (Yi and Langford, 2006). The fact that a construction job or work environment is considered as highly risky and hazardous does not mean that its susceptibility to accident is not controllable – this largely depends on "work situation" which is humanly controllable. Hence, this research attempts to identify the health and safety challenges on construction sites and strategies that could be employed to produce the best practice guide for health and safety for the construction sites within Bauchi Metropolis.

## II. GLOBAL SITUATION OF HEALTH HAZARDS ON BUILDING CONSTRUCTION SITES

Construction has been regarded as the most hazardous place in which to work with a high level of health and safety risks (ILO, 2011; Smallwood et al., 2008). The International Labour Organization estimates that at least 60,000 fatal accidents happen in a year on construction sites around the world, which is one in six of all fatal work related accidents. Furthermore, it has been acknowledged that 25–40% of fatalities in the world's occupational settings are contributed to by construction (ILO, 2011). Based on fatality statistics, different countries show that the construction industry produces 30% of fatal industrial accidents across the European Union (EU), yet it employs only 10% of the working population. In the United States of America (USA) the sector accounts for 20% of fatal accidents and only 5% of employment, and in Japan construction fatalities account for 30-40% of industrial fatal accidents (ILO, 2011). In the developing world, the risks associated with construction work are much greater. Available data would suggest they are 3–6 times greater (Jason, 2008). In comparison with developed countries, construction sites in developing countries are ten times more dangerous.

### 2.1 Health and Safety Challenges in Developing Countries

Approximately 45% of the world's population and 58% of the population over 10 years of age belong to the global workforce, i.e. 60-70% of the adult male and 30-60% of the adult female population of the world (Chandrasekar, 2011). There is a wide variation in economic structures, occupational structures, working conditions, work environment, and the health status of workers in different regions of the world, in different countries and in different sectors of the economy. Therefore the mechanisation of the construction industry is not uniform throughout the world. However, as stated earlier, the construction industry plays a vital role in boosting the economy of any country, especially a developing country. It provides the infrastructure required for other sectors of the economy to flourish. Many studies, such as Coble and Haupt (1999) have shown that construction industry reflects the level of economic development within the country. The construction sector everywhere faces problems and challenges. However, in developing countries, these difficulties and challenges are present alongside a general level of socio-economic stress and a lower productivity rate when compared to developed countries (Ofori, 2000). Nevertheless it is generally believed that the construction industry is a good source of employment at various levels of skills, from a general labour to semi-skilled, skilled and specialist workforce. Other major areas that impact on this sector are lack of research and development, lack of trade and safety training, client dissatisfaction, and the continuously increasing construction costs (all of which result in less profitability).

Construction within developing countries often fails to meet the needs of modern competitive businesses in the marketplace and rarely provides the best value for clients and taxpayers (Datta, 2000). Additionally, this sector also demonstrates poor performance in respect of health and safety due to the absence of any stringent safety and construction laws. International labour organization (ILO, 1987) attributes the poor

health and safety records in construction projects within developing countries to:

- i. The high proportion of small firms and the high number of self-employed workers;
  - ii. The variety and comparatively short life of construction sites;
  - iii. The high turnover of workers;
  - iv. The large proportion of seasonal and migrant workers;
- Kartam et al. (1998) found that, in most developing countries, for example like India, there are no training programs for staff and workers; therefore, no orientation for new staff or workers is conducted; hazards are not pointed out; and no safety meetings are held. Employees are expected to learn from their own mistakes and experience.

In adopting different approaches to health and safety in developed and developing countries, two main differences can be identified. The first is the existence of legislation and its effective implementation; the second is hazard awareness. In developed countries, many safety acts and legislation exist and are implemented effectively. Nominated safety officers promote hazard awareness with the help of regular safety training sessions. In developing countries, however, safety rules barely exist at all; and when they do, they are inappropriate, ineffective, out-of date and based on conditions that prevailed while the country was still being colonised. Additionally, the regulatory authority is usually very weak in implementing rules effectively, and work hazards are either not perceived at all, or perceived to be less dangerous than they actually are (Larcher and Sohail, 1999; Hinze et al., 1999).

### 2.2 Occupational Health and Safety in Nigeria

Occupational health safety In Nigeria has been in existence and can be traced back to the slave trade period. According to Kalejaiye (2013), records show that the Medical Examination Board of the Liverpool Infantry introduced occupational health in Nigeria in 1789. Kalejaiye (2013) further reports that this board was saddled with the responsibility of promoting the health of the British slave dealer in Africa and also stated that the health service was established by Colonel Luggard (who was once the Governor-General of Nigeria) to care for the health and welfare of the colonial administrators and British soldiers; then, after many years, due to the poor working conditions of workers, occupational health services were introduced in some Nigerian industries, and the Occupational Health Legislation Act established. Kalejaiye (2013) asserts that due to the impact of increased mechanization on the health and welfare of workers, the occupational health unit in the Federal Ministry of Health and the Institute of Occupational Health in Oyo state Ministry of Health were established. Nigeria signed the Geneva Convention in 1981 (Adeogun & Okafor 2013), yet 32 years after, implementation of proceedings of the convention is insignificant. Adeogun & Okafor (2013) report that OSH in Nigeria is still at infancy; in the same way, Diogwu et al. (2012) and Okolie & Okoye (2012) maintain that OSH in Nigeria is poor. [as cited by (Nnedinma U. (2014)]

For instance, although there are no reliable accident data in Nigeria (Idoro 2008; Okolie & Okoye 2012), a study by Ezenwa (2001) over a 10-year period (1987-1996) of fatal injuries reported to the Federal Ministry of Labour and Productivity

(Inspectorate Division) shows that out of 3183 injuries reported, 71 were fatal. In fact between 1990 and 1994, the overall fatality rate as recorded by the Ezenwa (2001) is 22% of the above reported cases. This explains why Idoro (2011) in a study of 42 construction contractors in Nigeria, found that in 2006 the best safety record is 5 injuries per worker and 2 accidents per 100 workers. These records are high (Idoro 2011) whether compared to other countries or not. However, this is not a true representation of what obtains in Nigerian factories (Ezenwa 2001) because the records are worse than stated above, as the poor OSH regulatory system in the country does not encourage mandatory reporting of accidents (Ezenwa 2001; Idoro 2008), which OSH regulations require. However, Diugwu et al. (2012) blame the big gap in OSH in Nigeria on the dysfunctional health and safety laws in the country. As a result, all the sectors in the country are clearly unregulated (Diugwu et al. 2012).

### 2.3 Occupational Health and Safety Legislation in Nigeria

The Nigerian Federal Ministry of Labour And Productivity (Inspectorate Division) enforces occupational health and safety regulations while the national council for occupational safety and health will enforce the labour, Safety, Health and Welfare Bill of 2012. Before the above, the Factories Act of 1987 (now known as Factories Act of 1990), which Kalejaiye (2013) reports as a substantial revision of the Factories Act of 1958 (i.e. Colonial Legislation), the Workman’s Compensation Act of 1987, the Labour Act of 1990, the Workman’s Compensation Act of 2004, the Employee’s Compensation Act of 2011 (which repeals the Workman’s Compensation Act of 2004) were introduced; some of these laws are criticised as inadequate. For instance, the Factories Act of 1987 does not include the construction industry in the definition of its premises (Diugwu et al. 2012; Idoro 2008, 2011); consequently, the industry remains unregulated. Idubor & Osiamojie (2013); Okojie (2010) contend that the severities of penalties stipulated by OSH laws in Nigeria are insignificant; in that offenders are not deterred by the penalties.

The enforcement processes require issuing of warning or notices to offenders, after which the lower level of enforcement, which includes the sealing of a defaulting factory, takes place (Okojie 2010). Regrettably, this is not practicable in Nigeria in that the resources required are under estimated and not made available. In affirmation, Okojie (2010) stated that the sealing of premises, which is a form of enforcement rarely, happens in Nigeria. Also, Adeogun & Okafor (2013) note that unhealthy exposures to risks of workers in organizations make it evident that OSH laws are not enforced in Nigeria. The argument therefore is that there should be daily inspection of workplaces by the factory inspectors and monthly reports to the Federal Ministry of Labour and Productivity (Okojie 2010), but this is farfetched. Equally important, a study by Diogwu et al. in 2012, shows that majority of construction workers in Minna, Nigeria (if not in the whole country) are not aware of the body responsible for enforcing OSH regulations in the industry. In the study, about 79.5 % of the respondents could not identify the correct body responsible for OSH enforcement in Nigeria. This suggests lack of knowledge as per OSH and its ineffective enforcement. Granted that there is proper enforcement of the OSH regulations across Nigerian industries, the workers will be aware, as they must have heard of or seen the enforcement taking place. In view

of these highlighted deficiencies, it is pertinent to further examine the key issues to enforcing OSH regulations in Nigeria; thus, the subsequent section addresses this.

### 2.4 Regulating Authorities

Safety and welfare regulation of Nigeria’s factories decree of 1987, the industrial safety and welfare regulations were prompted by the necessity to control standard of performance in the industry (Mahmud, 2012).The control was necessary because of the prevalent conditions in the industry. The regulation defining the standard of performance in the industry in Nigeria is the same for all other industries i.e. the factories decree of 1987 (Kolo, 2015).In Nigeria, shortly before our independence, the condition in the factories was very bad except in a few expatriate factories and to arrest the situation before it led to a national disaster, the federal government decided to introduce in 1955, the first Nigeria’s Factories act which made provision for safety health and welfare in factories safety, health and welfare in factories (Belel, 2012).

### 2.5 Role of Health, Safety and Environment Department

Role of HSE Department Work-associated health, safety and environment (HSE) comprise the communal, cerebral and corporal comfort of labourers, their dependents and the society. In order to achieve these collaborations and contribution among government, workers, trade unions and other bodies is required. Less consideration has been given to work-related health, safety and environment concerns, but it would cost immensely if ignored. Understanding and ability to protect ourselves, our loved ones, community and the surrounding that we so much rely upon for existence is the key thing to have. Lives of labourers and their relatives, community, proprietors and state might get affected seriously by work-related accidents and diseases (Kirby & Hurst, 2004). Table 1 illustrates effects of work-related accidents on individuals, community and government.

**Table 1. Work-Related Effects of Accidents**

Affecters	Effects
<b>I.</b> Workers and his family	i. The grief and suffering of the injury or sickness, ii. The loss of salary, iii. The conceivable loss of a job, iv. Treatment costs
<b>II.</b> Community	i. Seeing a adored and praised-worthy individual suffering from an injury or ailment, ii. anxiety and tension, iii. Time and effort to look after for the person, iv. Financial damages and hardship, Loss of life
<b>III.</b> Employer	i. Payment for task not done, ii. treatment and compensation expenditures,

	<ul style="list-style-type: none"> <li>iii. Repair or replacement of damaged machinery and equipment,</li> <li>iv. Decrease or a provisional halt in production,</li> <li>v. High training expenditures and administration costs,</li> <li>vi. Potential decline in the quality of work,</li> <li>vii. Negative impact on morale of other worker</li> </ul>
<b>IV. Government</b>	<b>i. Decrease in Gross National Product (G.N.P)</b>

Source: ILO, 2004

These days, many companies have HSE departments as a part of their organizational structure or administrative wings. The chief objectives of HSE departments in any organizations are to reduce work-associated health, safety and environmental accidents and diseases. Some responsibilities of HSE departments are mentioned in table 1. These responsibilities are assigned to curtail environmental, occupational health and safety, community health and safety, construction and decommissioning, and sustainable development issues at work site.

**Table 2. Responsibilities of HSE Department**

Areas of Interest	Responsibilities
<b>I. Environmental</b>	<ul style="list-style-type: none"> <li>i. Water Conservation,</li> <li>ii. Hazardous Materials Management,</li> <li>iii. Waste Management Noise Control, Contaminated Land and Remediation,</li> <li>iv. Air Emissions and Ambient Air Quality,</li> <li>v. Energy Conservation,</li> <li>vi. Wastewater and Ambient Water Quality</li> </ul>
<b>II. Occupational Health &amp; Safety</b>	<ul style="list-style-type: none"> <li>i. Personal Protective Equipment (PPE),</li> <li>ii. Special Hazard Environments,</li> <li>iii. Monitoring,</li> <li>iv. General Facility Design and Operation, Communication and Training,</li> <li>v. Physical Hazards Protection,</li> <li>vi. Chemical,</li> <li>vii. Hazards Protection,</li> <li>viii. Biological Hazards Protection,</li> <li>ix. Radiological Hazards Protection</li> </ul>
<b>III. Community Health</b>	<b>i. Traffic Safety,</b>

<b>&amp; Safety</b>	<ul style="list-style-type: none"> <li>ii. Transport &amp; handling of Hazardous Materials, Disease Prevention,</li> <li>iii. Emergency Preparedness and Response,</li> <li>iv. Water Quality and Availability,</li> <li>v. Structural Safety of Project Infrastructure,</li> <li>vi. Life and Fire Safety (L&amp;FS)</li> </ul>
<b>IV. Construction &amp; Decommissioning</b>	<ul style="list-style-type: none"> <li>i. Environment,</li> <li>ii. Occupational Health and Safety,</li> <li>iii. Community Health and Safety</li> </ul>
<b>V. Sustainable Development</b>	<ul style="list-style-type: none"> <li>i. Reduction in Carbon footprint,</li> <li>ii. Reduction in Energy footprint,</li> <li>iii. Reduction in Water footprint,</li> <li>iv. Conducting Lifecycle assessment,</li> <li>v. Industrial symbiosis</li> </ul>

Source: World Bank, 2007

### III. METHODOLOGY

The study area is Bauchi metropolis in Bauchi state of Nigeria, it was chosen because of high rate of professionals and construction activities. Kothari (2004) descriptive research gives an accurate profile of respondents, events or satiations while explorative design involve search of literature that are relevant to the objectives and provide qualitative information on developmental issues on views. Therefore, this research used survey in collecting data about health and safety challenges on construction sites.

#### 3.1 Data Sources:

Primary data was sourced using a structured questionnaire in this research. Secondary data sources for this study are: journals, published/unpublished articles, conference scripts, textbooks and the World Wide Web (websites).

#### 3.2 Sampling Method and Sample Size:

This research is exploratory; hence, a nonprobability purposive sampling technique was used for this study as is in line with the work of Oresegun (2009). A total of 50 questionnaires were distributed to core building professionals (respondents) which includes Architects, Builders, Structural Engineers and Quantity Surveyors that are either practicing as construction site engineers or project managers in construction contracting firms in Bauchi Metropolis. They composed of two parts; part one sought to depict the demographic information of the respondents while part two was designed based on the objectives of the study.

The questions were a mixture of open ended and close ended questions.

Likert scale was used as a measurement scales in the questionnaire presented to respondents. It was adopted to assess the respondents' experience judgment on the health and safety challenges on construction sites. Moreover, the study measured the feelings of the respondents for a given item on rated scale using 1-to-5 response scale from strongly agreed to strongly disagreed.

The data obtained was thoroughly screened and analysed. Statistical Package for Social Sciences was used as a tool for data analysis in this study using descriptive analysis through mean and standard deviation.

metropolis. The overall responses success rates were determined using the formula for computing questionnaires success rate (Inuwa, 2014).  $\text{Questionnaire success rate} = (\text{Questionnaires received} \times 100) / (\text{Questionnaires administered})$ .

The research recorded an overall questionnaire response rate of 94% out of 100% from the questionnaire administered a total of 50 questionnaires in the study area but the filled and returned questionnaires were 47 and used for analyses; this response rate seems to be justifiable to measure its variables in the field of construction industry. The result of a survey could be considered as biased and of little value if the response was lower than 30-40% as in Usman *et al.*, (2012). Therefore, the study recorded an overall questionnaire response rate of 94% which indicate an unbiased and significant value.

#### IV. PRESENTATION OF RESULTS AND ANALYSIS

Referring to Table 3 below, study administered 50 questionnaires to construction professionals within Bauchi

**Table 3. Questionnaires Distribution Responses**

Locations	Total distribution of Questionnaires	
	Distributions	Retrieved
BS Multi Project Ltd	20	19
Akmaz Const. Ltd	10	8
Mailo Const. Ltd	5	5
NM Const. Ltd	5	5
Imabat Const. Ltd	10	10
<b>Total</b>	<b>50</b>	<b>47 (94%)</b>

Source: Authors Field Work, 2017

#### 4.1 Data Analysis for the General Information of Respondents

This section conveyed information regarding the general information of the respondents which covers: Professional background, academic qualification, years of company in operation and years of experience in construction.

According to Buys (2004) in Inuwa (2014) analysis of such data assists the researcher immensely to ensure that all the variables that may have an influence on the correctness of the data have been analyzed. This by implication ensures that the respondents used for a study are appropriate sample for the intended universe or domain of content (Pallant, 2001).

#### 4.1.1 Area of Specialization of Respondents

Referring to Table 4 below depicts the area of specialization of the respondent; the result shows the five core professionals in building industry. The Architects with 31.9% representing 15 respondent, Quantity surveyors with 12.8% representing 6 respondents, Building Engineer with 21.3% representing 10 respondent, Civil Engineer with 23.4% representing 11 respondent each and Estate Surveyor with 10.6% representing 5 respondent respectively as shown below;

**Table 4. Area of Specialization of Respondents**

Profession	Frequency	Percentage (%)	Cumulative Percent
Architect	15	31.9	31.9
Quantity surveyor	6	12.8	53.2
Building Engineer	10	21.3	66.0
Civil Engineer	11	23.4	76.6
Estate Surveyor	5	10.6	100.0
<b>Total</b>	<b>47</b>	<b>100.0</b>	

Source: Authors Field Work, 2017

**4.1.2 Academic Qualification of the Respondents**

Referring to Table 5 below shows the data analysis of the respondent with respect to their educational qualification, the majority of the respondents possess B.sc/HND with 51.1% representing 24 respondents, MSc with 31.9% each representing

15 respondents and 12.8% representing 6 respondent have postgraduate Diploma (PGD) qualification. The least qualification is National Diploma (ND) with 4.3% representing 2 respondents.

**Table 5. Educational Qualifications**

Profession		Frequency	Percentage (%)	Cumulative Percent
Valid	M.sc	15	31.9	31.9
	PG.D	6	12.8	44.6
	B.sc/ H.ND	24	51.1	95.8
	ND	2	4.3	100.0
Total		47	100.0	

Source: Authors Field Work (2017)

**4.1.3 Years of Experience of Respondents**

Referring to Table 6 below depicts the frequency and percentages of the respondents in terms of years of experience in construction industry, (1-5) years have 25.5% representing 12 respondents, (6-10) years have 36.2% representing 17

respondents, (11-15) years have 17.0% representing 8 respondents, (16-20) years have 8.5% representing 4 respondents and over (20 and above) years have 12.8% representing 6 respondents within the study area respectively as shown below;

**Table 6. Years of Experience**

Years of Experience		Frequency	Percentage (%)	Cumulative Percent
Valid	1-5	12	25.5	25.5
	6-10	17	36.2	61.7
	11-15	8	17.0	78.7
	16-20	4	8.5	87.2
	20 and above	6	12.8	100.0
Total		47	100.0	

Source: Authors Field Work, 2017

**4.1.4 Years in Business**

Referring to Table 7 below depicts the frequency and percentages of the respondents in terms of years of experience in construction industry, (1-5) years have 31.9% representing 15 respondents, (6-10) years have 34.0% representing 16

respondents, (11-15) years have 17.0% representing 8 respondents, (16-20) years have 2.1% representing 1 respondents and over (20 and above) years have 10.6% representing 5 respondents within the study area respectively as shown below;

**Table 7. Years in Business**

Years of Experience		Frequency	Percentage (%)	Cumulative Percent
Valid	1-5	15	31.9	31.9
	6-10	16	34.0	66.0
	11-15	8	17.0	87.2
	16-20	1	2.1	89.4
	20 and above	5	10.6	100.0
Total		47	100.0	

Source: Authors Field Work 2017

**4.2 Data Analysis for the Research Objectives**

**4.2.1 To assess the causes of accidents in construction sites**

One of the major objectives is aimed at assessing the causes of accidents in construction sites within Bauchi metropolis. The study employed the used of literature searched and analysis in achieving the stated objectives. Twenty causes were identified of which fifteen practices were finalized after a pilot study was conducted. Referring to Table (8) below shows that all the causes are effective but excessive noise, poor construction materials arrangement and tiredness are averagely effective which shows that they rarely cause accidents on construction site in the study area.

While the rest of the causes are the most frequent causes of accident on construction site having the highest mean score values, meaning that almost all the respondents are familiar with them in the study area and agreed with Alhajeri (2011).

Furthermore, for assessing the causes of accidents on construction site, the respondents were asked to assess the causes of accidents on construction site using the following scale; strongly dis agreed = 1; Dis agreed = 2; Neutral = 3; Agreed = 4; Strongly Agreed = 5. As illustrated in Table 8, the effectiveness ranked in order of mean scored value. In order to answer the research question of the objective, the study set out to determine the most effective causes of accident on construction site as perceived by the respondents in the study area. The practices were analyzed descriptively based on the responses of the respondents using Mean-score and Ranking. The Mean-scored ranges from (2.98-4.32); hence, showing the level of effectiveness of causes of accident. Referring to table 8 below shows that the lack of warning system is the most effective causes of accident on construction site in the study area having the highest Mean value 4.32 and ranked 1<sup>st</sup>, followed by negligence having the mean value 4.30 and ranked 2<sup>nd</sup>, failure to follow safety rules with mean value 4.26 was ranked 3<sup>rd</sup>, while the less effective ranking as perceived by the respondents was Excessive noise with mean value 2.98. Therefore, by implication the mean scored by the respondents vindicated that more than 80% of the practices are effective considering the study area.

Referring to Table 8 below shows the mean values in maximum of 4.32 and minimum of 2.98 for the causes of accident on construction site. The implication of these values shows that the assessment was above a score of three in the five point Likert scale. This vindicated that, the practices in the study area generally recognized and admitted the practices as effective in construction sites. The top three ranked from the assessment causes of accident on construction site in table 8 below are;

- i. Lack of warning system (4.32)
- ii. Negligence (4.30)
- iii. Failure to follow safety rules (4.26)

While the least three ranked from the practices of cost management in table x above are;

- i. Excessive noise (2.98)
- ii. Tiredness (3.96)
- iii. Poor construction materials arrangement (3.96) respectively.

**Table 8. Causes of accident on construction site**

Variables	N	Mean	Std. Deviation	Ranking
Improper use/defective tools and machines	47	3.98	1.032	12
Negligence	47	4.30	0.778	2
Excessive noise	47	2.98	1.310	15
Dropping/ throwing from high rise projects	47	4.11	0.759	9
Tiredness	47	3.96	0.859	13
Poor Construction materials arrangement	47	3.96	0.779	13
Faulty with scaffold	47	4.13	0.969	4
Unsafe working conditions and practices	47	4.13	0.824	4
Failure to follow safety rules	47	4.26	0.896	3
Alcohol intake	47	4.13	0.947	4
Lack of use of personal protective equipment	47	4.13	0.947	4
Transient workforce	47	4.04	0.833	11
Incorrect work procedure	47	4.13	0.850	4
Lack of safety signboards on site	47	4.11	0.787	9
No warning system	47	4.32	0.755	1

Note, Scale: 1.00–1.80 = very ineffective, 1.81–2.60 = ineffective, 2.61-3.40 = averagely effective, 3.41-4.20=effective, 4.21-5.00=very effective

Source: Authors Field Work, 2017

**4.2.2 To Evaluate the Current Improved Methods of Integrating Health and Safety Practice Within Construction Sites.**

The second objective of this study is aimed at evaluating the current improved methods of integrating health and safety practice within construction sites of Bauchi metropolis. The study employed the used of literature searched in achieving the stated objective. More than fifty (50) methods were identified of which fifteen (15) [see: table 9] were finalized after a pilot study was conducted. Referring to table 9 shows that the five most effective methods of integrating health and safety in the study area are; Keeping a register and record of all accidents, Review health and safety practices regularly and share with employees, Making a financial allowance for all residual risk items and almost all the methods were agreed by the respondents but only undertaking training for subcontractors and workers, establishing a health and safety committee were less effective. This shows that careful attentions need to be pay on those particular ones and has agreed with (Kelajaiye, 2013).

**Table: 9 Methods of Integrating Health and Safety**

Variables	N	Mean	Std. Deviation	Ranking
Establish a Health and safety Committee at company level	47	4.15	0.751	13
Adopt Health and Safety regulations for in and off site work	47	4.36	0.705	3

Appoint Health and Safety officers	47	4.28	0.800	11
Implement health and safety at all stages of the project	47	4.30	0.623	9
Devise training programs and identify training needs for all staff	47	4.15	0.691	13
Identify and manage health and safety risks and hazards present within any activities of the business	47	4.32	0.755	6
Keep a risk register.	47	4.30	0.720	9
Assign appropriate actions for project team members against each risk item	47	4.19	0.900	12
Make a financial allowance for all residual risk items	47	4.36	0.870	3
Keep a register and record of all accidents	47	4.53	0.747	1
Ensure sub-contractors used to carry out jobs on behalf of the company do carry out a risk assessments relevant to the job	47	4.36	0.764	3
Review health and safety practices regularly and share with employees	47	4.49	0.655	2
Use of first Aid in companies	47	4.32	0.695	6
Site visitation by authorities	47	4.32	0.837	6
Undertaking training for subcontractors and workers	47	4.13	0.924	15
Valid N (list wise)				

Source: Authors Field Work, 2017

## V. RECOMMENDATION AND CONCLUSION

### 5.1 Recommendations

The following are the recommendations are made base on this research findings:

- i. First aid box should be provided in case of minor injuries and a stand-by ambulance is stationed in case of major injuries.
- ii. Standards for material and labour based on current forms of materials and labour should be established that is suitable to the industry.
- iii. There should be special focus on training for all categories of industry participants by all professional bodies at industry levels.
- iv. Contractor selection should be based on individual's capability regarding safety issues.
- v. Construction workers should be motivation should be looked into and be enlightened on the dangers associated with construction activities.
- vi. Warning systems should be provided on construction sites.
- vii. Provision of Health and Safety insurance of workers and facilitate the payment benefits related to Health and Safety insurance for them.

### 5.2 Conclusion

The research discovered that the respondents were exposed to different health and safety hazards and this were attributed to lack of complying with health and safety guidelines and ignorance. There is need to improve safety management through effective and sustainable measures, health and safety training, regular workplace, supervision and establishment of active and functional occupational health and safety programmes that are essential to guard the health and safety condition of workforce on construction sites.

It may be concluded that effective Health and Safety practices for employees in

Nigerian construction industries are yet to be fully appreciated and implemented among construction firms. As such, it may be recommended that appropriate authorities should not only tighten the enforcement of Health and Safety practices but should also foster mechanisms to audit Health and Safety practices in the construction industry for continual improvements because employees are the greatest assets.

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# A comparative study of soil physicochemical properties between eucalyptus, teak, acacia and mixed plantation of Jhilmil Jheel wetland, Haridwar-Uttarakhand

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**Abstract-** The present study was conducted in Jhilmil Jheel wetland which is situated on the left bank of river Ganga between Latitude N29°32' to 29° 50' and Longitude E 78°10' to 78°15' covering an area of 3783.50 hectares. The altitude of the area varies from 200 to 250 meters above msl. This wetland is known for conservation of *Cervus duvauceli duvauceli* (Barasingha). It is situated between Haridwar - Najibabad highway in the natural course of the Ganges. A two-year study was conducted between the year 2012-2014 to analyse the soil physicochemical properties between different plantation sites of this magnificent wetland i.e., eucalyptus plantation, teak plantation, acacia plantation and mixed plantation. After the analysis, it was observed that the soil texture under eucalyptus plantation, teak plantation and acacia plantation was sandy loam in nature while it was observed clay loam under mixed plantation site. Maximum bulk density was observed under eucalyptus plantation site ( $1.50 \text{ g cm}^{-3}$ ) while it was minimum ( $1.29 \text{ g cm}^{-3}$ ) under mixed plantation site. Moisture content was observed maximum (14.57 %) under mixed plantation site whereas it was observed minimum (8.38 %) under acacia plantation site. Soil pH was observed near neutral (i.e., 6.82 and 6.78) under teak plantation and acacia plantation site while it was slightly acidic (i.e., 6.55 and 6.49) under eucalyptus plantation and mixed plantation site. The result revealed that the maximum soil organic carbon (1.99 %), total nitrogen (0.23%), available phosphorus (14.66 ppm) and exchangeable potassium (230 ppm) was observed under mixed plantation site whereas the result revealed that the minimum soil organic carbon (1.60 %), available phosphorus (9.26 ppm) and exchangeable potassium (111.5 ppm) was observed under acacia plantation site except for the total nitrogen which was observed minimum (0.17 %) under eucalyptus plantation site. One-way ANOVA and post-hoc tukey test was also applied to analyse and to compare the mean significant difference between each parameter under different sites.

**Index Terms-** Wetland, soil organic carbon, plantation, physicochemical characteristics, ANOVA.

## I. INTRODUCTION

Rapid growth of population and industrialization has putted huge negative impact on the rich biodiversity of India which also include wetlands. Wetland soils are highly productive and fragile in nature. It supports rich biodiversity and extensive food chain and sometimes referred to as "Biological Supermarkets". Protection and improvement of such fragile ecosystem is highly required to ensure the productivity and health of this wetland ecosystem. Soil is the major source of nutrients for the growth of plants and while determining the degree of soil physicochemical characteristics is very necessary to evaluate the soil fertility. The nutrient transformation and its availability in soils depend on pH, clay minerals, cation and anion exchange capacity (Reddy and Reddy, 2010). One of the important factors to determine quality of soil and serves as sources of nutrients for improving physical and biological properties of soils in addition to productivity is organic matter. So, a study was conducted to analyse the fertility of soil under four plantation sites (i.e., eucalyptus, teak, acacia and mixed plantation) of Jhilmil Jheel wetland as the present investigation was an attempt to document the physicochemical properties under different land use and it is hope that the study will provide a baseline data and useful knowledge in the future as no such work was carried out.

## II. STUDY AREA

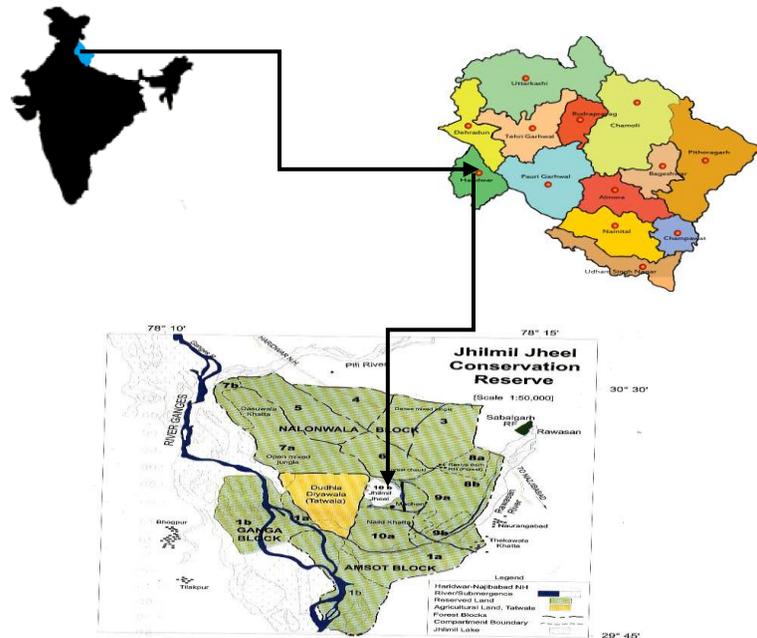
Jhilmil Jheel wetland is a saucer shaped wetland situated on the left bank of River Ganges between N 29° 32' to 29° 50' and E 78° to 78° 15' covering an area of 3783.50 ha of Reserve Forest. Of the total area covered by Jhilmil Jheel wetland, the plantation area covered 3116.6 ha which was further divided into different strata with eucalyptus plantation covering an area (1726.30 ha) followed by teak plantation (81 ha), acacia plantation (830.60 ha) and mixed plantation (478.7 ha). The altitude of the area varies from 200 to 250 meters above mean sea level. It is located on the Haridwar – Highway and besides the natural course of the Ganges to the south of it in Chidiyapur Forest Range of Haridwar Forest Division, Uttarakhand.

Each stratum has been further divided into different blocks:

1. Eucalyptus plantation (Ganga block 1a, 1b, 4, 6, 7a, 8a, 9a, 9b, 10a)
2. Teak plantation (block 9a and 8b)

3. Acacia plantation (Amsot 1a and 1b)
4. Mixed plantation (block 5 and 7b)

## STUDY SITE



**Figure 1. Extensive study area of Jhilmil Jheel wetland** (Source: Haridwar forest department)

## III. MATERIAL AND METHODS

Soil samples were collected from each site for estimation of different physico-chemical parameters. At each site, 30 soil cores were obtained randomly at a depth of 0-30 cm with the help of soil corer. The collected soil samples were brought into the laboratory. After air drying and removing twigs and pebbles, the soil samples were ground in a pestle mortar and then sieved through 2mm mesh sieve to determine the soil moisture, pH and bulk density, the sieved samples were stored in the thick quality polythene bags for the determination of different soil parameters like texture, organic carbon, total nitrogen, available phosphorus and exchangeable potassium. The analysis was done following the standard procedures:

1. Texture: Hydrometer method (Lemenih *et al.*, 2005)
2. Bulk density: Core sampler method (Blake, 1965)
3. Moisture: Sartorius moisture meter
4. pH: Digital Lutron pH-201 pH meter
5. Organic carbon: wet oxidation method (Walkley and Black, 1934)
6. Total nitrogen: Kjeldahl method (Bremner, 1960).
7. Available phosphorus: Olsen's method (1954)
8. Exchangeable potassium: Flame photometer

## IV. RESULTS AND DISCUSSION

The negative impacts of monoculture tree plantations in forest areas have been thoroughly studied and documented in nearly all the countries where they are located. The plantation site was divided into four subsites i.e., eucalyptus plantation, teak plantation, acacia plantation and mixed plantation. Physicochemical parameters were set for all the four subsites and data was analysed. One-way ANOVA and post-hoc tukey test was applied to analyse the mean significant difference between each parameter under different sites which was shown in table 1.

**Table 1. Soil physicochemical properties under eucalyptus, teak, acacia and mixed plantation site of Jhilmil jheel wetland**

Parameter Site	Texture				Bulk Density (g cm <sup>-3</sup> )	Moisture (%)	pH (1:2.5)	Organic Carbon (%)	Total Nitrogen (%)	Av. Phosphorus (ppm)	Ex. Potassium (ppm)
	Sand (%)	Silt (%)	Clay (%)	Texture class							
Eucalyptus plantation	56 <sup>a</sup>	25 <sup>a</sup>	19 <sup>a</sup>	Sandy loam	1.50 <sup>a</sup>	12.32 <sup>a</sup>	6.55 <sup>a</sup>	1.62 <sup>a</sup>	0.17 <sup>a</sup>	10.92 <sup>a</sup>	175.5 <sup>a</sup>
Teak plantation	64 <sup>c</sup>	23 <sup>a</sup>	13 <sup>c</sup>	Sandy loam	1.37 <sup>b</sup>	11.90 <sup>a</sup>	6.82 <sup>b</sup>	1.94 <sup>b</sup>	0.21 <sup>b</sup>	13.30 <sup>b</sup>	220 <sup>b</sup>
Acacia plantation	67 <sup>c</sup>	20 <sup>b</sup>	13 <sup>c</sup>	Sandy loam	1.42 <sup>c</sup>	8.38 <sup>b</sup>	6.78 <sup>b</sup>	1.60 <sup>a</sup>	0.19 <sup>b</sup>	9.26 <sup>c</sup>	111.5 <sup>c</sup>
Mixed plantation	33 <sup>b</sup>	37 <sup>c</sup>	30 <sup>b</sup>	Clay loam	1.29 <sup>d</sup>	14.57 <sup>c</sup>	6.49 <sup>a</sup>	1.99 <sup>c</sup>	0.23 <sup>c</sup>	14.66 <sup>d</sup>	230 <sup>d</sup>
F	22.53	11.11	5.40	-	95.77	47.09	59.36	6.86	18.83	74.72	50.63
P	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	***	***	***	-	***	***	***	***	***	***	***

*Same alphabets represent statistically at par group*

**Soil texture under eucalyptus, teak, acacia and mixed plantation site:** When the soil samples were analysed to see the texture of the soil under different land uses, it was observed that the soil under eucalyptus plantation, teak plantation and acacia plantation site was sandy loam while under mixed plantation site, the texture of the soil was depicted clay loam in nature as shown in table 1.

One-way ANOVA was applied to compare the mean difference of sand, silt and clay content between each site. The analysis showed the mean of sand, silt and clay under the four subsites showed significant difference at (P < 0.05 level). Post-hoc analysis revealed that mean sand percentage under eucalyptus plantation site and mixed plantation site showed significant difference with each other and between other two subsites, while no mean significant was observed between teak plantation site and acacia plantation site in terms of mean sand percentage. Similarly, silt content under acacia plantation site and mixed plantation site showed significant mean difference between each other and with eucalyptus plantation and teak plantation site while no significant mean difference was observed between eucalyptus plantation and teak plantation site. Finally, clay content under eucalyptus plantation site and mixed plantation site showed significant difference between each other and with teak plantation site and acacia plantation site but no significant difference was observed between teak plantation and acacia plantation site.

**Soil moisture under eucalyptus, teak, acacia and mixed plantation site:** The result revealed that the soil moisture content was observed maximum (14.57 %) under mixed plantation site followed by eucalyptus plantation site (12.32 %), teak plantation site (11.90 %) and the minimum (8.38 %) soil moisture was observed under acacia plantation site (Table 1). The high soil moisture content under the mixed plantation site may be due to high litter layer on the surface as compare to other sites which helps protect the moisture from evaporation. Another reason for having high moisture content under mixed plantation site and low moisture content under acacia plantation site was because of the texture of the soil. It was depicted from the study that the texture of the mixed plantation site was clay loamy while it was sandy loamy under eucalyptus plantation site, teak plantation site and acacia plantation site. Clay particles can hold soil moisture for longer period of time as compare to the sandy soil.

