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Correlational Relationship between Organizational Self-Efficacy and Organizational Self-Esteem

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Abstract- Self-efficacy is the belief an individual has that they possess the ability to do something. Self-esteem is an individual's self-evaluation of one's character. Looking into self-efficacy and self-esteem organizationally it is said that organizational self-esteem is an employee's self-perceived competence within an organization while organizational self-efficacy is an employee's beliefs that their self-competence can be translated into successful action within the organization (Pierce, Gardner, Cummings, & Dunham, 1989). The focus of this study was to investigate the correlational relationship between occupational self-efficacy and occupational self-esteem. A total of 135 participants whom were all employed at the time were surveyed with the use of the Organizational Based Self-Esteem Scale (OBSE) and New Occupational Self-Efficacy Scale (OCCSEFF). However, the study did not find what it hypothesized. A correlation could not be conducted and no difference was found between gender and self-efficacy and gender and self-esteem. However, because not many studies find no significant results that in it of itself should be taken into consideration.

Index Terms- self-efficacy, self-esteem, organizational, organizational self-efficacy, organizational self-esteem, occupational self-esteem, occupation self-efficacy, efficacious beliefs

I. INTRODUCTION

Correlational relationship between Organizational Self-Efficacy and Organizational Self-Esteem

Long before Albert Bandura defined the concept of self-efficacy and introduced it as the main component in his social cognitive theory (Bandura, 1977), human motivation was discussed in reference to outcome expectancies. It was when treating phobic individuals while using mastery modeling techniques, that individual differences in generalization were found despite the subject's targets of fear. With the proper use of techniques (e.g. handling a lizard) all subjects developed a strong outcome expectancy with the idea that properly using the techniques would protect them from adverse consequences (e.g. encountering a lizard), yet all subjects differed in their perceived capabilities in using the proper techniques outside of therapy. Bandura went on to label the differences in perceived capabilities as self-efficacy (Bandura, 1977). It was then hypothesized by Bandura that both self-efficacy and outcome expectancies affect motivation but he suggested that self-efficacy plays a much bigger and dramatic role than outcome expectancies.

Bandura explains the concept of self-efficacy as one's judgment of how well one can execute courses of action while facing adversity (Bandura, 1982). Bandura sought to assess the levels and strength of self-efficacy across all activities and contexts. In terms of self-efficacy, levels refer to the dependence on the difficulty of the task at hand (i.e. spelling of word). Transferring self-efficacious beliefs across activities is known as generality. Strength in terms of self-efficacy is measured by the amount of certainty one has when performing a task (Bandura, 1977; 1997).

Overall the concept of self-efficacy is that it is an individual's expectation of personal mastery. In other words, it is the belief one has in one's own competence. It is theorized that self-efficacy is the factor that determines how much effort an individual is willing to invest in the face of aversive experiences and times of difficulty (Bandura, 1982). Individuals with low self-efficacious beliefs are characterized as self-doubting and insecure while individuals with high self-efficacious beliefs have a stronger sense of self and security; therefore, as a result, individuals give their entire attention and effort to the obstacles at hand (Bandura, 1982). According to Bandura (1982), self-efficacy is the gradual development of one's accumulative experiences. Thus, the cognitive appraisals and integrations of these accumulative experiences determine the self-efficacy of an individual. The belief of one's own self-efficacy is built on four components: enactive attainments, verbal persuasion, vicarious experiences, and physiological state (Bandura, 1982).

The first component, enactive attainments, is the most abundant source of self-efficacy (Bandura, 1982). It is the most influential because they are the predications of the results obtained from personal experiences. Enactive attainments are founded upon authentic mastery experiences (Bandura, 1982); repeated successful experiences increase self-efficacy while repeated failures decrease self-efficacy. Successes and failures then lead to outcome expectations. Outcome expectations are judgments that an individual has about the consequences that follow any performance(s). Positive expectations lead to incentives while negative expectations lead to disincentives (Bandura, 2006).

Verbal persuasion is described as persuading a person that they have the capabilities to seek success. Although it is not the most potent component, it does contribute to success on two bases: 1) if the appraisal is within realistic boundaries and 2) the credibility of the person giving the verbal persuasion which is better known as the persuader (Bandura, 1982; Zimmerman, 2000). Such verbal appraisal can motivate an individual to develop their skills and overall sense of personal efficacy (Bandura, 1982).

Self-efficacy is partly built by vicarious experiences. Vicarious experience is described as observing others, similar to one's self, who attain success and that one judges to be capable of doing; in other words, an individual's self-comparison to others and their outcomes (Bandura, 1982). Vicarious experiences are built by watching others perform a task that one either has little to no experience with (Bandura, 1982). If watching another person is perceived by an individual as being more talented than the relevance of the observed person's performance outcome will be discounted (Zimmerman, 2000). For instance, a recreational tennis player may observe Serena Williams serve a tennis ball at 132 MPH. Such an observation may not increase the recreational tennis player's confidence because the recreational tennis player is not a professional, grand-slam champion like Serena Williams. But if that same recreational tennis player observes another recreational tennis player serve a tennis ball at 132 MPH with similar characteristics as themselves they may be convinced that they are able to achieve such a task.

The fourth and last component, physiological state, is an individual's judgment of one's current state of health and stamina. When an individual is highly aroused, tense and/or stressed, it debilitates performance, thus individuals expect to achieve success when they are calm and collected (Bandura, 1982). When individuals are required to achieve success through physical means, judgment is based on health. If failure is expected because the task at hand is interpreted to be difficult or complicated symptoms of physical inefficacy occurs. Although these symptoms vary from person to person, symptoms generally include exhaustion, aches, feeling flushed, heart palpitations, headaches, bodily aches, and sweaty palms (Bandura, 1982; Lunenburg, 2011).

Aside from being built by the four components previously mentioned, there are three dimensions to self-efficacy. These three dimensions are: magnitude, strength, and generality. Magnitude is the degree of adversity an individual perceives they can conquer. Strength is when an individual judges the magnitude of a task as either weak or strong. Generality is the expectations that an individual generalizes in any given situation (Bandura, 1997).

It is assumed that self-efficacy responds to changes within personal contexts and outcomes, regardless if it is directly, vicariously, verbally, or physiologically experienced. Because self-efficacy is assumed to have a responsive nature, self-efficacious beliefs are investigated as indicators of change and individual differences due to its sensitivity (Zimmerman, 2000). In other words, self-efficacy does not apply in all realms of human life. Individuals differ in where and how much efficacy they cultivate and regarding the levels in which they develop efficacy within their given pursuits. For instance, an individual may have a high sense organizational self-efficacy but a low sense of educational self-efficacy. In similar terms, self-efficacy is multifaceted (Bandura, 2006).

Individuals are influenced by their self-efficacious beliefs, it is what directs them to think erratically, strategically, optimistically, or pessimistically (Bandura, 2006). Efficacious beliefs influence an individual's course of action, challenges, goals, commitments and effort invested into each of their endeavors, outcome expectancies, perseverance, resilience, and their life choices and accomplishments (Bandura, 2006).

In simpler terms, efficacious expectations at any given time determine the initial decision of performance and the amount of persistence invested while facing obstacles. Thus, to sum up the concept of self-efficacy as a whole, self-efficacy is the catalyst force behind one's judgement of capability to determine the choices and skills needed for any given task (Bandura, 1982).

In general, research has found that there are many psychological variables related to self-efficacy. Self-efficacy and its properties have been measured with the use of questionnaires which are specific in task, may vary in difficulty, and capture some extent of complexity (Zimmerman, 2000). Measures of self-efficacy concern themselves with the capabilities to perform rather than personal qualities, such as a person's physical or psychological characteristics. Respondents of such questionnaires judge their perceived capabilities of fulfilling task demands instead of how they feel about themselves personally.

Self-efficacy has a multidimensional and multifaceted nature and differs on the basis of the function's domain (Zimmerman, 2000). For instance, a 14-year-old male may have greater self-efficacious beliefs and certainty in regards to playing sports and may have weak self-efficacious beliefs and certainty in regards to academia. In other words, perception of efficacy depends on the mastery criterion instead of normative and/or other criteria. Finally, because self-efficacious beliefs are judged in reference to the future it plays a causal role in motivation (Zimmerman, 2000).

In general, individuals that are efficacious demonstrate more often than not positive judgements rather than negative judgments about the consequences of their actions (Bandura, 1997). Efficacious beliefs influence people's thoughts and behaviors. It even impacts other determinants such as goals, aspirations, commitment, resilience to adversity, outcomes, and perseverance.

Generally speaking people spend a lot of their time, emotions, energy, and hope into their work (Argyle, 1999). Self-efficacy and work have an intimate relationship and much of people's self-efficacy is derived from work. For instance, in the case of job lost the longer a person is unemployed, the more their self-efficacy diminishes thus, less effort is put into job search and the chances of finding a new job decreases (Eden & Aviram, 1993).

Studies in both the organizational and gender contexts have used the concept of self-efficacy to understand the development of a woman's career (Betz & Hackett, 1981, p. 400). Betz & Hackett (1981) view self-efficacious expectations useful in the comprehension of a women's career development. Because of sex role socializations or sex typing as it is also known, females are less likely than males to develop strong career related self-efficacious expectations (Maccoby & Jacklin, 1974; Sherman, 1971, 1976). In simpler terms society does not encourage or actively discourages women and girls from engaging in activities that not only increases but, also strengthens self-efficacious expectations (Maccoby & Jacklin, 1974; Sherman, 1971, 1976). For example, according to the study conducted by Farmer (1976), women continue to be underrepresented in such professions such as law, medicine, mathematics, science, engineering, and managerial and

administrative positions. It is a possibility that low self-efficacy may be a factor of restriction of women's career options.

Betz and Hackett (1981) found that out of the 20 occupations they looked into females had greater self-efficacy for traditional feminine occupations such as dental hygienist, social worker, and so forth. Whereas males had greater self-efficacy for traditional male occupations such as accountant, engineer, and so forth. In their study, males reported equivalent self-efficacy to both traditional and nontraditional occupations whereas females reported less self-efficacious beliefs to nontraditional occupations than traditional occupations. Thus, the beliefs of the undergraduate students to pursue certain occupations corresponded with patterns of sex typing (Betz & Hackett, 1981).

In the organizational context occupational self-efficacy is built on Bandura's definitions and concept of general self-efficacy but as it has been a focal point in current and past research (Scherbaum, Cohen-Charash, & Kern, 2006). Organizational studies have shown, through the years, that as general self-efficacy is positively correlated with everyday satisfaction and performance, occupational self-efficacy also positively correlates with job satisfaction and job performance (Rigotti et al., 2008). Research has found that occupational self-efficacy can be used to access different jobs, organizational levels, and so forth (Rigotti, Schyns, & Mohr, 2008). Occupational self-efficacy is not only positively related to job satisfaction and commitment but, it is also related to general self-efficacy (Rigotti, Schyns, & Mohr, 2008).

Research has shown that employees who are highly self-efficacious provide themselves with high personal goals while those with low self-efficacy provide themselves with relatively low personal goals (Lunenburg, 2011). In other words, employees perform at levels consistent with their self-efficacious beliefs. Employees who value their efficacy highly are likely to persist in the face of problems while employees, on the other side of the spectrum, are more likely to give up when problems arise (Lunenburg, 2011). Lock and Latham (1990) concluded that a strong perception of self-efficacy leads to more planned and challenging goals; individuals with positive images of self-efficacy will focus their efforts and attention at the task at hand. Such focus and attention in achieving a highly oriented goal motivates individuals to stretch their abilities and efforts in mastering new challenges, and overcome previous performances.

There is no doubt that performance is heavily influenced by self-efficacy as prior research has shown. It effects performance via motivating individuals to set and pursue high levels of performance, which in turn stimulates, organizes, and directs efforts in goal pursuits. In other words, self-efficacy can be thought of as a motivational construct of performance and goal orientation. Which is why highly self-efficacious employees have confidence in their ability to be successful in almost all, if not most, job duties and responsibilities (Brown, Leigh, & Jones, 2005).

American philosopher, William James suggested in 1890, that people create an idea based on their individual characteristics such as physical attributes, abilities, needs, and so forth, which then forms as an impression of their own character. In contemporary times this impression is referred to as self-concept. Self-concept are not so much a description of one's self but rather an evaluation of one's self. This evaluation is better

known as self-esteem. Overall, self-esteem is the approval or disapproval of one's self. It is an individual's judgement of self-worth; And much like self-efficacy, self-esteem also varies. For instance, an employee may reflect positively of their computer skills but may reflect negatively of their social skills (Kanning & Hill, 2012). It is an aesthetic phenomenon that is understood by dividing it into two distinct categories: instrumental and intrinsic value. Instrumental refers to what an object is good for, and intrinsic value refers to the qualities of the object itself that are deemed worthy (Tafarodi & Swann Jr, 2001). Apply this concept to people and you get the merits of both what an individual can do and what they appear to be. In other words, you get the two dimensions of self-competence and self-liking which in turn makes up the dual nature of self-esteem (Tafarodi & Swann Jr, 2001).

The overall positive or negative orientation one has of oneself is known as self-competence. Self-competence is the instrumental value of the dual nature of self-esteem. Although it is closely related to self-efficacy it is not equivalent (Bandura, 1989,1992). Self-competence is one's experience as an intentional being that brings desired outcomes through the use of one's will, whereas self-efficacy is the belief of being capable to achieve such desired outcomes (Tafarodi & Swann Jr, 2001).

The intrinsic value of self-esteem is self-liking. Self-liking is the experience an individual has of being a social object, more specifically a good or bad person. Self-liking develops through the internalization of the judgements conveyed on by others of oneself (Tafarodi & Swann Jr, 2001). This is seen with young children who interpret the appraisals of the adults around them. For example, if a child is consistently appraised as being good then they view themselves as good (Tafarodi & Swann Jr, 2001).

The concept of self-esteem has been an interest for researchers. Many researchers argue in recognizing self-esteem as a hierarchical and multifaceted phenomenon (Shavelson, Huber, & Stanton 1976; Song & Hattie, 1985; Tharenou, 1979). With the use of self-assessment items, participants can indicate how they rate themselves as a whole. Such inventories, like the Rosenberg Scale, allow to illustrate how imperative self-esteem is for the diversity of human behavior and experience. For example, there have been positive correlations between self-esteem and general life satisfaction (Diener, 1984; Diener & Diener, 1995), popularity or social integration (Demo & Savin-Williams, 1992; Riggio, Throckmorton & DePaola, 1990; Riggio, Watring & Throckmorton, 1993). And negative correlations have been found between self-esteem and alcohol and self-esteem and drug consumption (Dielman, Campanelli, Shope & Butchart, 1987; Zimmermann, Copeland, Shope & Dielman, 1997).

Coined by Pierce, Gardner, Cummings and Dunham (1989), organizational self-esteem refers to an individual's own evaluation of their adequacy and worth as a member of an organization. It is suggested that an employee's belief of him or herself is connected to the employee's organizational motivation, attitude, and behavior (Pierce et al., 1989). Organizational members with high organizational self-esteem view themselves as vital, meaningful and worthy. Highly organizational self-esteemed employees have confidence in their abilities and skills, as these are the kinds of employees that are referred to as

motivated, capable, and empowering by their peers (Pierce et al., 1989). It is important to note that while highly self-esteem members of an organization are likely to participate in task-related activities and persevere longer in performance behavior, organizational members with low self-esteem predict failure rather than success. These are the type of employees that are likely to quit, fail under the pressures of undesirable circumstances and engage in fewer performances (Pierce et al., 1989). Additionally, Pierce et al. (1989) found in their study that an employee's performance and satisfaction at work is positively affected by organizational self-esteem.

Organizational self-esteem can also be described as the extent to which a person believes himself to be a worthwhile contribution to the organization (Kanning & Hill, 2012). One theory of self-esteem is that individuals will develop attitudes and behaviors that are consistent in maintaining their level of self-esteem (Korman, 1976). Similar to having high self-efficacy an individual with high self-esteem, whether general or organizational, has the opinion that he or she can fulfill any assigned tasks. In terms of organizational self-esteem, those with high esteem value themselves as important and effective in regards to organizational-related tasks and/or goals. Research has shown that individuals with high organizational self-esteem will consistently develop a favorable work attitude, work productivity, and perform at the highest levels (Korman, 1976). Individuals with low organizational self-esteem will consistently develop an unfavorable work attitude and work unproductively (Korman, 1976).

In general, it is believed that people with a high sense of self-esteem tend to have a high sense of self-efficacy (Bandura, 1977). Although these two concepts of self are distinct, they relate to one another. These two concepts range from general to specific and are multidimensional (Gardner & Pierce, 1998). It is believed that individuals with high self-efficacy tend to have a sturdy sense of self-esteem. A safe assumption and example would be that an individual who perceives themselves as capable, significant, worthy, and successful will be predicted in having a high probability of success. Whereas an individual who perceives themselves as incapable, insignificant, unsuccessful, and unworthy will be predicted to have a low probability of success (Bandura, 1977).

However, organizational self-esteem differs from organizational self-efficacy because organizational self-esteem is an employee's self-perceived competence within the organization while organizational self-efficacy is an employee's beliefs that their self-competence can be translated into successful action within the organization (Pierce, Gardner, Cummings, Dunham, 1989).

The two concepts also differ in their perceptual targets: self versus self via task accomplishments, time perspectives (current assessment of the self versus future assessment of the self), and the extent to which these concepts are either a belief and/ or an evaluation (Gardner & Pierce, 1998). Gardner and Pierce (1998) hypothesized that both organizational self-efficacy and organizational self-esteem positively influence an employee's performance and job related attitude. Their results indicated that both self-esteem and self-efficacy influence an employee's overall performance, attitude, and effectiveness. However, they found that self-esteem is shaped by an

individual's efficacy. Thus, an employee's attitude and behavior are influenced by efficacy which in turn effects an employee's organizational-based self-esteem.

Prior research conducted on self-efficacy and self-esteem has shown that each concept, on its own and/or together, effects an individual, both as an employee and as a person. Both self-efficacy and self-esteem can affect an employee's performance, motivation, and goal setting as previously discussed. These two perceptions of self, self-efficacy and self-esteem, were examined under an organizational context. After reviewing the literature, it was hypothesized that there would be a strong correlation between occupational self-efficacy and occupational self-esteem. It was also hypothesized that there would be a difference between gender and self-efficacy and gender and self-esteem.

Method

Participants

Participants for this study were recruited using conveniencesampling via email, text messaging, and social media. Participants were not compensated for their participation. Anyone under the age of 18 were excluded from the study. Anyone who marked themselves as "other" or "not applicable" in regards to gender, race, education, or employment status were alsoexcluded.

A total of 135 participants were used for the study. 93 of the participants were males with a $Mage=42.68$. 42 of the participants were female with a $Mage=32.93$. The age range was 18-77 with a $Mage=39.64$ and $SD=23.241$. Overall, self-efficacy had a mean of 44.85 with a SD of 6.721 and self-esteem had a mean of 51.81 and a $SD=7.650$.

Males had a mean of 51.99 and a SD of 7.695 for self-efficacy and a mean of 45.35 and a SD of 6.125 for self-esteem. Females had a mean of 51.40 and a SD of 7.629 for self-efficacy and a mean of 43.74 and a SD of 7.849 for self-esteem.

Materials

Materials that were used for this study included a computer or mobile computing device, such as a tablet or smart phone that could have been connected to the Internet in order to access the survey link hosted on QuestionPro.com.

Procedure

Prior to beginning the survey, each participant was provided an Informed Consent Form (Refer to Appendix A) which outlined the general nature of the study, the right of withdrawal, and confidentiality. Participants who were used were over the age of 18. In order to maintain confidentiality, surveys did not require names and/or signatures. Participants were informed that their participation in the study was voluntary and was not connected to their place of employment. Participants had the right to withdraw from the study without any negative consequences. Participants were also advised that there were no known risks involved in completing the survey.

Once participants finished the survey they were sent to a "Thank You" page which indicated that the survey had been submitted and completed. Briefing was not included as part of the survey procedure; however, if participants felt that the survey may have distressed them, they were advised to contact the

researcher through email or phone with their questions, comments, and/ or concerns.