In contradiction to the above findings, Srivastava (1993) had estimated that the eucalyptus sp. had high water holding capacity in the soil. There was more soil moisture under eucalyptus than a nearby open area even after three consecutive drought years. Abbasi

and Vinithan (1997) had established that eucalyptus hybrid plantations didn't depleted soil moisture and their performance in their report always compared favourably with plantation of another tree species. Regarding complaints against eucalyptus that it draws water from water table, several researchers had investigated its root behaviour also in different soil conditions. George (1977) noticed that tap root of eucalyptus hybrid had descended to a depth of 3 m and the lateral roots had spread up to 3.5 m. These findings were also supported by Rao (1984) and Davidson (1985) in a study made in 10-year-old plantations of eucalyptus globules and *Pinus radiata* near Rome reporting that the tap root of the former reached a depth of 4.20 m and of the latter a depth of 2.20 m and the lateral roots a radius of 11 m and 5 m respectively.

One-way ANOVA suggested significant mean difference in the soil moisture content between different subsites at ( $P < 0.05$  level). Post-hoc test revealed that eucalyptus plantation site, acacia plantation site and mixed plantation site showed strong significant mean difference while no significant mean difference was observed between eucalyptus plantation site and teak plantation site with respect to the mean values of soil moisture for homogenous subsets (table 1).

**Soil bulk density under eucalyptus, teak, acacia and mixed plantation site:** In table 1, the analysis showed that the bulk density was estimated highest ( $1.50 \text{ g cm}^{-3}$ ) under eucalyptus plantation site followed by acacia plantation site ( $1.42 \text{ g cm}^{-3}$ ), teak plantation site ( $1.37 \text{ g cm}^{-3}$ ) and the lowest bulk density was observed under mixed plantation site ( $1.29 \text{ g cm}^{-3}$ ). Low bulk density under mixed plantation site may be because of high organic matter content in the soil as high organic matter improves the overall quality of the soil. From the field study, less quantity of litterfall was observed under monoculture plantation sites which adds to less amount of organic matter into the soil. Okoro *et al.*, (1999) on comparing the soil physical properties of some monoculture plantations (*T. grandis*, *Nauclea diderrichii* and *G. arboreai*) in the lowland rain forest belt of South-western Nigeria with that of natural forest found that the texture of the soils was not affected by the respective plantation species. Amponsah and Meyer (2000) studied soils of natural forests converted to teak plantations (21.3 to 5.1 years) in the Offinso and Juaso forest districts in the Ashanti region, Ghana and found that in the 0-20cm and 20-40cm depth, bulk density significantly increased.

Mongia and Bandyopadhyay (1994) reported that the replacement of virgin forest with highly valued plantation species viz., *Pterocarpus dalbergioides*, *S. robusta*, *T. grandis* and *Elaeis guinensis* plantation in Andaman led to a rapid deterioration in soil physical properties and found that bulk density of the surface soil increased to ( $1.30 \text{ gm/cc}$ ), ( $1.49 \text{ gm/cc}$ ), ( $1.35 \text{ gm/cc}$ ) and ( $1.28 \text{ gm/cc}$ ) in plantations respectively, compared to bulk density of  $1.05 \text{ gm/cc}$  in the virgin forest.

When we compared the mean values under each subsite (table 3), one-way ANOVA depicted significant mean difference at ( $P < 0.05$  level). After applying post-hoc tukey test, the analysis revealed all the four subsites were strongly and significantly different from each other with respect to the mean values of soil moisture.

**Soil pH (1:2.5) under eucalyptus, teak, acacia and mixed plantation site:** In our study, the soil pH under the four subsites of plantations were estimated which was shown in table 1. The soil pH was observed near neutral under teak plantation and acacia plantation site while soil pH under mixed plantation and eucalyptus plantation site was observed to be slightly acidic in nature as shown in table 1. Decomposition of soil organic matter releases organic acids leading to decrease in pH in forest (Killham, 1994). This may be one of the reason for having low soil pH under mixed plantation site as it produces large components of litter as compare to the other three sites. Eucalyptus trees are invasive species that survive by inserting an acid into the soil killing the plant roots that surround it. Therefore, the eucalyptus site was slightly acidic. This would make sense that why the eucalyptus plantation site has high pH concentration as compare to teak plantation site and acacia plantation site. Relatively low values for pH, organic carbon, exchangeable bases and exchange acidity were observed in monoculture teak and eucalyptus (uncoppiced and coppiced) compared to those in mixed plantations by Balagopalan *et al.*, (1992) in the state of Kerela. Similar observations were also being made by (Hann, 1997) where they mentioned that the reduction in soil pH can be attributed to accumulation and subsequent slow decomposition of organic matter, which releases acids in the forest soil.

Despite having high organic matter present in the teak plantation site, Nazir and Netajini (2014) in their study showed that the average soil pH (7.12) was higher under teak forest and pH showed negative correlation with organic carbon, organic matter, whereas it was observed positively correlated with phosphorus under three forest types in Dehradun. Paudel and Sah (2003) reported similar results for soils in tropical sal (*Shorea robusta Gaertn.*) forests in eastern Nepal.

when the data for the selected parameter was subjected to one-way ANOVA to see whether significant differences exist with respect to different land use at ( $P < 0.05$  level), it was depicted from the analysis that there was significant difference between different subsites. The post-hoc analysis also showed that that between eucalyptus plantation site and mixed plantation site showed strong significant mean difference between each other and with the other subsites with respect to the mean values of soil pH while no mean significant difference were observed between teak plantation site and acacia plantation site (table 1).

**Soil organic carbon under eucalyptus, teak, acacia and mixed plantation site:** The result showed that the mixed plantation site has got the maximum percentage of soil organic carbon followed by teak plantation site, eucalyptus plantation site and the least amount of percentage soil organic carbon was observed under acacia plantation site. Large quantity of litterfalls adds to large quantity of organic matter into the soil which ultimately leads to increase in the organic carbon content in the soil. Similar observations were made out in our study where mixed plantation site and teak plantation site having high litter contents had high organic matter in the soil whereas less litterfall under the eucalyptus plantation site and acacia plantation site showed low soil organic carbon content in the soil as shown in table 1.

Wang *et al.*, (2008) conducted a study on litterfall and its decomposition rates in a monoculture and mixed stand in southern China. Their study depicted that the annual litterfall at the pure and mixed stands varied from 244 to 788 and 455 to 1041 g m<sup>-2</sup> yr<sup>-1</sup>, respectively. They estimated that the mean annual litterfall at the mixed stand (699 g m<sup>-2</sup> yr<sup>-1</sup>) was higher 24% than that at the pure stand (565 g m<sup>-2</sup> yr<sup>-1</sup>). Xu and Nie (2002) stated that the productivity of well-managed plantations can be sustained whereas poor management practices result in dramatic yield declines across rotations and continued soil degradation. The mixed stand of forest species seemed to be the best plantation system, as it increased soil organic matter and fertility level and improved soil structure. Chaubey *et al.*, (1988) found that litter production was 1.5-2.0 times greater in the teak plantations (20-23 year) than in adjoining forests in Madhya Pradesh. Annual leaf litterfall was higher in teak than in eucalyptus (Singh *et al.*, 1993). It was also observed that decay rate of the litter varied significantly both in the field and in the laboratory. Teak litter decomposed rapidly when compared to that of *E. tereticornis* (Singh *et al.*, 1993; Pande and Sharma, 1993a).

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One-way ANOVA was subjected to analyse the mean difference among each site under plantation at (P < 0.05 level) which was shown in table 1. The analysis showed that sites with respect to soil organic carbon showed significant mean difference. The post-hoc test also showed that teak plantation site and mixed plantation site were significantly different with each other and also with eucalyptus plantation and acacia plantation site and while no significant difference were observed between eucalyptus plantation site and acacia plantation site with respect to the mean values of soil organic carbon content for homogenous subsets.

**Soil total nitrogen under eucalyptus, teak, acacia and mixed plantation site:** Our result showed that total nitrogen was maximum (0.23 %) under mixed plantation site followed by teak plantation site (0.21 %), acacia plantation site (0.19 %) and the least was depicted under eucalyptus plantation site (0.17 %). The study also showed that total nitrogen was strongly and positively correlated with SOC and that with high soil organic carbon observed under mixed plantation site leads to high concentration of total nitrogen in the soil. Another possible explanation for having high nitrogen content in the soil was due to higher plant litter production in the mixed plantation site. Total nitrogen increased with increasing organic matter which was also observed by Nazir and Netajini, (2014) in their study. According to Jha *et al.*, (1984), if the soil is rich in organic matter, it is definitely rich in total nitrogen also. Haan (1977) also analysed that the availability of nitrogen depends upon the amount and properties of organic matter.

Our study depicted high nutrient values under mixed plantation site and teak plantation site but in contrast to our findings, Blanford (1933) reported that teak cropping lead to serious soil erosion especially due to the removal of undergrowth and soil erosion was the main form of soil deterioration in Burma. After a, thorough study in pure teak plantations of Burma, Castens (1933) notes that soil deterioration due to teak cropping may be slow. Increased nitrogen content in soil under mixed plantation site as compare to other sites depicted high rate of litter decomposition, the decomposition rate was more rapid on nitrogen rich site (Gosz, 1981; Vitousek *et al.*, 1994 and Prescott, 1995) and nutrient supply to the soil due to decomposition of litter was reduced with increased in degree of disturbance (Conn and Dighton, 2000 and Zimmer, 2002) which was visible in the eucalyptus plantation site and acacia plantation site. When the selected parameter was subjected to one-way ANOVA to observe the significant mean difference between all the four subsites, the analysis showed that mean values of total nitrogen with respect to its subsites showed significant difference at (P < 0.05 level). Further, post-hoc test also revealed that there exists a strong mean difference between eucalyptus plantation site and mixed plantation site while no mean significant difference was observed between teak plantation site and acacia plantation site with respect to the mean values of soil total nitrogen for homogenous subsets (table 1).

**Soil available phosphorus under eucalyptus, teak, acacia and mixed plantation site:** Our result showed that the maximum (14.66 ppm) available phosphorus was observed under mixed plantation site followed by teak plantation site (13.30 ppm), eucalyptus plantation site (10.92 %) and the least (9.26 ppm) was observed under acacia plantation site. Marquez *et al.*, (1993) studied the effect of teak chronosequence (in 2-7- and 12-year old plantations) on soil properties in the Ticoporo Forest Reserve, Venezuela. Their findings showed that the available soil phosphorus concentration showed a significant decline with plantation age. They suggested the possibility that older teak trees could take nutrients more efficiently from deeper soil horizons and return them to the soil surface as leaf litter. The increase in soil nutrients observed under teak plantation could be a consequence of leaf litter decomposition and further nutrient cycling which proves the higher concentration of available phosphorus under teak plantation site and mixed plantation site as well.

Pande and Sharma (1993b) noted teak and sal conserved more nutrients than pine and eucalyptus, and conservation of nitrogen and phosphorus was found greater than that of other nutrients which supported our findings and explained the reason for having low concentration of available phosphorus under eucalyptus plantation and acacia plantation site.

We applied one-way ANOVA to depict whether there exists any significant difference among different land uses. After the analysis, the result showed that each site with respect to the mean value of available phosphorus showed significant difference at (p < 0.05 level). Post-hoc test also revealed that the mean values of each subsite were observed strongly and significantly different from each other for homogenous subsets with respect to the mean values of soil available phosphorus.

**Soil exchangeable potassium (ppm) under eucalyptus, teak, acacia and mixed plantation site:** Our study showed that soil exchangeable potassium was maximum (230 ppm) under mixed plantation site followed by teak plantation site (220 ppm), eucalyptus

plantation site (175.5 ppm) and the least (111.5 ppm) was observed under acacia plantation site (Table 1). As it was mentioned in previous studies that clay soil particles can hold more soil nutrients than the sandy soil particles and our findings also showed similar trend with high exchangeable potassium content under mixed plantation site which has clay loamy texture in comparison to the remaining three subsites which were having sandy loamy texture. This may be one of the reason for having high potassium content under mixed plantation site. This study was supported by Kaila (1965) who observed in his study that potassium fixation by samples of many soils of Finland increased with clay content which indicated that soils with higher clay contents were likely to contain more non-exchangeable potassium. Sands were often made up of almost entirely of quartz and therefore contain very small amounts of potassium minerals.

Levy (1964) reported greater exchangeable potassium availability to plants in soils of coarse texture than on fine texture. Thus, replacement of a given amount of exchangeable bases will cause release of more potassium ions from sandy soils than from clayey soils with equal exchangeable potassium content. Some researches tried to find out relation between soil pH and potassium. Our study showed that there was low potassium content where high soil pH was observed except for the teak plantation site where potassium content was depicted quite high even when the soil pH was near neutral. York *et al.*, (1953) noted that the fixation of fertilizer potassium takes place more readily in neutral than in acid soils and liming an acid soil increases its ability to fix potassium. Geodert *et al.*, (1975) stated that though liming decreases potassium susceptibility to leaching, it might also reduce solution potassium to levels where plants suffer deficiencies.

When one-way ANOVA was applied, the statistical data suggested that there was significant difference at (P 0.05 level). Post hoc test revealed that all the subsites were strongly and significantly different from each other for homogenous subsets with respect to the mean values of soil exchangeable potassium.

## V. CONCLUSION

It was observed from the above study that mixed plantation site has got the maximum nutrient values followed by teak plantation site and the least was observed under both acacia plantation site and eucalyptus plantation site. It was also observed that mixed plantation site had very dense vegetation as compare to the rest of the three subsites. The amount of litter fall was again observed maximum under mixed plantation site as it was obvious with having high vegetation density. We also observed high ground litter production under teak plantation site due to presence of its large leaves which adds extra litter to the surface of the ground. The physical properties of soils in monocultures of teak (*Tectona grandis*) and eucalyptus (*E. tereticornis*, uncoppiced and coppiced) and mixed stands of teak and bombax (*Bombax ceibu* /*B. malabaricum*) in Thrissur forest division, Kerala was studied by Balagopalan *et al.*, (1992). They found that the differences in physical properties were negligible. Chavan *et al.*, (1995) studied the effect of forest tree species viz. *T. grandis*, *Terminalia tomentosa*, *Pongamia pinnata*, *G. arborea*, *eucalyptus*, *Acacia auriculiformis*, and (*Casuarina equisetifolia*) on properties of lateritic soil (Maharashtra) and concluded that there was no change in soil physical properties. They also found that chemical properties of soils under monocultures of teak (*T. grandis*), eucalyptus (*E. tereticornis*, uncoppiced and coppiced), and mixed stands of teak and bombax (*B. ceiba* [*B. malabaricum*]) in Kerala differed between plantations. Finally, it was concluded that the mixed plantation site of plantation forest was depicted to be the most fertile site followed by teak plantation site, eucalyptus plantation site and the least fertile site was depicted to be the acacia plantation site which had got the least mean values with respect to soil physicochemical properties.

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# COMPARATIVE STUDY ON MALARIA VECTORS DENSITY AND MALARIA INFECTION IN YOLA-SOUTH L.G.A OF ADAMAWA STATE

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## Abstract

*Malaria is a parasitic disease caused by plasmodium parasite. This study was conducted to compare malaria vector density and malaria infection in Yola South Local government area of Adamawa State, Nigeria. The result of this study revealed that there was positive correlation between malaria vector density and malaria infection based on sites of location ( $R=0.007$ ) and based on month ( $R=0.009$ ). Malaria vector density was observed lowest in Upper Benue Quarters (9.52%) and in the same way the infection was observed lowest (6.72%) in the same site. Relationship based on month revealed that malaria vector density was observed highest in the month of August (40.48%) and in the same way malaria infection was observed highest (33.20%) in the same month. Also, malaria vector density was observed lowest in the month of September (20.83%) and in the same way the infection was observed lowest (19.70%) in the same month. The result of this study revealed that most of the malaria vectors sampled were either blood fed (28.57%); gravid (25.59%) or half gravid (27.38%). This implies high contact between the malaria vectors and human or other animal host. Control of malaria vectors is necessary to reduce the rate of infection.*

**Key words:** Infection, Malaria, Parasite, Transmission, Vector

## I. INTRODUCTION

Malaria is a parasitic disease caused by four distinct species of plasmodium parasite, transmitted by mosquitoes of the genus Anopheles, which are most abundant in tropical/subtropical regions, although they are also found in limited numbers in temperate climates. Transmission is associated with changes in temperature, rainfall, humidity as well as level of immunity. The IPCC Special Report on Regional Impacts of Climate Change [3] acknowledges that climate have an impact on vector-borne diseases. Changes in climate affect potential geographical distribution and transmission of vector-borne infectious diseases such as malaria. Several researches have suggests that climate can affect infectious disease patterns because disease agents (viruses, bacteria, and other parasites) and their vectors (such as insects or rodents) are clearly sensitive to temperature, moisture, and other ambient environmental conditions. Studies on the interaction between climate and malaria have focused in recent years on the potential role of climate change in determining recent increases in malaria transmission in highland areas in Africa where temperature rather than rainfall has been the parameter of greatest interest [4] and [6]. The aim of this research work was to investigate the relationship between malaria vectors density and malaria infection in Yola-South Local Government Area of Adamawa State.

## II. MATERIALS AND METHOD

### 1.2.3 Study Area

This study was conducted in Yola-South Local Government Area of Adamawa State, Nigeria. Yola has a geographical coordinates of 9°12'0" North and 12°29'0" East. It is the capital city of Adamawa State, located on the River Benue. It has a population of 194,607 (National Population Commission, 2006). The study area lies within the Sudan savannah zone with marked dry and wet seasons. Yola has an annual rainfall from the months of April to October and a dry season from the month of November to March. Temperature drops in the rainy season especially in the month of July to October. The movement of the inter-tropical discontinuity (I.T.D.), and

associated zones of rainfall during the course of the year, is the major factor controlling rainfall and temperature variation in the study area. Temperature rises slightly after the rainfall ceases in the months of March-May and that could reach as high as 41°C. In the months of December-February, the dry harmattan weather characterizes the area, which is cold and dusty. The movement of the wind by December sweeps across the study area and the movement continue eastward. Like most areas in northern Nigeria, the soil of Yola-South are derived from the basement complex rock, however, there is some alluvial soil along the Benue flood plains. The soil of the study area is loamy and it drains easily when it rains. The vegetation of Yola-South consists of short grasses and medium shrubs, more especially in the months of August and September during which the area records higher amount of rainfall. Agriculture is the mainstay of about 70% of the inhabitants of the State. The ecological condition of the state permits cultivation of root crops, cereals and rearing of livestock in large numbers. Majority of the individuals residing within the study sites are farmers, others are civil servants and business men and women. The dominant tribes in the study area are Fulani.

#### 1.2.4 Study Design

Five study sites were selected namely: Mobile barracks, Upper Benue staff quarters, Anguwan Fulani, Rumde-Jabbe and Mbamba Mission. The sites selected were close to each other in order to ease the mosquitoes sampling. Mosquitoes breeding places were created using an artificial container (earthen pots) in some selected houses within the study sites. Two (2) earthen pots were placed in two (2) houses in each of the five (5) selected study sites, each of the two houses selected in each study site were selected using systematic random sampling in which in every five (5) houses one (1) of the middle located house was selected for sampling. The process was repeated four (4) times in a month for a period of three (3) months (July, August and September). At the end of the studies a total of 120 breeding sites were created. Blood sample was collected from individual residing within the study sites from July to September for malaria parasite examination using a simple random sampling in which all the individual have equal chances of participating.

#### 1.2.5 Collection and Identification of Mosquitoes

Mosquitoes' vectors were collected using a hand net from the breeding containers once in a week by covering the breeding containers and spraying insecticide heavily and the pot were relocated to another houses within the study sites for re-sampling of mosquitoes vectors. Sampled mosquitoes were mounted on glass slides and viewed under simple Olympus (dissecting) microscope for identification using relevant taxonomic keys [2]. *Anopheles* mosquitoes were identified by the palp which is as long as the proboscis and pointed and by the number, the length, and arrangement of the dark and pale scales the veins of the wings [2]. Male and female *Anopheles* mosquitoes were identified by examination of antennae, in which those with feathery (plumose) appearance are males and those with only short and inconspicuous antennal hairs (pilose) are females [2]. Other mosquito species identified were *Culex* and *Aedes*. The *Culex* genus has transparent wings while the *Aedes* genus has silvery shining stripes on the head region [2].

#### 1.2.6 Determination of Malaria Vector Density

The malaria vectors density were calculated as:

$$\frac{\text{Total number of malaria vectors (female } \textit{anopheles} \text{) collected}}{\text{Total number of containers}}$$

#### 1.2.7 Examination Malaria Parasite

Blood sample were examined for malaria parasite in all the study sites at the end of each month selected for this research. Rapid diagnostic test strip were used for malaria parasite diagnostic since it is suitable for large sample size. First response malaria Ag. *P. falciparum* (HRP2) card test was employed for the rapid diagnosis of *plasmodium falciparum*.

#### 1.3.8 Statistical Analysis

The data obtained were analyzed using Correlation statistical analysis such that positive R value implies positive correlation while negative R value implies negative correlation and results obtained were represented in tables and graphs.

### III. RESULTS

A total of 1806 mosquitoes were sampled to determine the distribution of mosquitoes based on species and sex in the study area. Distribution based sex (Table 1) indicated that there were 1220(67.55%) female mosquitoes and 586(32.45%) male mosquitoes. Distributions of the female mosquitoes based on species indicated that Female *Culex* were 908 (74.43%), Female *Anopheles* 202

(16.56%), and Female *Aedes* were 110 (9.02%). Chi-square statistical analysis shows that there was significance difference in the distribution of mosquitoes based on species and sex in the study area ( $p=0.020$ ). And a total of 495 persons from different households in the different communities and location within the study area were enrolled in the study for blood sample collection. Rapid diagnostic test card employed for the diagnostic of blood sample collected identified that 134(27.07%) of the samples were positive for malaria parasite. Presence of a line on both the T (test region) and C (control region) on the test card indicates positive results.

Table 1 shows the distribution of malaria vector density and prevalence of malaria infection based on sites of location. The table indicated that Upper Benue staff quarters had the lowest malaria vector density 0.16(9.52%) and also has the lowest prevalence of malaria infection 9(15.50%). However, Chi-square statistical analysis showed that there was no significance difference in the distribution of malaria vector density and prevalence of malaria infection based on location in the study area ( $p=0.220$ ).

Table 2 shows the distribution of malaria vector density and prevalence of malaria infection based on months. The table indicates that the month of August have the highest malaria vector density 0.68(40.48%) and in the same way have the highest prevalence of malaria infection 62(33.20%). The month of September have the lowest malaria vector density 0.35(20.83%) and also have the lowest prevalence of malaria infection 30(19.70%). Chi-square statistical analysis showed that there was no significance difference in the distribution of malaria vector density and prevalence of malaria infection based on month in the study area ( $p=0.199$ ).

Table 1: Distribution of Malaria Vector Density and Prevalence of Malaria based on sites of Location

Location	malaria vector density (%)	malaria prevalence (%)
Mbamba Mission	0.47 (27.98)	41 (29.50)
Mopol Barracks	0.37 (22.02)	38 (31.70)
Upper Staff Quarters	0.16 (9.52)	9 (15.50)
Rumde Jabbe	0.33 (20.00)	32 (25.60)
Anguwan Fulani	0.35 (20.83)	14 (32.70)
Total	1.68 (100.00)	134 (27.10)

$$\chi^2=20.00, df=1, P (0.220)$$

Table 2: Distribution of Malaria Vector Density and Prevalence of Malaria based on Month

Month	malaria vector density (%)	malaria prevalence (%)
July	0.65 (38.69)	42 (26.90)
August	0.68 (40.48)	62 (33.20)
September	0.35 (20.83)	30 (19.70)
Total	1.68 (100.00)	134 (27.10)

$$\chi^2=6.000, df=1, P (0.01)$$

#### IV. DISCUSSION

A total of 1806 mosquitoes were sampled from earthen pots and examined under a microscope. Three species namely, *Aedes*, *Culex* and *Anopheles*, were identified. Female *Anopheles* (Malaria vectors) identified were 202 (16.56%). A total of 495 blood sample were collected from individuals within the study site and were examined for malaria parasite using a rapid diagnostic test strip out of which 134(27.10%) were positive for malaria infection. The result of this study revealed that there was positive correlation between malaria vector density and malaria infection based on sites of location ( $R=0.007$ ) and based on month ( $R=0.009$ ). The result of this study showed that malaria vectors breed in all the study locations thus every person in the study location is at risk of malaria attack. Attributes of rate of exposure of the study population to vector bites due to nature of their work and standard of living form a factor in the transmission pattern of the disease. Due to lack of regular supply of pipe-borne water, people resort to storing water fetched from their local streams in earthen pot and containers in and around houses. These provide clear standing water that serve as favourable breeding sites for the malaria vector (female *Anopheles* mosquitoes) in all the study locations. However, malaria vector density was observed lowest in Upper Benue Quarters (9.52%) and in the same way the infection was observed lowest (6.72%) in the same site. The low population density of malaria vector density collected in Upper Benue Staff quarters synchronized with the low malaria prevalence in the area. This is an indicator of the unavailability of good breeding sites for female *Anopheles* mosquitoes (malaria vectors) in the area, which may be due to good sanitary behavior of the individuals in this area.

The ecology and behavior of malaria vectors and other mosquitoes populations investigated in this study were greatly influenced by the prevailing months of rainy season. Relationship based on month revealed that malaria vector density was observed highest in the month of August (40.48%) and in the same way malaria infection was observed highest (33.20%) in the same month. Also, malaria vector density was observed lowest in the month of September (20.83%) and in the same way the infection was observed lowest (19.70%) in the same month. The result of this study revealed that most of the malaria vectors sampled were either blood fed (28.57%); gravid (25.59%) or half gravid (27.38%). This implies high contact between the malaria vectors and human or other animal host. High abundance or distribution of malaria vector density in the month of August may be attributed to the proliferation of rain pools, as well as the resultant improved humidity for adult- mosquito survival and dispersal [6]. The significantly higher densities of malaria vectors collected during the rainy season in this study, to a large extent, explains the equally seasonal pattern of clinical cases of malaria, with peak transmission shortly after maximum annual rainfall in Nigeria [5]. The pattern of modal distribution of hourly biting density of the mosquitoes, both indoors and outdoors, varied considerably with rainfall months. This finding indicated that variable weather conditions that characterize different seasons in the Tropics influence anopheline blood feeding activities and, hence, malaria transmission. For example, relative humidity affects mosquito flight activities and blood meal seeking behavior [6].

#### V. CONCLUSION

The rate of transmission of malaria is correlated with the distribution of malaria vector density. Control of malaria infection will require effective control of the malaria vectors distribution.

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# Relationships between National Code of Ethics and Conduct for Public Service and Financial Ethical Values in Tanzanian Local Government Authorities

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**Abstract:** *The government of the United Republic of Tanzania has issued the national code of ethics and conduct for public service to help public servants, among other things to use well public resources. Contrarily, some employees in Tanzanian Local Government Authorities are misusing public resources. This paper analyses views on position of financial ethical values in Tanzania local government authorities as well as determine correlation between adherence to the national code of ethics and conduct for public service and financial ethical values. A sample of 400 respondents was selected randomly using a table of random numbers. The study applied descriptive statistical data analysis to determine position of financial ethical values in Tanzania local government authorities. Besides, inferential analysis was done using Pearson's correlation to measure the strength of relationship between the dependent variable (code of ethics and conduct for public service) and independent variables (financial ethical values). The indicators of the independent and dependent variables were measured at the ratio level in terms of points scored on statements, which were used to measure them. Based on research findings it is concluded that although there is positive and significant relationships between code of ethics and conduct for public service and financial ethical values, the national code of ethics and conduct for public service alone is ineffective in nurturing financial ethical values of employees working at Tanzania local government authorities. Therefore, council administrators should put in place their own additional mechanisms of enforcing adherence to financial ethical values in their respective councils.*

**Key words:** Code of ethics and conduct, public service, financial ethical values

## 1.0 INTRODUCTION

### 1.1 Background and Statement to the Problem

The image of government depends upon the conduct of its public officeholders (Vyas-Doorgaperad and Ababio, 2010). The code of ethics and conduct for public service specifies prohibitions and articulates an acceptable behaviour of public officeholders (Staurt, 2005). A well-written code clarifies the values and standards of official behaviour (Salminen and Moilanen, 2006). The government of the United Republic of Tanzania, for the first time in 1961, issued a code of ethics and conduct for public service (URT, 2005). The code articulates expected ethical behaviour, conduct and standards of performance of the public servants (URT, 2005). Later on, President's Office Public Service Management (PO-PSM) issued Circular letter No. 4 of 2005 directing all public service employers to ensure that new employees attended induction training within six months of their engagement. Among others, the training intends to familiarize public servants with the national code of ethics and conduct for public service.

The Government of Tanzania perhaps expected to have public servants with higher ethical standards (Eghosa, 2012). In turn, the government expected the public servants to apply ethical standards gained to improve their financial ethical values that are integrity, accountability, transparency, conflict of interest and trust. Integrity means that individual behaviours are consistent with their stated values and that they are honest, ethical,

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responsible and trustworthy (Hoy and Miskel, 2005, cited by Mabagala, 2013). Accountability is concerned with decision-makers providing answers to those who have entrusted them with financial resources (Chalu and Kessy, 2011). Transparency means access and right to information on LGAs' budgets and accounts (Chalu and Kessy (2011). Conflict of interest is a disclosure of personal financial interest in the public service (Liem, 2007). Trust is a belief built upon financial perceptions or images of the characteristics of others, based on previous experience (Liem, 2007).

Abiding by financial ethical values, public servants were expected to adjust their malpractices as well as behaving ethically especially in relation to financial practices (Staurt, 2005, Brammer and Millington, 2005). Different from the aforementioned expectations, some Tanzanian LGAs have been facing unethical allegations (Mbaya *et al.*, 2014). For example, a recent study has revealed lack of financial transparency and accountability in most Tanzanian LGAs (Poncian and Chakupewa, 2015). Additionally, some Tanzanian LGAs had foreseeable presence of billions of money spent on unintended expenditures (Poncian and Chakupewa, 2015). The worst of the matter was the fact that the 2012/13 CAG report indicated that loans amounting to TZS 1, 389,192 866 were not recovered though contract dates had already expired in the 58 audited LGAs (NAO, 2014 in Poncian and Chakupewa, 2015).

Besides the above drawbacks, many studies reviewed in relation to code of ethics and conduct for public service were carried out in other countries (Victoria, 2012; Sakyi and Bawole, 2009; Staurt, 2005). Again, there was no recent study carried out in Tanzania, which analysed position of financial ethical values in Tanzania local government authorities. Moreover, it was not known why unethical financial practices were still recurring in Tanzanian local government authorities' in spite of numerous efforts taken to offset them. Therefore, there was a need to carry out a study to fill the gaps in information available that the current study had identified. Therefore, in this paper, positions of financial ethical values (integrity, accountability, transparency, conflict of interest and trust) in terms of points scored on them in an index-summated scale were analysed as well as correlation with adherence to the national code of ethics and conduct for public service and financial ethic values. In addition, the theory of consequentialism that is reviewed below guided this study.

## **1.2 Theory of Consequentialism/utilitarianism**

The theory holds that an agent performs a morally right action if such an action will maximize good and minimize evil in terms of the number of people who benefit from that particular action (Ochulor, 2011). In other words, if an action gives happiness to the greatest number of people affected by it, it becomes morally right (Uduigwomen 2006 cited by Ochulor, 2011; Alder *et al.*, 2008). From this theory, it is easy to see how unethical financial conduct goes against the principle of morality. Misuse of public fund has bad effect on the society, jeopardizes the common good and ultimately inflicts pain on a very large number of people, if not the whole nation. The theory emphasizes to take into account the final consequence of our action. For the sake of this study, the final consequence is the application of financial ethical values while using LGAs' funds so the funds could benefit the entire council (Rainbow, 2002). In order to use LGAs financial resources efficiently and effectively to benefit entire LGAs as an ultimate consequence, it is inevitable to adhere to the financial ethical values that are integrity, accountability, transparency, conflict of interests and trust.

However, the theory contains the following flaws. Uncertainty can lead to unexpected results, making the user seen as unethical as time passes because the action taken did not benefit the people as predicted it would be (Victoria, 2012). The process of identifying and weighing all the consequences, or even a number of consequences deemed sufficient to make the decision, is often too time consuming for decisions that need to be made quickly. Moreover, it is problematic to evaluate the morality of decision based on actual consequences as well as probable consequences.

Nevertheless, the consequence approach has the hoped-for consequences as a starting point, which leads to a certain type of action, which has justifiable aspirations. It is worth noting that this study addressed the

contribution of national code of ethics and conduct in public service towards nurturing employees' level of ethical values. As such, among other things, the final consequence of the national code of ethics and conduct for public service was to have employees with high financial ethical values. Thus, the theory guided this study to show whether the national code of ethics and conduct for public service has at all enhanced LGAs employees' level of financial ethical values.

### **1.3 Conceptual Framework**

The national code of ethics and conduct for public service nurtures employees' financial ethical values that are integrity, accountability, transparency, conflict of interest and trust. Alternatively, the national code of ethics and conduct for public service enhances employees' level of financial discipline, including use of public resources with care, be answerable to the public resources and be open while using public resources. In addition, it acts as a regulator towards self-interests and organization interests in relation to public resources. The code shapes employees behaviour, which in turn curbs the possibility of arriving at financial decisions not guided by financial ethical values.

## **2.0 METHODOLOGY**

### **2.1 Selection of the Research Areas**

Four LGAs in Tanzania that are Shinyanga Municipal Council, Korogwe Town Council, Monduli District Council and Siha District Council were selected for the study. There were two major reasons to support this selection. The first reason was based on arguments by Ary *et al.* (2000) that the most important characteristic of a sample is its representativeness and not its size. Secondly, since characteristics of urban and rural councils vary from one council to another, the selection of four councils enhanced chances for inclusion rural and urban councils. Simple random sampling was used to select the already mentioned councils. The approach employed a table of random numbers. The table of random numbers typically consists of an extensive series of numbers randomly generated using a computer. MS Excel was used to generate such numbers whereby the “=RAND()” command was used. The first step was to assign each LGA a serial number, and then four LGAs where serial numbers corresponded with some of the numbers that were generated randomly were selected i.e. the LGAs listed above were selected for the research (Ary *et al.*, 2000).

### **2.2 Research Design**

The study adopted a cross-sectional design. The design enabled this study to collect data from four LGAs at a single point of time. Through this design, a body of quantitative and qualitative data were collected in four randomly selected LGAs. Use of triangulation enabled this study to gather data from different sources through different methods. The study examined data collected to detect patterns of relationships between the national code of ethics and conduct for public service and financial ethical values (Bryman, 2004). The design also was useful for descriptive purposes such as determining relationships between national code of ethic and conduct for public service code and financial ethical values.

The respondents were selected using simple random sampling method. The method used a table of random numbers. The procedure was as follows. Each council provided a complete and update list of council employees. The researcher gave names of council employees in each council serial number. Based on a table of random numbers, the researcher selected respondents randomly by taking those whose serial number corresponded with some of the random numbers in the table of random number that was used. In each of the four (4) councils, the researcher selected 100 respondents making 400 respondents. Based on the criteria that conditions for establishment of Tanzanian LGAs were more or less the same (URT, 2013), the researcher selected 100 respondents from each council.

The researcher selected randomly council employees under the assumption that they were the key players in performing, supporting and evaluating services within their councils. Secondly, the researcher had an assumption that all council employees had reasonable knowledge regarding council's ethical and unethical conducts as employees' from low to high ranks interacted with each other. A pilot study was carried out and revealed those assumptions. In addition, the pilot study revealed that understanding of employees' ethical behaviours especially in relation to the use of council resources, were not determined by employees' working ranks but rather by personal interactions. The decision on the sample size was based on the argument that "too large a sample implies a waste of resources, and too small a sample diminishes the utility of the results" (Cochran, 1977, cited by Bartlett *et al.* (2001). Therefore, the study used Cochran's (1977) formula, cited by Bartlett *et al.* (2001) to determine the sub-sample sizes as follows:

$n =$  sample size;

$n = \frac{Z^2 * p (1 - p)}{d^2}$  (Cochran, 1977, cited by Bartlett *et al.* (2001), where:

$Z =$  a value on the abscissa of a standard normal distribution (from an assumption that the sample elements are normally distributed), which is 1.96 or approximately 2.0 and corresponds to 95% confidence interval;

$p =$  estimated variance in the population from which the sample is drawn, which is normally 0.5 for a population whose size is not known;

$d =$  acceptable margin of error (or precision), whereby the general rule is that in social research  $d$  should be 5% for categorical data and 3% for continuous data (Krejcie & Morgan, 1970, cited by Bartlett *et al.* (2001). The research used 5% since the study collected substantial categorical data.

Using a  $Z$ -value of 2.0, a  $p$ -value of 0.5, a  $q$ -value of 0.5, and a  $d$  value of 5% (which is equivalent to 0.05), the sample size ( $n$ ) was determined to be 400.

$$n = \frac{2^2 * 0.5 (1 - 0.5)}{0.05^2} = (4 * 0.25) / 0.0025 = 1 / 0.0025 = 400.$$

The study employed purposive sampling to select respondents for both key informant interviews and focus group discussions. As such, in each council, there were three focus group discussions (male, female and both male and female). The pilot study revealed that some women were not free to participate actively when mixed by men. Moreover, the same pilot study revealed that some points were not discussed well when men and women were separated. These were the reasons for having three groups for focus group discussions. Most of the participants were council customers (taxpayers/service beneficiaries or council citizens). Sakyi and Bawole (2009) argue that the focus group method is appropriate since it can provide basic information from those who witnessed, experienced or were direct beneficiaries or victims of both ethical and unethical behaviour. Furthermore, the researcher selected purposefully Heads of Department as key informant interviews. In each council Heads of Department selected were from human resources, procurement, finance and planning departments. These were the department with reliable information regarding use of councils' resources' and ethical behaviour of council employees. These departments were identified by pilot study carried out in Tabora municipal council prior this study.

### 2.3 Data Collection Instruments

The study used a self-administered questionnaire to collect employees' quantitative opinions regarding adherence to the national code of ethics and conduct for public service and financial ethical values in Tanzanian local government authorities. The questionnaire included a 29-statement index summated scale to measure the dependent variable (national code of ethics and conduct for public service) in Tanzanian LGAs, and a 24-statement index summated scale to measure the independent variable (financial ethical values). A checklist and FGD guide enabled this study to carry out key informant interviews and FGDs discussions. In addition, the study reviewed relevant documents such as budgetary reports, finance and administration committee reports, council by-laws and CAG findings.

## 2.4 Measurement of Variables

This study had one dependent variable (the national code of ethics and conduct for public service with eight constructs that are pursuit of excellence, loyalty to government, diligence, impartiality, integrity, accountability to the public, respect for the law and proper use of official information). Each of the eight items had a number of statements to which the respondents were required to respond Not at all adhered to (0), fairly adhered to (1 point), adhered to (2 points) or strongly adhered to (3 points). Likewise, the study had independent variables (financial ethical values with five constructs that are integrity, accountability, transparency, conflict of interest and trust). Each of the five constructs had a number of indicators to which the respondents were required to respond Not true at all (0), fairly true (1 point), true (2 points) very true (3 points). This study measured all dependent and independent variables individually as in Table 1.

**Table 1: Measurement of dependent variables**

The national code of ethics and conduct for public service	Not at all adhered to (0), fairly adhered to (1 point), adhered to (2 points) or strongly adhered to (3 points)
<b>(1) Pursuit of excellence in service</b> (doing the best)	Maintains personal hygiene (Hygiene) Dresses in acceptable attire in accordance with office norms (appearance) Uses language (politeness)
<b>(2) Loyalty to government</b> (valuing and showing commitment)	Loyalty to government (faithfulness) Implement policies and lawful instructions given by leaders (commitment)
<b>(3) Diligence</b> (working well, hard, everywhere and time management)	Uses skills, knowledge and expertise while discharging duties (competence) Executes duties and responsibilities with maximum time (time management) Works at any duty station (obedience) Punctualities at work place and official appointments (time management)
<b>(4) Impartiality</b> (being fair to others)	Engages in politics in official hours and at work premises (presence on duty) Provides unbiased services to clients (customer care) Passes information to allowed people or institutions (confidentiality) Engages in religion at official hours and off work premise (presence on duty)
<b>(5) Integrity</b> (delivering on the promises and consistently exercising duties as a public servant)	Exercises authorized powers within specified boundaries (legitimacy) Uses powers as directed in favour of LGA and client (legitimacy) Safeguards public resources (trustfulness) Uses public resource for public use only (trustfulness) Uses official time to perform duties entrusted (time management) Behaviours well within and outside the office (character) Discharges improper favours or bribe for person serving (handing bribes)
<b>(6) Accountability to the public</b> (answerability for actions and inactions taken)	Treats clients politely (customer care) Pays extra attention when dealing with vulnerable clients (customer care) Clarifies or provides direction on issues when requested (customer care)
<b>(7) Respect for the law</b> (right to dignity of others)	Familiar and abides with rules, regulations and procedures (competency) Applies laws, regulations and procedures at work (commitment) Treats fairly all members of the public (customer care) Sexual relationships at work place and during working hours (faithfulness)
<b>(8) Proper use of official</b>	Protects unauthorised official information (confidentiality)

<b>information</b> (caring confidential documents)	Uses official documents or information in course of discharging duties (confidentiality)
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**Table 2: Measurement of independent variables**

Financial ethical values	Not true at all (0), fairly true (1 point), true (2 points) or very true (3 points)
(1) <b>Integrity</b> (behaving financially according to stated financial ethical values)	Use council resources as instructed (authenticity) Use council funds as instructed (authenticity) Use council funds as budgeted (authenticity) Higher level of financial discipline (financial behaviour) Refuse of bribes (financial behaviour)
(2) <b>Accountability</b> (answering decisions made on financial to responsible authority)	Answerability for public funds (responsibility) Report the was public funds used (answerability) Observe internal financial rules and norms (commitment) Acceptance of complaints from citizens on use of public funds (customer care) Accountability for all resources (answerability)
(3) <b>Transparency</b> (making financial budgets accounts accessible to all responsible stakeholders)	Accessibility to financial information by all stakeholders and other users (openness) Publications of financial details in the press to all a balanced judgement (openness) Openness in decisions and actions taken regarding public funds (openness) Ready to give reasons for the decisions taken regarding public funds (answerability)
(4) <b>Conflict of interest</b> (disclosure of personal interest in the public service)	Avoidance of conflict of interest on use of public funds (fairness) Avoidance of influence of financial decisions for personal benefit (fairness) Use of public funds properly (faithfulness) Minimization of financial conflict of interest (fairness)
(5) <b>Trust</b> (building financial trust to all stakeholders)	Holding public fund in public trust (faithfulness) Responsibility for fund disbursed (answerability) Accountability to the public fund at all times (answerability) Trusted financial ethical behaviour (financial behaviour) Trusted social behaviour (character) Observation of standards of financial accountability (commitment)

As seen in Table 1 and 2, for national code of ethics and conduct for public service, an index-summated scale comprising 29 statements about national code of ethics and conduct for public service was used, while financial ethical values, an index summated scale comprising 24 statements was used to determine the levels of the variables. Automatic boundaries for classification of the scores obtained on the index scales were used to rank respondents' views on the national code of ethics and conduct for public service and financial ethical values into low level, moderate level and high level. The scores obtained were expressed in terms of points actually scored as percentages of maximum possible scores on the scales. The expression of points actually scored in percentages was done by multiplying the number of statements for each variable (29 and 24 as seen above) by automatic boundaries (0, 1, 2 and 3).

For example, by considering the national code of ethics and conduct for public service that had 29 statements, the percentage of low level was converted by multiplying 29 statements by the first upper automatic boundary 1 (29 x 1 = 29) divide by the highest possible score 29 ÷ (29 X 3 = 87) x 100 = 33.3%. The percentage of moderate level was converted by multiplying 29 statements by the second upper automatic boundary 2 (29 x 2 = 58) divide by the highest possible score 58 ÷ (29 X 3 = 87) x 100 = 66.7%. The percentage of high level was converted by multiplying 29 statements by third upper automatic boundary 3 (29 x 3 = 87) divide by the highest possible score 87 ÷ (29 x 3 = 87) x 100 = 100.0%. Thus, low, moderate and high levels were classified as (0% – 33.3%, 33.4% – 66.7% and 66.8% - 100.0%) respectively. Similarly, the above procedure was followed for financial ethical values.

## 2.5 Data Processing and Analysis

According to Meral and Eylem (2009), there is no universal method to help researchers choose a method which fits best in a given dataset. The study analysed primary quantitative data collected using the Statistical Package for Social Science (SPSS) software. Therefore, the analysis computed data into descriptive statistics including frequencies and averages on the index-summated scales to determine position of financial ethical values in Tanzanian LGAs. Podesva and Devyanis (2013) recommend use of frequencies to make value of ordinal variables meaningful. Frequencies give a clear ranking of a score in the distribution (Thomas and Nelson, 2001 cited by Mabagala, 2013).

Qualitative data were analysed using topic coding to identify material through themes (Morse and Richards, 2002). Through analytic coding three themes (status of financial ethical values, views on employees ethical behaviour and employees perception regarding national code of ethics and conduct for public service) were identified (Morse and Richards, 2002). On the other hand, this paper made use of Pearson coefficient correlations to measure the strength of linear relationship between national code of ethics and conduct for public service and financial ethical values in terms of points scored on the items listed in Table 1 and 2.

Pearson’s correlation was used because the variables were measured at the ratio level in terms of points scored on each of them. Pearson correlation measures the strength of relationships between two variables measured at the scale (interval and ratio) level. Correlation coefficients range from -1 to +1. A positive sign indicates that an increase in one variable is associated with an increase in the other variable, and a negative sign indicates that increase in one variable is associated with decrease in another variable (Crichton, 2001). According to Cohen and Holliday (1982), interpretation of correlation coefficients (regardless of positive or negative signs) is as follows: below 0.19 is very low, 0.20 – 0.39 is low; 0.40 – 0.69 is modest; 0.70 – 0.89 is high; and 0.90 – 1.00 is very high.

## 3.0 RESULTS AND DISCUSSION

### 3.1 Position of Financial Ethical Values in Tanzanian Local Government Authorities

#### 3.1.1 Position of integrity

Financial discipline and refusal to take bribe in Tanzania local government authorities were at a high position. Use of council funds as instructed was the last item in the list. In-depth interviews, which were carried out with heads of departments certainly affirmed decrease in the misuse of public resources. For example, one internal auditor said: “Recently, I have witnessed improvement in retirement of imprest from many employees including travelling expenses.” Perhaps, an increase in the number of dismissed senior officials in recent years, including ministers, permanent secretaries and many officers could be among the reasons making employees more ethical (Policy forum, 2013).

Although most of the discussants in focus group discussions said that number of LGA employees demanding bribes had decreased, few discussants reported some public officials requesting bribe. For example, one discussant said, “it is still impossible to transfer a student from one secondary school to another one without giving money to the headmaster.” The findings suggest that perhaps reforming some individual characters to suit LGA financial integrity is hard. This is justified by use of financial resources as instructed to be the last statement in the list (See Table 3). Yet, all aspects of integrity in Table 3 were at a high position concurrently the theory of consequentialism.

**Table 3: Position of Financial Ethical Values in Tanzanian Local Government Authorities**

Independent variables	Statement tested position of financial ethical values	Not true		True	
		n	%	n	%
Integrity	Use council resources as instructed	68	17.0	332	80.0
	Use council funds as instructed	95	28.0	288	72.0

	Use council funds as budgeted	89	22.3	311	77.5
	Higher level of financial discipline	67	16.8	333	83.2
	Refuse of bribes	67	16.8	333	83.2
<b>Accountability</b>	Answerability for public funds	85	21.3	315	78.7
	Report the was public funds used	82	20.5	318	79.5
	Observe internal financial rules and norms	59	14.8	341	85.2
	Acceptance of complaints from citizens on use of public funds	91	22.8	309	77.2
	Accountability for all resources	94	23.5	306	76.6
<b>Transparency</b>	Accessibility to financial information by all stakeholders and other users	85	21.3	315	78.7
	Publications of financial details in the press to all a balanced judgement	64	16.0	336	84.0
	Openness in decisions and actions taken regarding public funds	59	14.8	341	85.2
	Ready to give reasons for the decisions taken regarding public funds	59	14.8	341	85.2
<b>Conflict of interest</b>	Avoidance of conflict of interest on use of public funds	86	21.5	314	78.5
	Avoidance of influence of financial decisions for personal benefit	80	20.0	320	80.0
<b>Trust</b>	Use of public funds properly	101	25.3	299	74.7
	Minimization of financial conflict of interest	62	15.5	388	84.5
	Holding public fund in public trust	118	29.5	282	70.2
	Responsibility for fund disbursed	141	35.2	259	64.8
	Accountability to the public fund at all times	117	29.3	283	70.7
	Trusted financial ethical behaviour	128	32.0	272	68.0
	Trusted social behaviour	130	32.5	270	67.5
	Observation of standards of financial accountability	113	28.3	287	71.7

### 3.1.2 Position of accountability

Accountability in observation of internal rules and norms that hold civil servants accountable for public funds was at high position followed by reporting expenditure of public fund. The last in the list was accountability for council resources by all council workers (See Table 3). In-depth interviews stipulated improvement in accountability although few areas for improvements were inevitable. For example, in the in-depth interview, a head of department from accounts said, “public servants are supposed to operate ethically always.” These findings are similar to those by Omoregie (2012) that a responsible public agent should be able to account for their conducts to their bosses (elected officials in most cases), court of law, and citizenry by explaining positive and negative outcomes of their duties. Most discussants in the focus group discussions lacked knowledge regarding employees’ financial accountability. Moreover, discussants lacked knowledge regarding the proper place to channel their complaints regarding improper use of public funds. The findings suggest that, possibly, employees are accountable to their reporting authority and not to the citizens (the taxpayers and service beneficiaries) who have tasked them financial resources (Brillantes, 2000 and Conrad, 2005 cited by Chalu and Kessy, 2011). Nevertheless, in theory the national code of ethics and conduct of public service has enhanced employees’ level of accountability.

### 3.1.3 Position of transparency

Four statements measured position of transparency in Tanzanian local government authorities (See Table 3). The statements at high position were open decision and actions taken regarding public funds together with preparedness of the council to give reasons for the decisions and actions taken regarding public funds when called upon. The last in the list was making financial information accessible by stakeholders and users (See Table 3). Discussants in focus group discussions reported that although financial statements were available on councils’ notice boards, they were not user friendly. For example, one discussant said, “it is hard for me to understand financial reports posted on the council’s notice board.” Similarly, URT (2004, cited by Chalu and Kessy, 2011) pointed out lack of a complete and comprehensive information system, thereby creating obstacles for LGAs to demonstrate to local taxpayers to what extent they receive value for money (URT, 2004). These findings imply that transparency is high in terms of feasibility, but not in terms of accessibility as it is not easy

for some citizens to understand. Perhaps this is contradicting Santiaso (2006) recommendations that financial transparency should play an important role in safeguarding financial integrity and improves financial discipline in public financial management.

### **3.1.4 Position of conflict of interest**

Four statements measured level of conflict of interest in Tanzanian local government authorities (See Table 3). Out of the four statements used to measure level of conflict of interest, minimization of financial conflict of interest was at the high position. Use of public fund properly was the last among the list (See Table 3). Most of the discussants in both in-depth interviews and focus group discussions failed to articulate presence of employees' confronted with conflict of interest. For example, in in-depth interview a head of department said, "It is difficult to identify some personal interest unless you are very close to that person." Maybe failure to articulate presence of employees confronted with conflict of interest was because conflict of interest was too personal (Bertok, 2000 cited by Liem, 2007). While reviewing some corresponding files, the researcher identified some sorts of personal interest on some issues related with fund disbursement. For instance, one correspondence was written: "*Malipo haya yanatakiwa yajadiliwe na kikao cha menejimenit kwanza*", which is literarily translated as: "Council management should discuss before endorsing the requested funds". The reply was "*Ushauri wako ni mzuri, ila kwa uharaka tuliyonayo turuhusu hayo malipo yafanyike mapema*", which is literarily translated as: "You have good advice, but with the limited time we have, endorsement should be done immediately." Forcing to issue payment with immediate effect and neglecting adherence to procedures left behind some queries, which suggested prevalence of sort of personal interests towards requested fund, which is against the theory of consequentialism.

### **3.1.5 Position of trust**

Six statements were used to measure position of trust in Tanzania local government authorities (See Table 3). Out of the six statements, observation of standard of financial accountability set which increase public trust was at a high position, followed by staff accountability to the public fund at all times (See Table 3). There were contradicting findings regarding level of trust between heads of department and citizens. While heads of department declared to have improved level of financial trust, citizens were hesitant about it. For example, in a key informant interview with heads of department, they said: "The current financial system in our council has offset previous financial doubts." May be the effort made by fifth government from 2016 to bring the lost financial trust by taking disciplinary action to all public service who misappropriated public fund has facilitated to offset previous financial doubts. Contrarily, one discussant in a focus group discussion argued, "it is difficult to trust anybody on issues related to money". The argument is similar to an argument by Salminen and Ikola (2009) that trust in public organisations is an issue of different faces. These findings suggest that perhaps citizens lack trust in management of public funds due to psychological effects caused by already experienced mismanagement of public funds in previous governments. From Table 3 some aspects were at a moderate position while others were just adjacent to the moderate position, implying that some factors other than adherence to the national code of ethics and conduct for public service are crucial to ensure high position of financial ethical values.

## **3.2 Relationships between Code of Ethics and Conduct for Public Service and Financial Ethical Values**

Group percentages for the constructs of code of ethics and conduct for public service together with financial ethical were correlated to determine their levels of association. The correlating considers seven aspects that were the percentages of integrity, accountability, transparency, conflict of interest, trust and overall group percentage for both national code of ethics and conduct for public service and financial ethical values (See Table 4).

**Table 4: Percentages of the constructs correlated**

<b>Constructs of national public service code</b>	<b>n</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>
Pursuit of excellence in service	387	22.2	100.0	78.1
Loyalty to government	387	16.7	100.0	69.0
Diligence	387	25.0	100.0	69.6
Impartiality	387	0.0	100.0	64.6
Integrity	387	33.3	100.0	73.0
Accountability	387	33.3	100.0	74.6
Respect for the law	387	0.0	100.0	81.2
Proper use of official information	387	33.3	100.0	84.2
<b>Overall scores on national code of ethics</b>	<b>387</b>	<b>33.3</b>	<b>100.0</b>	<b>70.7</b>
<b>Constructs of financial ethical values</b>				
Integrity	400	26.7	100.0	68.7
Accountability	400	33.3	100.0	68.2
Transparency	400	25.0	100.0	67.9
Conflict of interest	400	16.7	100.0	71.2
Trust	400	0	18	11.5
<b>Overall score on financial ethical values</b>	<b>400</b>	<b>6.9</b>	<b>100.0</b>	<b>66.5</b>

Before correlation was run all variables were checked whether they have normal distribution by computing their normal distribution curve which were then checked visually. All of them were found to have fairly normal distributions. Hence, none of them was transformed. A correlation analysis was done to determine relationships between code of ethics and conduct for public service and financial ethical values. The results indicated positive and significant relationship between employees’ opinions about frequency of the three financial ethical values and the degree to which they viewed such occurrence. The correlation was highest for integrity ( $r = 0.213, p \leq 0.001$ ) and the overall financial ethical values ( $r = 0.210, p \leq 0.001$ ) followed by conflict of interest ( $r = 0.158, p \leq 0.01$ ) and transparency ( $r = 0.111, p \leq 0.05$ ).

**Table 5: Correlation between code of ethics and conduct for public service and financial ethical values**

<b>Variables correlated with code of ethics and conduct for public service</b>	<b>n</b>	<b>Correlation coefficient (r-value)</b>	<b>p-value</b>
Integrity	387	0.213***	0.000
Accountability	387	0.081 <sup>ns</sup>	0.110
Transparency	387	0.111*	0.030
Conflict of interest	387	0.158**	0.002
Trust	387	0.094 <sup>ns</sup>	0.066
<b>Overall financial ethical values</b>	<b>387</b>	<b>0.210***</b>	<b>0.000</b>

The dependent variable was code of ethics and conduct for public service

\*\*\* Correlation is significant at the 0.001 level (2-tailed), \*\* Correlation is significant at the 0.01 level (2-tailed)

\* Correlation is significant at the 0.1 level (2-tailed), **ns** = not significant

The above positive relationships imply that employees with high level of adherence to the code of ethics and conduct for public service have higher level of financial ethical values in terms of integrity, conflict of interest and transparency than employees with low level of adherence to the code of ethics and conduct for public service. Nevertheless, correlation analysis indicated that accountability and trust were not significantly correlated with national code of ethics and conduct for public service ( $p > 0.05$ ). This is perhaps correct because data in Table 3 revealed low percentages of accountability and trust as compared to levels of integrity, conflict of interest and transparency. In a similar way Aiko *et al.*, 2016 cited by Mdee and Thorley (2016) noted that trust in local government authorities in Tanzania declined by 8 percent between 2005/06 and 2014/15. Again, REPOA 2014 cited by Mdee and Thorley (2016) reported bad use of resources in Tanzanian local government authorities to the extent that only 6% of local revenues were used well, something which opposes the theory of consequentialism.

#### 4.0 CONCLUSIONS AND RECOMMENDATIONS

Objective one of this paper was to analyse positions of financial ethical values (integrity, accountability, transparency, conflict of interest and trust) in terms of points scored on them on an index-summated scale. The findings revealed position of financial values in Tanzania local government authorities to be high, although aspects of integrity, transparency and conflict of interests are higher than aspects of accountability and trust. Based on these findings, the role of national code of ethics and conduct in public service to make employees at Tanzanian LGAs accountable and trustworthy is at a low position as compared with integrity, transparency and conflict of interest. Thus, the Prevention and Combating of Corruption Bureau (PCCB) should take immediate actions towards council officers who are not accountable in order to restore declining public trust.

Objective two was to determine correlation between adherence to the national code of ethics and conduct for public service and financial ethical values. The findings revealed strong positive relationship between code of ethics and conduct for public service with three financial values that are integrity, transparency and conflict of interests. However, correlation between code of ethic and conduct for public service and accountability and trust was not significant. Following this, the national code of ethics and conduct for public service alone appear to be imperfect in strengthening financial ethical values of employees working with Tanzanian local government authorities. Consequently, councils are urged to have own additional mechanisms of enforcing adherence with financial ethical values in their respective councils.

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# Head Department's Servant Leadership and Students' Commitment at Private University

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**Abstract-** Head departments at private universities in Indonesia are faced with a major challenge regarding the high expectations of guaranteed satisfying services they have to provide which predicted can cultivate and develop the commitment of the students. Realizing the important of this issue, it is necessary to investigate the effect of head department's servant leadership, as one of the essential factors, on students' commitment. This quantitative study used descriptive and simple regression analysis research design, wherein 212 second semester university students were selected as the respondents of the study through convenience sampling method. A two-part questionnaire, based on the theories of Servant Leadership and Organizational Commitment, was used in gathering data. As an overall, the results revealed that the extent of servant leadership practiced by the head department was 'high' ( $M = 4.09$ ), and the students' commitment (Mean = 4.14) was 'high'. This study proved that head department's servant leadership ( $r = .831, p = .00 < 0.05$ ) significantly affected students' commitment. It means that students' high commitment is caused by head department's major effort in fulfilling students' hope and expectation through his servant leadership. Therefore, it is recommended that head department should practice servant leadership in order to foster the sense of commitment of the students for the benefit of the students themselves, and the institution as well.

**Index Terms-** Servant leadership; Students' Commitment

## I. INTRODUCTION

In the vast demand of the global era, educational institutions worldwide are confronted with the increasing demands of the quality in education, in line with the global changes that accompany the advances in science, technology, and information. At higher education level, a major challenge regarding the high expectations from the stakeholders and the needs of the students for the high quality of education still become the central objective of every educational institution. Administrators of higher education must be aware of the importance of this issues which main emphasis is in meeting the expectations and the needs of the students (DeShields, Kara, & Kayaking, 2005). Private university is demanded to be able to compete with other universities both public and private in terms of providing satisfying service quality, so that the students are willing to involve in all programs provided by the institution, follow the learning process to the end, to graduate on time, to be loyal to the university, have no intention to switch major, drop out, or switch to another university. This is crucial since the reduction number of students will affect the existence of the institution, considering the assumption that in order to be existed private university in Indonesia should have at least 2000 of its registered students (Kuncoro, 2008). This becomes a challenge for educational institutions, especially for private university, to be able to guarantee the satisfying service quality they provide that can cultivate and maintain the commitment of the students at the university.

Scholars proposed various factors in university which can increase or decrease students' commitment. One of those factors is the support from the leader, more specifically from head department, through his leadership behavior (Marks & Printy, 2003). Whether or not head department has served the students to his best still leave a big question. As a matter of fact, complaints raised and disappointments occurred regarding the existence of head department who failed to give the students solutions to their academic problems and had no empathy to their difficulties which triggered the onset of desire or decisions to switch major or to move to another university. Results from several studies revealed the decreasing number of university students who completed their study accordingly. It was found out that 49% of university students who enrolled in the year 2003-2004 completed their study in 2009, which means they need more than 4 years for this accomplishment. Moreover, 15% remained registered and completed their study after more than six years. Unfortunately, the other 36% no longer continuing their education, or had dropped out (Radford, Berkner, Wheelless, & Shepard, 2010). Another important research finding was revealed that out of 2.2 million students in the United States,

25%-30% of them did not return to register at the university for the second year Strom and Savage (2014). The reducing number of the registered students mostly happened in the first or second year of their study which allegedly affected by the low level of their commitment.

Regarding the needs and conditions above, this study was aimed to determine the extent of servant leadership practiced by head department and the level of students' commitment, and also to find out if there is a significant effect of head department's servant leadership to students' commitment. More specifically, this study was attempted to answer the following questions: 1) To what extent is head department practice servant leadership in terms of the following dimensions: altruistic calling, emotional healing, wisdom, persuasive mapping, and organizational stewardship? 2) What is the level of students' commitment?, and 3) Is there a significant influence of head department's servant leadership on students' commitment? This study was conducted to the second year students of three private universities in North Sulawesi, Indonesia. There were 212 students involved in this study. There are many factors that might influence students' commitment to their university. However, this study was focused only on servant leadership practiced by head department which theoretically influences students' commitment.

## II. LITERATURE REVIEW

As one of the primary stakeholders in higher education, students' commitment holds an important role in goal achievement processes. In general, commitment is regarded as a feeling of obligation, or one's emotions towards something or someone else. The theory of Allen and Meyer (2007) about the commitment of the organization proclaimed that the commitment of a person to the organization is the longing, necessity or compulsion and obligation of someone to remain loyal to an institution/organization. Commitment reflects the psychological conditions that bind a person and the organization (Meyer & Herscovitch, 2001). Commitment is a situation where an individual is loyal to the organization, whose goal or desire is to retain his membership in the organization, has a confidence in the values of the organization, try his best in the interest of the organization, and loyal towards his organization (Robbins & Judge, 2007), the same things that experienced by students as part or members of the educational institution. Thus, commitment is not just a physical existence within the organization, but this demanding an active role in giving the thoughts, concerns, ideas, and dedication entirely for the accomplishment of the organization.

The services offered by the university should provide elements which are predicted as ways to build students' commitment. Students' commitment is distinguished as their feeling of engagement to the educational institution in which they are being registered (Tinto, 1993). Student's commitment is a psychological condition that is reflected through the desire, needs, encouragement and obligations felt by the student to remain loyal to the school and to carry out and practice all the regulations with full consciousness and responsible attitude. Students' commitment exhibits to what extent they are attached to their university, feel satisfy and confident for their choice, and psychologically attached to their university (Davis, 2014). Student's commitment is also a collection of feelings and beliefs shared by students against the school organization as a whole, which measured through three components, namely: affective component (feelings of concern), cognitive component (trust), and behavior component (the thoughts of how to behave) (George & Jones, 2005). The commitment of the students illustrates the extent to which a student becomes a part of or tied to the university. Tied means also feel close, want to share up, be connected and dedicated to the school. Furthermore, the commitment of the students at the university is found as a trigger of the persistence behavior has a direct or indirect influence on their decision to stay at a particular university.

Each student conveys the feelings of attachment to the university through various manifestations. The commitment of the students are manifesting in retention rate, awareness, beliefs and the behavior of positive worth of mouth (Tjiptono & Chandra, 2011). The dimensions of the students' commitment was also constructed by Davidson et al. (2009) as the desire of students to sign up back and earn a degree from an educational institution, the beliefs of students in choosing the right college, and perception of the students to continue their study in an attempt to obtain a degree. In addition, the commitment of the students to the university can also be divided into three constructs, namely: goal commitment, institutional commitment, and external commitment that reflects the commitment of the students to their non-academic activities (Tinto, 1993). However, Woosley, Slabaugh and Mason (2005) categorized students' commitment into two things, namely: certainty toward their choice, and their desire to endure. The endurance signifies their persistence, perseverance and commitment. The instrument used for measuring an individual's commitment in the workplace can also be used in the scope of academic setting (Davis, 2014; Lather, et al., 2015). Based on the organization commitment theory of Allen and Meyer, then students' commitment to the university was categorized on three dimensions, such as follows: students' continuance commitment, students' affective commitment, and students' normative commitment. The results of the study proved that measurement of organizational commitment from can be used as the means to measure the commitment of the students to their university as well.

The need or desire of students to remain enrolled in a particular university, which is based on the specific risks that may be incurred if they did not continue their studies at the institution, demonstrated their continuance commitment (Davis, 2014) which may include time, effort or money. Some of the research results obtained that the students who have continuance commitment showed more intensive efforts in attending a lecture, or actively involved in many activities on campus, and being aware of the loss when they are

not able to use their time wisely to study in college (Tessema, Ready & Yu, 2012). Students who possessed continuance commitment are students who diligently active in learning processes and willing to continue their education (Jamelske, 2009) because they realize the loss if they stop their study. Further he added that students with high level of continuance commitment determine to complete his education on time. On the other hand, if the continuance commitment of the student is low, they have the tendency of not attending the regular class activities, ignoring with the importance of skill and knowledge to them, or even planning to drop out from school.

Students' affective commitment can be identified through their positive attitudes toward school that portray their emotional attachment to the school. Research that examined the students' affective commitment discovered a high affinity low levels of retention or transfer of students, whether it is a move to another major that is still within the scope of the same university or transfer to another university, where one of these things was caused by the leadership behaviors experienced by students (Archambault, 2008). Students' high affective commitment was also triggered by the guidance of the head Department who serve the students wholeheartedly during their time of consultation when they are in trouble or in a dilemma (Letcher & Neves, 2009). From the perspective of the students, affective commitment to the university is a reflection of to what extend the fulfillment of their needs and expectations bestowed by the university through the head department leadership behavior so that students feel obligated to complete their education on time. Not only that, students also actively being engaged in a variety of programs provided by the university, not eager to quit or move to another university. Even more, they feel whatever happens in the university it will become their concern and part of it.

Normative commitment is reflected through students' belief that as a part of a certain university they have to follow the rules set by the university. Normative commitment is an obligation felt by a person in an organization that is affected by his personal experiences before and after he becomes a part of the organization (Wiener as cited by Davis, 2014, p. 9). Students' normative commitment emerges as a reaction to their experiences of satisfying service they received from the head department (Schneider & White, 2004). They realize that they have a responsibility to do good things in order to create and maintain the good image of the university (Davis, 2014). Students who demonstrate normative commitment believe that to be remained in the university they have an obligation to be loyal. Loyal attitude is shown by having the awareness that the important role of the university becomes they concern and responsibility, as well as through acting out positive behaviors in maintaining the good image. They voluntarily inform their family and friends about the positive things the university offers. The existence of student participation in delivering the good and correct information in accordance with what they have been through is the signs of carrying out the normative commitment. The loyalty of students to their higher education institution is also a form of their commitment that will be the key to their academic achievement.

Leadership behavior is specific behavior pattern that is displayed in an attempt to influence others in order to achieve the institutional objectives. Various theories emerge with regard to leadership, including the Traits Theories, Behavioral Theories, and Situational Theories (Robbins & Judge, 2014), then coupled with the emergence of a new leadership perspectives i.e. the Leader-member exchange, and Shared Leadership (Kreitner Kinicki, & 2013). A person or a group of people who have the willingness to be led or influenced by the one they called a leader is usually caused by the behavior or leadership style that is displayed by the leader in treating other people. Leadership style is the behavior and strategies, as a result of a combination of philosophy, skills, traits, and attitude, which is often applied by a leader when he tries to influence the performance of his subordinates (Tampubolon, 2001). The style of leadership in implementing the functions as a leader has a huge impact to other people within the organization, and it is very crucial in managing the organization to achieve its goals.

Though various types of leadership have been proposed by scholars and supported by their proponents, according to Robbins and Judge (2014), "They do not explicitly deal with the role of ethics and trust". It means that those leadership behaviors might not explicitly related to the role of the leader in terms of ethics and beliefs, which for some people is very important in order to complete the picture of an effective leader, especially in the scope of the organization that are in the Asian region, where the leaders are expected to be able to put themselves in the situation of their subordinates. The most important principle stated by Greenleaf (2002) that the main responsibility of a leader is the service to the subordinates by putting the interests of subordinate above the leader's own interests. Long before servant leadership being proposed, leadership behavior that describes the behavior of the leaders that put the subordinates as their major concerns of services had been introduced by Ki Hajar Dewantara, Indonesia's Education founder. He recommended that education leaders should apply '*Tut Wuri Handayani*', a philosophy behind servant leadership, which is now known as the National Education theme in Indonesia.

Different explanations were used by scholars in defining servant leadership. One thing in common, however, they yielded the same principle which is value of equality. Servant leadership is characterized as a fundamental calling that displays selfless and self-sacrificing (Barbuto & Wheeler, 2006). Servant leadership exhibits behavior that deeply derived from the desire to do good things to others, moreover, to the followers (Greenleaf, 2002; Kreitner Kinicki, & 2013). Spears (2002) and Robbins and Judge (2014) described servant leadership as leadership style that places its serve as the main task and seeks to encourage other people within the organization. Leaders who implementing servant leadership facilitate the creation of good relationships and constantly develop the atmosphere of mutual respect of one to another, and empower the followers (Sendjaya & Sarros, 2002). These leaders know the importance of building a community and a good team work. They are responsive and lamented over the fate of colleagues or

subordinates. These behaviors exemplify servant leadership style which makes the followers or subordinates think and feel that they become the focus of their leaders' primary attention.

In order to investigate head department leadership behavior that was assumed as an antecedent of students' commitment, several instruments were constructed and developed. First was based on Wong and Page's (2003) study on servant leadership style who categorized it into four dimensions. First dimension is character-orientation which is represented by leader's wisdom. Second dimension is people-orientation which is represented by altruistic calling or leader's concern, and emotional healing or the restoration of emotions. The third dimension is task-orientation which is represented by organizational stewardship or the organizational supervision and persuasive mapping or convinced planning. And the fourth dimension is process-orientation which is represented by leader's service. Slightly differ from Wong and Page's, Barbutto and Wheeler (2006) also developed servant leadership dimensions based on Greenleaf's (2002) theory which was later known as: altruistic calling, emotional healing, wisdom, persuasive mapping, and organizational stewardship. Altruistic calling, emotional healing, and wisdom are head department's leadership behavior that specifies leader's people-orientation. On the other hand, persuasive mapping and organizational stewardship are head department's leadership behavior that stipulates leader's task-orientation.

Altruistic calling is described as a strong desire of the head department in making a positive difference in the lives of the students. When dealing with students, he serves and puts the interests of the students above himself. Even though he is busy with his administrative responsibilities, he will always work hard to meet the needs of the students. He allocates time dedicated to each student in accordance with the predetermined time and gives special attention to students that fosters an atmosphere of high concern on their academic goals (Holmes, 2004). He is a leader who is trying to understand and establish good communication with the students, as well as demonstrate a caring behavior, such as empathy and appreciation to students' achievements (Ford & Ford, 2009). Providing school environment conducive to the development of learning will indirectly make positive changes in the lives of the students.

Emotional healing is portrayed as the ability possessed by head department in enhancing students' self-confidence and restoring the spirit of students from failures, trauma or suffering they experienced. By doing so, head department helps the students to recover from their obstructions or misfortune they have. Head department helps the students in minimizing any conflicts that arise between the hope of academic achievement and the reality they have to face (McClellan, 2007), while at the same time he has to convince them about their potential. He must be able to encourage them to be independent and to have self-esteem so that no one will underestimate them. This is very important since social abuse or bullying from peers sometimes also happens in higher education. In addition, head department might assist the students in dealing with non-academic issues, such as family problems, financial difficulties, or interpersonal relationships with other students (Kuhn, Gordon, & Webber, 2006). In this case, head department acts out his role as a parent to the students unconsciously.

Wisdom is represented as having a strong intuition to recognize the problems that might occur within the department that he leads, and predicting possible consequences that might happen as the results of his decisions. He is able to understand the situation and the implications of that situation (Barbuto & Wheeler, 2006), and using his awareness and concern in creating the good learning environment in order to assist the students to acquire and share knowledge (Crippen, 2005), and he is able to see the possible opportunities that might be used as the solutions in uncertain circumstances that sometimes happen within the department. Head department is consistent in equipping himself about information and understanding on how to maximize the human resources in the department in attempt to provide qualified services to the students and knowledgeable in the implementation of institution's policy and procedures which are essential in assisting and guiding the students to know what should be done to graduate on time (McClellan, 2007), but remain open to inputs as well as complains from the students.

Persuasive mapping is characterized as the skills owned by head department in persuading rather than imposing his own will on students. He is a representative of unselfish person, performing the act of sacrificing personal interest for the benefits of the students. He has the capability in teaching students to be responsible, and in viewing and mapping out the problems encountered during his leadership, and then conceptualizing the planning that has been set before for the possibility of the emergence of the final results for the department. Head department is able to predict what might happen in the future of the department and anticipatively use his intuition to create a strategic plan and to make the vision become a reality (Barbuto & Wheeler, 2006). Head department involves the students in the process of decision making and inspires them in making it happen through some actions. He uses his academic background and professional interest of students to create plans for student academic progress and achievement (McClellan, 2007). By doing so, students are inspired and motivated to do their best not only for themselves, but for the benefit of the department as well.

Organizational stewardship is illustrated as the extent to which the head department is able to prepare and involve the students in giving a positive contribution to the community through the outreach program. Head department becomes a role model in transferring his knowledge for community development (Paul, 2015). He has a sense of high social responsibility, regularly providing access to the students to participate in community development program held by the department as an opportunity for professional development in the future, in order to improve the overall growth and teach them to appreciate the importance of the development of the community. Head department unrelenting drives the students to participate in various activities both within and outside the campus

that can develop their overall academic experience (Paul, 2015). Head department also plays a role in representing the academic and non-academic programs by involving the competent sources both from within and outside the campus, which is done regularly and its benefit can be felt by all students and the community.

### III. RESEARCH METHOD

This quantitative study utilized the descriptive and simple regression analysis research design. Descriptive design was used to describe the extent or the level of each variable under study. In order to find out whether a significant effect exists between independent variables and dependent variable, simple regression analysis research design was used (Fraenkel & Wallen, 2003). This design determined the effect of independent variable, which was head department servant leadership, to students' commitment as the dependent variable of the study. The population of this study were students from three private universities in North Sulawesi, Indonesia. The respondents were freshmen, registered at the second semester, collegiate year of 2016-2017. Through convenience sampling method, questionnaires were collected from 225 students who were present at the time when the instrument was administered. From all 225 distributed questionnaires, 220 were returned and 212 were usable for analysis.