Instrumentation

Participants first completed a demographic section which asked them about their gender, age in years, racial/ ethnic group they identify with, the years of education they have completed, their current employment status, years of experience they have in their current employment status, if they had military experience and if so, how many years of military experience they had, and their annual income. Each and every demographic question gave participants the option to of "prefer not to answer" or manually typing in "99" if they felt uncomfortable giving an answer.

Participant's completed the Organizational Based Self-Esteem Scale (OBSE) developed by Pierce et al. (1989). The OBSE is a 10-item scale which measures organizational self-esteem and takes about five minutes to finish. Participants indicated their level of agreement or disagreement through the use of 5 point items on the OBSE. A 5 point Likert scale with anchors that range from 1 (totally disagree) to 5 (totally agree).

Participants also completed the New Occupational Self-Efficacy Scale (OCCSEFF) developed by Collani and Schyn (2002). The OCCSEFF scale is a 19-item scale which measures organizational self-efficacy and takes about five minutes to finish. Participants indicated their level of agreement or disagreement through the use of 6 point items on the OCCSEFF. A 6 point Likert-Scale with anchors that ranges from 1 (completely true) to 6 (not at all true).

Results

The main purpose of the research was to find if a correlational relationship existed between occupational self-efficacy and self-esteem. Finding a correlational relationship between the two variables was the main, and overall hypothesis for the study. Finding if there was a difference between gender and self-efficacy and finding if there was a difference between gender and self-esteem were supplementary hypotheses.

For the correlational testing the null hypothesis was that there was no relationship between self-esteem and self-efficacy and the alternative hypothesis was that there was a relationship between self-esteem and self-efficacy. However, results should be considered inconclusive because not all of the pretesting criteria were met.

The pretest criteria of normality and symmetry were met. However, the pretest criteria of linearity and homoscedasticity were not met. Because the pretest criteria of linearity and homoscedasticity were not met a correlational test could not be conducted. Running a correlational test under such circumstances would have resulted in invalid results.

Two independent t-tests were conducted. The first t-test sought to look into gender and self-efficacy. The null hypothesis was that there was no difference between gender and self-efficacy. The alternative hypothesis was that there was a difference between gender and self-efficacy. The pretesting criteria of normality, homogeneity of variance, and N were met (Refer to Appendix B Table 1 & Table 2). An alpha level of .05 was used.

The homogeneity of variance for self-efficacy showed a significance (p) of .689; since this is greater than the alpha level

of .05, this suggests that there was no statically significant difference between the variances of the two groups; hence, meeting the pretest criteria. The N for the group of males was 93 and the N for the group of females was 42. Both groups satisfied the pretest criteria of having a minimum of N=30. The mean for self-efficacy and males was 51.99. The mean for self-efficacy and females was 51.40. The difference between the two groups was .59. In light of the significance (p) score of .683 (which is more than the alpha level of .05), the difference was not considered statistically significant. Thus, there was failure to reject the null hypothesis for this t-test (Refer to Appendix B, Table 2).

The second t-test sought to look into gender and self-esteem. The null hypothesis was that there was no difference between gender and self-esteem. The alternative hypothesis was that there was a difference between gender and self-esteem. The pretesting criteria of normality, homogeneity of variance, and N were met (Refer to Appendix C, Table 1), an alpha level of .05 was used.

The homogeneity of variance for self-esteem showed a significance (p) of .317; since this was greater than the alpha level of .05, this suggest that there was no statically significant difference between the variances of the two groups; thus, meeting the pretest criteria. The N for the group of males was 93 and the N for the group of females was 42. Both groups satisfied the pretest criteria of having a minimum of N=30. The mean for self-esteem and males was 45.35. The mean for self-esteem and females was 43.74. The difference between the two groups means was 1.61. In light of the significance (p) score of .197 (which is more than the alpha level of .05), the difference was not considered statistically significant. Thus, there was failure to reject the null hypothesis for this t-test (See Appendix C, Table 2).

Discussion

The purpose of the research was to find a correlational relationship between organizational self-efficacy and organizational self-esteem using the Organizational Based Self-Esteem Scale (OBSE) and the New Occupational Self-Efficacy Scale (OCCSEFF). The correlation was the main hypothesis and overall focal point of this study. Because the pretesting criteria of linearity and homoscedasticity were not met a correlation could not be conducted as intended. Running a correlational test without meeting all 3 of the pretest criteria would just result in invalid results. Therefore, this aspect of the study should be considered and should remain inconclusive.

For both independent t-tests it was hypothesized that there would be a difference between gender and self-efficacy and a difference between gender and self-esteem. The pretest criteria for both t tests were met and both t tests yielded the same results. Failure to reject the null hypothesis was concluded for both t tests. The interpretation of failing to reject the null hypothesis means that there is no set in stone truth that there is no difference between gender and self-esteem or gender and self-efficacy, it just means that the null hypothesis is plausible and that my data simply did not provide enough evidence to find statistical significance during testing.

However, it should be mentioned that 98 participants identified themselves as multicultural. Since multicultural

participants was the majority group and no literature was crossed that looked into multiculturalism, a correlation test, and a t-test was ran. There was no significance for both tests (See Table, Appendix D).

These research results are not similar to other research findings. Studies that have concerned themselves with both self-esteem and self-efficacy have found that both concepts of self parallel with one another. In general, research has found that both self-efficacy and self-esteem even though these two concepts of self are distinct, they relate to each other. Ranging from general to specific in their respective multidimensional nature (Gardner & Pierce, 1998). Landmark studies such as Bandura (1977) who found that individuals with high self-efficacious beliefs tend to have a sturdy sense of self-esteem. A safe assumption and example would be that an individual who perceives themselves as capable, significant, worthy, and successful will be predicted to have a high probability of success. Whereas an individual who perceives themselves as incapable, insignificant, unsuccessful, and unworthy will be predicted to have a low probability of success. Gardner & Pierce (1998), hypothesized in their study that both organizational self-efficacy and organizational self-esteem positively influences the performance and attitude of an employee. Their results indicated that both self-esteem and self-efficacy influence an employee's overall performance, attitude, and effectiveness. However, they found that self-esteem is shaped by an individual's efficacy. Thus, an employee's attitude and behavior is influenced by efficacy which in turn effects an employee's organizational-based self-esteem. Showing the interaction between the two concepts of self. Bet and Hackett (1981) found in their study that out of the 20 occupations they looked into that females had greater self-efficacy for traditional feminine occupations (e.g. dental hygienist, teacher, etc.) and had lower self-efficacious beliefs for non-traditional occupations. Whereas males reported equivalent self-efficacy for traditional male occupations (e.g. accountant, engineer, etc.) and non-traditional occupations. Thus, concluding that sex typing corresponds to certain occupations.

As far as this particular study goes it does not support the studies just mentioned. Although the study did not find what it was expecting and hoping to find it is still valuable to consider the information presented. The literature review suggests that there could be correlation between self-efficacy and self-esteem, and either it is organizationally based or not, it is still an important concept to look into. Self-efficacy and self-esteem could very well be the driving force behind motivation and success. If so, then this could be the vital ingredient in producing vital training and development, and desirable employees within major multi-million corporations.

Limitations in this study include convenience sampling, and outliers. Convenience sampling is a non-probability sampling where the participants are accessible and proximate to the researcher. Convenience sampling was used in the recruitment of participants because the researchers thought that was the best method to use in order to distribute the survey to a vast majority of people in a time efficient matter. The limit of using a convenient sample is that it is impossible to determine the possible sampling error and make statistical inferences from

the sample on to the population. It is impossible to make inferences about the populations based on the obtained sample. Two outliers were found while analyzing data: a score of 10 for self-esteem on the OBSE and a score between 90-95 on the OCCSEFF. It is possible that each of the outliers could have skew or change the shape of the data in the following ways: by increasing the range significantly, the changing the median, and by drastically changing the mean. It is not certain which the three were affected by the outliers.

In regards to future implications the first recommendation would be to not use a convenient sample, a random sample would be preferable. In regards to the outliers one of two things should happen: 1) be eliminated out of the data set or 2) be investigated carefully.

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Appendix A

Informed Consent Form

You are being asked to participate in an anonymous survey about perceived job experience which is being conducted by Zayda Costa, a graduate student at Carlos Albizu University (CAU), as part of a research course project.

This survey is anonymous, you will not be asked to include your name or any other identifying information. There are no known risks for participation in anonymous online surveys. If you feel uncomfortable with any part of the survey, you may discontinue at any time without any penalty or consequence. In addition, there are no specific benefits to you for your participation.

If you agree to participate you will be asked to complete a series of questions including basic demographic information as well as questions related about perceived job experience. The survey should take approximately 10-15 minutes to complete. The results of this survey may be published. The data from this project will be stored in a password protected file and only the researchers will have access to it. The data may be combined with the data from other studies and published as part of other papers. No identifying information will be included in any publications. Results will be available to you upon request by contacting Zayda Costa via zcosta500@sunmail.albizu.edu or (305) 484-2907 in approximately 6 months.

Questions regarding the purpose or procedures of the research should be directed to Zayda Costa, at zcosta500@sunmail.albizu.edu or (305) 484-2907. If you have a question or concern that cannot be addressed by the primary researcher, you may contact her supervisor and professor for this course project, Toni DiDona, PhD at tdidona@albizu.edu.

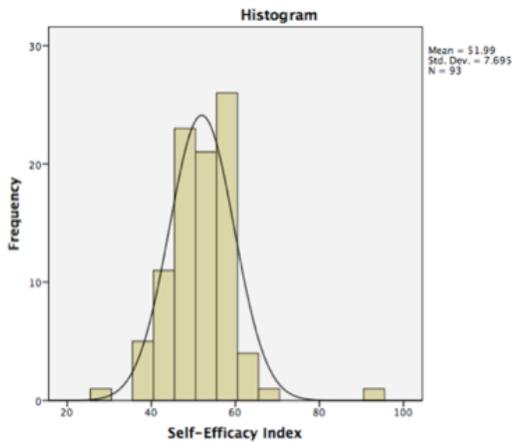
Your participation is completely voluntary and you may choose to withdraw at any time with no penalty. You must be at least 18 years of age to participate in this study.

Your completion of the survey serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older.