This study employed survey questionnaire. Two-part questionnaire was used to collect data needed in this study. The first part was a questionnaire based on Wheelar and Barbuto's (2006) theory of Servant Leadership which consisted of five dimensions named altruistic calling, emotional healing, wisdom, persuasive mapping, and organizational stewardship. The second part was based on Allen and Meyer's (2007) theory of students' commitment which categorized as continuance commitment, affective commitment, and normative commitment. A pilot study was conducted in order to gain the validity and reliability of this instrument. The result of the reliability test using the Cronbach ALPHA scale was .81, which was greater than the accepted coefficient, wherein  $\alpha = .70$  (Fraenkel & Wallen, 2003). The respondents were asked to rate each statement using a five-point Likert scale as follows: 5 (Very agree); 4 (Agree); 3 (Neutral); 2 (Disagree); 1 (Very disagree). The respondents' responses were scaled and the overall mean score was interpreted using the following criteria: 4.50 – 5.00 Very High, 3.50 – 4.49 High, 2.50 – 3.49 Moderate, 1.50 – 2.49 Low, and 0.50 – 1.49 Very Low. The level of significant influence was interpreted at .05. The respondents were given ample time at their own convenience in completing the questionnaire.

The data was encoded and analysed by using the Statistical Package for Social Sciences (SPSS) version 23 to obtain the information essential for data analysis and interpretation. Different statistical treatments were used to analyse the data: 1) To answer research questions 1 and 2 on the level of head department's servant leadership and university students' commitment, the researcher used descriptive statistical analysis through the frequency, mean and standard deviation, 2) To analyse research question 3 in determining the effect of independent variable to dependent variable under study, the mean, standard deviation, and simple regression were used.

### IV. FINDINGS AND DISCUSSIONS

#### *A. The level of Servant Leadership of Head Department in Terms of: Altruistic Calling, Emotional Healing, Wisdom, Persuasive Mapping, and Organizational Stewardship*

Table 1 shows the mean scores of each dimension of Servant Leadership practiced by the head department. Results indicated that the head department demonstrated high level of altruistic calling (M=4.11), emotional healing (M=4.16), wisdom (M=4.10), persuasive mapping (M=4.07), and organizational stewardship (M=4.02). All dimensions of head department leadership showed 'high' level of servant leadership. As an overall, Table 1 also shows the 'high' level (M = 4.09) of servant leadership performed by head department as perceived by the students.

Table 1: Mean score of head department servant leadership

	N	Minimum	Maximum	Mean	Std. Deviation
Altruistic Calling	212	2	5	4.11	.442
Emotional Healing	212	3	5	4.16	.440
Wisdom	212	3	5	4.10	.406
Persuasive Mapping	212	3	5	4.07	.422
Organizational Stewardship	212	3	5	4.02	.424
Overall Mean	212	3	5	4.09	.392
Valid N (listwise)	212				

The highest mean score on emotional healing indicated that in implementing servant leadership style head departments showed their willingness to listen to students with empathy and owned a heart to serve others. They really cared about the students and students felt welcome when they had to talk with the head department in sharing their problems or difficulties. They have also the enthusiasm to make personal sacrifices in their attempt to minister the students that is based on a strong sense of mission.

*B. The Level of Students' Commitment in Terms of Their Continuance Commitment, Affective Commitment, and Normative Commitment*

As delineated in Table 2, the mean score of students' commitment in terms of their continuance commitment, affective commitment, and normative commitment were calculated as having different high level of commitment. Affective commitment received the highest mean score (M=4.17), while the other two constructs of students' commitment, continuance (M=4.12) and normative commitment (M=4.10), received lower mean score, respectively. In addition, Table 2 also shows that as an overall students' commitment to their university was 'high' (M = 4.14). These results meant that students possessed high degree of commitments as a result of being engaged to the school and social environment. Students felt that they are a vital part of the university. Committed students admitted that they exercised 'go extra miles', and accomplished their school tasks with a degree of enthusiasm.

Table 2: The mean score of students' continuance commitment, affective commitment, and normative commitment

	N	Minimum	Maximum	Mean	Std. Deviation
Continuance Commitment	212	3	5	4.12	.434
Affective Commitment	212	3	5	4.17	.410
Normative Commitment	212	2	5	4.10	.538
Overall	212	3	5	4.14	.419
Valid N (listwise)	212				

*C. The Effect of Head Department Servant Leadership on Students' Commitment*

Table 3 shows the significant effect of head department servant leadership on students' commitment.

Table 3. The effect of head department servant leadership to students' commitment

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.831 <sup>a</sup>	.691	.690	10.499

a. Predictors: (Constant), Head Department's Servant Leadership overall

Model	Coefficients <sup>a</sup>		t	Sig.
	Unstandardized Coefficients	Standardized Coefficients		
	B	Beta		
(Constant)	22.579		2.980	.003
Head Department' Servant Leadership overall	.645	.831	21.682	.000

a. Dependent Variable: Students' commitment overall

As hypothesized, the study revealed that head department's servant leadership has a significant effect on students' commitment ( $r = .831, p = 0.00 < 0.05$ ). Therefore, on the basis of the results the null hypothesis which claims that there is no significant effect of head department servant leadership on students' commitment is rejected. The effect was in a positive direction, indicating that head department who possessed and practiced wisdom, altruistic calling, empathy, persuasive mapping, and organizational stewardship through his services influenced students' decision whether to stay or to leave. The strength of the influence was .831 which means that head department's servant leadership gave 83% contribution to student's commitment, while the other 17% was influenced by another variables that were not investigated in this study. The findings of this study indicated that the students perceived their head of department level of servant leadership was high. This finding is in line with some studies that revealed servant leadership is manifested through characteristics of leader who places the students' needs above his own needs (McClellan, 2007), provides an open and caring school atmosphere conducive to their learning that enables them to grow and develop their knowledge and skills, similar to the leadership behavior that was applied by head departments in private universities in North Sulawesi, Indonesia. This finding also implies that head departments have the willingness to allocate appropriate time for each student's appointment and give the students their attention to foster a caring environment. He also shows his enthusiasm in helping the students to recover from the trauma or difficulties they faced by providing assistance to provide emotional healings, and show his empathy and sympathy on student's misfortune. Moreover, head department is aware of the school environment and tries to search whatever campus sources have which can be used to educate the community through community service programs and enable the students to have the access to involve in that programs (Paul et al., 2012). Factors that seem worthless, nevertheless, provide significant effects on students' commitment to the university.

Maintaining a strong commitment to the organization is important to the organization itself since the loss of commitment will result in failure; the same thing also applied to any success of a university (McNally & Irving, 2010). The factor that influences the problems mentioned above is allegedly due to the lack of supports and services from institutions which meet the expectations of the students either through leadership style of the leaders in the respective study program, or other services which do not meet the expectations of the student that yield unsatisfactory and have an impact such as the low level of student commitment. That commitment occurs through active participation of students in lectures, social activities on campus, and through interaction with various parties in the campus environment. Thus, the commitment of the students as members of school organization is closely related to their feelings and trust to their university. Indicating the factors that may affect or alter the institutional commitment of the students will give an understanding of the various interventions that can enhance their commitment. Therefore, leadership that practice unselfishness should be applied by the head departments that aims to develop and maintain student commitment.

## V. CONCLUSION

Based on the results of the study, it can be concluded that:

- As an overall, head departments of private universities in North Sulawesi in Indonesia exhibited high level of servant leadership as perceived by the students. This means that in leading and guiding the students, head departments put into practice the elements which represent the calling to serve others, the healing towards one's emotional problems, the wisdom, the influential actions through persuasive mapping, and the capability of embracing others in actuating organizational stewardship.
- Students who were registered at three different private universities in North Sulawesi in Indonesia have high level of commitment to their university. This means that students in these three private universities have committed to complete their study on time, had no intention to move or transfer to another university, and designated to be loyal to the university.
- There was a significant effect on students' commitment which was caused by the head department's servant leadership. This means that head department implemented servant leadership in dealing with the students. Students felt more likely to be committed to the university because they experienced the help and support from the head department.
- The results of this study are consistent with the theory that proclaims subordinates will be committed to an organization when they are led by the leader who provides consideration, useful influence, and professional support in a nonthreatening manner.

## VI. SUGGESTIONS

In maintaining and developing students' commitment to the university it is suggested that:

Head Departments in private universities in North Sulawesi, Indonesia need to implement servant leadership in order to foster students' commitment to the university. Private university, as forefront of delivering academic services in higher education, should promote its teacher who has the quality of a servant leader to be the head department. University students might preserve greater commitment if head department demonstrate such behavior.

University Students should build up their commitment to the university by being engaged actively on the learning processes and to the various programs facilitated by the university, and to optimize the access or other services which have been provided that might prevent them from the tendency of having low commitment to the university.

The findings of this study in general contribute to the leadership literature by determining the extent to which servant leadership style of private university head departments influenced students' commitment to their university. However, further research is needed that includes more variables related to students' commitment and servant leadership.

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# Application of a $^{15}\text{N}$ tracer method to study the complementarity of bacteria versus yeast in nitrogen assimilation by *Artemia nauplii*

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**Abstract:** Using the  $^{15}\text{N}$  stable isotope technique, nitrogen (N) assimilation of *Artemia* was determined in feeding regimes where the two yeast strains wild-type (WT) and its mutant *mnn9* were gradually replaced by HT3 or HT6, or where the bacterial strains were gradually replaced by each yeast strain. A trypsin assay was performed on *Artemia* fed the various replacement feeding regimes, in order to detect the effect of the presence of bacteria or of the yeasts on the protein digestive response in *Artemia*. HT6 fed *Artemia* showed a higher N assimilation than when using HT3, suggesting a better food value of HT6 for *Artemia*. The assimilation of nitrogen from bacteria was related to the presence of yeast strains. In the HT3 fed *Artemia* group, the presence of WT yeast showed higher N assimilation from HT3 than the presence of *mnn9*, suggesting an enhanced utilization of poor quality HT3 in the presence of WT yeast. When using the higher quality HT6 on the other hand, *mnn9* acted in a very similar manner. This is the first observation where *mnn9* improves the N assimilation from any bacteria. When N assimilation from yeast strains was tested in the presence of bacteria, both bacterial strains HT6 and HT3 showed a clear enhancement in utilization of N from *mnn9*, probably by providing exogenous enzymes, highlighting the additional importance of these strains of bacteria for *Artemia* in utilizing yeast. A significant reduction ( $p < 0.05$ ) of trypsin activity was observed in *Artemia* fed HT3 alone, as compared to all other feeding treatments, confirming the lower suitability of the HT3 isolate for sole feeding of *Artemia*. We conclude that HT6, being a better N source for *Artemia*, also favors the utilization of N derived from yeast in the food.

**Index term:** *Artemia*,  $^{15}\text{N}$ , bacteria, yeast, assimilation

## I. INTRODUCTION

Annually, 2500-3000 tonnes of dry *Artemia* cysts, mainly harvested in inland salt lakes such as Great Salt Lake, Utah, USA, are used for aquaculture hatcheries worldwide (FAO, 2011). *Artemia* cysts are stored easily over long periods and are obtained within 24 h by incubating cysts in seawater. *Artemia* are the best sources of live food cultured fish and shellfish species (Sorgeloos *et al.*, 2001). Due to these convenient characteristics, the demand cysts for aquaculture hatcheries has continuously increased over the past few decades. However, the production of *Artemia* cysts from inland salt lakes is not constant and the demand of this product for hatcheries sometimes exceeds the supply. Trying to meet the demand, the technique of *Artemia* culture in salt ponds has been introduced throughout the world such as in Thailand (Vos and Tunsutapanich, 1979) the Philippines in 1977 (De Los Santos *et al.*, 1980), Vietnam in the 1980's (Sivagnanam *et al.*, 2011), and Pakistan in 2007 (Sultana *et al.*, 2011). In typical pond culture, *Artemia* are fed with microalgae, chicken manure and rice bran thanks to their no-selective filter feeding characteristics (Sorgeloos *et al.*, 2001), and bacteria in the water are also play a role in *Artemia* nutrition. In indoor culture, bacteria grow in culture medium have proven as food for *Artemia* (Toi *et al.*, 2013). In addition, bacteria are also believed as the enzyme source to break down large particles and make them easy to absorb by *Artemia* (Intriago and Jones, 1993). However, these study did not prove how bacteria can improve the nutrient assimilation in *Artemia*, and it also extremely difficult to evaluate the contribution of bacteria nutrient to *Artemia* among variety food sources in the pond condition culture.

The present study was therefore conducted to elucidate the contribution of two known bacterial isolates from a laboratory *Artemia* culture to nitrogen assimilation in *Artemia* when they were used in a controlled laboratory culture system alongside two strains of

baker’s yeast *Saccharomyces cerevisiae* (wild type and mnn9), assumed to have different digestibility by *Artemia*, resulting in different *Artemia* growth. The latter strain has reduced mannose and increased glucan content in the cell wall as compared to the wild type strain. Coutteau *et al.* (1990) detected  $\beta$ -glucanase activity in the *Artemia* gut, but no mannase activity. In addition, trypsin activity was measured to evaluate the digestive response in *Artemia* (Rojas-García *et al.*, 2009) when bacteria and yeast were offered together as food. The  $^{15}\text{N}$  tracer method was used as a tool to detect the exact nitrogen source of the protein assimilated.

## II. MATERIALS AND METHODS

### Experimental design

Two experiments were performed under gnotobiotic culture conditions; the first to determine the effect of the presence of yeasts on nitrogen derived from bacteria in *Artemia* nauplii, and the second to determine the effect of the presence of bacteria on nitrogen derived from yeasts.

Hatched bacteria-free *Artemia* nauplii (second instar) were manipulated under the laminar flow hood for the experimental set-up. The nauplii were first harvested on a sterile sieve and washed thoroughly with FAASW to get rid of hatching waste products. *Artemia* nauplii were then diluted by FAASW in a sterile 500 mL beaker. Sub-samples of *Artemia* were collected (n = 4) to determine their density in 1 mL. Afterwards, the *Artemia* nauplii were distributed in 1 L sterile screw-cap bottles containing 1 L of FAASW at a stocking density of 20 nauplii/mL, and 9.1 mg (dry matter intake) of food was offered to each bottle, based on the feeding regime for *Artemia* as described by Coutteau *et al.* (1990). The proportion of each food in the mixed diets was prepared according to Table 1.

In experiment 1, *Artemia* were fed mixed diets containing the  $^{15}\text{N}$  labeled bacterial strain HT3 together with unlabeled WT or mnn9 yeast. In another set of treatments *Artemia* were fed mixed diets containing the  $^{15}\text{N}$  labeled bacterial strain HT6 and unlabeled yeast WT or mnn9. In experiment 2, labeled WT and mnn9 yeast were fed to *Artemia* together with the unlabeled bacterial strains HT3 or HT6. In both experiments, yeasts and bacteria were offered to *Artemia* in different proportions (90/10, 50/50 and 10/90), and two treatments with the pure diet (100% yeasts or 100% bacteria) were used as controls. After feeding manipulation, the culture bottles were tightly closed by special screw caps supplied with an air inlet and outlet. Three replications for each treatment and for the control were run under gnotobiotic conditions for 24 h.

Table 1: Feeding regime for *Artemia* nauplii during 24 h (adapted from Coutteau *et al.* 1990) expressing different portions (%) of each food type (bacteria versus yeast). based on dry matter. Experiment 1: *Artemia* fed mixed diets consisting of unlabeled yeast (WT or mnn9) and  $^{15}\text{N}$  labeled bacteria ( $^{15}\text{N}$  HT3 or  $^{15}\text{N}$  HT6). Experiment 2: *Artemia* fed mixed diets consisting of  $^{15}\text{N}$  labeled yeast ( $^{15}\text{N}$  WT or  $^{15}\text{N}$  mnn9) and unlabeled bacteria (HT3 or HT6)

Treatment code	$^{15}\text{N}$ yeasts	Bacteria	$^{15}\text{N}$ bacteria	Yeasts
<b>Experiment 1</b>				
E1-FR1 (control 1)	0	0	100	0
E1-FR2	0	0	90	10
E1-FR3	0	0	50	50
E1-FR4	0	0	10	90
E1-FR5 (control 2)*	0	0	0	100
<b>Experiment 2</b>				
E2-FR1 (control 1)	100	0	0	0
E2-FR2	90	10	0	0
E2-FR3	50	50	0	0
E2-FR4	10	90	0	0
E2-FR5 (control 2)*	0	100	0	0

\*:  $^{15}\text{N}$  natural abundance of *Artemia* fed solely unlabeled yeasts (Experiment 1) or unlabeled bacteria (Experiment 2) was used as a background to calculate the excess of  $^{15}\text{N}$  and N assimilation in *Artemia*.

### Preparation of *Artemia* nauplii

For preparation of bacteria-free nauplii, cysts of *Artemia franciscana* Kellogg 1906 (EG<sup>®</sup> Type, INVE Aquaculture, Belgium) were decapsulated according to the protocol as described by Sorgeloos *et al.* (1977) and Marques *et al.* (2006a). Briefly, the dry cysts were first soaked in tap water for 1 h and then transferred to a laminar flow hood for decapsulation. The *Artemia* cyst shell was removed by reaction with sodium hypochlorite (NaOCl). Decapsulated cysts were harvested on a sterile sieve, and washed with FAASW as much as possible to remove all residual bleach. Decapsulated cysts were transferred into 1 L sterile bottles containing 1 L FAASW (Marques *et al.*, 2006a) for hatching at 28 °C for 24 – 30 h under standardized hatching conditions (Sorgeloos *et al.*, 1986).

### Diet preparation

#### Culturing, labeling and harvesting of yeast

Two baker's yeast strains i.e. wild-type (WT) and its mutant mnn9, originated from the European *Saccharomyces cerevisiae* archive for functional analysis EUROSCARF, University of Frankfurt, Germany, were used in the study. WT was used for its low digestibility and the strain mnn9 for its improved digestibility by *Artemia* (Marques *et al.*, 2004b).

Before mass culturing, yeast was streaked on a Yeast Extract Peptone Dextrose (YEPD) agar plate (n = 2) containing 10 g/L yeast extract (Sigma), 10 g/L peptone (Sigma), 20 g/L dextrose (Sigma), and 20 g/L agar. The medium was prepared in FAASW. Visible colonies appeared after three days incubation in the dark at 28 °C. A single colony forming unit (CFU) of each yeast strain was picked up from the agar plate by a sterile loop and transferred into 500 mL sterile Erlenmeyer flasks for inoculation. Each inoculated Erlenmeyer contained 300 mL of 0.2 µm filter-sterilized yeast nitrogen base medium (YNB, without ammonium sulfate and amino acids), and was supplemented with 5.0 g/L ammonium sulfate, 5.0 g/L D-glucose, 0.02 g/L L-histidine, 0.04 g/L L-methionine, and 0.04 g/L LD-tryptophan in FAASW. For  $^{15}\text{N}$  yeast enrichment, each strain of yeast was grown on sterile YNB without ammonium sulfate and amino acid medium, supplemented with 4.99 g/L ammonium sulfate (Sigma) and 0.01 g/L  $^{15}\text{N}$   $\text{NH}_4\text{Cl}$  (Sigma) and the concentration of each amino acid was similar to that of the unlabeled yeast cultures.

After inoculation, the inoculated flasks were carefully closed by sterile cotton caps and incubated in a shaker (28 °C; 120 rpm). Yeast cultures were harvested in the exponential growth phase, detected by optical density (Marques *et al.*, 2004a). Yeast cultures from the Erlenmeyer were first transferred to 50 mL sterile screw-cap plastic falcon tubes, and the yeast cell pellet was obtained by centrifuging ( $\pm 2,000 \times g$ ; 5 min). The pellet was washed twice in FAASW (Marques *et al.*, 2006a; Soltanian *et al.*, 2007) and then resuspended in FAASW. The yeast solution was stored at 4 °C for subsequent use. Its concentration was determined based on cell counts using a Burker haemocytometer chamber. All the manipulations related to yeast harvesting were performed under a laminar flow hood to maintain sterility. After a 24–36 h growth period, the  $^{15}\text{N}$  signature increased from 0.3709% to 1.8832% and from 0.3707% to 1.3796% for WT and mnn9 yeast, respectively.

#### Culturing, labeling and harvesting of bacteria

For mass culturing, each strain of bacteria, stored at – 80 °C was streaked on MA (BD Difco<sup>™</sup>) plates (n = 2). Visible colonies appeared after two days of incubation at 28 °C. A single colony from each bacterial strain was picked by a sterile loop and transferred to a sterile Erlenmeyer containing autoclaved modified marine broth (M-MB). Briefly, M-MB was prepared using 0.1 g/L  $\text{NaNO}_3$ , 2.0 g/L yeast extract, 0.1 g/L Fe(III) citrate, 19.45 g/L NaCl, 5.9 g/L  $\text{MgCl}_2$  (anhydrous), 3.24 g/L  $\text{NaSO}_4$ , 1.8 g/L  $\text{CaCl}_2$ , 0.55 g KCl, 0.16 g/L  $\text{Na}_2\text{CO}_3$ , 0.08 g/L KBr, 0.034 g/L  $\text{SrCl}_2$ , 0.022 g/L  $\text{H}_3\text{BO}_3$ , 0.004 g/L Na-silicate, 0.0024 g/L NaF, 0.0016 g/L  $\text{NH}_4\text{NO}_3$ , 0.008 g/L  $\text{Na}_2\text{PO}_4$ , with a final pH of 7.6. For labeling the bacteria, the M-MB ingredients were identical but

0.01 g/L NaNO<sub>3</sub> was replaced by <sup>15</sup>N NaNO<sub>3</sub> (Sigma). After inoculation, the inoculated flasks were carefully closed by sterile cotton caps and incubated in a shaker (28 °C; 150 rpm) for 24–48 h. The labeling technique resulted in an increase of <sup>15</sup>N signature in bacterial cells from 0.3677% to 8.7586% and from 0.3670% to 9.1965% for HT6 and HT3 bacteria, respectively.

When visible growth appeared, the bacterial suspension in the incubated flasks was transferred to sterile 50 mL screw-cap falcon tubes under laminar flow hood conditions. The cells were harvested at the stationary growth phase by centrifugation ( $\pm 4,400 \times g$ ; 15 min). Bacterial cell pellets were washed twice in FAASW. The bacterial cell pellets were then re-suspended in FAASW and the density of bacteria was determined by measuring its turbidity using a spectrophotometer set at 550 nm, assuming that an optical density of 1 corresponds to  $1.2 \times 10^9$  cells/mL, according to the McFarland standard (BioMerieux, Marcy L'Etoile, France).

### Dry weight determination of yeast and bacteria

Dry weight (DW) of yeast and bacteria was determined according to the methodology described by Soltanian *et al.* (2007). Briefly, 50 mL of culture suspension of each yeast and bacteria strain was filtered through a pre-weighed 0.45  $\mu$ m Whatman membrane using a Buchner funnel connected to a vacuum pump. The filter was then washed with ammonium formate solution (0.5 M) to remove the salt, placed into an aluminum pre-tared cup and dried in an oven at  $104 \pm 1$  °C for 4 h. The samples were then removed from the oven, placed in a desiccator for cooling down, and weighed with an analytical balance (0.0001 g accuracy)

### Sample collection and data analysis

#### Nitrogen accumulation in *Artemia*

To prevent interference of undigested <sup>15</sup>N labeled food in the digestive tract of *Artemia* with the results of <sup>15</sup>N accumulation in *Artemia* tissue, the undigested food was biologically evacuated from the gut before <sup>15</sup>N analysis. This was done by placing the *Artemia* in a 1 L beaker containing 500 mL of FAASW and cellulose particles (20  $\mu$ m; Sigma). The cellulose powder had been diluted in FAASW and sieved through a 50  $\mu$ m net to prevent particle clumping. Cellulose was provided to the beakers with *Artemia* at a concentration three times higher than the feeding ration. Aeration was provided continuously to ensure homogeneous distribution of the cellulose in the water. *Artemia* was regularly checked under a binocular microscope for observation of the ingestion status. *Artemia* were harvested when the digestive tract was completely filled with cellulose.

After the evacuation step, *Artemia* were harvested on a sieve and rinsed with FAASW to remove all uneaten cellulose and wastes. After washing, *Artemia* was first soaked in a benzocaine solution (Sigma, 0.1%) for 10 s and then transferred to a benzalkonium chloride solution (Sigma, 0.1%) for 10 s to kill all the attached bacteria on the exoskeleton (Chládková *et al.*, 2004). Afterwards, *Artemia* was washed as much as possible with de-ionized water (DEMI-water). *Artemia* were then quickly stored in a freezer ( $-20$  °C) to prevent leaking of <sup>15</sup>N caused by the metabolism.

After thawing, *Artemia* were placed into a Petri dish with DEMI-water, and 200 to 600 *Artemia* nauplii from each replicate were sampled by a Pasteur pipette and rinsed on a metal mesh sieve (250  $\mu$ m pore size). *Artemia* were then gently transferred using a small forceps onto a pre-weighed tin capsule cup of 8 x 5 mm. The wet samples were oven-dried at 70 °C for a day (De Troch *et al.*, 2007), placed in the desiccator for cooling and weighed with an analytical balance (precision 0.1 mg). Subsequently, the <sup>15</sup>N assimilation in *Artemia* was measured by using an elemental analyzer (ANCA-SL, PDZ Europa, UK) coupled to an *isotope-ratio mass spectrometer* (IRMS) (20-20, SerCon, UK) at the Department of Applied Analytical and Physical Chemistry, Ghent University, Belgium.

The amount of nitrogen assimilation from food in *Artemia* (ng N/individual) was calculated with the equation described by Burford *et al.* (2004).

$$N \text{ (ng/individual)} = (e \times n) / (f \times \text{no. } Artemia)$$

where e:  $^{15}\text{N}$ -ratio (atom % excess) in *Artemia*, n: total amount of nitrogen content in *Artemia* (ng), f:  $^{15}\text{N}$ -ratio (atom % excess) in the food, no. *Artemia*: number of *Artemia*.

### Trypsin assay

To prepare crude enzyme extracts, *Artemia* samples (35 mg) from all treatments in experiment 2 were ground with a plastic pestle (25 s) in an eppendorf tube containing 1 mL of cold homogenizing mixture (1:1) of 0.85% NaCl-2.5 mM ethylenediaminetetraacetic acid (EDTA) and Triton-X 1%-10 mM  $\text{CaCl}_2$  (Rojas-García *et al.*, 2009). After 24 h in darkness at 4 °C to allow enzyme extraction, the homogenates were centrifuged at 12,000 x g for 30 min at 4 °C. The supernatant was used as crude enzyme extract. Trypsin-L activity was measured using N-alpha-benzoyl-DL-arginine-p-nitroanilide (BAPNA) (Tseng *et al.*, 1982) as the substrate in 50 mM Tris-HCl and 10 mM  $\text{CaCl}_2$  buffer, pH 7.1. The measurement and calculation of trypsin activity was done by the methodology as described by Rojas-García *et al.* (2009). Briefly, the p-nitroanilide (pNA) formation by enzymatic BAPNA breakdown was recorded spectrophotometrically after 24 h.  $\text{DO}_{410}$  increment ( $\Delta$ ) was calculated as the difference of  $\text{DO}_{410}$  at 24 h ( $\text{DO}_f$ ) and at time 0 h ( $\text{DO}_i$ ). Background  $\text{DO}_{410}$  (increment) due to non-enzymatic pNA production was assayed in tubes without crude enzyme extract using buffer and BAPNA.

$$\Delta_{\text{sample or background}} = \text{DO}_f - \text{DO}_i$$

The  $\text{DO}_{410}$  increments due to positive trypsin-L were calculated by subtraction as follows:

$$\text{Trypsin-L } (\Delta\text{DO}_{410}) = \Delta_{\text{sample}} - \Delta_{\text{background}}$$

### Method used to verify axenity

Axenity of food, *Artemia* nauplii and *Artemia* culture medium was checked by the methodology as described by Marques *et al.* (2004a; 2004b). Briefly, food, *Artemia*, hatching and culture water were checked for contamination by plating on MA plates (n = 2). The plates were checked for absence of bacteria after incubation at 28 °C for 5 days. The experiment was discarded whenever the *Artemia* nauplii, water or food were found to be contaminated.

### Statistical analysis

The data of nitrogen assimilation or enzyme digestive response from yeasts, bacteria and mixed yeast-bacteria diets in *Artemia* were first checked for homogeneity of variance and normality of distribution by the Levene's *F* test and P-P plot, respectively. As all data failed to meet these assumptions, the datasets were logarithmically and square root transformed. Statistical analysis was performed using Statistica 7.0 for Windows. All datasets were analyzed using one-way analysis of variance (ANOVA) followed by Tukey's honestly significant difference (HSD) at 0.05 level of probability.

## III. RESULTS

### Nitrogen assimilated by *Artemia* from bacterial strains HT3 and HT6

Assimilation of N from HT3 (Fig. 1) was gradually reduced when the proportion of bacteria in the mixed diets with yeast (either WT or mnn9) was reduced. However, there appeared to be differences in this trend between the different strains of yeast. When replacement of HT3 bacteria by mnn9 and WT was done, there was always more N assimilation in *Artemia* from HT3 when co-fed with WT than with mnn9. Replacement of HT3 up to 50% by yeast did not significantly change N assimilation compared to the control 1 ( $p > 0.05$ ), except in case of 50% replacement with mnn9 (Fig. 1). Similarly, N assimilation derived from HT6 bacteria was gradually reduced when the proportion of this bacterial strain in the mixed diets with either type of yeast was reduced, but co-fed with HT6 there was no consistent difference between the two types of yeast (Fig. 1). A significant reduction ( $p < 0.05$ ) of assimilation was already evident at 10% replacement with WT compared to the control. When the controls of the two bacterial strains HT3 and HT6 are compared, the latter allowed for more N assimilation in *Artemia* than the former.

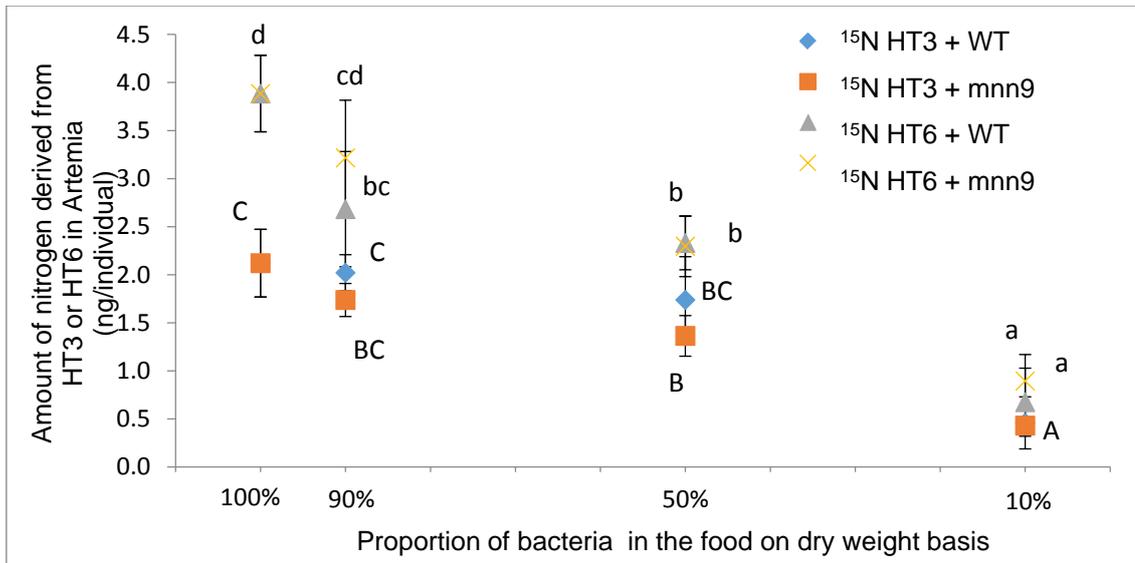


Figure 1: Effect of the presence of yeast on nitrogen assimilation from bacteria (ng/individual) in *Artemia*. The values are mean  $\pm$  standard deviation (n = 3). Different letter superscripts of HT3 treatments and HT6 treatments indicate significant difference ( $p < 0.05$ ) between the treatments. For the proportion of bacteria in the mixed diets, see Table 1.

**Nitrogen assimilated by *Artemia* from yeast strains WT and mnn9**

Nitrogen assimilation in *Artemia* from yeast strains WT and mnn9 (Fig. 2) was gradually reduced when the proportion of yeasts in the mixed diet with bacteria (either HT3 or HT6) was reduced. In wild type yeast (WT), a steady decline of N assimilation was evident when the proportion of WT in mixed diets was gradually replaced by bacteria. Except for 10% replacement of WT by HT6, N assimilation from WT in *Artemia* fed mixed diets was always significantly lower than the control ( $p < 0.05$ ). For mnn9, in contrast, significantly lower N assimilation than the control was only obtained at replacement levels as high as 50% in case of HT3 and 90% in case of HT6. The combination with HT6 always produced higher N assimilation from both yeast types than the one with HT3. All treatments with the WT strain, including the control, resulted in much lower yeast-derived N assimilation than those with mnn9.

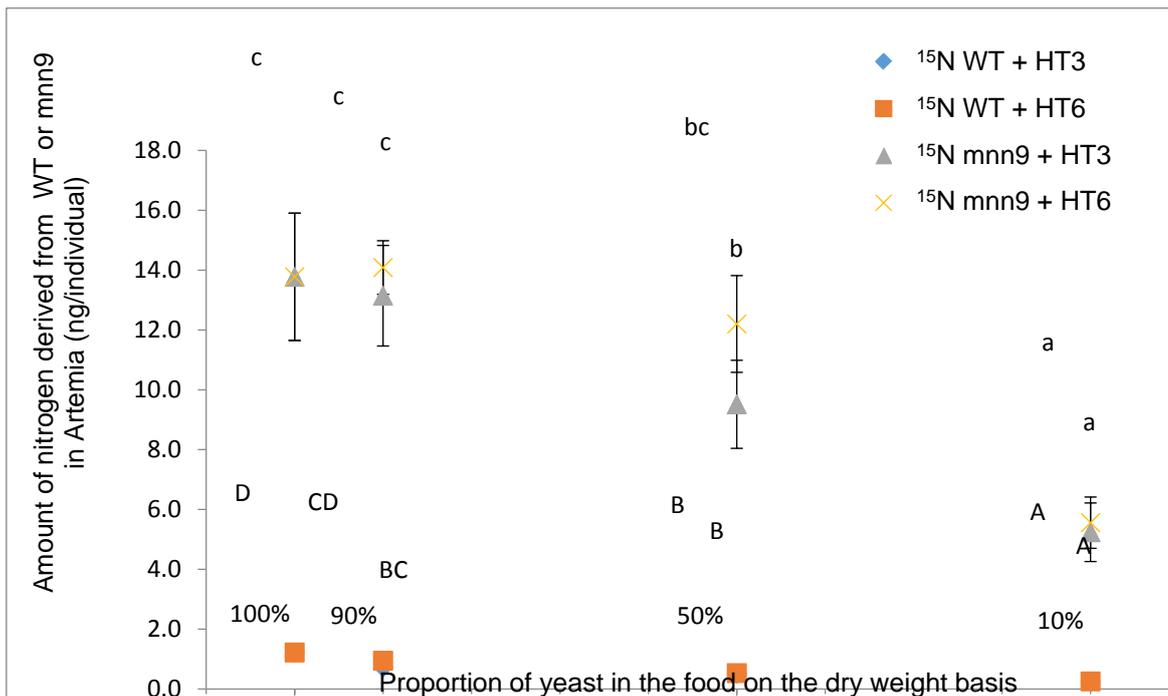


Figure 2: The effects of presence of bacteria on nitrogen assimilation from yeasts (ng/individual) in *Artemia*. The values are mean  $\pm$  standard deviation (n = 3). Different letter superscripts of WT treatments and mnn9 treatments indicate significant difference of  $p < 0.05$  between the treatments. For the proportion of yeast in the mixed diets, see Table 1.

**Trypsin activity of *Artemia* fed mixed diets of yeasts and bacteria**

No significant differences in trypsin-L activity were found among the treatments when replacing any of the two yeasts strains by either HT3 or HT6 bacteria (Fig. 3 A and 3 B, respectively), or when comparing the treatments with 100% yeast or 100% HT6 fed *Artemia*. In contrast, a significantly ( $p < 0.05$ ) lower trypsin-L activity was found in the 100% HT3 control compared to all mixed diets and to other controls.

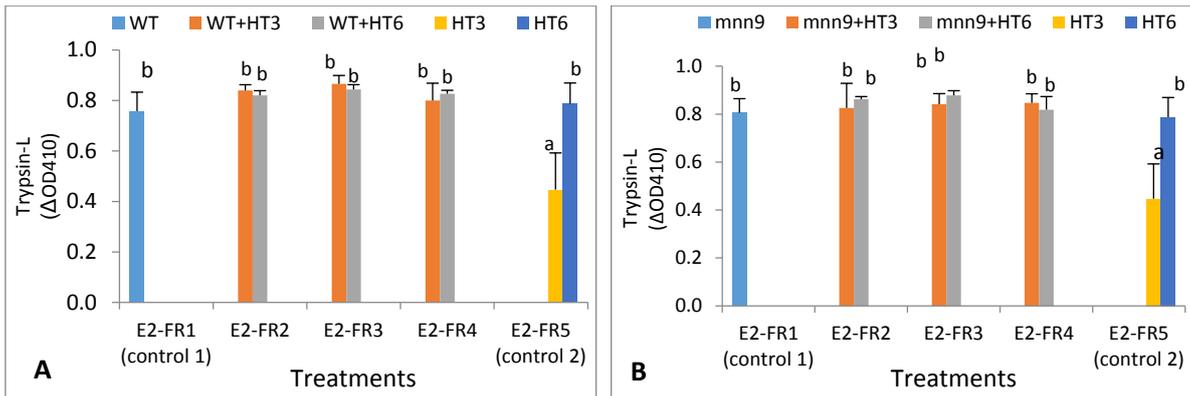


Figure 3: Effect of pure WT yeast and mixed WT yeast-bacteria diets (A) and of pure mnn9 yeast and mixed mnn9-bacteria diets (B) on trypsin-L activity in *Artemia* nauplii. Values are mean  $\pm$  standard deviation (n = 3). Different letter superscripts within each figure indicate statistical significant difference of  $p < 0.05$  between the treatments. For abbreviation of the treatments, see Table 1. For better comparison, control 2 (100% HT3 or HT 6) is shown on each graph.

IV. DISCUSSION

In previous study, bacterial isolates HT3 and HT6 associated with *Artemia* culture were demonstrated as being a suitable diet for *Artemia* nauplii (Toi *et al.*, 2014). In this study the nitrogen assimilation from the food was determined when these bacteria were offered to *Artemia* nauplii in a mixed diet together with wild type WT and mutant mnn9 yeast. The data illustrate that HT6 provides for higher N assimilation in *Artemia* than HT3 when equal amounts (DW) of bacteria are offered, as evident when the respective FR1 (controls) are compared. This is a confirmation of previous findings (Toi *et al.*, 2014) where N assimilation from HT6 in *Artemia* was also higher than from HT3.

When both bacterial strains in the food are gradually replaced by yeast (WT or mnn9), the assimilation of N from bacteria in *Artemia* is also gradually decreasing, probably due to the reduced availability of bacteria when yeast is added. There are, however, differential effects on N assimilation depending on the replacing yeast strain and the available bacterial strain. When HT3 is present, replacement by WT always provides higher assimilation from bacteria, though not statistically significant, than replacement by mnn9 (Fig. 1). A first possible explanation for this difference between both yeast types could be that the presence of mnn9 as replacement provides more digestible food than replacement by WT (Marques *et al.*, 2004b), hence producing lower N assimilation from bacteria. Alternatively, WT may contribute for more exogenous enzymes than mnn9 such as proteolytic enzymes and alkaline phosphatase, leading to better utilization of bacteria and hence resulting in less reduction of N assimilation from HT3. According to Lara-Flores *et al.* (2003) the addition of yeast into a formulated diet for 3-week old fish Nile tilapia (*Oreochromis niloticus*, Linnaeus 1758) triggered alkaline phosphatase activity. High activity of alkaline phosphatase is believed to be related to increased nutrients absorption into enterocytes of fish (Gawlicka *et al.*, 2000). Ozório *et al.* (2012) found the body weight of *O. niloticus* increasing 3 times at the end of the experiment (51 days), when yeast *S. cerevisiae* was added to formulated

diets up to 20%. These data therefore suggest a strong potential of wild type yeast to assist in utilization of bacteria by *Artemia*. This action seems to be less prominent in *mnn9* fed *Artemia*, co-fed with HT3, suggesting that *mnn9*, being a mutant, has not a similar positive effect on utilization of bacteria by *Artemia*.

However, these possibilities do not explain the interaction of HT6 and replacement by WT and *mnn9*, and its effect on N assimilation from the bacteria. In our experiment with HT6, *mnn9* replacement instead of WT generally caused less reduction of N assimilation from HT6, though the differences were not significant. Higher N assimilation from HT6 than from HT3 may interact with *mnn9* resulting into an increased N assimilation from bacteria (Fig. 3.1), though further studies are needed to prove or refute this hypothesis.

Our results further show that when yeast strains are replaced by HT3 and HT6, there is a gradual decline of N assimilation from yeast. This may be due to the reduced availability of yeast in the culture medium. Moreover, for both yeast types the N assimilation seems to be related to the bacterial strain used. With HT3, nitrogen assimilation from yeast is always less than with HT6 (Fig. 2). Literature data suggest that, other than being a dietary component, bacteria can also improve the availability of yeast nutrients to *Artemia*. The potential of bacteria as a source of digestive enzymes for *Artemia* has been reported previously (Intriago and Jones, 1993; Marques *et al.*, 2004a). Significantly improved *Artemia* performance by the addition of bacteria as compared to axenic conditions has been reported by Douillet (1987) and Intriago and Jones (1993). Bacterial enzymes, such as N-acetyl- $\beta$ -glucosaminidase (chitinolytic activity) and  $\beta$ -glucosidase (cellulolytic activity),  $\beta$ -glucanase (glucalytic activity), and mannase were detected in selected bacterial strains (Fleet and Phaff, 1974; Araki *et al.*, 1992; Rombaut *et al.*, 1999) and their presence in the *Artemia* digestive tract may improve yeast digestibility, resulting in improved performance of *Artemia* (Marques *et al.*, 2006a) as well as rotifers (Tinh *et al.*, 2006).

Our study is the first to indicate that, when using the two yeast strains WT and *mnn9* as sole diet, the latter results into a remarkably high N assimilation when it is fed to *Artemia* nauplii. Even though the assimilation of N has never been analyzed before, similar findings are reported elsewhere as exemplified by increased growth and survival of *Artemia* nauplii fed with *mnn9* (Marques *et al.*, 2004b). The *mnn9* yeast mutant does not have a mannoprotein layer in the external cell wall (Marques *et al.*, 2004b), rendering it more digestible as *Artemia* nauplii do not have mannase activity (Coutteau *et al.*, 1990). Further, improved N assimilation in *mnn9* may also be related to the higher nutrient content of *mnn9*, as indicated by its higher ash-free dry weight (Marques *et al.*, 2004b; Soltanian *et al.*, 2007). Gunasekara *et al.* (2011) reported that the length of the *Artemia* nauplius mid gut increases when *Artemia* is fed with *mnn9* yeast compared to WT. The mid gut segment is more active in the absorbance of nutrients and the secretion of digestive fluids (Schrehardt, 1987). The experiment was performed for a short period (24 h) and as there were no obvious differences in *Artemia* length and survival among the treatments (results not shown) after 24 h, it was assumed that there was no difference in food consumption by *Artemia*, which might have affected N assimilation.

The enzyme assay of trypsin-L highlighted that whether *mnn9* or WT is used, there is no significant difference in trypsin-L activity in *Artemia*. When HT6 is fed solely, the activity of trypsin-L is similar to that in *Artemia* fed solely WT or *mnn9*, suggesting that, within the time duration of our experiment, WT, *mnn9* and HT6 stimulate similar levels of trypsin-L activity, be it fed solely or in combination. Only *Artemia* fed solely HT3 showed significantly lower levels of trypsin-L than all other feeding treatments. This effect is not present in treatments where HT3 is fed in combination with yeast. This finding is in agreement with our previous study where the presence of HT3 lead to lower N assimilation from microalgae in *Artemia* when compared to the presence of HT6 (Toi *et al.*, 2014). Similar negative effects of bacteria on trypsin-L activity in *Artemia* have been reported previously (Rojas-García *et al.*, 2008). The negative effects of HT3 on trypsin-L activity and its compensation by the yeast strains show that the yeast strains tested here can modulate digestive functions of *Artemia* in a favorable manner.

In conclusion, bacteria and yeast not only may play an important nutritional role in *Artemia* when fed as sole diet, but their joint presence in *Artemia* culture may also improve nitrogen assimilation in *Artemia*.

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# ***Role of ycf1* plastid gene as DNA barcode for some solanaceous plant species discrimination.**

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**Category: Review Article**

## **Abstract:**

DNA barcode is the short-term marker sequences containing genetic information of respective organism to decide the specific organisms species identity in the universe. DNA barcoding is important engine for the classification for the plant to plant or species to species with the help of any ex-plant part if main part is not available and preserved for period of time.

DNA barcoding is the most important tool which can provide reliable species discrimination in the context of malpractices of the parents of the hybrid from the same crop plant. Plant Chloroplast genome with number of gene having single or multiple copy with respective chromosome. Chloroplast genes are more than 100 in numbers put in to code proteins which are responsible for the process of photosynthesis.

Chloroplast regions is very essential for DNA barcoding study. Many scientists work/ sequences from chloroplast genome for the study of discrimination. Kress *et al.* in his study<sup>[1]</sup> recommended that by working as comprehensive and universal cytochrome c oxidase for human as a DNA barcode is failed to evaluate discriminate many higher plants species due to its lower rate of oxidation. Also some research scholars suggested both *rbcL* and *matK* as highest important and universality with unique property of discriminating with higher versatility in studies. Plastid DNA sequences are the prevalent DNA barcode for the angiospermic plant and its species<sup>[3]</sup>. Adding the nuclear internal transcribed spacer ITS.

There were several screenings of plastid genes regions in the plant, three plastid genes *rbcL*, *matK*, and *trnH-psbA* were found and one nuclear (ITS) gene sequences and became the standard DNA barcode of choice. These sequence barcode found and noted as most important investigation in many plant species.<sup>[5]</sup> The analysis study of DNA barcodes of high specificity towards species equivalency is most critical to the achievement of plant DNA barcoding. Two zones of the plastid *ycf* gene found with high variability compared with other regions in the plastid genome. So *ycf* found most suitable plastid region for the barcoding of plant compared with *matK* and *rbcL* plant DNA barcodes which are presently universal plant DNA barcode<sup>[2]</sup>. Presently *matK* and *rbcL* works as master DNA barcode in crop plant molecular marker system.

*ycf1* works as a phytoremediation means it takes out toxic substance from plant and release in environment for plant health. It breaks down the high level of the cadmium to optimum. But the real role/ function of the *ycf1* gene/protein is unknown till today

Still there is vast scope of *ycf1* as a DNA barcode for Solanaceae family crops like capsicum, brinjal, tomato etc because there is no or negligible research in this era.

All these three vegetable crops are very important and used as an important vegetables for routine diet in the world so it becomes important to verify better source and better hybrid for diet with higher nutritional value.

Keywords : Solanaceae, angiosperm, F1 hybrids, discrimination

Abbreviations : matK-mutarase K, rbcL-ribulose 5 fructose L, ycf-yeast cadmium factor,

## Introduction:

Former distinct plastid genome regions essentially plastid genes like *matK*, *psbK-I*, *rbcL*, *rpoC1*, *rpoB*, and *trnH-psbA* and combination of *rbcL-matK* which that are intermittently tried in plants as a plant molecular markers and plant systematics have been extensively evaluated and claimed as barcode [4,5]. In future challenge and yeast cadmium factor expressing gene will be the best option. The main reason is that *ycf* is having most variable region. Recently, Dong *et al.* launched and proved that *ycf1* regions of the plastids genome is highly variable in angiospermic flowering plants [6]

Our primary aim is here to design a vegetable crop plant DNA barcode for Indian major F1 hybrids of chilli, brinjal and tomato from different agricultural companies with different regions. It will be the precious future tool to discriminate the close inter-relationships in the crop parents and hybrids from the different sources. Current application may becomes most powerful tool using *ycf1* as a DNA barcode for solanaceous crops like chilli, brinjal and tomato. *Ycf1* is a single copy gene with IR region with highly diversity compared with all other *matK*, *rbcL*, *trnH-psbA* etc in plastid genome.

Beyond the core *rbcL+matK* barcode, the most extensively used plastid marker is the intergenic spacer *trnH-psbA* for discrimination of the species. In general, when the sample set is constrained, levels of discrimination can be high [7]. DNA barcoding in vegetable crop plants is most likely to provide insights into species-level taxa in groups with simple phenological or phenotypic observation, those with very publicly distributes. That have received inappropriate taxonomic attention to appropriate characterization as of diversity they contain in their nature [7].

The first clade consisted of four *Nicotiana* species and second consisted of *Solanum*, *Capsicum*, *Atropa*, and *Datura* [9]. Clement W. L. & Donoghue M. J claimed very lower level of diversity among closely similar species [10].

There are naturally more than 100 genes, 5 speculative chloroplast reading frames from *ycf* region, and few open reading frames. [9]. Angiospermic crops plants of solanaceae family like capsicum, eggplant and tomato that composes more than 3000 plant species placed within about 90 genera. Few achievements have been made to study the variations in chloroplast genomes of Solanaceae family. Chilli, brinjal and tomato these three crops are From this family capsicum/ chilli, brinjal and tomato are the most important vegetable crops in the world and its importance to human indicates necessity of the research study.

*Capsicum* is with different species eg *C. annuum* *C. baccatum* L., *C. chinense*, *C. frutescens* and *C. pubescens* but capsicum annuum is quite distinct morphologically. Robert L.J founds sequence variation within four of the eight cpDNA introns examined permitted the separation of the *C. annuum* complex members from other taxa [11]. Particular data supports and proves preceding report on the presence of indels and exchange within the introns whose existence or non-existence confirms that linked with phenotypic character based classification. [11].

## DNA barcoding Method :

**Conclusion:** Chloroplast genome with its *ycf1* gene is having most variable region and such regions are very helpful for the phylogenetic study of any plant species or species to species. Also helpful develop a DNA barcode for specific species. As

compared with all the genes of the chloroplast reveals that only *ycf1* gene is having most variable region.

Presently DNA barcoding using plastid genome became the most effective tool for the discrimination of the vegetable crops. For the development of barcode PCR amplification and sequencing methods are most important and to be followed for the study.

This study will be extensive evaluation and discrimination of the vegetable crop hybrids using DNA barcode. More than 20 F1 hybrids will be selected and to be evaluated and developed a DNA barcode for three different crops. All these vegetable crop hybrids will be evaluated for interconnection with the help of DNA barcode. We chose the chloroplast region *ycf1* as DNA barcode for the evaluation of the crop hybrids based on its discrimination power while taken into account about other plastid region of the chloroplast. This region is more volatile and more fine for the discrimination inter and intra species differentiation for the diversification.

#### **Possible Challenges and limitations of *ycf1* DNA barcoding:**

*ycf1* is a gene with highly variable region in the plastid genome in plants,

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##### **2. Phylogenetic utility of *ycf1* in orchids: a plastid gene more variable than *matK***

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##### **4. *ycf1*, the most promising plastid DNA barcode of land plants**

[Wenpan Dong](#),<sup>1</sup> [Chao Xu](#),<sup>1</sup> [Changhao Li](#),<sup>1,2</sup> [Jiahui Sun](#),<sup>1,2</sup> [Yunjuan Zuo](#),<sup>1</sup> [Shuo Shi](#),<sup>1</sup> [Tao Cheng](#),<sup>1</sup> [Junjie Guo](#),<sup>3</sup> and [Shiliang Zhou](#),<sup>1</sup>

##### **5. Biological identifications through DNA barcodes.**

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##### **7. Choosing and Using a Plant DNA Barcode**

Peter M. Hollingsworth<sup>1\*</sup>, Sean W. Graham<sup>2</sup>, Damon P. Little<sup>3</sup>

##### **8. Highly Variable Chloroplast Markers for Evaluating Plant Phylogeny at Low Taxonomic Levels and for DNA Barcoding**

Wenpan Dong<sup>1,2</sup>, Jing Liu<sup>1,3</sup>, Jing Yu<sup>1,3</sup>, Ling Wang<sup>2</sup>, Shiliang Zhou<sup>1\*</sup>

**9. Comparative Genomics of Ten Solanaceous Plastomes**

Harpreet Kaur,<sup>1</sup> Bhupinder Pal Singh,<sup>1</sup> Harpreet Singh,<sup>2</sup> and Avinash Kaur Nagpal<sup>1</sup> <sup>1</sup> Department of Botanical and Environmental Sciences, Guru Nanak Dev University, Amritsar 143005, India <sup>2</sup>Department of Bioinformatics, Hans Raj Mahila Maha Vidyalaya, Jalandhar 144008, India

**10. Barcoding success as a function of phylogenetic relatedness in Viburnum, as a clade of woody angiosperm.**

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**11. DNA Barcoding in a Crop Genebank: The Capsicum annum Species Complex**

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**Plant DNA Barcode Project,**

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# Foraminiferal Biozonation And Biochronology of Praibonian – Repulian sediments of the Agbada Formation, Niger Delta

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**Abstract-**Foraminiferal biostratigraphic analysis was carried out on eighty (80) ditch cutting samples from two wells (well C: 13 samples, interval 2410 -2770m at 30m and well F: 67 samples, interval 2000-3320m at 20metres) located in the Northern Depobelt of the Tertiary Niger Delta. This was achieved based on the use of standard micropaleontological sample procedures and the analysis and interpretation of the foraminiferal biofacies assemblages. A total of eighty four (84) foraminifera species were recovered from the study wells consisting of thirty (30) genera, eighteen (18) families and three (3) suborders with a total foraminifera count of one thousand, eight hundred and seventy two (1872) comprising twenty four (24) planktic and one thousand, eight hundred and forty eight (1848) benthic forms respectively. The planktic and benthic foraminifera recovered from the Agbada Formation are transitional in character between the typical Late Eocene (P16/17) and the Early Oligocene (P18/19) epoch and therefore, indicate the transition between the Priabonian age and the Rupelian age. This interpretation reaffirms the existence of the Late Eocene – Early Oligocene sediments in the Niger Delta.

**Index terms:** Agbada Formation, Biozone, Biochronology, Foraminifera, Niger Delta, Priabonian, Rupelian, Northern Depobelt.

## I. INTRODUCTION

The concept of biozonation is very important in Biostratigraphy (stratigraphy) and it buttress the facts that organisms that are fossilized after death display obvious evolutionary changes through the geologic time that are unique to a particular series/stages as evidenced in stratigraphic record. This therefore makes the fossil assemblages that characterize any geologic age distinct from any other. The basic units of biostratigraphy are the biozone. Biozones (also known as biostratigraphic zone) are bodies of strata that are interpreted based on the fossils found in the rocks. Biostratigraphic units are delineated based on the presence of some diagnostic biostratigraphic feature or attribute (fossil taxa). A biozone can be established based on the following criteria (but are not limited to this): a single taxon, co-occurrence of taxa, on appearance and disappearance of taxon / taxa and relative abundances (Petters, 2016 Personal communication).

In biostratigraphy study, the main goal is to understand the distribution of fossils in the stratigraphic record and attempt to subdivide these strata into units based on the fossil found in them as well as use this information to adequately place the rock units within a certain time spans according to the evidences. Biozone (in the strict sense) are records of events that took place in geologic past and should not be confused with chronostratigraphy.

The concept of biozonation is somewhat straight forward and uncomplicated. The occurrence of a particular fossil species in different geographic localities points to the fact that rocks from these localities were deposited at similar times in the earth history. However, complexities may arise from the following: the training and identification ability of the biostratigrapher, environmental effects, rates of evolution and state of preservation of the fossils. It is a generally practice in biozonation to stack relatively older and

younger biozones together with no attempt made to give absolute ages (in years) for the biozones. Due to this, the concept of biozonation gave birth to a new and more dependable concept called biochronology.

Biochronology attempts to accurately date evolutionary first appearance or extinction of a species using ages calibrated by radiometric methods alone or in relationship with radiometrically calibrated magnetic reversals, stable isotope zones or astronomically tuned events. These dated levels on a global synchronous events are denoted as first appearance datums (FADs) and last appearance datums (LADs) or locally as FO or LO of a species in a particular region. Environmental factors may obstruct the actual ages locally and prevent it corresponding to its actual FAD or LAD.

#### A. Biostratigraphic studies of the Niger Delta

Intensive foraminiferal biostratigraphic studies of the onshore, shallow and deep offshore areas of the Tertiary Niger Delta have been carried out using ditch cuttings, cores and sidewall sample. Surprisingly, most of the foraminifera biostratigraphic studies are not recorded in literature (unpublished) due to problems associated with exclusive legal right.

Reyment (1959, 1965) attempted the establishment of biozone for the Tertiary sediments of the southern Nigeria based on the identified foraminifera species (*Bolivina spp*, *Afrolivina afra*, *Afrolivina bantu*, *Bolivina ihuensis* and *Bolivina owerri*).

Petters (1979) describe the two (2) distinctive biostratigraphic horizons from the Parabe-1 well using ditch cutting samples. *Globorotalia tumida* and *Globorotalia fohsi peripheroronda* was used to identify the Pliocene and Early – Middle Miocene age respectively whilst *Globorotalia opima nana* and *Globorotalia opima opima* in association with *Globorotalia siakensis* suggests Late Oligocene age. Petters (1982) carried out a detailed documentation of the benthic foraminiferal species in the Niger Delta as part of the Central West Africa Cretaceous – Tertiary stratigraphy and recognized eleven (11) benthic foraminiferal zones namely *Anomalina plummerae* – *Trochammina wickendeni* zone, *Planulina beadnelli* - *Ammoastuta nigeriana* zone, *Neobulimina subregularis* – *Gabonita lata* zone, *Bolivina afra* – *Haplophragmoides talokaense* zone, *Anomalinoidea bermudezi* – *Epinodes pseudoelevatus* zone, *Nonion oyae* – *Uvigerina hourcq* zone, *Altistoma sclaris* – *Epistominella pontoni* zone, *Hanzawaia mantaensis* – *Cibicidoides colombianus* zone, *Nonion ecaudoranum* – *Epinodes eshira* zone, *Pseudonodosaria paucicostata* – *Spiroloculina tenuis* zone and *Amphistegina gibbosa* – *Epistominella vitrea* zone.

Petters (1983) also studied the planktic foraminiferal contents of the Niger Delta as part of the Gulf of Guinea and recognized nine (9) planktic zones namely *Subbotina praecursoria* zone (Late P1), *Morozovella pussila* – *M. angulata* zone (P3), *planorotalites pseudomenardii* zone (P4), *Morozovella velascoensis* – *M. subbotinae* zone (P5-P6), *Acarinina pentacamerata* zone (P9), *Globorotalia opima* zone (P21), *Globogerina ciperensis* – *Globorotalia kugleri* zones (P22-N4), *Praeorbulina glomerata* zone (N8), *Globorotalia fohsi fohsi* – *G. fohsi lobata* – *robusta* zones (N10-11). Petters (1984) identified *Globorotalia officinalis*, *Globorotalia ouachitaensis*, *Globorotalia occlusa*, *Globorotalia angulisuturalis* and *Globorotalia nana* from the Opuama-1 and Opuekeba-1 wells (base of Opuama Shale) belonging to the following zones: *Globorotalia opima*, *Globorotalia ciperensis* and *Globorotalia kugleri* planktic foraminifera zones. Petters (1995) stated that the Akata and Agbada Formations contain abundant foraminifera (such as *Nonion costiferum*, *Nonion ecaudoranum*, *Hopkinsina bononiensis*, *Hopkinsina Magnifica*, *Bolivina ignara*, *Bolivina simplex*, *Bolivina gracilis*, *Bolivina miocenina*, *Bolivina scintilla*, *Bolivina ordinaria*, *Uvigerina mexicana*, etc) with the open shelf pro-delta environments being usually very densely populated by foraminifera unlike the tidal creeks and estuaries which are inhabited by arenaceous foraminifera.

Chiaghanam *et al.*, (2011) worked on Miocene sediments and encountered three sequences. These include: Bolivian 25a (*Bolivina mandorveensis*), *Bolivina spp.*, *Uvigerina spp.*, *Textularia-3 (Spiroplectammina wrightii)*, *Textularia spp.*, Planktonic-Spp, *Globigerinaoides spp.*, *Globigerina spp.* and Ostracoda as the dominant species in sequence I. The dominant species within sequence II are *Globigerina spp*, *Nonion-3(Pseudonion atlanticum)*, *Uvigerina-5(Uvigerina sparsicostata)*, *Valvulineria-1 (Hanzawaia strattoni)* and Ostracoda. The dominant species identified within sequences III are *Bolivina 25(Brazilina interjuncta)*, *Bolivina 26(Bolivina beyrichi)*, *Cassidolina-3(Cassidulina norcrossi)*, *Eponides 12(Cibicorbis inflata)*, *Globigerina- Spp*, *Globigerinoides-1(Globigerinoides immaturus)*, Ostracoda and *Uvigerina-5(Uvigerina sparsicostata)*. Adegoke (2012) identified some transgressive markers such as *Eponides* (13.8Ma and Older), *Globigerinoides subquadratus/Uvigerina sparsicosta* (12.5 - 13.8Ma), *Globorotalia mayeri/Spirosigmoilina oligocaenia* (12.5 – 10.5Ma) and *Uvigerina subperegrina* (10.5 - 8.2Ma) in the Niger Delta. Fajemila (2012) on the other hand identified five (5) foraminiferal zones in two wells from the offshore western Niger Delta. These include *Globorotalia acostaensis/Uvigerina subperegrina* zone, *Globorotalia merotumida/plesiotumida /Ammobaculites agglutinans* zone, *Globoquadrina dehiscens/Haplophragmoides narivaensis* zone, *Globorotalia tumida/ Cyclammina minima* zone and *Globigerina nepenthes/Haplophragmoides compressa* zone. Okosun *et al.*, (2012) carried out foraminiferal biostratigraphy of the Akata Field (

Akata-2, 4, 6 and 7 wells) located in the eastern Niger Delta. Three (3) planktic foraminiferal zones (*Globorotalia continuosa*, *Globorotalia obesa*/*Globorotalia mayeri*, and *Globorotalia peripheroacut*) and three (3) benthic zones (*Spirosigmoilina oligocaenica*, *Uvigerina sparsicostata*, and *Eponides eshira*/*Brizalina mandorovenssis*) were established in both well Akata-2 and 4. One planktic foraminiferal zone (*Praeorbulina glomerosa*) and two benthic foraminiferal zones (*Brizalina mandorovenssis*/*Eponides eshira* and *Poritextularia panamensis*) were proposed for wells Akata-6 and 7.

Obiosio (2013) encountered a rich *Bolivina* assemblage (*Bolivina ottaensis*, *Bolivina ihuoensis*, *Bolivina imperatrix*, *Bolivina simplex*, *Bolivina striatella*, *Bolivina ignara*, *Bolivina foliacea*, *Bolivina inconspicua* etc) during the study of the onshore Tonjor-1 well in the Niger Delta. He identified eighteen foraminifera species and assigned Late Eocene age based on the index planktonic foraminifera. Obiosio (2013) used the *Bolivinids* presence to correlate with global Early Eocene transgression and utilized the morphologic features (strong costae and larger test) to suggest a well oxygenated slope to bathyal environment for the penetrated sediments. Peter and Adewale (2014), working on the shallow offshore western Niger Delta identified twenty-two (22) benthonic species among them are the following calcareous species: *Lenticulina inornata*, *Quinqueloculina microcostata*, *Quinqueloculina lamarckiana*, *Heterolepa floridana*, *Heterolepa pseudoungeriana*, *Marginulina costata*, *Cibicides spp.*, *Amphicoryna scalaris caudata*, *Lagena spp.*, and *Lagena striata*. Two informal benthonic zones were proposed for the interval, which also fell within the Agbada Formation. They are *Heterolepa Pseudoungeriana* Informal Zone and *Lenticulina inornata* Informal Zone

Ajayi and Okosun (2014) carried out a study on four (4) wells located in the deep-offshore area of the Niger Delta. Forty two (42) planktic foraminifera species were recorded and three (3) planktic zones were established (*Globorotalia margaritae margaritae* subzone : N18, *Globigerinoides obliquus extremus* – *Sphaeroidinellopsis seminulina* zone : N17, and *Globorotalia acostaensis* zone : N16).

Olotu and Promise (2014) also carried out a biostratigraphic analysis on core samples from three wells (two (2) wells from offshore depositional belt and one (1) well from the onshore coastal swamp depositional belt) in southwestern Niger delta and dated the sediments penetrated by the wells as Early Miocene based on the First Appearance Datum (FAD) and last Appearance Datum (LAD) of diagnostic faunal makers such as *Globorotalia obesa*, *Globigerinoides bisphericus*, *Globigerinoides obliquus*, *Globigerinoides immaturus*, *Orbulina universa* and *Orbulina suturalis* and their suite of Early-Middle Miocene benthic foraminiferal assemblage which include *Bolivina miocenia*, *Lenticulina rotulata*, *Alveolephragmium crassium*, *Bolivina beyrichi*, *Saccammina complanata* and *Cyclammina minima*.

Ukpong *et al.*, (2017) carried out a biostratigraphic study of Well K-27 in the Niger Delta and identified four foraminiferal zones viz: *Globigerina selli/pseudohastigerina barbadoensis* zone (P18-P19), *Globigerina ampliapertura* zone (P20/N1), *Globorotalia opima opima* zone (P21/N2) and *Globigerina ciperoensis ciperoensis* zone (P22/N3).

## B. Location of study well

The study wells (wells C and F) are located in the Northern Delta depobelt of the Niger Delta which forms a segment of the Niger Delta petroleum province of Nigeria (figure. 1).

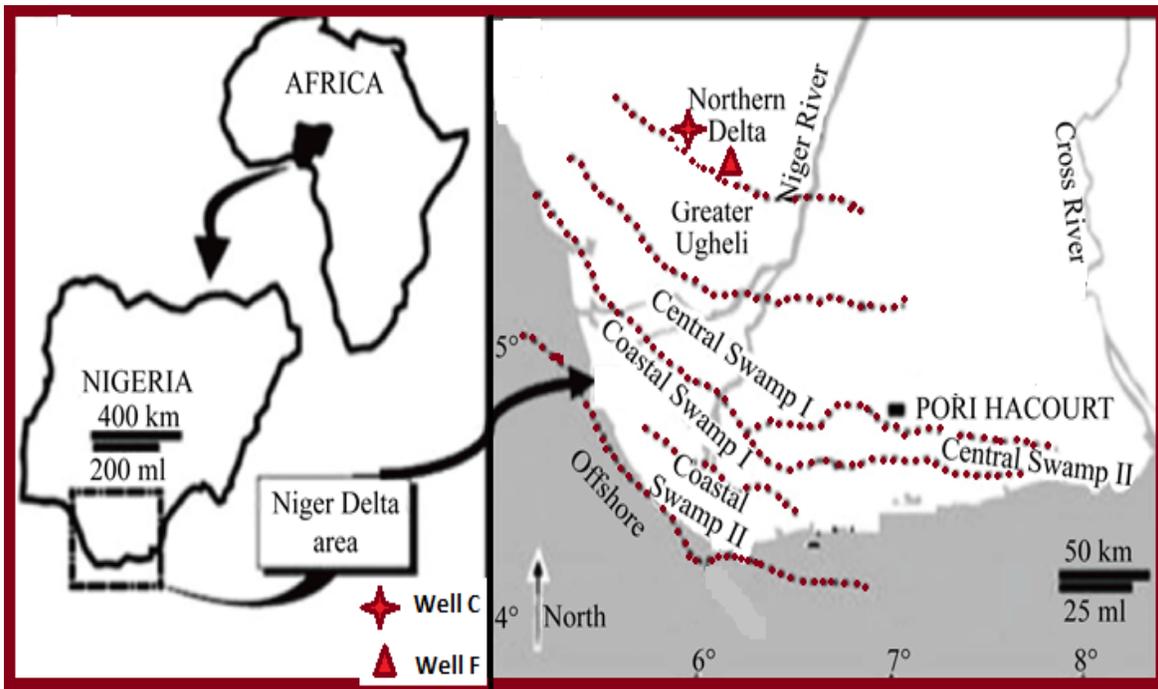


Figure 1: Map of the Niger Delta showing the depobelts and location of the study wells (C and F)

### C. Regional setting

The Niger Delta Basin is a prolific hydrocarbon provinces that contains enormous hydrocarbon both on the onshore, shallow and deep offshore areas and it is located between Latitudes 3° and 6° N and Longitudes 5° and 8° E respectively in the Gulf of Guinea, on the margin of West Africa (figure 2). The segment that characterizes the onshore of the Niger Delta Province is defined by the geology of southern Nigeria and southwestern Cameroon. The northern boundary and the northeastern boundary is characterized by the Benin Flank trending east-northeast hinge line south of the West Africa basement massif and outcrops of Cretaceous age on the Abakaliki High and Calabar Flank demarcating the adjacent Precambrian respectively (Tuttle *et al.*, 1999). The offshore boundary to the east of the Niger Delta province is characterized by the Cameroon volcanic line, the western boundary is defined by the easternmost transform-fault which forms the Dahomey basin and the 4000-meter bathymetric contour and two kilometer (2km) sediment thickness contour or in areas characterized by sediment piles greater than two kilometers to the south and southwest (Tuttle *et al.*, 1999).

The Niger Delta is described by Doust and Omatsola (1990) as one of the largest deltaic systems in the world. The formation of the Niger Delta basin began in the Early Cretaceous; it was developed at the triple junction between South Atlantic, Gulf of Guinea Margin and Benue Trough (Burke, 1972). The Niger Delta deltaic system is known to prograded over an area of three hundred kilometers (300 km) since the Late Eocene (Short and Stauble, 1967; Burke, 1972; Evamy *et al.*, 1978; Whiteman, 1982; Stacher, 1995). The development of the Niger Delta continues from Late Eocene till the Holocene, building out on African continental margin and its associated oceanic crust.

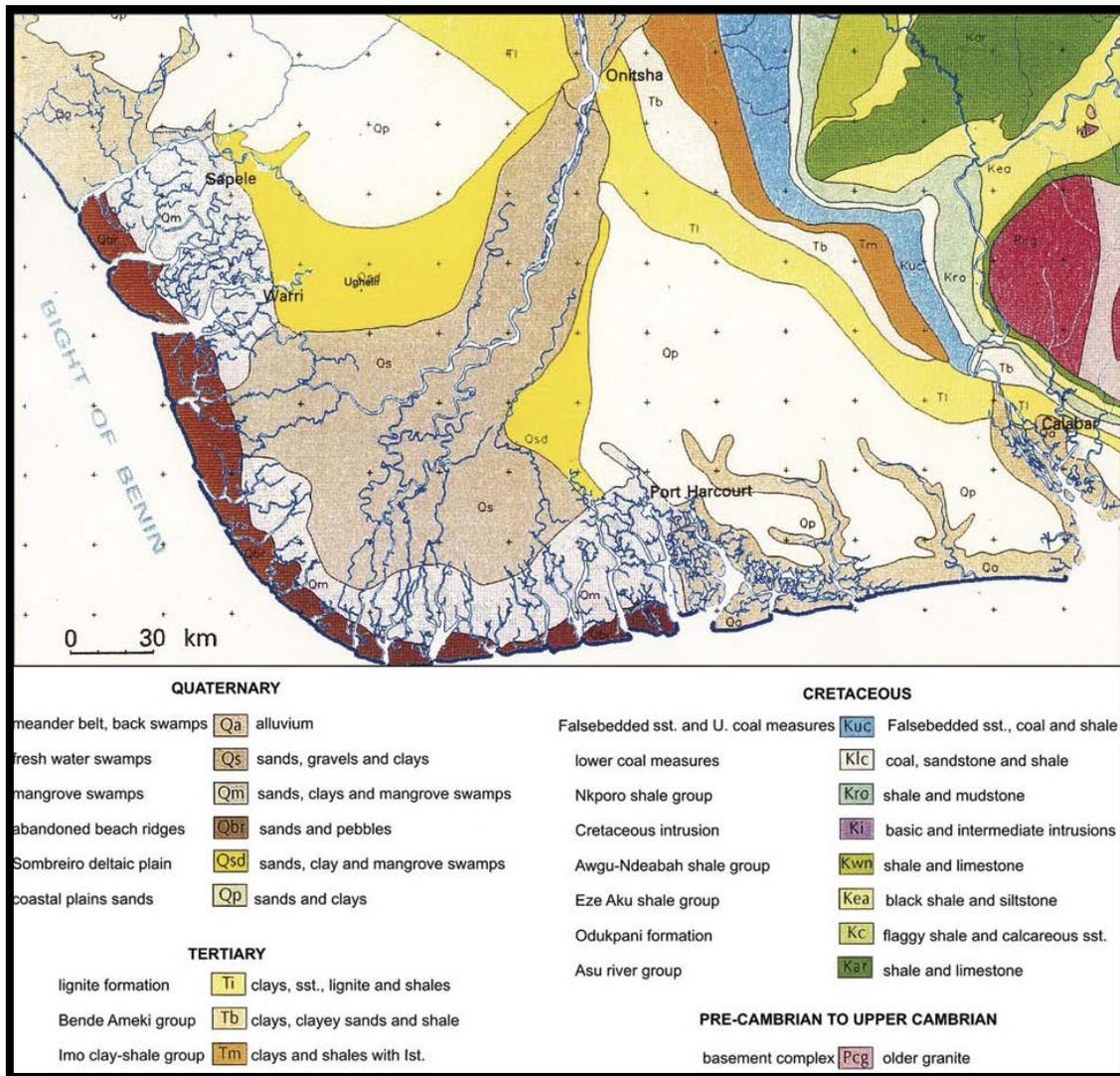


Figure 2. Geologic map of the Niger Delta (Reijers, 2011)

#### D. Lithostratigraphy of the Niger Delta

Three (3) main vertically stacked lithologic units are known and defined in the Niger Delta by various workers (Doust and Omatsola, 1990; Weber, 1971; Weber & Daukoru, 1975; Evamy *et al.*, 1978; Ejedawe, 1981; Knox & Omatsola, 1987) and they correspond to the three-fold lithostratigraphic subdivision proposed by Short and Stauble (1967) for the subdivision of the Niger Delta (figure 3) viz:

- I. Akata Formation (indicating marine environment)
- II. Agbada Formation (indicating transitional environment) and
- III. Benin Formation (indicating continental environment)

The Akata- Agbada – Benin Formations can be distinguished based on their sand-shale ratio. The type sections of these formations have been described by the following authors: Short and Stauble (1965), Avbovbo (1978), Evamy *et al.*, (1978), Whiteman (1982), Doust and Omatsola (1990), Knox and Omatsola (1989) and Kulke (1995). These formations represent the major depositional environments of a regressive megasequence (Doust and Omatsola 1990) and strongly point to a deltaic environments characterized by fluvio-marine (wave and tide) interplay. These formations are currently overlain by varied sediments of younger ages. Boboye and

Fawora (2007) pointed out that the Benin Formation is overlain by diverse types of Quaternary deposits. Weber and Daukoru, (1975) defined the diverse nature of the overlying sediments based on the interaction between marine, fluviomarine and fluvial processes and their deposition on littoral and deltaic plain environments.