Appendix B

Table 1

Males and self- efficacy



Females and self-efficacy

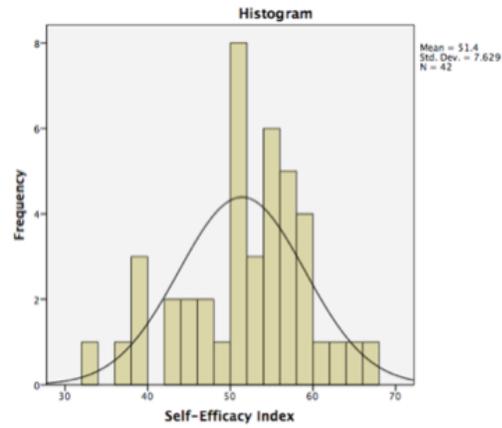


Table 2

Test of Homogeneity of Variances

Self Esteem Index				
Levene Statistic	df1	df2	Sig.	
1.011	1	133	.317	

1

ANOVA

Self Esteem Index					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	75.628	1	75.628	1.683	.197
Within Groups	5977.409	133	44.943		
Total	6053.037	134			

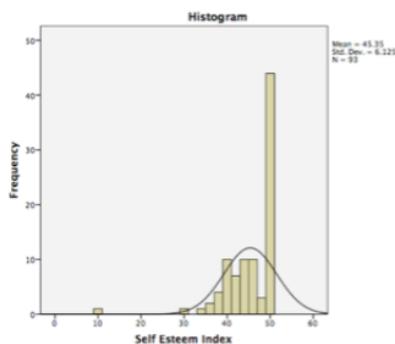
Descriptives

Self Esteem Index								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1	93	45.35	6.125	.635	44.09	46.62	10	50
2	42	43.74	7.849	1.211	41.29	46.18	10	50
Total	135	44.85	6.721	.578	43.71	46.00	10	50

Appendix C

Table 1

Males & self-esteem



Females & self-esteem

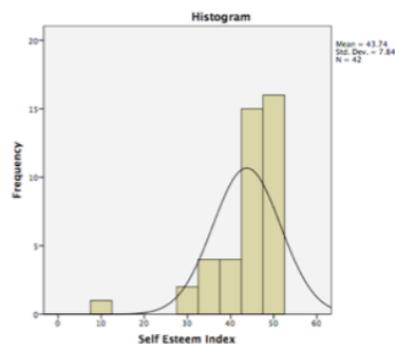


Table 2

Test of Homogeneity of Variances

Self-Efficacy Index

Levene Statistic	df1	df2	Sig.
.161	1	133	.689

ANOVA

Self-Efficacy Index

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.884	1	9.884	.168	.683
Within Groups	7833.108	133	58.896		
Total	7842.993	134			

Descriptives

Self-Efficacy Index

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1	93	51.99	7.695	.798	50.40	53.57	28	92
2	42	51.40	7.629	1.177	49.03	53.78	33	66
Total	135	51.81	7.650	.658	50.51	53.11	28	92

Table 1

ANOVA

Self-Efficacy Index

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	127.181	1	127.181	2.028	.158
Within Groups	6021.798	96	62.727		
Total	6148.980	97			

Appendix D

ANOVA

Self Esteem Index

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	89.228	1	89.228	1.677	.198
Within Groups	5107.108	96	53.199		
Total	5196.337	97			

Correlations

		Self Esteem Index	Self-Efficacy Index
Self Esteem Index	Pearson Correlation	1	-.009
	Sig. (2-tailed)		.931
	N	98	98
Self-Efficacy Index	Pearson Correlation	-.009	1
	Sig. (2-tailed)	.931	
	N	98	98

Central Government Aids Given to the State of Jharkhand to Fight against Naxalism

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Abstract- The authors in this paper discuss the growing population of Naxalites in the state of Jharkhand, and what role does the state and the center government is playing to curb the Naxalism. The paper talks about what all funding is given by the center government to the state in order to do so, and what all schemes the state is posing to control the growing population of Naxalism.

The methodologies used by the authors are Qualitative Research

What facilities are given to the armed forces to control the act of Naxalism? Are they providing sufficient amenities to the forces to control it? These are areas where this paper revolves around and gives a real picture of the current situation.

I. INTRODUCTION

Operation Green hunt was the name coined by the Indian media to describe the anti- Naxalites movements which were lead down by the government of India's paramilitary forces and the state forces against the Maoist. This movement was probably started in the month of November 2009 along with the five states in the Red corridor. The government of India never used the term Operation green hunt to describe it's anti- Naxalite movements. So there was a huge controversy going on at that time whether it is relevant to deploy Central Reserve Force (CRPF) in the state of Jharkhand, so after doing all the discussions with the Jharkhand Chief Minister Shibu Soren. Who was acting as the Chief Minister of Jharkhand at that particular time. In the year 2010 the Union Ministry had sent almost 1,200 CRPF personnel to Ranchi, and the total number of CRPF personnel by the end of the year was 7,000 in the state of Jharkhand. The battalion came from Assam and Tripura where it was deputed to fight with the rebel forces. According to the Daily mail by the end of the 2012, almost 100,000 paramilitary personnel were deployed by the government in its anti-Naxal operations from the CRPF, Border Security Force (BSF), Indo-Tibetan Border Police (ITBP), and CoBRA. To take up fight with Maoists in their home land.¹

The government came up with new idea to set up **special commando forces** on the lines of **Greyhounds** in all Maoist-affected areas. The aim of the government was to provide money to the states to clone the Greyhounds in totality. So that they can take up fights with Maoist in their home land by inducting locals into these forces, who will be trained by the Army and ex-

Greyhounds commanders in jungle warfare. This proposal will soon be submitted to the Union cabinet for approval. On 30 May 2013, the Indian Air Force's Air Chief declared that apart from the currently operating MI-17 helicopters, the Indian Air Force is inducing a fleet of MI-17V5 helicopters to "provide full support to anti-Naxal operations."²

The Indian government took various initiatives to control the insurgency of maoist, and one of the initiatives was by creating Left-wing extremism (LWE) division. The LWE division was created on October 19, 2006 in the ministry the only motive of this division was to look into Naxals operations in a holistic manner. The LWE division only implements security related schemes and basically, focuses on capacity building in the LWE affected states. The division also monitors and works as a vigilant and keeps checks on every LWE situation and counter-measures being taken by the affected states. According to Govt. of India LWE affected states are Chhattisgarh, Jharkhand, Odisha, Bihar, West Bengal, Andhra Pradesh, Telangana, Maharashtra, Madhya Pradesh and Uttar Pradesh are considered LWE affected areas although in varying degrees.

The role and functions of this division are very vast for instance it helps in development of central armed police forces in LWE affected States. It reimburses security related expenditure incurred by the LWE affected States and keeps monitoring the progress in regard to assistance to the State Governments to upgrade their Special Forces under the Scheme for Special Infrastructure in Left Wing Extremism affected States. It provides assistance to the State Governments for construction/ strengthening of fortified police stations under the Scheme for Construction/ Strengthening of 400 Fortified Police Stations in LWE affected districts. Provides funds to the CAPFs for Civic Action Programme in LWE affected areas. It also reviews the security situation in the LWE affected States and issuing advisories and alerts to the State Governments concerned. It also provides assistance to State Governments for creation of operational infrastructure and logistics required to combat LWE, and also helps in implementation of various development schemes, flagship programs and distribution of titles under the [Scheduled Tribes and other Traditional Forest Dwellers \(Recognition of Forest Rights\) Act, 2006, in LWE affected States.](#)³

² www.ipcs.org/article/naxalite-violence/naxal-violence-new-structures-and-old-woes-in-jharkhand-4093.html

³ www.gktoday.in/steps-taken-by-government-to-tackle-lwe

¹ www.satp.org/satporgtp/countries/india/maoist/Assessment/2015/Jharkhand.htm

Some of the Important schemes for LWE affected areas which are given by the central government in order to uplift them are as follows.

- **Security Related Expenditure (SRE) Scheme:** Under the Security Related Expenditure (SRE) scheme, funds are provided for meeting the recurring expenditure relating to insurance, training and operational needs of the security forces, rehabilitation of Left Wing Extremist cadres who surrender in accordance with the surrender and rehabilitation policy of the State Government concerned, community policing, security related infrastructure for village defence committees and publicity material.

Special Infrastructure Scheme (SIS):The Scheme of Special Infrastructure in Left Wing Extremism affected States was commenced in 11th five-year plan from the financial year 2008-09 with an outlay of Rs. 500 crores to cater critical infrastructure gaps of Security forces which could not be covered under any other scheme. During the 11th Plan period (2008-09 to 2011-12) an amount of Rs. 460.00 crores were allocated of which Rs. 445.82 crores was released to the 9 LWE affected States for meeting out the objects related to requirements of mobility of the police/SFs by upgrading existing roads/tracks in inaccessible areas, measures to enhance security in respect of police stations/outposts located in vulnerable areas etc. The Scheme was extended to the 12th Five Year Plan period on 02.04.2013, with an outlay of Rs. 373 crores, comprising 280 crores (75%) as Central share and Rs. 93 crores (25%) as State share. Rs. 122.13 crores were released to the LWE affected States during the years 2013-14 and 2014-15 for up gradation of training infrastructure, weaponry, equipment and fill up critical infrastructure gap of Special Forces of the States. **The Scheme has been discontinued from Central assistance from the financial year 2015-16 as per recommendations of the 14th Finance Commission.**⁴

Unified Command in the States of Chhattisgarh, West Bengal, Jharkhand, and Odisha, which constituted of officers from the security establishment, besides civilian officers representing the civil administration and it will carry out carefully planned anti-LWE measures.

The command & control setup in the States of West Bengal, Jharkhand, Chhattisgarh and Odisha has been re-structured and an IG from CRPF posted in each of these states to work in close coordination with IG (anti-Naxal operations) in the State. The Central Government has approved a new scheme to assist the State Governments for construction/strengthening of 400 fortified police stations.

Security Related Expenditure (SRE) Scheme: Funds are provided for meeting the recurring expenditure relating to insurance, training and operational needs of the security forces, rehabilitation of Left Wing Extremist cadres who surrender in accordance with the surrender and rehabilitation policy of the

State Government concerned, community policing, security related infrastructure for village defence committees and Publicity material.

Scheme of Special Infrastructure: To cater to critical infrastructure gaps, this cannot be covered under the existing schemes. These relate to requirements of mobility for the police/security forces by upgrading existing roads tracks in inaccessible areas, providing secure camping grounds and helipads at strategic locations in remote and interior areas, measures to enhance security in respect of police stations outposts located in vulnerable areas etc.

Road Requirement Plan for LWE areas: The Road Requirement Plan (RRP) Phase-I was approved in February, 2009 for improvement of road connectivity in 34 most LWE affected districts in 8 States viz. Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Orissa and Uttar Pradesh. The RRP-I envisages the development of 1126 km of National Highways and 4351 km of State Roads (total 5477 km), at a cost of Rs. 7300 crore. A length of 848 km has been built at an expenditure of Rs 1363 crores till 31st December 2011. The stretches for Phase-II of the Road Requirement Plan have been finalized by the Ministry of Home Affairs in August 2011, based on the priority indicated by the State Governments and is under consideration with the Ministry of Road Transport & Highways.⁵

II. CONCLUSION

These are all the schemes, and plans which central government is giving to the state of Jharkhand in order to fight against the Naxalism. But the ground reality is something different and all these plans and schemes are not working with full efficacy only these schemes and plans lies on the paper. The condition is very pathetic in these areas police forces are not getting full support what central government is giving to the armed forces from top to bottom police forces are affected the most 1st their salary is low and they are not given equal treatment like armed forces. Now which police force I'm talking about in police forces also they are sub divisions like home guard forces. Whereas their salary is even lower than the police forces and even they don't have the proper training to deal with the Naxals. These forces are sent to deal with Naxals during election time or in any other situation. Now the situation gets worse after this when the prejudice starts taking place in terms of facilities. They don't have given proper equipment in order to survive in the forests and also they don't have any facilities given so that they can be in touch with their family after months and months they usually talk to their home through satellite phones and there is always a long queue for these guys and given limited amount of time to talk to their homes. In these forces, there is increasing rate of committing suicide due to mental depression or trauma which they have to face during that time and some dies due to brain fever which spreads through mosquito in these forests

⁴ www.ipcs.org/article/naxalite-violence/combating-maoism-lessons-from-jharkhand-4575.html

⁵ timesofindia.indiatimes.com/india/Maoists-claim-government-air-dropping-bombs-in-Jharkhand/articleshow/42830364.cms

areas. Now the biases start from here when the armed forces get air ambulances whereas these Home Guard forces are sent through vehicles eventually which take more time to reach hospitals in between many casualties happen due to lack of infrastructure and they die like wild animals and no one cares about it. Regarding armed personals also they don't have so much of facilities still they are using old choppers to go to these remote areas. These choppers are not well equipped with the modern technologies and become an easy target for the Naxals. What is the reason behind all this ill treatment which is going on in Jharkhand this is all because of our political leaders of Jharkhand who funds these Naxals groups for the sake of vote bank politics because in all theses remote areas of Jharkhand where Naxals are more dominating in nature and people are uneducated they benefit from it and party who pays them more that political party only wins from that place because they force

people to give their vote to that political party only otherwise they threaten them with various methods like by rapping their women's in their house or by killing. Even though with all lacuna which we have in our system police and armed forces are working well Naxals are getting strong retaliation from our armed forces which ultimately results that now from many districts of Jharkhand they are sent back and now they are in back foot because they lacking in modern technologies which are armed and police forces are equipped with and ransacking their places in order to capture their guns and ammunition.

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India's Retail Sales of ECommerce: An Econometric Analysis

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Abstract- The paper studied the behavior of total retail sales of ecommerce in India during 2005-2020 with the help of semilog and exponential trend model and Bai-Perron(2003) test for structural shift and Hodrick-Prescott Filter (1989) model for smooth trend and ARIMA(1,1,1) model for stationary and we relates its relationship with internet users, credit and debit card users and GDP growth rate during 2005-2015 with the help of double log multivariable regression model although Johansen cointegration test(1988) and VEC model(1996) were applied to relate growth with retail sales of ecommerce.

The paper found out those retail sales of ecommerce in India during 2005-2020 has been increasing at the rate 41.93% per year which is significant and it is exponentially increases at the rate of 0.728% per year which is more acceptable and significant whose residual test confirmed that exponential series has heteroscedasticity, autocorrelation, partial autocorrelation and serial correlation problems. The retail sales of ecommerce in India during 2005-2020 do not follow random walk and random walk with drift which is strengthened by variance ratio test but it consists of three upward structural breaks in 2007, 2010 and in 2013. Yet it is turned into smooth trend line from cyclical path by H.P. Filter model. But its ARIMA(1,1,1) model showed the series is unstable and nonstationary.

The paper also showed that one percent hike in percent of population of internet users led to 1.931% increase in retail sales in ecommerce during 2005-2015 in India which is significant at 1% level. Besides, one percent increase in debit card users and GDP growth rate led to 1.267% increase and 1.768% decrease in retail sales in ecommerce significantly but it has insignificant positive relation with credit card users. When growth is dependent variable, then growth and debit card users are significantly positively associated but when retail sales is dependent variable then internet users and retail sales are positively associated significantly. Granger Causality test confirmed that total retail sales in ecommerce (x_1), percent of population using internet (x_2), number of credit (x_3) and debit cards (x_4), GDP growth rate of India (y) during 2005-2020 showed bidirectional causality except X_2 does not Granger Cause X_1 and x_2 and x_4 have no causality. Johansen cointegration test assures that GDP growth rate and retail sales in ecommerce are cointegrated in the order CI(1) in which VEC model is unstable, diverging and error correction is speedy and significant in the equation Δy_t .

The paper states that Ecommerce in India grew so fast that it ranks second preceded by China and it may constitute 4% of GDP within 2020 where India needs improved infrastructure, control fraud e payment and e security, develop e-Customs and e-taxation, minimize regulatory gap, and many others policies recommended by several institutions.

Index Terms- retail sales of ecommerce, internet users, credit and debit card users, GDP growth rate, structural break, Granger-Causality, cointegration, VECM

JEL-C32, M21, M31, M48

I. INTRODUCTION

E-commerce — broadly defined as the use of the Internet as a platform for sales, sourcing, and exchange of market information — is playing an important role in supporting global economic growth. Latest market research data predicts that the share of e-commerce of total sales will reach 12.4% in 2019. Industry surveys suggest that e-commerce industry is expected to contribute around 4 percent to the GDP by 2020. In comparison, according to a NASSCOM report, by 2020, the IT-BPO industry is expected to account for 10% of India's GDP, while the share of telecommunication services in India's GDP is expected to increase to 15 percent by 2015. With enabling support, the e-commerce industry too can contribute much more to the GDP. Around 90% of the global e-commerce transactions are stated to be in the nature of B2B, leaving meagre 10% as B2C e-commerce. Case of India is no different where most of such transactions are in the nature of B2B. Moreover Indian e-commerce industry is characterized by "Market Place" model. McKinsey Global Institute estimated that the Internet contributes an average 3.4 percent in developed countries and 1.9 percent of GDP in aspiring countries. In some aspiring countries, such as Taiwan and Malaysia, the Internet contributes to GDP at levels similar to those in developed countries. This is due to their strong net exports of ICT goods and services. In line with other aspiring countries, the Internet's contribution to India's GDP

— what we call its iGDP — is moderate today, at 1.6 percent, or \$30 billion in GDP. At 1.6 percent of GDP, India's iGDP is comparable in size to key service sectors, such as hotels and restaurants, and utilities. India's share of Internet-linked GDP at about 3.2 percent. Even in 2015, when aggregate Internet penetration is projected to reach 28 percent, the penetration of India's rural population is likely to remain at a low 9 percent, compared with urban penetration of 64 percent. India's likely Internet penetration of 28 percent in 2015 will be far less than the projected global average of 43 percent. To achieve a penetration of nearly 40 percent by 2015, which would be similar to China's Internet penetration at that date, India would need to have notched up more than 500 million Internet users. Institute's projections indicate that by 2015 India is likely to have a base of more than 100 million Internet-enabled smart devices and more than 150 million consumers with low cost, high speed Internet

access. By 2015, India's 330 million to 370 million projected Internet users will constitute an estimated 12 to 13 percent of the global Internet user base, the second-largest national group of Internet users worldwide behind only China. If India puts itself on an accelerated trajectory towards higher penetration to reach 500 million Internet users by 2015, the iGDP could be as high as 3.3 percent.

Global Retail Development Index-2016 showed that China ranks one in this index followed by India. China scored 72.5 where as India scored 71.0. Chinese national retail sale stood 3.46 billion US dollar followed by 1009 billion US dollar of India. A.T. Kearney's 2016 FDI Confidence Index ranks China second-a signal of its continued attractions to foreign investors. GDP growth improved case of doing business and better clarity regarding FDI regulations puts India in second place. India is now the world's fastest growing major economy overtaking China. Retail demand is increasing driven by urbanization, an expanding middle class and more women entering the workforce. India's strong ranking reflects foreign retailer increased optimum in the 1 trillion US Dollar retail market and its vast potential. In ecommerce, government now permits 100% FDI for on line market places, with some caveats to create a level playing field. In this paper, we endeavour to show the behavior of total retail sales of ecommerce during 2005-2020 and its nexus with internet users, credit and debit card users and GDP growth rate of India during 2005-2015

II. LITERATURE REVIEW

Sixun Liu(2013) estimated GDP as the dependent variable, the number of CN domain name ,the international outlet bandwidth, the number of Internet users , the number of online shopping users , the scale of online advertising and the number of websites as independent variables in China during 1997-2011 and found positive and significant relation from which it can be seen that the residual series is stationary, which also verify the co-integration relationship of the empirical model is correct.

Jing Huirong(2014) studied the relationship between the B2B (Business to Business) E-commerce transactions and GDP by applying cointegration test, Engle-Granger test. He found that there is not exist long-term and stable cointegration relationship between the B2B E-commerce transaction volume and GDP, GDP growth is caused the reason by B2B transactions, but GDP is not the cause of the B2B transaction volume increase in Beijing from 2001 to 2011. It is found that E-commerce is the Granger cause of the development of the logistics industry, and there are long-term co-integration between the E-commerce development and the development of the logistics industry.