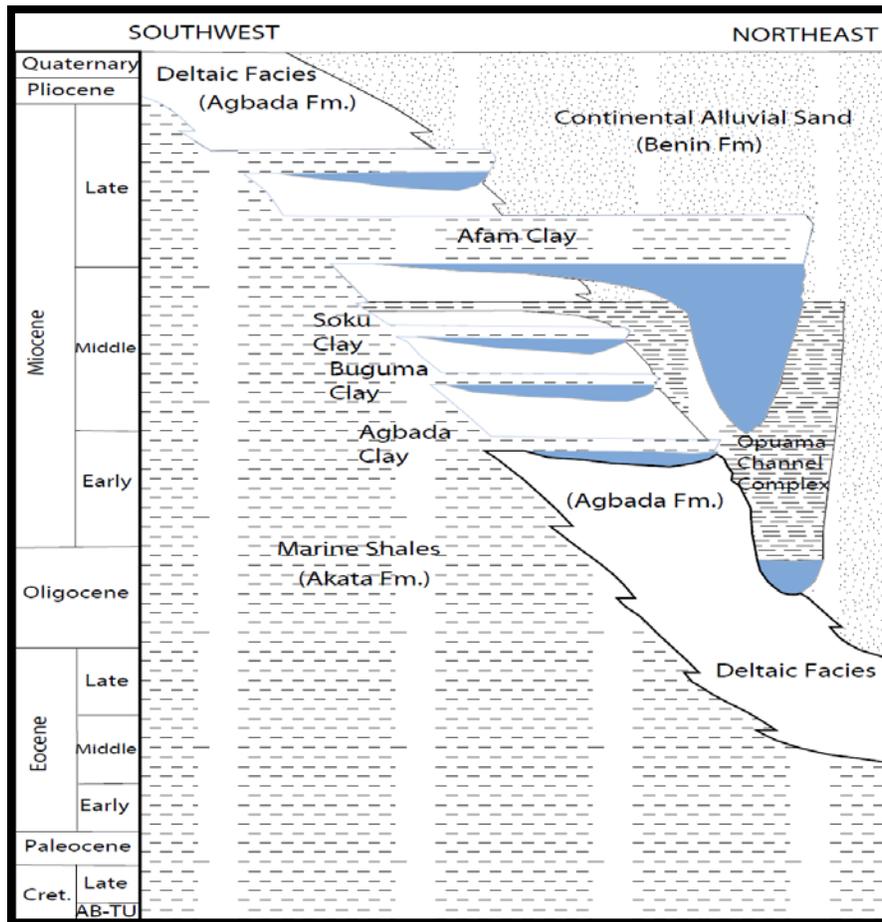


Figure 3. Stratigraphic column showing the three (3) formations that makes up the Niger Delta. Modified from Shannon and Naylor (1989) and Doust and Omatsola (1990).

## II. MATERIALS AND METHODS

### A. Materials

Ditch cutting samples from the study wells (well C and well F) were obtained. A total of eighty (80) ditch cutting samples were used for this study. Well C ranges from depth 2800m – 2410m consisting of thirteen (13) samples at 30metres interval whilst well F ranges from depth 2000m – 3320m consisting of sixty seven (67) samples.

### B. Micropaleontological sample processing

One of the standard approaches for the foraminifera sample processing method was applied in this study. The anhydrous sodium carbonate procedure outlined by Brasier (1980) and Armstrong and Brasier (2005) was utilized in the preparation of samples from wells C and F. The sample preparation is in three (3) phases: soaking, wet sieving and drying of residues. The residues obtained after the extraction of foraminifera from the prepared samples were properly stored in well labeled sample bags for lithologic/sedimentologic analysis. Identification of the foraminifera extracted from the samples was done by comparing picked forms with previously published forms.

### III. RESULTS AND DISCUSSION

Foraminiferal analysis was carried out on eighty (80) samples obtained from the two wells (wells C and F). The foraminifera forms recovered include planktic and benthic foraminifera (calcareous benthic and arenaceous benthic foraminifera). Some foraminifera forms are long ranging in terms of stratigraphic occurrence while others have restricted stratigraphic occurrence with regional – cosmopolitan distribution. Foraminifera distribution charts of the wells C and F are presented in figures 4 and 5. The total count of picked foraminifera prior to description was four thousand and twenty two (4022) specimens but due to poor preservation most of the recovered foraminifera could not be described. A total count of one thousand, eight hundred and seventy two (1872) foraminifera specimens were described from the two wells (wells C and F). Also recovered were seventy two (72) ostracods, two (2) pelecypods and one (1) gastropod which were collectively classified as miscellaneous. Figure 4 and 5 shows the foraminiferal chart for wells C and F.

Foraminifera analysis of well C reveals a moderate – high abundance and diversity throughout the entire well section between 2410 – 2560m and 2590 – 2770m except for a barren interval (2560 – 2590m) towards the mid-section of the well. Foraminifera analysis of well F revealed relatively high foraminiferal abundance and diversity throughout the entire well except for some barren intervals within the upper section of the well (2020-2260m) and some intervals (2000-2020m, 2320-2340m, 2400-2420m, 2900-2920m, 3260-3280m) characterized by poor foraminifera recovery. The foraminifera species described from well C consists of twenty seven (27) species from seventeen (17) genera, thirteen (13) families and three (3) suborders while the foraminifera species described from well F consists of seventy nine (79) species from thirty (30) genera, eighteen (18) families and three (3) suborders. The total species recovered from both wells (wells C and F) is eighty two (82) from thirty (30) genera, eighteen (18) families and three (3) suborders.

The total count of foraminifera described from well F is one thousand, seven hundred and seventeen (1717) comprising twenty three (23) planktics (making 1.34percent of the total count) and one thousand, six hundred and ninety four (1694) benthics (making 98.66percent of the total count). The benthic forms comprises of one thousand, six hundred and fifty six (1656) calcereous benthic forms (making 96.44percent of the total benthic count) and thirty eight (38) arenaceous benthic forms (making 2.21percent of the total benthic count). One hundred and fifty five (155) foraminifera counts was obtained from well C, comprising of one (1) planktic (making 0.61percent of the total count) and one hundred and fifty four (154) benthics count (making 99.39percent of the total count). The benthic count comprises of one hundred and forty seven (147) calcereous benthic forms (making 94.84percent of the total benthic count) and seven (7) arenaceous benthic forms (making 4.513percent of the total benthic count).(Figure 6 shows the percent of the total foraminifera counts for wells C and F respectively).



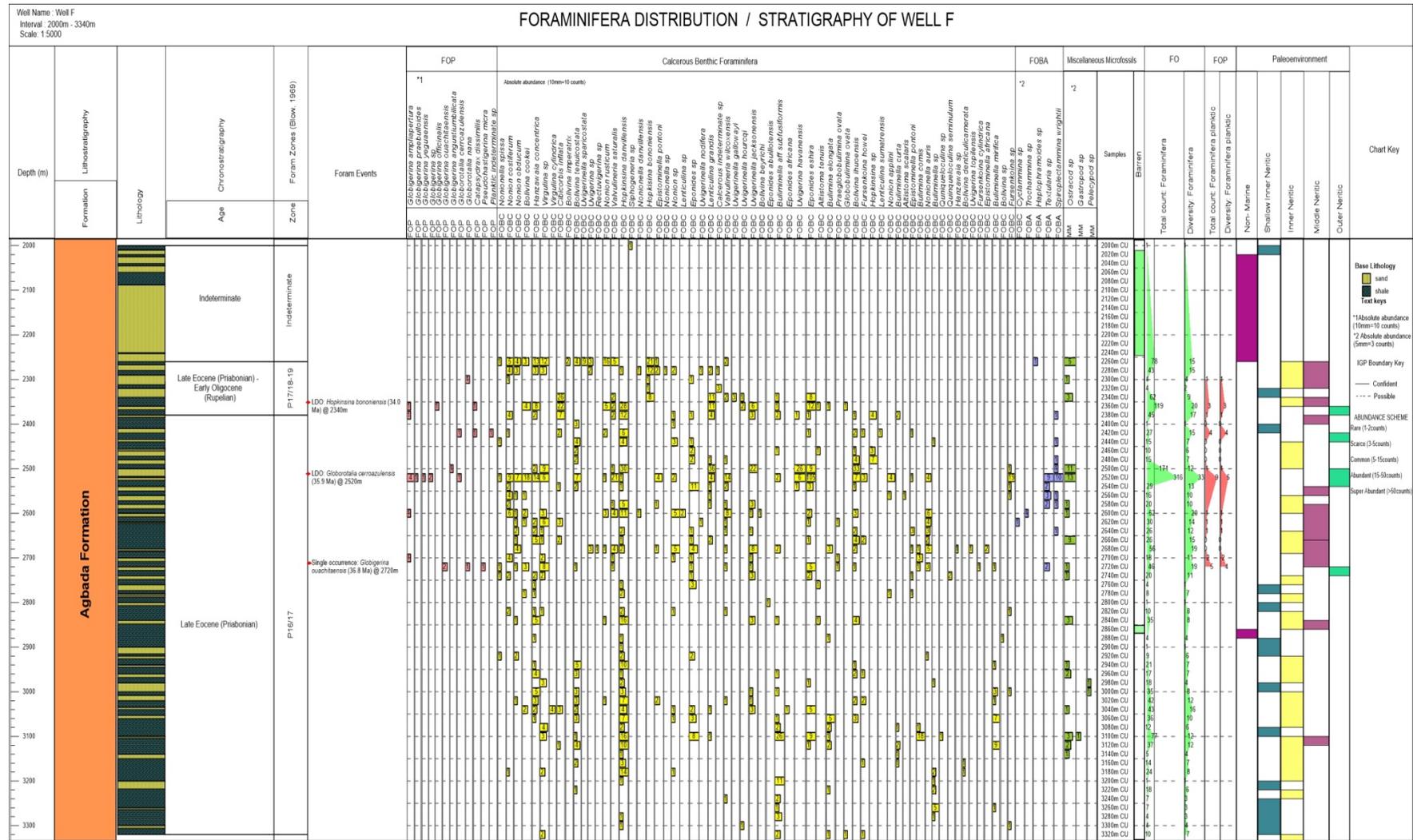


Figure 5. Foraminiferal chart of well F

The alphanumerical designation of Blow (1969) and its equivalent in Bolli and Saunders (1985) and Petters (1982) were adopted for this study. The use different foraminifera species to designate different zones was based on the occurrences of age diagnostic planktics taxa and other associated benthic assemblages.

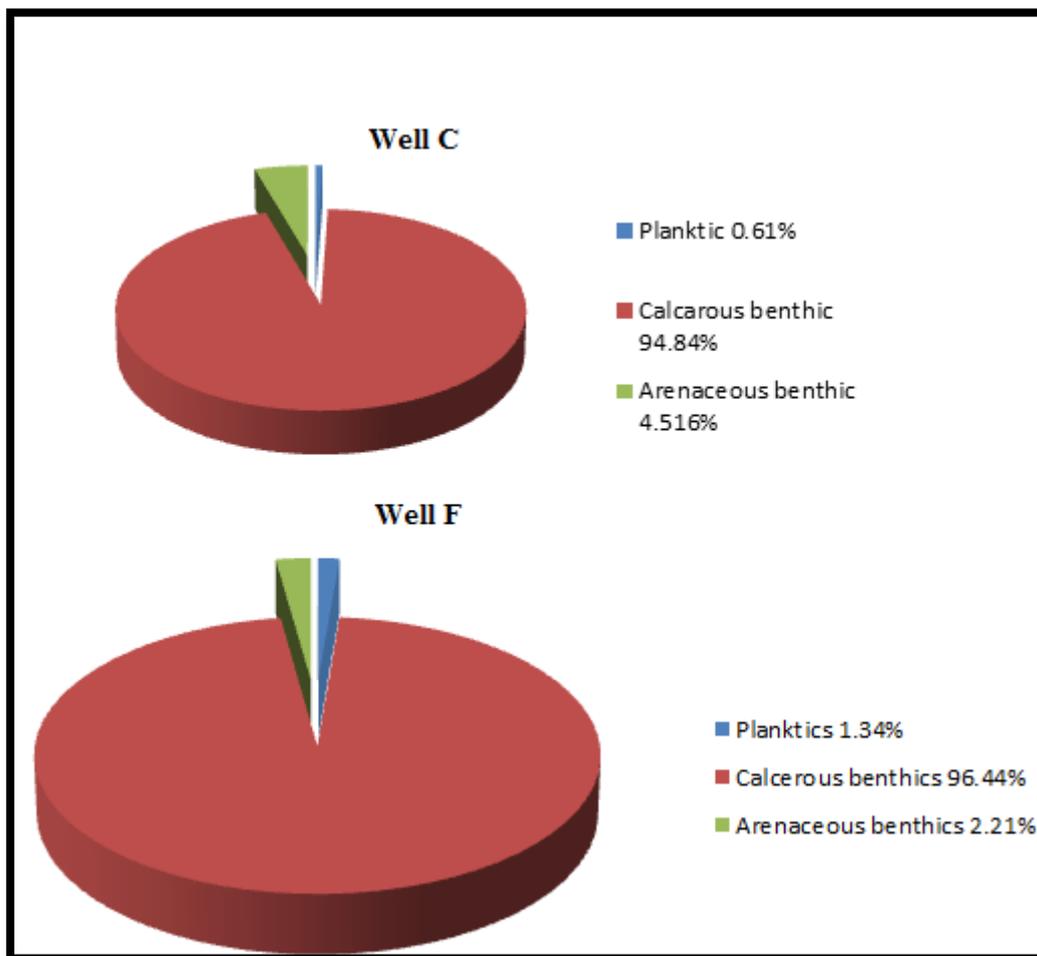


Figure 6. Pie chart showing the percent of foraminifera counts in wells C and F

A. Foraminifera biostratigraphy of Well C

Interval: 2410-2500m

Foram zone: P18 / 19 (*Pseudohastigerina micra* / *Globigerina ampliapertura* zone)

Age: Early Oligocene (Rupelian)

Key microzone events: The co-occurrence of *Hopkinsina bononensis*, *Hanzawaia concentrica*, *Valvulineria wilcoxensis*, *Epistominella pontoni*, *Bolivina tenuicostata* and *Uvigerina sp.*

Single occurrence of *Uvigerina sp*

FDO / LAD of *Hopkinsina bononiensis* at 2440m.

The age diagnostic foraminifera assemblage in this interval is characterized by *Epistominella pontoni*, *Nonionella spissa*, *Nonion applini* *Nonion costiferum*, *Eponides eshira*, *Hopkinsina bononensis*, *Hanzawaia concentrica*, *Valvulineria wilcoxensis*,

*Epistominella pontoni*, *Bolivina tenuicostata* and *Uvigerina sp.* All these foraminifera assemblages are suggestive of the Early Oligocene. *Epistominella pontoni* is an Oligocene – Miocene form (Petters, 1995). Petters (1982) reported *Nonionella spissa* and *Nonion applini* as Middle Oligocene – Early Miocene index forms while *Nonion costiferum* was reported as an Oligocene – Pliocene form. Petters (1982) also reported *Eponides eshira* as a Middle Oligocene – Middle Miocene form in the Niger Delta. *Uvigerina sp.* is also indicative of Paleocene – Oligocene (Petters, 1982). Brouwer *et al.* (1977) used *Hopkinsina bononiensis* to mark the Early Oligocene. The occurrence of *Hopkinsina bononiensis* and *Uvigerina spp.* at 2410m and 2470m respectively is an indication of an age not younger than Oligocene (table 1). This interval corresponds to the P18 zone of Blow (1969) and *Pseudohastigerina micra* / *Globigerina ampliapertura* zone of Bolli and Saunders (1985) as well as the *Altistoma scalaris* – *Epistominella pontoni* zone of Petters (1982).

Interval: 2500-2800m

Foram zone: P17/18 zone (*Globorotalia cerroazulensis* / *Pseudohastigerina micra* zone)

Age: Late Eocene (Priabonian) - Early Oligocene (Rupelian)

Key microzone events: Single occurrence of *Globorotalia sp.* at 2500m and *Praeglobobulimina ovata* at 2740m

The age diagnostic foraminifera assemblages in this interval include *Globorotalia sp.*, *Nonion sp.*, *Nonion costiferum*, *Valvulineria wilcoxensis*, *Bolivina tenuicostata*, *Eponides eshira*, *Praeglobobulimina ovata*, *Epistominella pontoni*, *Hanzawaia concentrica* and *Nonion applini*. Petters (1982) used a similar assemblage to assign this age. The single occurrence of *Globorotalia sp.* at 2500m and the FDO/LAD of *Praeglobobulimina ovata* at 2740m supports the assigned age (table 1).

Nathan (1977) used *Globorotalia sp.* to assign an Early Eocene age to the coastal strip between Buttress Point and Ship Creek, South Westland while Bolli *et al.*, (1994) used *Praeglobobulimina ovata* as a marker for the Early Eocene Lizard Springs Formation of Trinidad. Clendenen *et al.* (1990) also used *Praeglobobulimina ovata* to assign Eocene age to the Albatross sequence in Sitkinak Island.

This interval (2500–2800m) corresponds to the P17/18 zones of Blow (1969) and *Globorotalia cerroazulensis* - *Pseudohastigerina micra* zone of Bolli and Saunders, (1985) as well as the *Nonion oyaie* – *Uvigerina hourqi* / *Altistoma scalaris* – *Epistominella pontoni* zone of Petters (1982).

#### B. Foraminifera biostratigraphy of Well F

Interval: 2000 – 2260m

Foram Zone: Undiagnostic

Age: Indeterminate

This interval is barren of foraminifera except for the single occurrence of *Siphogenerina spp.* at 2000m. Thus the age of this interval could not be determined. However, it is not younger than Oligocene. Petters (1995) recovered one specimen of *Siphogenerina senni* that is similar to *Siphogenerina sp.* from the Parabe-1 and dated it Oligocene.

**TABLE 1: Foraminiferal microbiozonation of well C**

Interval (m)	Foram zone (Blow, 1969)	Foram zone (Bolli and Saunders, 1985)	Age	Remarks
2410-2500	P18	<i>Cassigerinella chipolensis</i> / <i>Pseudohastigerina micra</i> zone	Early Oligocene (Rupelian)	Occurrences of <i>Hopkinsina bononensis</i> infer an age not older than Oligocene in the Niger Delta. The co-occurrence of <i>Hopkinsina bononensis</i> , <i>Hanzawaia concentrica</i> , <i>Valvulineria wilcoxensis</i> , <i>Epistominella pontoni</i> , <i>Bolivina tenuicostata</i>  Single occurrence: <i>Uvigerina spp.</i> at 2440m. FDO / LAD: <i>Hopkinsina bononiensis</i> at 2440m
2500-2800	P17/18	<i>Globorotalia cerroazulensis</i> / <i>Pseudohastigerina micra</i> zone	Late Eocene (Priabonian) – Early Oligocene (Rupelian)	Single occurrence: <i>Globorotalia spp.</i> at 2500m and <i>Praeglobolulimina ovata</i> at 2740m

Foram Zone: P17/ P18-19 (*Globorotalia cerroazulensis* / *Pseudohastigerina micra* - *Globigerina ampliapertura* zone)

Age: Late Eocene (Priabonian) - Early Oligocene (Rupelian)

Key microzone events:LDO/FAD of *Hopkinsina bononiensis* at 2340m

FDO/LAD of *Globigerina ampliapertura* at 2360m.

Single occurrence of *Globigerina officinalis* at 2360m

The age diagnostic foraminifera assemblage in this interval is made up of *Nonion obducum*, *Nonion rusticum*, *Hanzawaia concentrica*, *Hopkinsina bononiensis*, *Bolivina imperatrix*, *Bolivina tenuicostata*, *Bolivina ihuoensis*, *Lenticulina grandis*, *Uvigerina jacksonensis*, *Uvigerina havenensis*, *Uvigerina hourcq*, *Valvulinera wilcoxensis*, *Valvulinea suturalis*, *Globorotalia cerroazulensis*, *Globorotalia nana*, *Globorotalia officinalis*, *Catapsydrax dissimilis* and *Globigerina ampliapertura*. The recovered foraminifera assemblages suggest Late Eocene – Early Oligocene ages (Petters, 1982, 1983). Petters (1983) reported *Globigerina officinalis* as an index form for middle Eocene - Oligocene in the Niger Delta. The single occurrence of *Catapsydrax dissimilis* further gave credence to the age of this unit (Boersma, 1978). This foraminifera assemblage represents a section of the Eocene/Oligocene transition. The single occurrence of *Globorotalia nana* at 2300m is an indication of an age not younger than Oligocene. The FDO/LAD of this taxon occurs in the Oligocene (Blow, 1969). The FDO/LAD of *Bolivina imperatrix* and *Bolivina ihuoensis* at 2260m and 2380m respectively supports this age. The co-occurrences of *Bolivina ihuoensis*, *Uvigerina jacksonensis*, *Uvigerina havanensis* and *Uvigerina hourcq* at 2380m are indicative of the penetration of the Late Eocene in the Niger Delta (Petters, 1982). This interval corresponds to the P17/P18-19 zones of Blow (1969) and *Globorotalia cerroazulensis* / *Pseudohastigerina micra* - *Globigerina ampliapertura* zone of Bolli and Saunders (1985) as well as *Nonion oyae* – *Uvigerina hourqi* / *Altistoma sclaris* – *Epistominella pontoni* zone of Petters (1982)(table 2).

Interval: 2380 – 3320m

Foram Zone: P16-17 (*Globorotalia cerroazulensis* zone)

Age: Late Eocene (Priabonian)

Key microzone events: LDO/FAD of *Globorotalia cerroazulensis* at 2520m.

Single occurrence of *Globigerina ouachitaensis* at 2720m

Single occurrence of *Pseudohastigerina micra* at 2720m

LDO of *Globigerina ampliapertura* at 2720m.

The age diagnostic foraminifera assemblage in this interval is made up of *Bolivina ihuoensis*, *Bolivina denticulocamerata*, *Epinodes eshira*, *Uvigerina jacksonensis*, *Uvigerina havanensis*, *Uvigerina hourcq*, *Epistominella minuta*, *Hopkinsina mirifica*, *Hopkinsina danvillensis*, *Epinodes eshira*, *Fursenkoina howei*, *Fursenkoina cylindrical*, *Buliminellita mirifica*, *Nonion obducum*, *Nonion rusticum*, *Globorotalia cerroazulensis*, *Globigerina ampliapertura*, *Catapsydrax dissimilis*, *Globigerina ouachitaensis*, *Globorotalia nana*, *Pseudohastigerina micra* and *Globigerina yeguaensis*. This foraminiferal assemblage constitutes a typical component of the Late Eocene age in the Niger delta (Petters, 1982; 1983).

Petters (1982) pointed out that *Uvigerina jacksonensis* has been reported from Eocene strata in many parts of the world. Petters (1983) reported scarcity of *Globorotalia cerroazulensis* and *Pseudohastigerina micra* in the Niger Delta. The occurrence of *Globorotalia cerroazulensis* as well as the increase in counts of *Globigerina ampliapertura* is indicative of the penetration of the P16/17 foram zone (Blow, 1969). The single occurrence of *Globigerina ouachitaensis* and *Pseudohastigerina micra* at 2720m further supports the assigned age (Petters, 1983)(table 4).

McGowran (2008) recorded *Globorotalia cerroazulensis* as an index form for the Eocene. Samanta (1969) and Poore and Brabb (1977) used a similar assemblage in dating the Eocene succession of the Kopili Formation and Butano Sandstone respectively. All these give credence to the assigned age of Eocene. Bolli (1957) used *Globigerina yeguaensis* to

date the Middle – Early Eocene in the Navet Formation, Southern Trinidad. *Globigerina yeguaensis* was first described from the subsurface sediments of Yegua Formation (Middle Eocene), Texas and is widely distributed in sediments of Middle and Upper Eocene age. Berggren (1960) extended the lower limit of the age range to the Lower Eocene.

This interval (2380 -3320m) corresponds to the P16/17 zones of Blow (1969) and *Globorotalia cerroazulensis* of Bolli and Saunders (1985) as well as *Nonion oyae* – *Uvigerina hourqi* zone of Petters (1982)

#### IV.SUMMARY AND CONCLUSION

The paper provides information on the foraminifera from the Late Eocene (Priabonian) – Early Oligocene (Rupelian) boundary which appears to be one of the most important breaks within the Cenozoic. Continuous sequences at the Eocene - Oligocene transition were rarely described in the literature except for the terminal Eocene events. This study provides a fairly/complete record as well as continuous sequences through the Eocene-Oligocene boundary as recovered in neritic facies contrary to most records that are from the deep ocean environments.

Foraminiferal biostratigraphic analysis of sediments penetrated by well C and F revealed similar ages of Late Eocene – Early Oligocene. The sediments of well C is of Late Eocene (Priabonian age) - Early Oligocene (Rupelian age) and consist of two (2) foram zones: P17/18 (*Globorotalia cerroazulensis* / *Pseudohastigerina micra* zone) and P18 (*Pseudohastigerina micra* zone). The sediments of well F is also of Late Eocene (Priabonian age) - Early Oligocene (Rupelian age) and consist of four (4) foram zone: P16 -17 / P18-19 (*Globorotalia cerroazulensis* / *Pseudohastigerina micra* - *Globigerina ampliapertura* zone).

TABLE 2. Foraminiferal microbiozonation of well F

Interval (m)	Foram zone (Blow, 1969)	Foram zone (Bolli and Saunders, 1985)	Age	Remarks
2000-2260	Undiagnostic	Undiagnostic	Indeterminate but not younger than Oligocene	Predominantly barren
2260-2380	P17/P18-19	<i>Globorotalia cerroazulensis</i> / <i>Pseudohastigerina micra</i> - <i>Globigerina ampliapertura</i> zone)	Late Eocene ( <i>Priabonian</i> ) – Early Oligocene ( <i>Rupelian</i> )	Single occurrence of <i>Globigerina officinalis</i> at 2360m. FDO/LAD of <i>Globigerina ampliapertura</i> at 2360m. LDO of <i>Hopkinsina bononiensis</i> at 2340m
2380-3320	P16/P17	<i>Globorotalia Cerroazulensis</i> zone	Late Eocene ( <i>Priabonian</i> )	LDO/LAD: <i>Globorotalia cerroazulensis</i> at 2520m. LDO of <i>Globigerina ampliapertura</i> at 2720m. Single occurrence of <i>Globigerina ouachitaensis</i> and <i>Pseudohastigerina micra</i> at 2720m

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# Mind the gap: Implementation Challenges to the Transition towards Inclusive Education in East African Country

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**Abstract-** Most of the African children with disabilities live in sub Saharan, Africa. Many of these countries including: Ethiopia, have ratified international conventions on the rights of children with disabilities and are making a transition towards inclusive education. However, the vast majority of Africans with disabilities are excluded from schools and opportunities to work. This study examines the challenges in making this transition in one East African country, Ethiopia. A multi-method qualitative research approach was adopted. Document analysis identified the Ethiopian governments' vision for inclusive education. This vision was compared with the reality revealed by observations and interviews. Observation of teacher-student and student-student interactions in classrooms and outdoors, and analysis of the physical environment, was made in a total of fifteen classrooms drawn from five primary schools found in southern Ethiopia. In-depth interviews were conducted with school principals, classroom teachers, students with and without disabilities, and members of the parent teacher association. It has learned from the study that though the government policies that are prerequisite for inclusive education exist in Ethiopia, there is a large gap between policy and practice. In particular, the implementation of the policies is hindered by a lack of special needs professionals, a shortage of relevant teaching resources and accessible basic amenities, and low level of collaboration among stakeholders.

**Index Terms-** Inclusive Education, Children with Disabilities, IEP, Challenges

## I. INTRODUCTION

**A** 1.1 Background of the Study  
According to UNICEF, more than 80% of children with disabilities live in developing countries and have little or no access to appropriate services (Deluca, M. Tramontano, C. and . Kett M, 2014). Despite the efforts and achievements of Education For All (EFA) and the Millennium Development Goals (MDGs), children with disabilities remain one of the main groups that continue to be excluded from education around the world; those who do attend school are more likely to be excluded in the classroom and to drop out (UNESCO, 2015).

According to UN statistics, there are currently over 600 million persons with disabilities throughout the world of whom 400 million live in developing countries and 80 million in Africa (ACSL,2017).Most of the African children with disabilities live in sub Saharan, Africa. Many of these countries (including:

Ethiopia, Kenya, Burundi, Rwanda, Tanzania, and Uganda) have ratified international conventions on the rights of children with disabilities and are making a transition towards inclusive education. However, the vast majority of Africans with disabilities are excluded from schools and opportunities to work.

In a movement towards inclusive education the government of Ethiopia adopted the United Nations convention on the right of the child on December 9, 1991. The constitution of the Federal Democratic Republic of Ethiopia (FDRE), article 9(4) states that all international agreements ratified by Ethiopia are an integral part of the law of the land .Article 13 further elaborates that all legislative, executive, and judicial organs have the responsibility to respect and enforce what is embedded in the constitution.

The Ethiopian constitution establishes the right to equal access to publicly funded social services urges all Ethiopians to have access to public health and provides rehabilitation assistance to people with disabilities and other disadvantaged groups.

The Ethiopian Education and Training Policy (TGE, 1994) requires expansion of basic quality education for all including children with special needs. In order to achieve the goal of universal primary education by the year 2015 as stipulated in the policy, due attention has to be given to the enormous number (10 %) of children and students with special educational needs (MOE, 2006).

In 2006 the MOE has developed Federal Special Needs Education strategy which focuses on the promotion of inclusive education to meet the Millennium Development and EFA goals (MOE, 2006). According to this document the government's strategy for improving the provision of educational services for children with special educational need is based on the principle of inclusion. The special needs education (SNE) strategy aims to make the education system inclusive by educating teachers and establishing support system in regional education bureaus (REBS), *woreda* education bureaus (WEBS) and in schools(MOE,2006). The strategy recognizes the need to identify and remove barriers by considering learners' diversity through for example transcribing textbooks in to Braille, using sign language as a medium of instruction and other activities (UNESCO, 2007). Despite the effort Ethiopia has shown in the process of Education for All (EFA), it has been noted that there is still a gap in the provision of access to all learners particularly those with special education needs hence, and actualizing special needs education (MoE, 2012)

## 1.2 Problem Statement

The government of Ethiopia is striving to achieve the goal to provide quality education for all citizens. Moreover, as the country adheres to international convention concerning child right, and also the federal democratic republic of Ethiopia reorganizes the existence of diversity in peoples, cultures etc, and the country considers diversity as beauty (opportunity) to develop the country. Thus, the need to make a shift to inclusive education is logical.

Children and young people with disabilities including psychological problems of different origins, learning difficulties, behavioral disorders and family problems, who are confronted with abusive behaviors at home and schools, increase the number of dropouts and repeaters at schools and the population of homeless children and youth on the street. Such children and young people have needs that can be addressed within ordinary schools, but only if the schools are organized and teachers are appropriately educated and use appropriate instructional strategies along inclusive education (MoE, 2006). The movement towards educating children with disabilities along with those without disabilities will have twists and turns, and there is a long way to go to get everything in place in the way of moving forward, and thus it is always important to check whether the necessary preparations are in place or not (Tirussew, 2005).

In southern parts of Ethiopia (about 185Km south to Addis Ababa, capital city of Ethiopia) where the current study has conducted students having diversified needs share the same class and school and learn together including those which are recognized as having visual impairment, motor disability, and hearing impairment. Due to the international paradigm towards inclusive education pioneered by western countries, Ethiopia is also following similar scenario without having necessary preconditions. In many schools mere presence of students with disabilities in schools is perceived as inclusive education by school communities. Thus, to fill the understanding gap about inclusiveness of the school practice especially as to whether the overall teaching and learning process, the learning environment, the practice of community building is in line with inclusive education or not. Thus, it is important to understand whether the necessary requirements of inclusive practice are in place in order to realize inclusive education. Therefore, the researcher formulated the following research questions.

- How does the schools' environment (physical and social) respond to the needs of students?
- How does the instructional strategy used in the schools address the needs of students?
- To what extent does the school community collaborate with local community and among each other?

## 1.3 Objectives of the Study

### General Objective

To understand the implementation gaps hindering the transition towards inclusive education.

### Specific Objectives

- To explore as to whether the schools environment (physical and social) appropriately respond to the needs of students or not.
- To analyse the instructional strategies used in the schools in addressing the needs of students.

- To identify the extent to which the school community collaborate with local community and among each other?
- To forward feasible recommendation that helps to improve the journey towards inclusive education.

## 1.4 Significance of the Study

The study benefits those working in inclusive education to have a glance look at their own practice and improve their service. It helps them to see the extent to which they are practicing instructional strategy which is in line with the principle of inclusion in such a way that they would become better practitioners of inclusive education than they did. Moreover, the study offers an opportunity to understand one's weaknesses and strengths in the move towards building inclusive community helping diversified students, and orchestrating learning.

The school and local community would be benefited from the study by doing better in involvement, mutual respect, and collaborating with each other. As a result schools would perform better, more students become beneficial in their education and in all forms of participations. The schools and local community would be benefited from the reciprocal relationship expected to be established as a result of understanding the role and status of each other. Moreover, this study is important in the move towards building inclusive society and realization of fundamental human right. Understanding the gaps might inform the government and all stakeholders to work hard and take correcting measures.

## II. RESEARCH METHODS AND DESIGN

### 2.1. Methodological Approach

In this study qualitative research approach was followed. Qualitative research focuses on the process that is occurring as well as the product or outcome. Researchers are particularly interested in understanding how things occur (Fraenkel & Wallen, 1990; Merriam, 1988 cited in Cresswell, 2003). Qualitative research allows the investigator to interpret and bring to light an understanding of particular subjects and events (Denzin & Lincoln, 1994). Qualitative research is much more relevant and appropriate to identify the fundamental roles of personnel beliefs, feelings and perceptions, and organizational dynamism, as well as the social process that plays a great role in shaping practices in special needs education (Peck and Furman; 1992 in Mertens & McLanughin, 1995). Qualitative research method enables the researcher to explore problems in accordance with the insider's view point and it is concerned with developing explanations of social phenomena (Bogdan and Biklen, 1992). Thus, qualitative research approach and particularly case study was employed to explore and describe implementation challenges to the transition towards inclusive education from the view points of school administration, teachers, students, and local community.

### 2.2. Research Design

To get a detailed account or description of the issue, qualitative case study was employed. Qualitative case study

focuses on providing a detailed account or description of a single instance or bound system rather than making general explanations about phenomenon (Sherman & Webb, 2003). Qualitative research takes place in the natural setting. The qualitative researcher often goes to the life (home, office) of the participant to conduct the research. This enables the researcher to develop a level of detail about the individual or place and to be highly involved in actual experiences of the participants.

### 2.3 Selection of Participants

To obtain the richest possible information and thus understand the issue under study as clearly as possible, non probability- purposive sampling was used. Payne and Payne (2004), states that sampling in qualitative research is generally based on non-probability rather than probability and random approaches. In purposive sampling, whether a member of the population is chosen as a participant is decided not by chance rather it is decided by whether the individual could provide a rich information on the issue or not. According to Cresswell, (2007) the concept of purposeful sampling is used in qualitative research. This means that the inquirer selects individuals and sites for study because they can purposefully inform an understanding of the research problem and central phenomena. Thus, the researcher purposefully included five school principals, fifteen teachers, ten members of parent teacher Association (PTA), ten students without disability, and ten students with disability.

### 2.4. Data Collection Instruments

In order to obtain the necessary data for the study three instruments namely interview, observation, and document analysis were used. According to Cresswell (2003), in qualitative research the actual methods of data collection are based on open-ended observation, interview, and documents.

### 2.5. Data Analysis mechanisms

Data were analyzed using qualitative method. Data obtained from interview, observation, and document analysis were transcribed, coded, triangulated and themes were made. Finally, Data Analysis was carried out using narration and the summary of the words of respondents.

## III. RESULTS AND DISCUSSIONS

This study was aimed to understand implementation challenges to the transition towards inclusive education in selected schools of Ethiopia. More specifically it was intended to achieve the following specific objectives.

- To explore as to whether the schools environment (physical and social) appropriately respond to the needs of students or not.
- To analyse the instructional strategies used in the schools in addressing the needs of students.
- To identify the extent to which the school community collaborate with local community and among each other.

In order to achieve the above specific objectives data were collected using three instruments namely; interview, observation, and document review. The very extensive data were reduced, organized, and themed under *school physical environment, the school social environment, the teaching-learning process, collaboration and opportunities in the schools* and thus presented as follows.

### 3.1 The Schools' Physical Environment

*A student with a disability cannot learn in an inclusive classroom if he cannot enter the room, let alone the school building. Some schools are still inaccessible to students in wheelchairs or to those other mobility aides and need elevators, ramps, paved pathways and lifts to get in and around buildings. Accessibility can go beyond passageways, stairs, and ramps to recreational areas, paved pathways, and door handles. A student with cerebral palsy, for instance, may not have the ability to grasp and turn a traditional doorknob. Classrooms must be able to accommodate a student's assistive technology devices, as well as other furniture to meet individual needs (UNESCO,2008)*

Contrary to the above expectations the pathways leading to the gates of the schools were not clean and had a lot of obstacles. They were not smooth to allow free movement for students who were blind as well as for students with motor disability. Therefore, the students were observed to face difficulty in getting into the schools. There were no access ramps for wheelchair use. In the school compound itself the pathways to and from classrooms, toilets, library, offices were hurdled by a number of obstructions. There were trees, newly planted foliage & fenced, stones collected here and there, dig outs, etc. These and others seem to hinder blind students and students with motor disability not move freely in the school compound. Generally speaking the outdoor environment of the schools had a number of hazards. It was unsafe and inaccessible for some students.

The classroom physical environment also didn't allow easy movement of students in the class. The classrooms were overcrowded by desks which were attached together. There was also large number of students in a single class. Thus, it didn't allow free movement for children with motor disability and visual impairments. This is not characteristics of inclusive classroom which was described by Belk (2005) as, the need of classroom arrangement to allow for freedom of movements. One of students with disability using crutches responded,

*I can't easily and safely access my classroom as it has stages. The classroom materials are also not arranged well. Desks are not arranged properly for easy movement. It is also not suitable to sit on.*

A learner using wheelchair says

*There were also stages at every room in the school. How can I step on to get in to the classrooms? It hindered me to get in to the rooms unless someone carry/ lifts me up to the upper stages*

Almost all of the classrooms were not aesthetically pleasing and materials in the class were not arranged to meet the needs of all students. There was shortage of materials in the class to encourage the learning of all students. There was also scarcity of furniture in some classes of the schools. The class design and arrangement of furniture seem unfortunate to accommodate the

needs of students with motor and those with visual impairment. Some classes had no sufficient natural or artificial light thus making some students to miss important points which can otherwise be gained from observing the teacher and the blackboard. There were classes which were overcrowded and suffocated. There was no electric ventilation to foster easy movement of air in the class to serve the large number of students. Temperature in the afternoon shift, which was relatively hot, was aggravated by the nature of the classroom buildings and large number of students in the class. Students at their first arrival to the class in the afternoon were observed to be busy in dealing with sweats and taking off their most upper wears.

The overall topography of the school compounds also seem unfortunate for easily movement to access different rooms.

One of the student with visual impairment responded:

*I can't move freely in the classroom as well as in the school. There are a number of obstacles here and there. I used to collide with different objects in the schools. Therefore I decided to sit at specific place.*

Another learner using wheelchair says

*The toilets were not suitable for me. I couldn't use any of them. I couldn't get in to the toilet room with my wheelchair. It has stage and also had narrow door. Moreover, as I see from distance and as I informed by my classmates, it has no special design to support me at appropriate place to use it. Therefore, I usually manage/minimize my food and drink intake before school but still I encountered problems in school including wetting my dresses.*

The toilets were not suitable for students with motor disability. It seems that any of the toilets in the schools were not made to consider the needs of students with motor disability during its construction and almost no attempt was made to modify at least some of them to the current demand of students with motor disability. Lack of toilet access in the school made the students to abstinent from food for certain time so that they would not need toilet at school times. Such condition might have its own impact on students learning.

### 3.2. The Social Environment of the Schools

Students with disabilities and those without disabilities were observed while they were coming to the schools and in the school compounds. Most of them were observed to chat and walk together. It seems that they didn't discriminate each other. In the flag ceremony they attend it commonly together by forming lines without preferring one student to another based on any other differences. They didn't prefer one to another based up on disability or other differences. In moving to the class or out of the classes, they formed pairs or small groups based on their relationship other than disability condition. Exception to this condition was that deaf students seem to tend together in movement and discussion. But here also there was communication between deaf and hearing to some extent.

Student with physical disability says,

*In moving together in school compound students without disabilities usually don't discriminate me. They approach me just like other student. In play ground and any activity they even provide me the first chance. In the class also we sit together. In students team work I am grouped with students without disabilities. We work together. We also exchange learning*

*materials. They usually support me. Teachers also encourage me to be successful in my education through their advices.*

In play grounds during break times, students were observed actively playing with each other. Teachers were also observed communicating with some students regardless of their disability. Students seem to disclose their problems freely to their teachers for solution. The teachers approached/interacted almost all students in similar manner regardless of their differences. Students without disability were also observed showing concern and care for students with disabilities and vice versa. In the classroom, students with disabilities and students without disabilities were observed to learn and discuss issues together. They did class works together, showed concern for each other. When the teachers order them to form arbitrary groups, students with disabilities also could find friends easily to form the group they need. In borrowing materials among themselves no difference was observed among students with disabilities and students without disabilities. It seems that there were no discrimination in the classroom among the teachers and students due to disability. But some teachers were observed that they ask more "difficult" questions students without disabilities than they used to ask students with disabilities.

### 3.3 Teaching Learning Process

It is likely that there are students functioning at different levels. Some will be working at their age level, some will be working a year or more ahead, and some other will be working at an earlier age level (MoE,2012). Such conditions require teachers to prepare their lesson according to the needs and abilities of children. In order to address such diversified needs, teachers should use multi-level teaching or make lesson adaptation to respond to the diversified needs.

Moreover, according to UNESCO (2008), just as the environment must be accessible to students with disabilities, the curriculum must facilitate inclusive education, too. General educators must be willing to work with inclusion specialists to make modifications and accommodations in both teaching methods and classroom and homework assignments. Teachers should be flexible in how students learn and demonstrate knowledge and understanding. Written work, for example, should be limited if a student cannot write and can accomplish the same or similar learning objective through a different method.

Opposite to the above idea, the teaching learning process carried out in the schools was almost depended on lecture and traditional group discussion. In the schools all students were considered as working at the same ability level. Even though the teachers believed that there are three different ability levels in their students, no practical attempt was made to address the needs of such diversified ability levels. The teachers almost employed similar teaching methodology for all students. In addition, no curriculum modification was made to respond to the needs of all students. What the students learn (the content) was the same for all students in the class. The teachers used student text books with no modifications. The way the teachers present the lesson for the students was almost the same for all students in the same class despite differences among students. Thus, there were students who couldn't benefit from the content taught as well as the teaching methodology employed. This strategy

opposes with the advise that Kendall and DeMoulin (1993) cited in Belk (2005) offered *teachers of inclusive classroom are expected present lessons in a multi sensory manner, using relevant material and active learning methods, and they need to teach to the personal interests of the students.*

In line with the above idea Urdvari-Soluer & Thousand (1995) and Belk (2005) also agreed that *... teachers of inclusive classroom need to adapt or differentiate the curriculum by changing the content, methods and the use of flexible and non standardized assessments that are more responsive to human diversity.*

Furthermore, in the schools under study no time adjustment was made on learners' speed of learning and learning styles were not addressed appropriately. Classroom tasks were not present at different levels of complexity. The teachers gave almost equal amount of time to copy notes from blackboard, or to accomplish activity regardless of their difference.

UNESCO (2001), Quiun & Ryba (2004), and National Science Foundation (2006) opposes the teachers practice describing as

*the need to have instructional differentiation like: sensitivity to students' diversity, the use of active learning methods, using different learning styles (visual kinesthetic, auditory, etc), providing tasks and questions at different levels of complexity and varying numbers of steps in practice.*

Lesson plans were not in line with the needs of every student. The objectives were not specific and didn't communicate what was intended to achieve. Moreover, it puts the students to be only recipients of the instruction rather than active participants. There was no Individualized Education Plan (IEP) to address educational services tailored to the needs of learners with special educational needs. To the contrary, UNESCO (2009) underscored the need to have individual educational plan for the child with a special needs. MoE (2012) also described the importance of preparing and using IEP for learners and teachers. According to the document IEP assures the right of learners to education and helps the teacher to deliver effective programs for learners with special needs. It also helps to overcome barriers in education.

Document analysis showed that the Ministry of Education in Ethiopia endorsed inclusive education (IE), and the use of individualized education programs (IEP) for children with special needs, and provided printed guidelines about these to some school. Encouraging progress had been achieved in exposing teachers to initial training and in building ramps to increase the accessibility of classrooms. However, many barriers to the implementation of inclusive education remained as problems. Interviews with school principals and class teachers revealed that they were not in a position to understand, disseminate or implement the IE guidelines obtained from the Ministry of Education.

*Interviews with principals and teachers revealed that most had no access to support staff (such as permanent or itinerant special needs professionals), IEP and IEP teams did not exist, and the rigid curriculum was difficult to adapt for children with special needs.*

### 3.4 Collaboration

Teachers working together, with other professionals, or with parents to help student with special educational needs in the schools seem to be weak. There was totally absence of itinerant teachers and shortage of professionals in special needs education in the schools under study. Moreover, teachers teaching in the same school or class were not collaborating to the expected level to help student with special needs in their class.

*One of the barriers associated with inclusion education is a lack of communication among administrators, teachers, specialists, staff, parents, and students. Open communication and coordinated planning among staff are essential for inclusion to work. Time is needed for teachers and specialists to meet and create well-constructed plans to identify and implement modifications the, accommodations, and specific goals for individual students. Collaboration must also exist among teachers, staff, and parents to meet a student's needs and facilitate learning at home.*

Some teachers took initiation and form *special needs club* in two of the schools but the school administration seem to stay far from them. Furthermore, the collaboration between school and local community was found to be unsatisfactory. The school and local community come together rarely to discuss issues of special needs children. The Education and training board at the *kebele administration* level seem to ignore the issue of students with special needs. But there were contacts with *Woreda* education office on the issues. Still their relationship was not beyond asking statistical data about number and types of students with special educational needs. Though the current trend is providing access to education in the nearest school, to this paradox, the education office itself is sometimes not willing to hire or assign professional teachers in special needs education to schools accepting students with special needs. Instead, the office made the special needs children to attend only specified schools. As a result, some students with disabilities were forced to attend a school very far from home while others (for example, children with intellectual disability) stayed at home.

## IV. SUMMARY, CONCLUSION AND RECOMMENDATIONS

### 4.1 Summary

This study was intended to understand implementation challenges to the transition towards inclusive education in selected schools of Ethiopia. In order to achieve this general objective, the following basic questions were raised.

- How does the schools' environment (physical and social) appropriately respond to the needs of students?
- How does the instructional strategy used in the schools address the needs of students?
- To what extent does the school community collaborate with local community and among each other?

In order to answer the above basic questions qualitative case study research approach was followed. Data were collected using three instruments namely interview, observation, and document analysis were used. The participants of the study were five school principals, fifteen teachers, ten members of parent teacher Association (PTA), ten students without disability, and ten students with disability. The participants were purposely

selected. Open ended interview questions were carefully developed by the researcher and held with school principals, teachers, students, and PTA members. Observation focused on both physical environment and social environment of the school. From the collected data it was found that the schools' physical environment was almost inaccessible for students who were physically challenged and for blind students. The outdoor environment and indoor environment were almost difficult to be accessed by physically challenged. Toilets and the play grounds were the most challenging for wheelchair users. Moreover, the schools' environment were full of obstacles and hard to navigate, inaccessibility of toilets, lots of stages, absence or shortage of special needs professionals, lack of itinerant teachers, rigidity of curriculum, absence of IEP and IEP team, unsatisfactory relationship between the school and local community. Teaching learning process and its plan seem to ignore students with disabilities.

#### 4.2 Conclusion

Almost all schools under the study were physically inaccessible for students who used wheelchairs. The schools were not accessible for anyone in wheelchair. It is possible to say that the schools were not open for those who use wheelchair. So it is not logical to expect a number of wheelchair users in an environment which is not accessible. Failure to provide accessible environment is denying the rights of the children to equal access of publicly funded social services (Article 41 of the constitution of FDRE). The whole school compound and classroom equipments, library, toilets, etc. were not equally accessed to all students. The number of students in the class was very high that teachers couldn't support all students. The classrooms were not ease for students learning. There were shortage of professionals, itinerant teachers, and resource room. The social environments of the school on the other hand seem good. The interaction among students with disability and students without disabilities as well as teachers and students was relatively interesting. The teaching-learning process was characterized by highly rigid curriculum despite government's effort in preparing guideline for curriculum differentiation and individual educational program. Teachers seem to lack knowledge and competence to do so. Teachers didn't prepare and help students according to their needs and abilities. The content, instructional methodology, assessment, and instructional-aids were not adapted to the needs of students. There were also lack of adequate communication among administrators (woreda, Kebele, & school), teachers, parents, and students.

#### 4.3 Recommendations

- ❖ The school and local administration should facilitate mechanism in which school grounds and facilities become safe, clean, and well-maintained.
- ❖ Hurdles and obstructions in the schools should be removed by the school community.
- ❖ Local and school administration should facilitate the implementation of policies and strategies formulated by the Ministry of Education (MoE) on inclusive education to ascertain the rights of individual learners.
- ❖ Practical measures should be taken by the school and local administrative body to facilitate accessibility of

toilet, library, classrooms, play grounds, seats, and path ways to the needs of students with disabilities.

- ❖ The *Woreda* education office should assign professionals (itinerant teachers, Braille & sign language teachers) to respond to the acute shortage of professionals and support staff. They should work together to prepare and utilize individualized education plan (IEP) for learners in need of it.
- ❖ Resource rooms should be made available at schools. Moreover, the under resourced once should be equipped with appropriate teaching learning materials (Braille text books, tactile graphs, and other stationary and mobility material for children with disabilities).
- ❖ Screening and assessment tools should be developed by professionals and made available at schools for use.
- ❖ Teachers should adapt or modify the content, methodology, instructional-aids, and assessment according to the students needs. The effort made by MoE in preparing documents is interesting but classroom teachers should get mechanism on how to adapt curriculum.
- ❖ Collaboration among and between the school and local community should be facilitated by the school, members of parent teacher association, and *Kebele* education and training board.
- ❖ More comprehensive researches should be carried out on the practice of inclusive education.

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# A Study on Handwriting Analysis by OCR

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**Abstract** –OCR, commonly known as Optical Character Recognition also known as Optical Character Reader. It is used to collect information from handwritten documents or manuscripts, printed paper data records. It is a common method of digitizing handwritten manuscripts so that they can be modified or used digitally in modern technology.

**Index Terms** – Acknowledgement, Conclusion, OCR Procedure, Text Processing.

## I. INTRODUCTION

THE recognition and conversion from images of text have always been a challenging task for automatic data processing and information retrieval and services. In particular, the task of scanning human handwriting and making them not only digital readable, but also searchable and digitally editable, is important to retrieve and collect information.

In this way, the information of old manuscripts or any handwritten document can be a valuable and interesting source to build a strong and complete information network. Different organizations are interested in the mass scale digitization of historic manuscripts or handwritten documents with a focus on offering improved full-text searching.

## II. OCR PROCEDURES

Different digital collections and information systems digitalize handwritten documents, such as old manuscripts of any historic civilization or very old manuscript or any handwritten document. However, optical character recognition of old handwritten manuscripts often poses different challenges. In the following phrases we summarize the main issues.

## III. OCR problems of Handwritten Documents

Working with handwritten documents, we face different problems.

**Image problems:** One of the major problems is the quality of the original manuscript and the quality of the scan. This includes issues such as curled pages, blurred fonts, or manually edited pages (e.g. stamps or hand-written notes).

**Font type and layout:** Human handwritings are not supported by standard OCR software. The fonts or

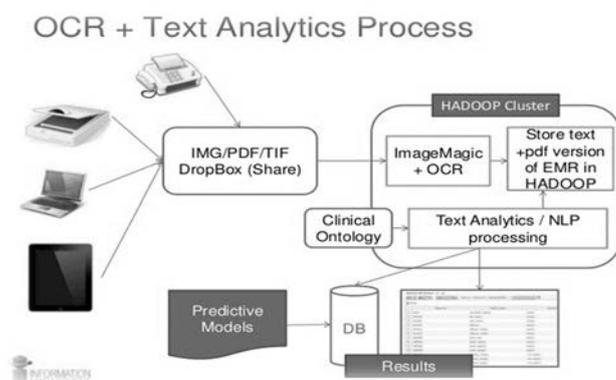
characters are different with the change of person. Old manuscripts are even harder to recognize, because they use font styles that are totally new to modern human society. Thus, also the spacing between words and characters is often not consistent. Additionally, historic papers often use different and inconsistent layout structures.

**Missing knowledge base:** Traditional OCR software uses knowledge bases based on contemporary dictionaries and grammatical structures to enhance the OCR procedure and does not provide manuscripts documents. Additionally, historic manuscripts often do not follow specific orthographic structures and rules, thus words can be written differently in the same text.

Every manuscript or handwriting is different from each other. Thus, very specific and unique problems can occur for every project. In the next section, we take a closer look at the overall OCR process, and possibilities to improve the different steps.

## IV. OCR Process

Since technology develops by time the necessity of recording data in handwritten format decreases by time, now a days all records are being kept in format of digitized text document or media, so it is necessary to focus on these specific problems in the OCR process. In the following section, we describe the procedure of OCR with a focus on creating a learning / feature base for handwritten documents, which can be used for improving machine learning algorithm. To improve the accuracy of the OCR process, different actions can be taken in every single step of the process.



- **Scanning:** The first phase of Optical Character Recognition is the scanning phase. This phase is one of the most important phases. If possible, scans

should be made of well-preserved and clean originals. The scanning resolution should be at least 300 dpi and the output image a lossless image format (e.g. tiff).

- **Pre-processing:** This is the second phase of Optical Character Recognition. In this step, the scanned document can be manually optimized for the OCR process. This includes image editing processes such as increasing the contrast, reducing noise, or simplifying the colors.
- **OCR-process:** In this phase of Optical Character Recognition, the chosen OCR system reads the images and applies an algorithm to recognize the characters. It is crucial to choose OCR software that fits the current problem and supports a training/learning algorithm.
- **Create learning base:** To improve the OCR-process it is very important to create and improve the learning base for training the OCR system. This base consists of a dictionary fitting the document improved character pattern.
- **Post-processing:** In this phase, knowledge can be applied which had not yet been available to the OCR system. In a final step, the output can be corrected manually.

## V. Conclusion

In this paper, we tried to throw light on the process of OCR of scanned old documents, historic books, manuscript of a very old document. To compare the accuracy of the OCR methods, a normalized version of the Levenshtein distance can be used. Since every historic book is different and poses its own and new challenges, the most important step of an OCR process is building a learning base. The main contribution of this work is a model for OCR processes of historic books with old fonts. With such a model, with respect to preened post-processing, the accuracy of OCR of manuscripts or human handwriting can be improved significantly, compared to related approaches.

## VI. ACKNOWLEDGMENT

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# The Climate Change Strategy-the Company's Performance: Examining the Mediating Role of The Disclosure of Climate Change in Indonesia

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**Abstract-** The purpose of this study is to prove the influence of climate change strategy on the company's performance with the disclosure of climate change as a mediator. Research using explanatory approach from secondary data of carbon emitter company that is companies in the manufacturing, mining, utility, plantation and transportation sectors which is listed on the Indonesia Stock Exchange. Data is taken from annual reports, sustainability reports, and corporate website in 2010 up to 2016 of 259 firm years. The results analysis shows that the climate change strategy either proactive and reactive give positive influence to the company's performance, the climate change strategy gives positive influence to the disclosure of climate change, the disclosure of climate change gives positive influence to the company's performance, the disclosure of climate change has been able to mediate the positive influence of the climate change strategy to the company's performance.

**Index Terms-** climate change strategy, the disclosure of climate change, environmental performance, the company's performance

## I. INTRODUCTION

The influence of global warming on human life has led to a series of serious actions from the world community to make efforts to prevent the effects of global warming is increasingly widespread. The response of scientists and governments to the importance of corporate action in climate change activity seems to spread and develop rapidly (Jones and Levy, 2007). Industrial pollution is considered one of the main causes of global warming. Media, global leaders, the environment, customers, investors and other stakeholders consider this issue seriously (Ahmad and Hossain, 2015). Traditional enterprise strategies used in a market-based economy cause negative impacts on the natural environment that threaten ecosystems that support human existence (Michalishin and Stinchfield, 2010). So companies face many challenges to prove that they are careful about environmental pollution and treat it responsibly.

There is a relationship between environmental strategies and the company's performance as a result of environmental innovation (Russo and Fouts, 1997). Organizational capabilities associated with pollution prevention technologies will lead to cost savings only if a company also has complementary capabilities in innovation processes and implementations (Christmann, 1999). Similarly, Klassen and Whybark (1999) found that the ability to develop and use manufacturing initiatives collectively into a portfolio of environmental technologies. This capability will help the companies improve production and environmental performance simultaneously that increase leads to continuous improvement, innovation, and integration of total quality management in operations.

The theory of legitimacy explicitly recognizes that business is bound by social contracts in which the company agrees to take socially desirable actions in return for agreeing to business objectives and other benefits, and this ultimately ensures their business continuity (Reverte, 2009). Gray (2006) argues that theory of legitimacy is an organization-oriented view of society that allows organizations to focus on the role of information and openness in relationships between organizations, states, individuals and groups. Campbell's (2000) research on Corporate Social Responsibility (CSR) and CSR reporting found that companies use voluntary disclosure to fulfill social contracts and build corporate legitimacy. With resources based view, legitimacy is seen as an organizational resource for survival. The organization will adopt a strategy to ensure the continued supply of these resources (Deegan, 2002).

Delivery of environmental and social issues through annual report which is the most preferred media because it is considered the most effective and considered the most credible (Abdel-Rahim, 2010). The results of research Matsumura et al (2011) on the impact of corporate value on carbon emissions and voluntary disclosure of carbon emissions with data from the Carbon Disclosure Project indicates that the stock market recognizes companies for their carbon emissions, but more penalties are imposed on companies that do not disclose emission information. This result is consistent Lungu et al (2009) stated the company discloses environmental activities because the company needs recognition from the community towards their commitment to environmental improvement efforts. For some companies, this disclosure effort is just a way to improve the company's image.

Indonesia is one of the world's largest emitters of greenhouse gas emissions. According to data from REDD (Reduction Emissions from Deforestation and Forest Degradation) cooperation, in 2005 Indonesia contributed 2.05 giga tons of greenhouse gas emissions. This fact places Indonesia as the third largest contributor of carbon emission in the world after the United States (5.95 giga ton) and China (5.06 giga tons). Indonesia's carbon gas emissions are predicted to be 3 giga tons of CO<sub>2</sub> by 2020. Based on the Human Development Report released by United Nations Development Program (UNDP) in 2008, Indonesia is ranked 14th in the world for carbon emissions, far below developed countries that produce carbon (Natural Resources Development Center, 2013).

Based on the above description, then the formulation of the problem in this study is whether the climate change strategy influences the company's performance is mediated by disclose climate change strategy, so there are four research questions below: (1) Does the climate change strategy affect the company's performance? (2) Does climate change strategy affect the disclosure of climate change? (3) Does the disclosure of climate change affect the company's performance? (4) Does climate change strategy influencing the company's performance through the disclosure of climate change?. The objectives of this study are expected to provide an explanation of climate change issues in Indonesia through empirical testing by: (1) proves that climate change strategies affect the company's performance. (2) proving that climate change strategy influence of the disclosure of climate change (3) proves that the disclosure of climate change affects the company's performance (4) proves that climate change strategy influences the company's performance through the disclosure of climate change. While theoretical benefits of this research are: (1) This research can provide empirical evidence that complements pre-existing research and is the development of management accounting science, particularly the field of environmental cost management to the linkage between climate change strategy, the disclosure of climate change, and performance company. (2) Contributes to the development of Resources Based View theory and theory of legitimacy underlying the selection of climate change strategies for the achievement of the company's performance.

## II. IDENTIFY, RESEARCH AND COLLECT IDEA

### Literature Review and Hypotheses

#### The Climate Change Strategy influence to The Company's Performance

Hart (1995) points out within the framework of Natural Resourced Based View (NRBV) there are three interconnected strategies: pollution prevention, product stewardship, and sustainable development that can be applied to address various types of environmental problems, including climate change. Some research on the impact of environmental strategies and the company's performance provides evidence that the proactive environment provides performance that adds revenue and cost reduction (Porter and Linde, 1995) that proactive environmental management can reduce production costs by reducing the amount of waste and the needs of various inputs, including energy and raw materials, logistics costs by reducing product weight and packaging (Rao and Holt, 2005). In addition to impacting costs, environmental management can have an impact on revenue. Companies can achieve revenue growth in existing markets through reputation enhancement by demonstrating the reduction of environmental impacts of products and processes by conducting environmental management systems (Klassen and McLaughlin, 1996). In addition, a proactive approach to environmental and performance management can provide access to new markets (Porter and Linde, 1995), particularly environmentally conscious markets that demand environmentally friendly products, such as hybrid and electric vehicles (Su Yol Lee and Rhee, 2007).

Research on reactive environmental strategies suggests that sustainability initiatives that organizations commonly use are cost efficiency. Efficiency is carried out, among others, by the use of less water, the use of reasonable electricity, improve the supply chain by cutting travel or transportation and waste, and reduce the use of non-renewable energy sources (Ratiu, 2011). Companies improve performance and gain competitive advantage not by increasing revenue from sales. The hypothesis proposed is as follows.

H1a: The proactive climate change strategy has a positive influence to the company's performance

H1b: The reactive climate change strategy has a positive influence to the company's performance

#### The Climate Change Strategy influence to the Disclosure of Climate Change

Social pressure to reduce greenhouse gases is generally regarded as one of the main determinants of the company's commitment to climate change issues (Hoffman, 2005; Okereke, 2013). Ernst and Young's (2010) study of 300 major corporate executives from 16 countries shows that 84% of executives surveyed perceived stakeholder expectations as an important or very important element of the decision to engage in climate change issues. In addition, governments, investors, suppliers, customers, competitors, and the general public are becoming increasingly aware of the problem and tend to exert institutional pressure, especially in carbon-intensive industries (Okereke and Russell, 2010; Kolk and Pinkse, 2005). The companies in this sector are responsible for the carbon footprint in industrialized countries. The companies must face new social and regulatory pressures adopted to combat climate change (Talbot and Boiral, 2015).

Research on the corporate disclosure of climate change issues generally emphasizes the importance of enterprise efforts to social legitimacy, the type of communication and the particular arguments used to justify the company's negative impact. The literature on impression management and technical neutralization, while not specifically addressing climate change issues, makes it possible to better analyze the arguments used by companies to enhance or protect corporate image, especially when their social legitimacy is threatened (Talbot and Boiral, 2015). The company exhibits a reactive attitude by denying responsibility on issues of climate change and a proactive attitude will anticipate responsibility for the problem and find ways to respond to climate change issues so that both proactive and reactive strategies will reveal climate change issues to support its chosen strategy (Dawkins and Fraas, 2011). The hypothesis proposed is as follows:

H2a: The proactive climate change strategy has positive influence to the disclosure of climate change.

H2b: The reactive climate change strategy has positive influence to the disclosure of climate change

#### Disclosure of Climate Change influence to the Company's Performance

Research Guo (2014) indicates that the disclosure of climate change is positively related to stock returns. Companies concerned with climate change are more likely to disclose climate change information to comply with the SEC 2010 guidelines. Ahmad and Hossain (2015) tested 79 companies about global warming and concluded that although the disclosure of climate change is not mandatory for Malaysian companies, they continue to disclose it. While Ziegler et al (2011) conducted a portfolio analysis on the effect of disclosure of responses on climate change to stock performance indicates that there is a positive influence between the disclosure of climate change and stock performance. Matsumura (2014) examines data collected from companies that disclose voluntary Carbon Disclosure Projects in the S & P 500 firm to find that the firm's value effects of managers that disclose carbon emissions are higher than firms that do not disclose. The hypothesis proposed is as follows:

H3: Disclosure of change has a positive influence to the company's performance.

#### The Climate Change Strategies influence to the Company's Performance through the Disclosure of Climate Change

Wartick and Cochran (1985) declare a company that exhibits a reactive attitude of denying responsibility and a company that exhibits a proactive attitude anticipates responsibility for issues and seeks ways to become a leader in responding to issues. Associated with disclosure with poor environmental performance records using disclosures to explain their performance (Brown and Deegan, 1998). Through corporate disclosure will reduce the likelihood of negative market reactions to information, including stock price reductions and shareholder litigations in which companies seek to polish stakeholder relationships by slightly adjusting policies (Ashforth et al., 2013). Furthermore, the value of the firm will increase with the selection of a proactive strategy to anticipates responsibility for issues and seeks ways to be a response leader to address climate change and increasing disclosure of climate change strategies to legitimize activities and to enhance firm social image.

H 4a : The proactive climate change strategy has a positive influence to the company's performance through the disclosure of climate change.

H 4 b: The reactive climate change strategy has a positive influence to the company's performance through the disclosure of climate change.

## Method

### Research Setting and Sample

The research approach used explanatory research which is a research that try to give a description and try to explain the reason of a phenomenon that has been studied. Data analysis in this research is done by using PLS (Partial Least Square) which is one part of SEM statistic (Structural Equation Method) based on variant. The use of PLS-SEM is recommended for strategic management research (Hair et al., 2014). The population of this study are all companies in the sector that contribute carbon emission that is energy sector, industry sector, forestry sector, agriculture sector, and transportation sector listed in Indonesia Stock Exchange on 2010 until 2016. This is done because structure of company operational relatively same. The sample selected using purposive sampling. Determination of the year of research starting in 2010 because Indonesia which in this case represented BSN (Badan Standardisasi Nasional) in December 2009 began to adopt ISO related Greenhouse Gas (GHG). Data used in this research is secondary data (financial statements, annual reports, and sustainability reports of carbon emitter company listed in Indonesia Stock Exchange. Data sources are obtained from: (a) Indonesia Stock Exchange (IDX), (b) Database at [www.idx.co.id](http://www.idx.co.id); and (c) web company. A number of companies in manufacturing sector, mining sector, utility and transportation infrastructure sector published financial statements, sustainability reports, and annual reports revealing the issue of climate change during the years from 2010 to 2016 used as samples is 266 firm years.

### Research Variables and Measurement

The climate change strategy referred to in this research is the company's strategic choice in responding to climate change (Kolk and Pinkse, 2005). Measurement of the climate change strategy is done by content analysis on financial statements, annual

reports, sustainability reports, and company web. To measure climate change strategies we use instrument develop by Kolk and Pinkse (2005). The items are: (a) proactive strategy: (1) process improvement is companies reduce energy, use energy more efficiently, and reduce greenhouse gas emissions by developing and implementing energy efficient new technologies. (2) product development to reduce emissions on current products and/or develop new energy-efficient products ; and (3) new product or new market combinations that reduce emission targets by entering new markets or strategic alliances and other forms of cooperation with other companies; (b) reactive strategies: (1) transfer of internal emissions by transferring intensive emissions activities to low pressure locations to reduce emissions, (2) supply-chain measures is replacing lower-emission inputs (using electricity from renewable energy sources) or transferring high-emission activities to partners through subcontracts (transportation sub-contracts), (3) emissions credit/emissions credit acquisition is companies interacting with parties others to reduce emissions either by purchasing emissions credits or through mechanisms such as Joint Implementation or Clean Development Mechanism. Measurement of the climate change strategy by giving value to the implementation of climate change activity: value 0 if no strategy statement, value 1 if no plan, value 2 if have plan but not yet implemented, value 3 if started implemented, value 4 if implemented but not yet evaluated, and value 5 if it has been implemented and evaluated the results (Binh and Khang, 2005).

The disclosure of climate change referred to in this study is the communication of the company's activities with regard to information on greenhouse gas emissions. The measurement of the disclosure of climate change is done by content analysis on annual reports, sustainability reports, and company web. To measure of the disclosure of climate change we use indicators in the Global Reporting Initiative or G4 GRI (2013) added 14 additional information (Prado-Lorenzo et al., 2009). GRI indicators include: (1) direct greenhouse gas (GHG) emissions (scope 1), (2) energy indirect greenhouse gas (GHG) emissions, (3) other indirect greenhouse gas (GHG) emissions, (4) greenhouse gas (GHG) emissions intensity, (5) reduction of greenhouse gas (GHG) emissions, (6) emissions of ozone-depleting substances (ODS) and (7) other significant air emissions. Additional information includes: (8) Target to reduce greenhouse gas emissions, (9) Specific statement from the CEO or company chairman that mentions climate change, (10) Consideration of climate change by the board of directors, (11) The words "climate change "or" global warming ", (12) Business of climate (use, energy, coal, diesel petrol, gas etc.), (14) Section devoted to climate change or global warming, (15) A target to reduce energy use or improve energy efficiency, (17) Opportunities for setting up a carbon funds or engaging in emissions trading scheme, (18) Management responsibility for climate change specifics, (19) Credits for Clean Development Mechanism (CDM) a projects under the Kyoto protocol, (20) Credits from Joint Implementation (JI) projects under the Kyoto Protocol, and (21) Increased forest fires. Measurements are made by identifying content of the disclosure of climate change. Scale of disclosure are value 0 if there is no statement, value 1 if stated in 1-2 sentences, value 2 if stated in 1 paragraph (at least 3 sentences), value 3 if stated in half page or 1-3 paragraph, value 4 if stated in 1 page or 3-6 paragraphs, and value 5 if more 1 page or more 6 paragraphs (Gunawan et al, 2008).

The company's performance in this research is a description of the company's financial condition at a certain period. The company's performance is measured based on the accounting performance (ROA) that is ROA (Return on Asset) which is dividing net profit (EAT) with total assets and ROE (Return on Equity) divide net income (EAT) with total equity and market performance with tobin's  $q$ .  $q = (MVS + D)/TA$ , where: MVS = Market Value of all outstanding Shares is the market value of shares obtained from the multiplication of the number of outstanding shares with the stock price (Outstanding Shares\* Stock Price). D = Debt is the market value of the debt, TA = Firm's Asset's;  $D = (AVCL - AVCA) + AVLTD$ , where: AVCL = Accounting Value of the firm's Current Liabilities = Short Term Debt + Taxes Payable, AVLTD = Accounting Value of the firm's Long Term Debt = Long Term Debt, AVCA = Accounting Value of the firm's Current Asset.

#### Validity Test and Reliability Test

The PLS analysis was tested using WarpPLs version 5.0 software to test the effect of the climate change strategy, the disclosure of climate change, and the company's performance. The relationship model between latent variables and indicators in this study is shown by the reflective model. Based on the value of loading factor with gradual testing so that each indicator has a value outer loading factor above 0.6, the indicator used in this analysis is proactive the climate change strategy consists of process improvement and new product/market combination. The reactive climate change strategy consists of internal emission transfer indicator and acquisition of emission credit / emissions credit trading. The disclosure of climate change variables are direct greenhouse gas (GHG) emissions, indirect greenhouse gas (GHG) emissions, other indirect greenhouse gas (GHG) emissions, greenhouse gas (GHG) emissions intensity, emissions of ozone-depleting substances (ODS) significant air emissions, Consideration of climate change by the board of directors, The words "climate change" or "global warming", Business opportunities from climate change, for example related to products, services or technologies, Use of energy (electricity use, coal, diesel petrol, gas etc.), Section devoted to climate change or global warming. And the company's performance variables with ROA, ROE, and Tobin's Q indicators. The value of the composite reliability of each variable above 0.6 indicates that the model meets the reliability test. Based on the above criteria, it can be concluded that the measurement model is good because it has fulfilled the validity and reliability requirements.

Results of modeling fit model with four fit model size is Average Path Coefficient (APC) of 0.215 with  $P < 0.001$ , Average R-squared (ARS) value of 0.132 with  $P = 0.008$ , Average adjusted R-squared (AARS) amount 0.123 with  $P = 0.011$ , and Average

block value of VIF (AVIF) of 1.010 less than 3.3 indicates that there is no multicollinearity problem between the indicator and the variables used.

Evaluation of the structural model by looking at  $R^2$  and  $Q^2$  Predictive Relevance to evaluate the structural model (Inner model) is.  $R^2$  is the coefficient of determination in the endogenous construct and the path parameter coefficient, while the value of  $Q^2$  Predictive Relevance is used to validate the predictive ability of the model. The latent variable has an  $R^2$  of 0.186 which means small and the company's performance has  $R^2$  of 0.077 which means small. Calculate the value of  $Q^2$  and get the value of  $Q^2$  of 0.180 for the disclosure of climate change and the value of  $Q^2$  for the company's performance of 0.083. A  $Q^2$  value greater than 0 indicates that the firm's performance model has relevant predictions.

Hypothesis Testing

Test significance by comparing p-value with alpha ( $\alpha$ ) used in this study is 5%. The result of the test to know the direct influence of one variable on another variable and the result of path analysis shows coefficient and p-value for each path can be seen in figure 1.

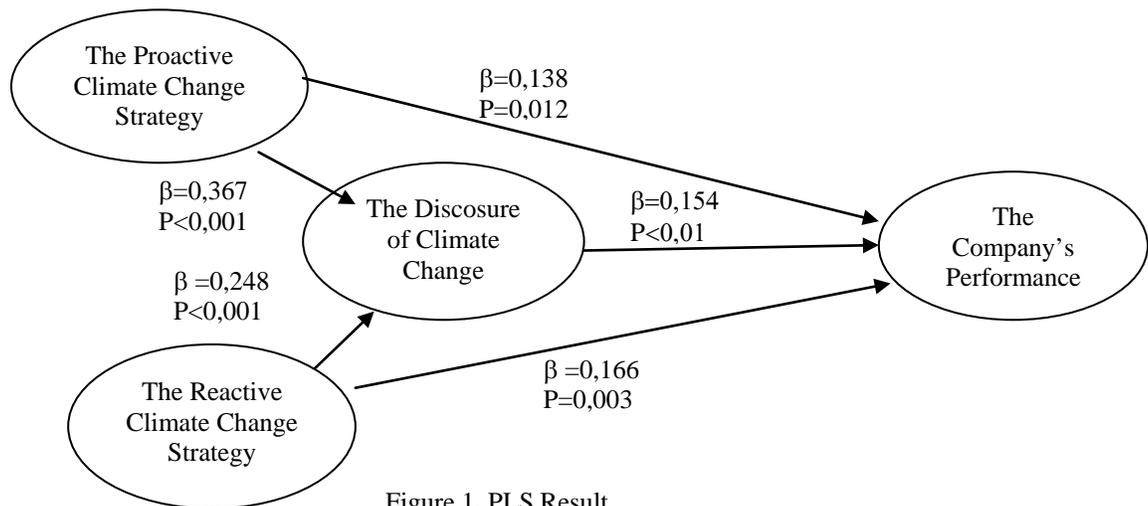


Figure 1. PLS Result

The proactive climate change strategy to the company's performance is positive that is equal to 0.138 with p-value less than 5%. This means that the proactive climate change strategy has a significant positive influence of the company's performance, the more proactive the climate change strategy, the better the company's performance. The resulting effect size value is 0.019 less than 0.35 indicates that proactive climate change strategies have little effect that means proactive climate change strategies have little role to improve the company's performance.

The reactive climate change strategy to the company's performance is positive 0.166 with p-value less than 5%. This means that the reactive climate change strategy has a significant positive influence of the company's performance, the more reactive the climate change strategy, the better the company's performance. The resulting Effect Size value of 0.032 smaller than 0.35 indicates that the reactive climate change strategy has little influence of the company's performance that means the reactive climate change strategy has little role to improve the company's performance.

The proactive climate change strategy to the disclosure of climate change resulted positive was 0.367 with p-value less than 5%. This means that the proactive climate change strategy has a significant positive influence of the disclosure of climate change, more proactive in the climate change strategy than more the disclosure of climate change. The resulting value of Effect Size of 0.130 less than 0.35 indicates that a the proactive climate change strategy has little influence of the disclosure of climate change that means proactive climate change strategies have little role to increase the disclosure of climate change.

The reactive climate change strategy to the disclosure of climate change resulted positive was 0.248 with p-value less than 5%. This means that the reactive climate change strategy has a significant positive influence of the disclosure of climate change, more the reactive climate change strategy, then more the disclosure of climate change. The resulting Effect Size value of 0.056 smaller than 0.35 indicates that the reactive climate change strategy has little influence of the disclosure of climate change that means that reactive climate change strategies have little role to increase the disclosure of climate change.