Mohamed Sayed Abou(2014) studied the impact of electronic commerce on national economic growth in Saudi Arabia during the period (2001-2013). The study uses an econometric model to get empirical research between E-commerce development and economic growth using the latest data of Saudi E-commerce development. The regression estimation shows that capital-labor ratio, the size of the private sector, terms of trade, number of business transactions via internet, information and communication technology expenditure, and the number of credit cards (as a method of payment) have significant and positive impact on economic

growth, while the size of public sector has significant and negative impact on economic growth. Morrison and Siegel (1997) studies find the positive effect of E-commerce on the productivity and the economic performance in USA manufacturing.

Purohit and Purohit(2005) showed that E-commerce has a tremendous growth potential and also generates economic growth in the country like India. The paper indicates as to how various factors related to e-commerce contribute to the growth of a vibrant and active electronic community, resulting in economic growth. Realizing the impact of e-commerce on economic growth, this study suggests a bottom up approach, wherein micro economic variables are used to prove the hypothesis.

Tryambak Hiwarkar (2013) found that E-commerce presents exclusive occasion for less developed countries to greatly expand their markets, both internally and externally. Externally, the Internet and other technologies may allow for low-cost international trade, even for small, local businesses. Internally, many groups of citizens who had been considered "marginalized" and "unbanked" may gain reasonable access to financial services, and may thus contribute more readily in all aspects of the economy.

III. METHODOLOGY AND DATA

To study the behavior of total sales in ecommerce in India during 2005-2020 , we used semilog linear model, exponential model, random walk with a drift model, variance ratio test, Bai-Perron (2003) test for structural breaks and Hodrick-Prescott Filter model for smooth trend and ARIMA (1,1,1) model for stationarity. To show relation among retail sales of ecommerce, percentage population internet users, number of credit and debit cards holders and GDP growth rate in India during 2000-2015, we used double log multiple regression model, Granger Causality test, Johansen cointegration test(1988) and VEC model(1996). Data have been collected from www.indiastat.com, www.statista.com, www.kpmg.com, www.cmocouncil.org, www.go-globe.com and from Digital Intelligence Special Report.

IV. FINDINGS FROM ECONOMETRIC MODELS

[A] Behavior of retail sales of ecommerce

Total retail sales in ecommerce in India have been increasing at the rate of 41.93% per year during 2005-2020 which is significant at 5% level.

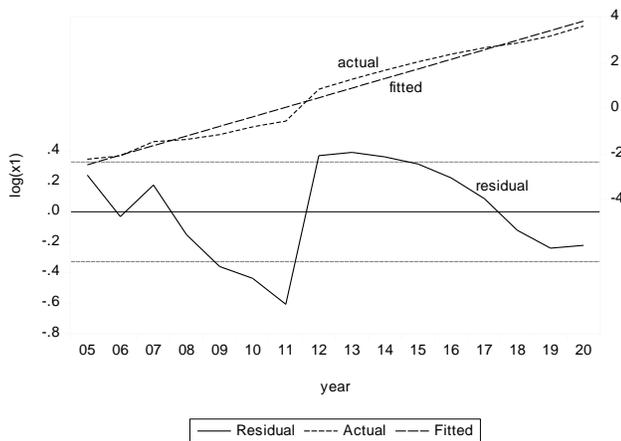
$$\text{Log}(x_1) = -4.983438 + 0.419346t$$

$$(-19.705)^* (23.654)^*$$

$$R^2 = 0.975, F = 559.55^*, DW = 23.65, * = \text{significant at 5\% level. } X_1 = \text{total retail sales in ecommerce. } t = \text{year}$$

In Fig-1, the fitted trend line is shown clearly which is moving upward steeply.

Fig-1:Trend line of retail sales of ecommerce.



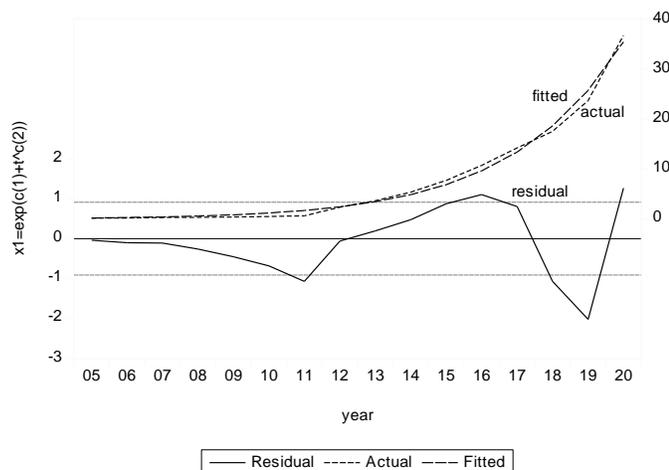
Source-Computed by author

Total retail sales of ecommerce in India are suitably fitted by exponential function during 2005-2020 which is significant at 1% level and it is exponentially increasing at the rate of 0.728% per year.

$$X_1 = e^{-5.6088 + t^{0.728076}}$$

$R^2=0.9930$, $DW=1.45$ and the t values of -5.6088 and 0.728076 are -24.385 and 83.9214 which are significant at 1% level.

In Fig-2,the estimated exponential fitted trend line is plotted which is steeply rising.



Source-Computed by author

Although the residual test of this exponential trend of total retail sales suffer from heteroscedasticity which was verified by Breusch-Pagan-Godfrey test where $nR^2=7.3353 \sim \chi^2(1)$ which is significant at 1% level.

$$\epsilon_t^2 = -1.270906 + 0.148126t$$

$$(-2.07)^* \quad (3.44)^*$$

$R^2=0.458$, $F=11.85^*$, $DW=2.0$, * =significant at 5% level

Residual test confirmed that it has serial correlation because $nR^2=9.481683 \sim \chi^2(2)$ which is significant at 1% level where $F=8.833$ which is also significant at 1% level. It was verified by Breusch-Godfrey Serial Correlation LM test.

From the Table- 1 , it is confirmed that the exponential trend has problem of autocorrelation and partial autocorrelation where Q stats are insignificant.

Table-1: Residual test of AC and PAC

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob...	
		1	0.189	0.189	0.6846	0.408
		2	-0.19...	-0.23...	1.4645	0.481
		3	-0.15...	-0.06...	1.9760	0.577
		4	-0.16...	-0.17...	2.6254	0.622
		5	-0.17...	-0.17...	3.4581	0.630
		6	-0.16...	-0.21...	4.2389	0.644
		7	0.012	-0.06...	4.2439	0.751
		8	0.171	0.016	5.2923	0.726
		9	0.001	-0.17...	5.2923	0.808
		1...	0.006	-0.03...	5.2943	0.871
		1...	-0.00...	-0.12...	5.2976	0.916
		1...	-0.01...	-0.05...	5.3051	0.947

*Probabilities may not be valid for this equation specification.

Source-Computed by author

Total retail sales of ecommerce do not follow random walk since the t value of the coefficient is significant.

$$\Delta x_{1t} = -0.034053 + 0.426327x_{1t-1}$$

$$(-0.081) \quad (9.41)^*$$

$R^2=0.87$, $F=88.63^*$, $DW=1.28$, * =significant at 5% level

But,the total sales of ecommerce in India during 2005-2020 do not follow random walk with a drift model.

$$\Delta x_{1t} = 1.158071 + 0.484106x_{1t-1} - 0.109097t$$

$$(0.614) \quad (4.829)^* \quad (-0.649)$$

$R^2=0.876$, $F=42.55^*$, $DW=1.25$, * =significant at 5% level.

The variance ratio test of total retail sales in ecommerce in India during 2005-2020 states that it does not show random walk because z statistic is significant which means Matingate is accepted where z statistics of variance ratio in period 8 is significant in individual tests.

Table-1: Variance ratio test

Joint Tests	Value	df	Probability	
Max z (at period 8)*	3.597632	15	0.0010	
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	1.272839	0.254392	1.072514	0.2835
4	1.734724	0.396113	1.854834	0.0636
8	2.759089	0.488957	3.597632	0.0003

16	NA	0.606763	NA	NA
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*=probability approximation using studentised modulus with parameter value 4 and finite degrees of freedom. Total retail sales in ecommerce during 2005-2020 in India showed three upward structural breaks in 2007,2010 and 2013

which were observed by Bai-Perron test which is significant at 5% level and sequential F statistic of break test are significant for those three breaks. HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 3.0000) technique was applied.

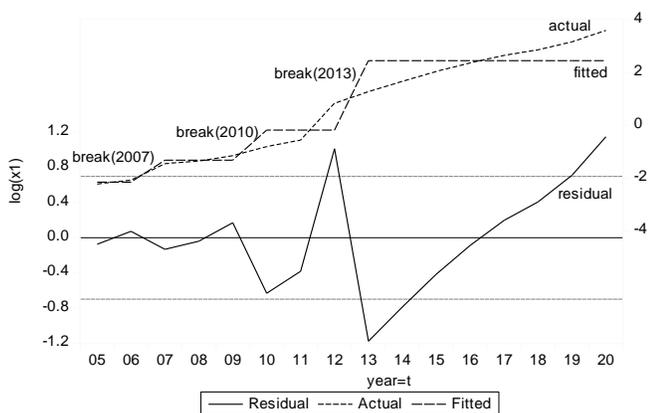
Table-2:Structural breaks(log(x₁))

Variable	Coefficient	Std. Error	t-Statistic	Prob.
		2005 - 2006 -- 2 obs		
C	-2.152533	0.034456	-62.47275	0.0000
		2007 - 2009 -- 3 obs		
C	-1.319989	0.068008	-19.40931	0.0000
		2010 - 2012 -- 3 obs		
C	-0.176268	0.375232	-0.469759	0.6469
		2013 - 2020 -- 8 obs		
C	2.454698	0.413033	5.943105	0.0001
		R ² =0.904,F=37.95*,DW=1.43		
		Sequential F-statistic determined breaks		
Break Test	F-statistic	Scaled F-statistic	Value**	
0 vs. 1 *	39.99361	39.99361	8.58	
1 vs. 2 *	25.44364	25.44364	10.13	
2 vs. 3 *	38.61906	38.61906	11.14	
3 vs. 4	10.75099	10.75099	11.83	

*=significant at 5% level,**=Bai-Perron critical value,Source-Computed by Author

In Fig-3,three structural breaks in 2007,2010 and 2013 are clearly visible in the fitted line of log(x₁) during 2005-2020 where all the breaks are upward.