The disclosure of climate change to the company's performance is positive that is 0.154 with p-value less than 5%. This means that the disclosure of climate change has a significant positive influence of the company's performance, more proactive the climate change strategy, then more the disclosure of climate change. The resulting Effect Size value of 0.026 smaller than 0.35

indicates that the disclosure of climate change has little influence of the company’s performance that means the disclosure of climate change has a small role to improve the company’s performance.

To examine effect the proactive climate change strategy on the company’s performance mediated by the disclosure of climate change is done with two analyzes is analysis without involving the disclosure of climate change in the influence of the proactive climate change strategy to the company’s performance and analysis by involving the disclosure of climate change in the influence of the proactive climate change strategy to the company’s performance.

The test results show the coefficient of the proactive climate change strategy path on the company’s performance without involving the disclosure of climate change is positive at 0.140 with p-value less than 5%. The path coefficients the proactive climate change strategy on the company’s performance with the mediation the disclosure of climate change resulting into a positive by 0.138 with a p-value of less than 5%. All of path showed a significant pathway and decrease the coefficient but still significant, that mean there is mediation effects of the disclosure of climate change in effect of the proactive climate change strategy to company’s performance (Hair et al, 2014). Furthermore, calculate Variance Account For (VAF) to determine the form of mediation and how mediation variable able to absorb a significant direct effect earlier than the model without mediation variable. From the calculations in Table 1 are known value of VAF is 0.289 or close to 0.30. which means partial mediation (Hair et al, 2014).

Table 1. Test of Indirect Influence (VAF) Proactive Climate Change Strategy to Company’s Performance with Mediation The Disclosure of Climate Change

Indirect influence:		0.057
The proactive climate change strategy → the disclosure of climate change	0.367	
The disclosure of climate change → the company’s performance	0.154	
Direct influence: the proactive climate change strategy → the company’s performance (without involving the disclosure of climate change as a mediator)		0.140
total effect		0.197
VAF = indirect influence / total effect	0.057/0.197	0.289

To test the effect of climate change strategies reactive to the company’s performance that are mediated by the disclosure of climate change performed with two analysis: the analysis without involving the disclosure of climate change in the effect of reactive climate change strategies to the company’s performance and analysis by involving the disclosure of climate change in the effect of the reactive climate change strategy to the company’s performance.

The test results demonstrate the path coefficient the reactive climate change strategy on the company’s performance without involving the disclosure of climate change is positive at 0.193 with a p-value of less than 5%. The path coefficients of the reactive strategy climate change on the company’s performance with mediate the disclosure of climate change is a positive 0.166 with a p-value of less than 5%. All three paths are significant and coefficients decreased with remained significant, so that there is a mediating effect of the disclosure of climate change in influence the proactive climate change strategy on company’s performance. Furthermore calculate Variance Account For (VAF) to determine the form of mediation and how mediation variable able to absorb a significant direct effect earlier than the model without mediation variable. From the calculations in Table 2 are known value of VAF is 0.165 or less to 0.30. which means there is no mediation effect (Hair et al, 2014).

Table 2. Test of Indirect Influence (VAF) Reactive Climate Change Strategy to the Company’s Performance with Mediation of the Disclosure of Climate Change

Indirect influence:		0.038
The reactive climate change strategy → the disclosure of climate change	0.248	
The disclosure of climate change → the company’s performance	0.154	
Direct influence: the reactive climate change strategy → the company’s performance (without involving the disclosure of climate change as a mediator)		0.193
Total effect		0.231
VAF = indirect influence / total effect	0.038/0.231	0.165

### III. WRITE DOWN YOUR STUDIES AND FINDINGS

Results of testing the hypothesis 1a the proactive climate change strategy has positive influence of the company's performance, which means consistent with the hypothesis that states 1a the proactive climate change strategy give positive influence of the company's performance. In other words, the hypothesis 1a successfully received. The implementation of a the proactive climate change strategy of carbon emitters firm (manufacturing, mining, plantation sector, infrastructure sector, utilities and transport) can be seen in the annual reports, sustainability reports, and web companies. Proactive strategies carried out by means of process improvement company can reduce energy, use energy more efficiently, and measures to reduce greenhouse gas emissions by developing and applying new technologies that save energy and combination products/new markets by entering new markets or strategic alliances and other forms of cooperation with other companies. The use of the proactive climate change strategy resulted in increased the company's performance caused their cost efficiency and increased revenue. The decline in costs is obtained with a more compliant, such as waste reduction and pollution prevention and enterprises with environmental strategies proactively generating ability of the organization to contribute to a competitive advantage suit with the research Hart and Ahuja (1999), Klassen and McLaughlin (1996) and Russo and Fouts (1997).

Results of testing the hypothesis 1b the reactive climate change strategy has positive influence of the company's performance that means the reactive climate change strategy have positive an influence of the company's performance in accordance with the stated hypothesis 1b the reactive climate change strategy have positive influence of the company's performance. In other words, the hypothesis 1 b accepted. Companies emitting carbon with the reactive climate change strategy perform reduce emissions with internal transfers by transferring an intensive emissions to the location that the low pressure to reduce emissions and companies interact with others to reduce emissions, and buying emissions credits through mechanisms such as joint implementation or Clean Development mechanism (CDM). The reactive climate change strategy influence of the company's performance due to this strategy cost efficiency with move responsibility for climate change issues to the other party. These results support the research conducted by Ratiu (2011) which states that the strategy is a reactive environment sustainability initiatives are generally used by organizations with cost efficiency and not to create competitive advantage by increasing revenues.

Results of testing the hypothesis 2a the proactive climate change strategy has positive influence of the disclosure of climate change indicate that the proactive climate change strategy has an significant influence of the disclosure of climate change consistent with the hypothesis 2a which the proactive climate change strategy has positive influence on the disclosure of climate change. This means that the hypothesis 2a accepted. Carbon Emission Disclosure in Indonesia is still a voluntary disclosure and the practice is still rarely carried out by business entities. According to the study Pradini (2013), the disclosure practices of greenhouse gas emissions, including carbon emissions is still low to fullfil the ISO 14064-1 guidelines. Companies that perform disclosure of carbon emissions are considered the legitimacy of the stakeholders, avoiding the threats, especially for companies that produce greenhouse gases such as increased operating costs, reduced demand, reputational risk, legal proceedings, as well as fines and penalties. Research conducted by containt analysis by Pradini (2013) using an index developed by the ISO as an indicator of the disclosure found that disclosure of greenhouse gas emissions is not affected profitability. Instead, Jannah (2014) using an index developed by the Carbon Disclosure Project (CDP) as the disclosure of climate change found that the disclosure of emissions significantly influenced by the profitability, leverage. According to research conducted by Dawkins and Fraas (2011) which concluded that the company will proactively anticipate responsibility for the problem and looking for ways to respond to climate change issues by informing stakeholders.

Results of testing the hypothesis 2b reactive climate change strategies has positive effect the disclosure of climate change indicate the reactive strategy climate change give positive influence of the disclosure of climate change means in accordance with the hypothesis 2b which the reactive climate change strategy has positive influence of the disclosure of climate change. This means that the hypothesis 2b accepted. Company emitter of carbon in the voluntary inform activities related to climate change. Everything is aimed to enhance the corporate image in order to attract investors to the company's value, which means the company's performance is good. The results showed that climate change information express company to just meet the existing regulations. According to Dawkins and Fraas (2011) the company showed a reactive stance to deny responsibility. Reactive strategies in the social responsibility tend to resist or escape from social responsibility.

Results of testing the hypothesis 3 the disclosure of climate change has positive influence of the company's performance indicate that the disclosure of climate change give significant influence of the company's performance consistent with the hypothesis 3 which of climate change has positive influence of the company's performance. This means that the hypothesis 3 accepted. Carbon emitters have disclosed activities related to the climate change. The purpose of disclosure is to improve the image of the company to attract investors so that the value of the company and then the company's performance go up. Management's efforts to disclose the climate change strategy are seen by investors as information to meet government regulations, so that investors respond to any information disclosed by the company. This is consistent with the theory of legitimacy which argues that voluntary disclosure is primarily to respond to external pressures (Deegan, 2002)

Results of testing the hypothesis 4a the proactive climate change strategy has a positive influence of the company's performance mediated the disclosure of climate change shows the disclosure of climate change mediates positive effects on the proactive climate change strategy and the company's performance. Companies with the proactive climate change strategy in

anticipation of responsibility for climate change issues, in addition to the company is already looking for ways to response these responsibilities. Therefore, the company has a good record of environmental performance so it does not need to use the disclosures to explain their performance. This is consistent opinion of Brown and Deegan (1998) that companies with a poor environmental performance record using the disclosure to explain their performance.

Results of testing the hypothesis 4b the reactive climate change strategy has positive influence of the company's performance mediated the disclosure of climate change shows the disclosure of climate change mediating positive influence reactive climate change strategies to the company's performance. The reactive climate change strategy will reject responsibility by transferring responsibility to the other party to anticipate the climate change issue. Adherents of this reactive climate change will give a justification of this strategy was intended to provide more disclosure. Companies with climate change strategies reactive show poor environmental track record and will use the disclosures to explain their performance. Through the company's disclosure will reduce the likelihood of a negative market reaction to the information, including the decline in share prices and shareholder lawsuits in which the company tried to polish stakeholder relations with a bit of adjusting policies. This is according to research conducted by Brown and Deegan (1998) and Ashforth et al (2013).

#### IV. GET PEER REVIEWED

Here comes the most crucial step for your research publication. Ensure the drafted journal is critically reviewed by your peers or any subject matter experts. Always try to get maximum review comments even if you are well confident about your paper.

**For peer review send you research paper in IJSRP format to [editor@ijsrp.org](mailto:editor@ijsrp.org).**

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#### VI. CONCLUSION

Based on the analysis and discussion in the previous section, we have following conclusions: (1) The climate change strategy give positive influence of the company's performance (2) The climate change strategy have positive influence of the disclosure of climate change, (3) The disclosure of climate change give positive influence of the company's performance, and (4) the disclosure of climate change has been able to mediated the positive influence of the climate change strategy to company's performance. Limitations the result are: (1) There are many companies that make sustainability reports from 2010 to 2016, (2) Samples were company emitters of carbon with the purposive sampling method with discretion (judgment sampling). The results of the analysis based on this method has the disadvantage to generalisation, and (3) This study analyzes only a proactive and reactive strategies. Based on the results of research implications and limitations of the study, the following suggestions are given for the improvement of future research (1) For the improvement of practices in government, the result of research can be used as an input to supplement the guidelines relating to carbon emissions law (2) for the improvement of practices in the company, the result of this study provides information to companies about the importance of innovation to respon climate change both in the process and products to create competitive advantage, contributes in raising the management awareness on climate change issues and lets employees make decisions about his relationship with company (3) for the improvement of accounting education, the result of this research to contributes in increasing academic concern related to improving accounting education curriculum. This research resulted in the disclosure of the findings of the climate change issue. Disclosure of the climate change issue is included in the management accounting subjects, so student get current issues relating to the sustainability accounting, can be used as a basis for evaluation materials and curriculum for accounting education. (4) For the

next study, this research is not separate sectors, then in the next study should be separated into sectors, because deferent sector produced deferent number emition carbon. Finally, Strategy Management Corporate Social Responsibility consists of Strategy Reactive social responsibility tend to resist or escape from social responsibility, strategy defensive in responsibility social undertaken by companies associated with the use of legal approaches or legal means to avoid or reject social responsibility, strategy accommodating a social responsibility to run the company due to the demands of society and environment of it, proactive strategy considers that social responsibility is part of the responsibility to satisfy stakeholders. If the stakeholders are satisfied, then the positive image of the company will build, and for future research is expected to add a accomodating strategy and defensive strategy variables.

#### APPENDIX

Appendixes, if needed, appear before the acknowledgment.

#### ACKNOWLEDGMENT

The preferred spelling of the word “acknowledgment” in American English is without an “e” after the “g.” Use the singular heading even if you have many acknowledgments.

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# Risk factors of Chronic Kidney Disease among the Patients attending nephrology clinic at Teaching Hospital, Batticaloa

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**Abstract-** Chronic Kidney Disease (CKD) is becoming a major health challenge worldwide especially in developing countries. It was earlier due to diabetes and hypertension like emerging chronic diseases, but now rapidly transits to multifactorial causes with increasing incidence and causing major health burden. A hospital based Cross Sectional Descriptive study was conducted to assess the associated risk factors of chronic kidney disease among 250 patients who were attending the nephrology clinic, Teaching Hospital Batticaloa (THB) from March 2016 to January 2017. Structured interviewer administered questionnaire, patient's medical reports and medical records review were used to collect the data through Simple random sampling approach. Chi square test was used to look into the significant relationship between CKD and associated risk factors. Among the study population CKD were 66%, which was higher in men than that in women (40% vs 26%), and it was increasing with aging. In both sexes, CKD was significantly associated with ageing ( $p=0.000$ ), male gender ( $p=0.000$ ), doing agriculture ( $p=0.000$ ), exposure of agrochemical ( $p=0.000$ ), smoking ( $p=0.000$ ), drinking alcohol ( $p=0.013$ ), tobacco and betel chewing ( $p=0.031$ ), hypertension ( $p=0.000$ ), diabetic mellitus ( $p=0.000$ ), cardiovascular diseases ( $p=0.005$ ), early kidney related disease conditions ( $p=0.000$ ) and family history of kidney disease ( $p=0.032$ ). In conclusion majority of the study sample had CKD and it was significantly associated with multi-factorial causes especially with ageing, agriculture, smoking, drinking alcohol, non-communicable diseases and possible genetic predisposition in vulnerable populations.

**Index Terms-** chronic kidney disease, risk factors, agriculture, diabetes, Batticaloa.

## I. INTRODUCTION

Chronic Kidney Disease (CKD) is increasingly recognized as a worldwide public health problem which is estimated prevalence of 8% - 16% and presumed to be another leading cause of mortality and leading to tremendous medical costs [1, 2]. It is defined as either kidney structural damage or a decrease in Glomerular Filtration Rate (GFR)  $< 60 \text{ ml/ min/1.73 m}^2$  for three or more months. And it's divided into five stages based on the progressive decline in GFR. This is a very serious condition because CKD often goes undetected and undiagnosed until it gets worse slowly over time which is incurable, has occurred. If CKD is caught early, medicines and lifestyle changes may help slow its progress [3]. At the End Stages of Renal Disease (stage 4 and 5) ESRD, kidneys can no longer clear waste and fluid on their own, all most complete renal failure and need a form of renal replacement therapy [4]. For that, renal transplantation, hemodialysis (HD) and peritoneal dialysis are the widely accepted treatment modalities for patients [5]. This progression of CKD is associated with a number of serious complications, including increased incidence of cardiovascular disease rather than progression to end stage renal disease, renal failure, hyperlipidemia, heart failure, coronary heart disease, or stroke anemia and metabolic bone disease, nutritional issues [6, 7].

In Sri Lanka, CKD is becoming one of the major health crises and highly concentrated in the North Central province with prevalence of 15% and having alarming signs on North Western Uva, Eastern, and Northern Provinces with a prevalence of 2-3% (8). The incidence of CKD is doubling every 4 to 5 years in Sri Lanka, leading to more than 5,000 deaths annually; excess of 150,000 people are currently affected. Although a number of agents have been postulated, no single offending agent has been identified as the cause of CKD [6]. The etiology, and demographic patterns in Sri Lanka are largely unknown. The disease mainly affects males of age group 30-60 years from poor socio-economic backgrounds who are involved in paddy farming, lived dry zonal area with exposure of one or more environmental factors and a possible genetic predisposition (9). Due to the rapid increase in prevalence, increasing attention has been focused on chronic kidney disease and its treatment recently. The estimates suggests that in excess of 6000 people were undergoing treatment for this condition in 2005 and millions of people around the world suffer from kidney diseases which is often associated with poor prognosis and it incurs, economic burden on the patient, family, community and the country as a whole [10]. In eastern province, Batticaloa district is one of the vulnerable area for CKD where is carried out agricultural production and comes under dry zone area. Therefore, this study has been conducted to identify risk factors of CKD among the patients at nephrology clinic Teaching Hospital Batticaloa as an intention of finding the significance solution for vulnerable people.

II. METHODS AND MATERIALS

This study was a hospital based Cross sectional Descriptive study carried out to assess the associated risk factors of chronic kidney disease among 250 patients who were attending a Nephrology clinic at THB during March 2016 to January 2017.using Evan Morris hyper geometric equation, the sample size was calculated (250 patients) from the total Nephrology clinic patients (700). Nonjudgmental simple random sampling method was used among subjects. Structured interviewer administered questionnaire and Patient’s medical reports review were used to collect the data. Data were collected from both male and female patients (above 19 years) who were attending study area during that study period and whom willing to participate in this study and exclusion criteria of this study were Age was less than 20 years patients, who were not present at the time of study, who refused to participate in this study, adults who were mentally disabled or not fit to participate in this study and pregnant mothers. Collected data were transferred to SPSS 19 statistical software and analyzed based on the research problem. The significant association of CKD and each investigated health-risk factor was tested using chi square test. This health risk factor categorized into socio-demographic, lifestyle, environment and health status of patients. Statistical significance was set at p-value of <5%. Ethical clearance was obtained from the Ethics Review Committee, Faculty of Health-Care Sciences, Eastern University, Sri Lanka and the permission was obtained from both Director and Consultant nephrologist of THB.

III. RESULTS AND FINDINGS

**Table 1: Description of Socio demographical characteristics of participants**

Characteristics	Overall		CKD	
	n	%	n	%
<b>Gender</b>				
Male	129	51.6	100	40
Female	121	48.4	65	26
<b>Age(Years)</b>				
20-30	50	20	11	4.4
31-40	32	12.8	15	6
41-50	40	16	26	10.4
51-60	53	21.2	45	18
61-70	59	23.6	52	20.8
>70	16	6.4	16	6.4
<b>Ethnicity</b>				
Tamil	127	50.4	79	31.6
Sinhala	4	1.6	2	0.8
Muslim	117	46.4	83	33.2
Others	2	0.8	1	0.4
<b>Education level</b>				
Never attended	33	13.2	32	12.8
Primary	75	30	63	25.2
Junior Secondary	52	20.8	33	13.2
Senior Secondary	83	33.2	34	13.6
Tertiary/collegiate	7	2.8	3	1.2
<b>Occupation</b>				
Unemployed	124	49.6	70	28
Agriculture	50	20.0	47	18.8
Self-employed other than agriculture	6	2.4	4	1.6
Government	17	6.8	9	3.6
Non-government	52	20.8	34	13.6
Retired	1	0.4	1	0.4
<b>If agriculture, Duration(Years)</b>				
<5	11	4.4	10	4
5-10	3	1.2	3	1.2
>10	43	17.2	41	16.4
<b>Type of involvement</b>				
Part time	16	6.4	16	6.4
Full time	41	16.4	38	15.2

<b>In-come(Rupees)</b>				
None	74	29.6	25	10
<5000	41	16.4	40	16
5000-10000	29	11.6	24	9.6
>10000-15000	40	16	26	10.4
>15000	66	26.4	50	20

The study was conducted among above 20 years old adults who were attended nephrology clinic, THB in Batticaloa. Out of them 51.6% (n=129) were males, 48.4% (n=121) were females, from that males, females with CKD were respectively 40% (n=100), 26% (n=65); majority of the responders were age group of 61-70 years (23.6% (n=59)) from that 20.8% (n=52) had CKD, Tamils were 50.4% (n=127) but highly Muslims 33.2%(n=83) were affected with CKD and 33.5% (n=83) had senior secondary education but 25.2% (n=63) of CKD patients had primary education. Majority of them 49.6% (n=124) were unemployed but 20% (n=50) were doing agriculture, among them 18.8% (n=47) had CKD, as a full time 16.4% (n=41) with more than 10 years 16.4% (n= 41) respectively. Among study sample most of them 57.6% (n=144) had less than 10000 rupees as a family income, from that population 35.6% (n=89) had CKD (Table 1).

**Table 2: Description of influencing factors of Chronic Kidney Disease.**

<b>Variables</b>	<b>Over all</b>		<b>CKD</b>	
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
<b>Exposure of agrochemicals:</b>				
Yes	55	22	49	19.6
No	195	78	116	46.4
<b>Main water source:</b>				
Well	153	61.2	105	42
Tube well	23	9.2	15	6
Pipe born	74	29.6	45	18
<b>Smoking:</b>				
Yes	72	28.8	60	24
No	178	71.2	105	42
<b>Alcohol:</b>				
Yes	55	22	44	17.6
No	195	78	121	48.4
<b>Tobacco, betel, lime: chewing:</b>				
Yes	65	26	50	20
No	185	74	115	46
<b>Diabetic mellitus:</b>				
Yes	94	37.6	81	32.4
No	156	62.4	84	33.6
<b>Hypertension:</b>				
Yes	107	42.8	93	37.2
No	143	57.2	72	28.2
<b>Cardiovascular disease:</b>				
Yes	24	9.6	22	8.8
No	226	90.4	143	57.2
<b>*Other kidney related diseases:</b>				
yes	63	25.2	10	4
No	187	74.8	155	62
<b>Family history of kidney diseases:</b>				
Yes	23	9.2	19	7.6
No	227	90.2	146	58.4

\*Other kidney related diseases such as acute kidney failure, recurrent urinary tract infection, obstructive uropathy, bladder cyst, systemic lupus erythematosus, urinary incontinence, post renal transplantation follow-up patients.

Among the study sample, 22%(n=55) had exposure of agrochemical from that 19.6%(n=49) had CKD; Majority of the respondents 61.2%(n=153) had used well as a source of drinking water, from that 42%(n=105) of them had CKD, 29.6%(n=74) of them getting pipe born water with that 18% (n=64) of them had CKD and considerable portion of them (CKD 6%, Non CKD 3.2%) had used tube well as water source respectively. 28.8%(n=72) had smoking habits among that, considerable portion of them (24%(n=60)) had CKD;

had habit of alcoholic respectively 22% (n=55), among them 17.6% (n=44) had CKD; 26%(n=65) had betel, lime chewing habits among that, considerable portion of them (former 20%(n=50) had CKD. Out of this study population, majority of the patients 37.6 % (n=94) had diabetic mellitus, 42.8% (n=107) had hypertension, 9.6% (n=24) had Cardiovascular disease; 25.2% (n=63) had other kidney related diseases respectively. Out of the CKD patients 32.4 % (n=81) had diabetic mellitus; 37.2% (n=93) had hypertension, 8.8 % (n=22) had Cardiovascular disease; 4% (n=10) had other kidney related diseases before they had diagnosed as CKD patients. But in Non CKD patients suffered from those diseases in very minimal percentage. 9.2% (n=23) had Family history of kidney diseases, from that 7.6% (n=19) had CKD (Table 2).

**Table 3: Significant levels of identified risk factors of CKD**

Significant variables	P value
Gender – male	<b>0.000</b>
Age	<b>0.000</b>
Ethnicity	0.431
Occupation - Agriculture	<b>0.000</b>
Exposure of agrochemical Main water source	0.505
Dietary pattern	0.509
Smoking	<b>0.000</b>
Alcohol	<b>0.013</b>
Tobacco, betel, lime chewing	<b>0.031</b>
Diabetic mellitus	<b>0.000</b>
Hypertension	<b>0.000</b>
Cardiovascular disease	<b>0.005</b>
*Early kidney related diseases	<b>0.000</b>
Family history of kidney diseases	<b>0.032</b>

\*Early kidney related diseases include Kidney stone, polycystic kidney disease, Nephrotic syndrome, Glomerular nephritis

According to the result of this study being male, aging, doing agriculture, exposure of agrochemical, smoking habit, had a history of diabetic mellitus, hypertension, early kidney related disease, cardiovascular diseases, alcoholic habit, tobacco, betel, lime chewing habits and family history of kidney diseases were significantly associated with CKD in Batticaloa. On the other hand ethnicity, main water source and dietary pattern were not significantly associate with CKD (Table- 3).

#### IV. DISCUSSION

Chronic Kidney Disease is a global epidemiological health problem which can causes premature morbidity, mortality and lowers quality of life and number of risk factors are associated with increasing prevalence of chronic kidney disease (CKD) in many patients [11,12] Therefore, this study aimed at assessing the prevalence and risk factors of CKD among the patients in nephrology clinic THB. This study revealed that 66% of them had CKD which were higher in males (40%) than in females (26%) and increasing with aging. Some studies supported this findings and shown that had significant association with aging (>55 years) and it was more prevalent among the age group of 50-70 years [12, 13]. But studies shown opposite association (higher in female than male), Severe stages of CKD were more frequent in males than female [14].

This study was found that being male, age, doing agriculture, poor income, exposure of agrochemical, having habits of smoking and drinking, had history of chronic illness, early kidney related disease conditions and had family history of kidney disease were significantly associated with CKD than other variables observed in nephrology clinic THB (p<0.05).This present study was supported by the study done in the North Central region of Sri Lanka that being male, aged, poor income, diabetic nephropathy, hypertension, having lipid, glomerulonephritis, obstructive uropathy, genetic predisposes were more significantly associated with CKD [13,15]. This study revealed that agriculture, exposure of agrochemical significantly associated with CKD as a previously reported study done in farming community Sri Lanka [12] shown that the exposure of agrochemical, heavy metals were (Arsenic, cadmium, lead, selenium and chronic lead exposure were significant risk factor for the development of CKD. But there was no any significantly associated with source of drinking water and CKD but some studies done in North Central Province Sri Lanka to identify the etiological factor of CKD[9,12] shown that there was significantly associated with drinking well, tube well water and CKD. The present study revealed that the life style habits such as smoking, drinking alcohol, tobacco and betel, lime chewing were significantly associated with CKD as previously reported studies shown that had significant positive associations with heavy cigarette smoking and increases the risk of

CKD for both men and women [16,17,]. Current study was found significant association between CKD and other health conditions including diabetes, hypertension, cardiovascular disease, kidney stone, glomerular nephritis, nephrotic syndrome, polycystic kidney disease and Other kidney related diseases which was shown similar association of previously reported studies [18, 19, ]. Some previous studies reported that, urbanization, obesity, history of CKD, taking ayurvedic treatment, history of snake bite, hyperuricemia, interleukin-6 levels, hematuria, hyperlipidemia, consumption of insecurity food, long term use of non-steroidal anti-inflammatory drugs and analgesics were also increase the risk of CKD [20, 21].

## V. CONCLUSION AND RECOMMENDATION

Being male, aged, doing agriculture, exposure of agrochemical, smoking and drinking alcohol, had a history of chronic illness (hypertension, diabetes mellitus, cardiovascular disease), early kidney related disease conditions (a kidney stone, glomerular nephritis, nephrotic syndrome, polycystic kidney disease) and had a family history of kidney disease was more significant risk factors than others for being CKD in Nephrology clinic THB. So multifactorial causes are the reasons for the CKD. Due to that, it is requiring multi-level efforts such as to limit the progression and prevent the further complication of CKD among the affected patients, carry out a massive awareness campaign to make them more aware about the risk factors, disease progression and treatment availabilities, to prevent the occurrences and reduce the prevalence of CKD in the vulnerable group, giving proper information regarding use of precaution for exposure of agrochemicals, water treatment for heavy metals, lessen malnutrition and change unhealthy behaviors and habits acquired.

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# Evaluation of Maternal Near Miss Cases at a Tertiary Care Hospital at Amritsar

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**Abstract-** Maternal mortality has always been an indicator of health status of a country. Though MMR has decreased in India, it has still not achieved target required by MDG 2015.<sup>1</sup> Near miss is a serious adverse event that leads to morbidity in the mother, but from which she survives. This term has the advantage over maternal death of drawing attention to surviving women's reproductive health and lives and is equally applicable in developing as well as developed countries. This was a prospective observational study conducted at a tertiary care institute- Bebe Nanki Mother and Child Care Centre, GMC Amritsar, Punjab from January 2016 to June 2017. Of the 10,747 obstetric admissions during study period, 9975 deliveries were conducted with 9717 live births. As per WHO criteria based on primary near miss event and organ system involvement, 158 cases were included for the study. There were 92 maternal deaths during the study period. Near miss incidence ratio was 16.26 per 1000 live births. Maternal near miss to mortality ratio was 1.72:1. Mortality index was 36.8%. Haemorrhage was the leading cause of maternal near miss in 44.94% patients. Most common organ system involved was cardiovascular system which was involved in 68.35%.

## I. INTRODUCTION

Maternal mortality is a result of a complex interaction between medical, cultural, logistic and socioeconomic factors and the prevailing healthcare infrastructure in the community. Maternal death and its rate in a year is an important indicator of healthcare in a country. Death of the mother during childbirth hits the backbone of the family. Family as a unit is shattered with maternal death.

India contributes to 16% of the world's population and accounts for over 18% of the maternal deaths in the world.<sup>2</sup> The term near miss used is thought of as a case where a woman had near brush with death and with intensive medical intervention, death was avoided and turned into a survival. This term is increasingly replaced by Severe Acute Maternal Morbidity (SAMM) which refers to the morbidity a woman actually suffers.<sup>3</sup> The WHO has recommended investigating near miss cases as a benchmark practice for monitoring health.

## Objectives

To determine the level of near miss morbidity due to severe obstetrical complications at our tertiary care hospital and to determine the most common causes of near miss in our centre.

## II. MATERIALS AND METHODS

This was a prospective observational study conducted at a Tertiary Care Institute- Bebe Nanki Mother and Child Care Centre, GMC Amritsar from January 2016 to June 2017. Serving as a referral centre for both Public and Private hospitals in Amritsar and nearby districts of Punjab, institute has approximately 7000 antenatal admission per year with provision of antenatal care and delivery services for both high and low risk patients.

Of the 10,747 Obstetric admissions during study period, 9975 deliveries were conducted with 9717 live births. As per WHO criteria based on primary near miss event and organ system involvement, 158 cases were included for the study. There were 92 maternal deaths during the study period. Cases were identified and followed up throughout their period of hospital stay.

- Patients were identified at the time of admission and were followed up till their discharge. WHO criteria for near miss<sup>4</sup>(2009) was used to identify the near miss cases. The WHO criteria identifies near miss cases based on three approaches: disease specific criteria, management based criteria and organ dysfunction based criteria. In our study organ dysfunction based criteria was used to identify the near miss case. Following indices were calculated.<sup>5</sup>
- Maternal Near Miss incidence ratio: number of near miss cases per 1000 live births.
- Maternal near miss to Mortality ratio: Proportion between maternal near miss cases and maternal deaths. Higher ratio indicates better care.
- Mortality index: Number of maternal deaths divided by number of women with life threatening conditions expressed as a percentage.

## III. RESULTS

Total 158 maternal near miss cases admitted during the study period were evaluated for various parameters. Most of the patients, 70(44.30%), were between age group of 20-25 years. 91 patients(57.59%) were multigravida. Majority of the patients, 112(70.89%) presented to our centre during antenatal period,

while the rest delivered at other centres and were referred for management of postpartum complications. Majority of the patients presenting at our centre were unbooked 143(90.50%) . This clearly emphasizes the importance of booking and regular antenatal checkups.

**TABLE I**

Parameters studied	Results (n=158)
Most common age group	20-25 years 44.30%(n=70)
Parity	Multigravida 57.59%( n=91)
Booking status	Unbooked 90.50% (n=143)
Referral	Referred 83.54%(n=132)
Referral centre	Civil hospitals 46.21%(n=61)
Mode of transport	108 ambulance 73.42% (n=116)

Haemorrhage was found to be the leading cause involved in maternal near miss, presenting complaint in 71(44.94%) followed by Hypertensive disorders of pregnancy in 34(21.52%), rupture uterus in 18(11.39%).

Causes of haemorrhage: Haemorrhage was the cause of morbidity was the in 71 patients(44.94%) which included PPH, APH, Placenta Accreta, Ruptured Ectopic.

**TABLE II  
CAUSES OF HAEMORRHAGE**

Haemorrhage	No.of patients	Percentage
PPH	32	45.07%
APH	7	9.86%
Placenta accrete	23	32.39%
Ruptured ectopic	9	12.68%
Total	71	

Our study identified the patients based on WHO organ system criteria, many patients had more than 1 system involved so all the organ systems involved were taken into consideration while classifying the patients based on organ system involvement. These patients could not be classified into water-tight categories, so cumulative incidence of organ system dysfunction was calculated.

Among our 158 near miss cases, 108 patients(68.35%) had cardiovascular system dysfunction followed by respiratory dysfunction in 59 (37.34%) coagulation abnormality in 58 (36.71%), uterine dysfunction in 42 (26.58%), neurological dysfunction in 17 (10.76%), hepatic dysfunction in 15 (9.49%) and renal dysfunction in 12 patients (7.59%).

**TABLE III  
ORGAN SYSTEM INVOLVEMENT**

Organ system involved	No. of patients	Percentage of total
Cardiovascular system	108	68.35%
Respiratory system	59	37.34%

Coagulation	58	36.71%
Uterine	31	19.62%
Neurological	17	10.76%
Hepatic	15	9.49%
Renal	12	7.59%

Of 158 patients, 46 patients came in post partum period, but their mode of delivery was taken into account. LSCS included caesarean hysterectomy and LSCS on dead baby also. 15 patients (9.49%) presented before the period of viability resulting in abortion, 66 (41.77%) underwent LSCS, 63 (39.87%) had NVD, 10(6.33%) had IUD vaginal delivery and 4 (2.53%) had vaginal birth after caesarean ( VBAC).

**TABLE IV  
MODE OF DELIVERY**

Mode of delivery	No. of patients	Percentage
Abortion	15	9.49
LSCS( inc. caesarean hysterectomy)	66	41.77
Normal vaginal delivery(NVD)	63	39.87
IUD Vaginal delivery ( IUDVD)	10	6.33
Vaginal birth after caesarean(VBAC)	4	2.53
	158	100.0

Regarding the time of delivery, 15 patients (9.49%) presented before the period of viability,50 patients(31.65%) had preterm delivery, 62 patients(39.24%) had term delivery, 31 patients(19.62%) had Intrauterine death. Fetal outcome of 46 post natal patients was also recorded so as to know the outcome various morbidities on the pregnancy outcome.

**TABLE NO.V  
MODE OF DELIVERY**

Fetal outcome	No.of patients	Percentage
Abortion	15	9.49
Alive preterm	50	31.65
Alive term	62	39.24
IUD	31	19.62
Total	158	

#### IV. DISCUSSION

Maternal near miss is defined as an event in which a pregnant or recently delivered woman survived a complication either during pregnancy, childbirth or 42 days after termination of pregnancy. For monitoring the level of obstetric healthcare, WHO recommends investigating near miss cases as a benchmark practice in addition to MMR. Maternal death audits form the mainstay of evaluation of maternal health services in developing countries where high level of maternal mortality has overshadowed severe obstetric morbidity.

Of the 10,747 obstetric admissions during study period, 9975 deliveries were conducted with 9717 live births. As per WHO criteria based on primary near miss event and organ system involvement, 158 cases were included for the study. There were 92 maternal deaths during the study period. Cases were identified and followed up throughout their period of hospital stay. 50% of the patients needed ICU intervention which highlights the importance of role of timely intervention and critical care.

In our study, most common age group involved was between 20-25 years. In similar study by Pandey et al,<sup>6</sup> majority (88.3%) were between 18-35 years age whereas Singh Abha et al<sup>7</sup> reported 21-30 years as the most common age group involved. Rathod et al<sup>8</sup> have reported a mean age of 21.75 years in their study.

Postpartum patients presented to our centre with various complications. 29.11% patients were in postpartum period on presentation at our centre while in similar study by Parmar et al<sup>9</sup> 19.5% patients were postpartum. Early marriage and multiple pregnancies coupled with anaemia and malnutrition increase the risk of various complications. Most common complication for referral in our study was PPH followed by eclampsia.

Significantly high rate of obstetric emergencies have been reported in multigravida in various studies which was also seen in our study with 91 (57.59%) cases of obstetric emergencies in multigravida as compared to 67 (42.41%) in primigravida.

Apart from anemia & multiple pregnancies, higher incidence of complications in multigravidas could be due to higher incidence of placenta praevia and accreta and higher incidence of rupture uterus in multigravida.

The commonest vehicle used for transportation was “108 ambulance” in 116 cases (73.42%). This demonstrates the role of “108 ambulance” in transporting of patients in our area. “108” is an emergency response system, operational in 21 states of India. Over the years it has greatly helped in transporting patients from rural areas to accessible healthcare centre.

The most common cause of maternal near miss in our study was haemorrhage ,On comparing our results with other studies, causes were found to be similar while hypertension was the leading cause in study by Singh Abha (2015) while Haemorrhage was leading cause in study by Rathod( 2012 ).

**TABLE VI**

Studies	Rathod 2012	Singh Abha 2015	Present study2017
Near miss event	Haemorrhage (26.70%) Hypertension(11.80%) Anaemia (24.84%)	Haemorrhage (22.2%) Hypertension(38.8%) Severe anaemia (32%)	Haemorrhage (44%) Hypertension (21%) Rupture uterus (11%)

We had a higher rate of ICU admission than reported in other similar studies-49.37% in our study as compared to 26.70% reported by Rathod et al<sup>8</sup>. This could be attributed to the fact that most of the patients were brought in critical state/decompensated shock & needed ICU for stabilisation.

During the study period there were total 158 maternal near miss cases and 92 maternal deaths thus maternal near miss to mortality ratio was 1.72:1. Maternal near miss incidence ratio was 16.26 per 1000 live births. Mortality index was 36.8%. High mortality index indicate that more number of women with life threatening conditions die, in our study high mortality index was due to the fact that our centre is the only tertiary care referral centre in the region and most of the patients reached hospital in critical state, out of all the near miss cases only 21(13.9%) were stable .

**V. CONCLUSION**

Maternal health is the direct indicator of prevailing health status in a country. Although maternal deaths have reduced in significant number over the past years, maternal morbidity due to risk factors like Haemorrhage, Anaemia, PIH continue to affect the lives of pregnant women substantially. Our study was undertaken with an aim to find out the incidence of these near miss cases at our hospital. Near miss cases were found to be quite high in number as compared to maternal deaths. In our study ratio of near miss to maternal deaths was 1.72:1. Most

common cause of the near miss in our study was haemorrhage and most common cause of ICU admission was hypertension. Our study emphasizes that timely identification of high risk factors and their treatment and timely referral of high risk patients can play a major role in preventing maternal mortality and morbidity.

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