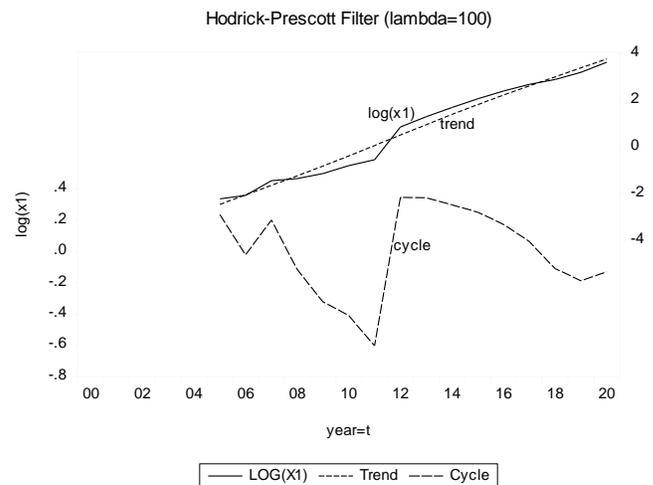
Fig-3:Structural breaks



Source-Computed by author

Hodrick-Prescott Filter model asserted that the log value of retail sales of ecommerce during 2005-2020 showed smooth trend line instead of cyclical pattern which is plotted in the Fig-4.

Fig-4:H.P.Filter of log(x₁)



Source-Computed by author

The estimated ARIMA(1,1,1) model of total retail sales of ecommerce in India during 2005-2020 remains nonstationary since AR(1) process is divergent and nonstationary which is significant but MA(1) process is convergent and nonstationary which is insignificant.

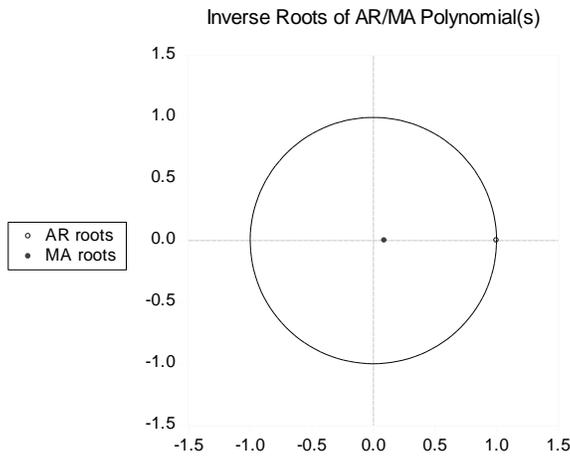
$$\text{Log}x_{1t} = -1085.537 + 1.000359\text{log}x_{1t-1} + \varepsilon_t - 0.090359\varepsilon_{t-1}$$

$$\begin{matrix} (-0.008) & (23.48)^* & (0.759) \end{matrix}$$

$R^2=0.974$, $F=231.66^*$, $DW=1.94$, inverted AR root=1.0 , inverted MA root=0.09 , *=significant at 5% level.

Yet this ARIMA(1,1,1) process is unstable which was verified by its one root is outside and other root is inside of the unit root circle which is seen in the Fig-5.

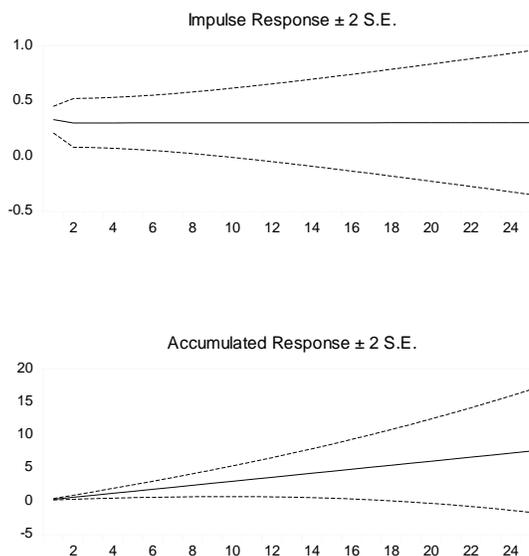
Fig-5:Unit root circle of ARIMA(1,1,1)



Source-Computed by author

The impulse response functions of ARIMA(1,1,1) confirmed that any exogenous shock could not back it into equilibrium, thus it is nonstationary and diverging which is shown in Fig-6.

Fig-6:IRF of ARIMA(1,1,1)



Source-Computed by author

[B] Nexus of retail sales of ecommerce with internet users, credit and debit card users and GDP growth rate

One percent increase in the percentage of population in internet users led to 1.931 percent increase in retail sales of ecommerce in India during 2005-2015 which is significant at 1% level.

$$\text{Log}(x_1) = -4.211429 + 1.931884\text{log}(x_2)$$

$$\begin{matrix} (-13.029)^* & (12.74)^* \end{matrix}$$

$R^2=0.947$, $F=162.35^*$, $DW=0.983$, *=significant at 1% level where x_2 = percent of population using internet.

Double log multiple regression model states that one percent hike in growth rate of GDP and debit card per year led to -1.7686% decrease and 1.26743% increase in retail sales in ecommerce per year during 2005-2020 which are significant at 5% level but one percent increase in credit card led to 0.07844% increase in total retail sales in ecommerce in India during the same period which is insignificant at 5% level.

$$\text{Log}(x_1) = -22.05374 + 0.078443\text{log}(x_3) + 1.267432\text{log}(x_4) - 1.768675\text{log}(y)$$

$$\begin{matrix} (-1.229) & (0.0676) & (6.421)^* & (-2.519)^* \end{matrix}$$

$R^2=0.883$, $F=17.6^*$, $DW=1.06$, *=significant at 5% level, where x_3 = number of credit cards, x_4 =number of debit cards , y =GDP growth rate.

On the other hand, if we assume GDP growth rate is the dependent variable and retail sales of ecommerce, internet users, credit and debit cards users are the independent variable, then the estimates showed that one percent change in retail sales, internet users, and credit card users per year led to 0.0254% increase ,0.827% decrease, and 0.1309% increase in GDP growth rate per year respectively during 2005-2015 which are insignificant at 5% level but one percent increase in debit card users per year led to 0.525% increase in GDP growth rate per year during the said period which is significant at 5% level.

$$\text{Log}(y) = -8.458387 + 0.025447\text{log}(x_1) - 0.827156\text{log}(x_2) + 0.130953\text{log}(x_3) + 0.525421\text{log}(x_4)$$

$$\begin{matrix} (-1.33) & (0.125) & (-1.65) & (0.326) \end{matrix}$$

$(3.00)^*$
 $R^2=0.66$, $F=2.95$, $DW=2.14$, *=significant at 5% level , x_2 = percent of population using internet

Now, if we assume retail sales of ecommerce is the dependent variable and internet users, credit and debit card users and GDP growth rate are the independent variable, then one percent hike in the percentage population of internet users per year led to 2.261% increase in retail sales of ecommerce per year during 2005-2015 in India which significant at 5% level but one percent increase in credit and debit card users and GDP growth rate per year will lead to 0.0576 % increase, 0.245% decrease and 0.1036% increase in retail sales of ecommerce per year respectively during the specified period in India which are insignificant at 5% level.

$$\text{Log}(x_1) = -1.420587 + 2.26142 \log(x_2) + 0.057678 \log(x_3) - 0.245231 \log(x_4) + 0.103622 \log(y)$$

(-0.097) (2.847)* (0.0705) (-0.446) (0.125)

$R^2 = 0.95$, $F = 28.65^*$, $DW = 1.16$, * = significant at 5% level

Granger Causality test confirmed that total retail sales in ecommerce (x_1), percent of population using internet (x_2), number of credit (x_3) and debit cards (x_4), GDP growth rate of India (y) during 2005-2020 showed bidirectional causality except X_2 does not Granger Cause X_1 and x_2 and x_4 have no causality which are shown in the Table-3.

Table-3: Granger Causality test

Null Hypothesis:	Obs	F-Statistic	Prob.
X_2 does not Granger Cause X_1	10	8.35047	0.0233
X_1 does not Granger Cause X_2		0.00032	0.9863
X_3 does not Granger Cause X_1	10	0.16904	0.6933
X_1 does not Granger Cause X_3		0.20265	0.6662
X_4 does not Granger Cause X_1	10	4.64880	0.0680
X_1 does not Granger Cause X_4		1.22442	0.3051
Y does not Granger Cause X_1	15	0.04758	0.8310
X_1 does not Granger Cause Y		0.00066	0.9799
X_3 does not Granger Cause X_2	13	1.81827	0.2073
X_2 does not Granger Cause X_3		0.45863	0.5136
X_4 does not Granger Cause X_2	13	11.9366	0.0062
X_2 does not Granger Cause X_4		6.05235	0.0337
Y does not Granger Cause X_2	15	0.83201	0.3797
X_2 does not Granger Cause Y		0.07780	0.7851
X_4 does not Granger Cause X_3	13	0.04876	0.8297
X_3 does not Granger Cause X_4		0.00405	0.9505
Y does not Granger Cause X_3	13	0.78291	0.3970
X_3 does not Granger Cause Y		0.73379	0.4117
Y does not Granger Cause X_4	13	2.63821	0.1354
X_4 does not Granger Cause Y		0.05542	0.8186

Source-Computed by author

Johansen cointegration test assured that GDP growth rate and total retail sales of ecommerce during 2007-2020 in India are cointegrated in the order one because both Trace and Max-Eigen statistic have one cointegrating equation each which are significant at 5% level.

Table-4: Johansen test

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.789358	23.31100	15.49471	0.0027
At most 1	0.101904	1.504692	3.841466	0.2199
		Max-Eigen Statistic		
None *	0.789358	21.80631	14.26460	0.0027
At most 1	0.101904	1.504692	3.841466	0.2199

*=denotes rejection of the hypothesis at 0.05 level, **=Mackinnon-Haug-Michelis(1999) p values
Source-Computed by author

Since GDP growth rate and retail sales in ecommerce are cointegrated then we have to verify the vector error correction estimates and the process of error corrections.

$$\Delta x_{1t} = -0.672305 + 1.954944 \Delta x_{1t-1} - 0.205805 \Delta y_{t-1} - 0.041124 EC$$

(-1.03) (6.17)* (-0.877) (-0.85)

$$\Delta y_t = 1.700 - 1.101977 \Delta x_{1t-1} + 0.704046 \Delta y_{t-1} + 0.259584 EC$$

(2.86)* (-3.8)* (3.28)* (5.88)*

$R^2 = 0.87$, $F = 23.03^*$, $SC = 3.94$, $AIC = 3.76$
 $R^2 = 0.79$, $F = 12.96$, $SC = 3.76$, $AIC = 3.58$

Both the VEC estimates are of good fit in which Δy_t is very much significant because t values of all coefficients are significant at 5% level even its error correction process is very faster than that of Δx_{1t} whose error correction term is insignificant and slow.

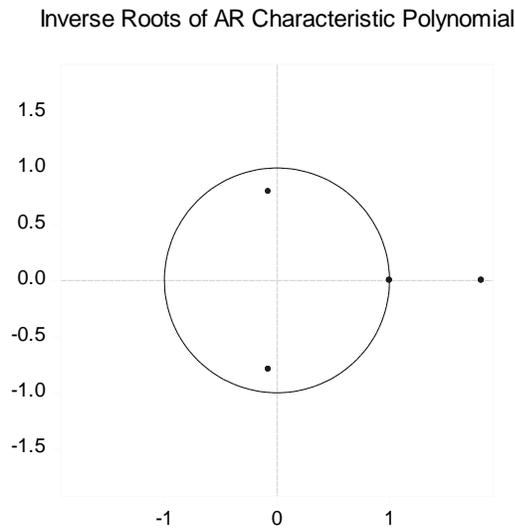
This VEC model has four roots of which one is greater than one, one root is unit and other two are less than one, therefore one root lies outside the unit root circle and thus why the VECM is unstable.

Table-5: Values of roots

Root	Modulus
1.817124	1.817124
1.000000	1.000000
-0.075881 - 0.791756i	0.795384
-0.075881 + 0.791756i	0.795384

Source-Computed by author

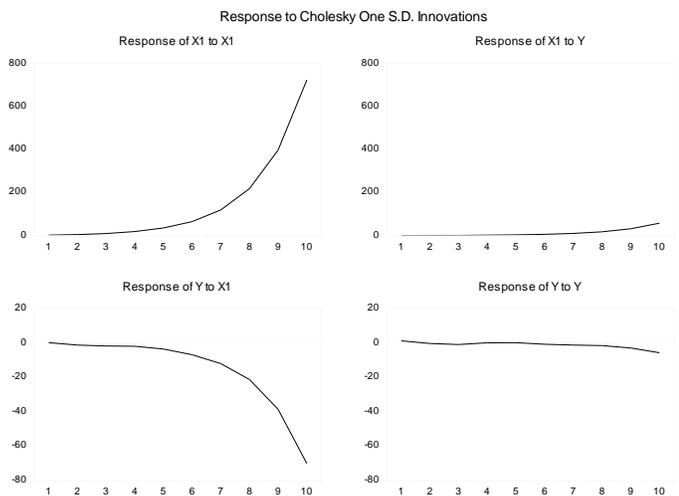
Fig-7:Unit root circle



Source-Computed by author

This VECM is unstable, nonstationary and divergent which are verified by impulse response functions that moved away from zero.

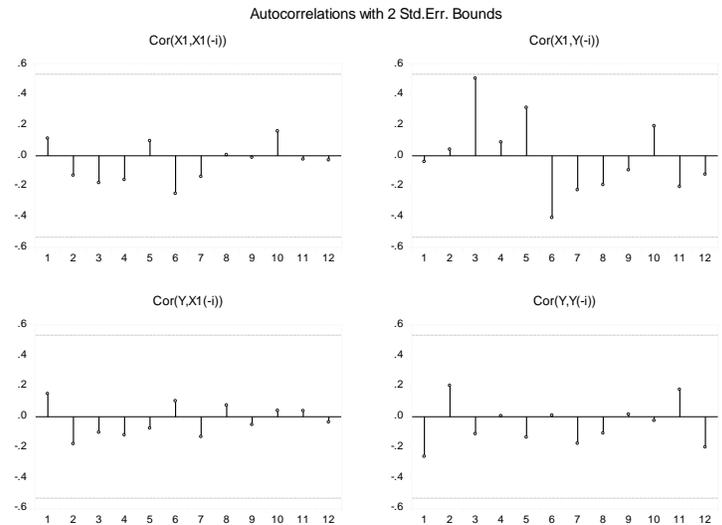
Fig-8:Impulse Response Functions



Source-Computed by author

Residual test of this VEC model showed that it has problem of autocorrelations which were seen by correlogram.

Fig-9:Autocorrelation



Source-Computed by author

It has serial correlation problem which is proven by Serial correlation LM test which is rejected as H_0 =no serial correlation at lag-1.

Table-6: VEC Residual Serial Correlation LM Tests

Lags	LM-Stat	Prob
1	1.271597	0.8662
2	1.645791	0.8005
3	5.095778	0.2776
4	1.290397	0.8630
5	1.788431	0.7746
6	4.345199	0.3613
7	1.663917	0.7973
8	1.469175	0.8321
9	0.662507	0.9559
10	11.58849	0.0207
11	5.959485	0.2022
12	15.31546	0.0041

Source-Computed by author

VEC residual normality test by Doornik-Hansen method showed that all component and joint skewness, kurtosis are insignificant as χ^2 distribution, and all components and joint of Jarque-Bera are also insignificant from H_0 =residuals are multivariate normal.

Table-7:Normality test

Component	Skewness	Chi-sq	df	Prob.
1	-0.202482	0.160856	1	0.6884
2	0.146801	0.084779	1	0.7709
Joint		0.245634	2	0.8844
Component	Kurtosis	Chi-sq	df	Prob.
1	2.736651	0.894500	1	0.3443
2	2.660271	0.747150	1	0.3874
Joint		1.641651	2	0.4401

Component	Jarque-Bera	df	Prob.	
1	1.055356	2	0.5900	
2	0.831929	2	0.6597	
Joint	1.887285	4	0.7565	

Source-Computed by author

V. LIMITATIONS AND FUTURE SCOPE

Since the period of study is short so that we failed to fit VAR and VEC model taking all the variables at a time and even we failed to fit Johansen cointegration test. On the other hand, we can take more variables which influences ecommerce in various dimensions. Comparative study can be easily included here easily such as India vs China and USA where ecommerce flourished tremendously.

VI. POLICY RECOMMENDATIONS

- [1] Improve the infrastructure of e-commerce systems, and increase government expenditures.
- [2] It is strongly suggested to establish uniform standards as soon as possible for on line payment system either in interbank or cross country payment.
- [3] Establish online security certification system and promote business investment.
- [4] Promote the building of logistics system and increase business investment
- [5] Governments must allow for new, innovative e-payments solutions and avoid the vested interests of incumbents
- [6] Tackle the multi-ministerial oversight challenge. Make e-commerce and cross-border e-commerce a national policy priority and a priority in the education agenda
- [7] Get ahead of m-commerce. Work with leading firms to create policy frameworks to support and guide the development of m-commerce.
- [8] Engage in more public and private dialogues and partnerships on cross-border e-commerce
- [9] Engage in cross-industry and cross-economy dialogues on establishing mutually agreed upon standards and frameworks for cross-border e-commerce.
- [10] Sign more FTAs with language specific to e-commerce. Keep an up-to-date database with all regulations and laws related to foreign market access
- [11] Control fraud payment because Fraud in e-payments is the biggest barrier to their growth.
- [12] Minimise regulatory gap because Regulations are not keeping pace with technological and business model innovations or with advances in cyber-crime.
- [13] Develop education seminar in conjunction with government platforms and industry associations.
- [14] Encourage universities to train experts and build a talent pool prepared to develop businesses and to train their peers in ecommerce
- [15] Provide co-working space, monitoring opportunities, and incubator facilities to facilitate the sharing of ideas and resources.

[16] It is essential to remove deficiencies in the existing laws and to seek convergence of media and technologies as early as possible.

[17] Coordinate efforts by export and import countries, online platform providers and intermediaries such as the express industry to both raise awareness and facilitate compliance with revenue, safety and security obligations

[18] Develop e-customs and e-taxation solutions that are paperless, connect with all relevant stakeholders and use intelligence-led and risk-based selectivity and targeting to improve the identification and targeting of high-risk shipments;

[19] Consider negotiating multilateral or plurilateral trade rules to promote and facilitate ecommerce.

VII. CONCLUSION

The paper concludes that retail sales of ecommerce in India during 2005-2020 has been increasing at the rate 41.93% per year which is significant and it is exponentially increases at the rate of 0.728% per year which is more acceptable and significant whose residual test confirmed that exponential series has heteroscedasticity, autocorrelation, partial autocorrelation and serial correlation problems. The retail sales of ecommerce in India during 2005-2020 do not follow random walk and random walk with drift which is strengthened by variance ratio test but it consists of three upward structural breaks in 2007, 2010 and 2013. Yet it is turned into smooth trend line from cyclical path by H.P. Filter model. But its ARIMA(1,1,1) model showed the series is unstable and nonstationary.

The paper also concludes that one percent hike in percent of population in internet users led to 1.931% increase in retail sales in ecommerce during 2005-2015 in India which is significant at 1% level. Besides, one percent increase in debit card users and GDP growth rate led to 1.267% increase and 1.768% decrease in retail sales in ecommerce significantly but it has insignificant positive relation with credit card users. When growth is dependent variable, then growth and debit card users are significantly positively associated but when retail sales is dependent variable then internet users and retail sales are positively associated significantly. Granger Causality test confirmed that total retail sales in ecommerce (x_1), percent of population using internet (x_2), number of credit (x_3) and debit cards (x_4), GDP growth rate of India (y) during 2005-2020 showed bidirectional causality except X_2 does not Granger Cause X_1 and x_2 and x_4 have no causality. Johansen cointegration test assures that GDP growth rate and retail sales in ecommerce are cointegrated in the order CI(1) in which VEC model is unstable, diverging and error correction is speedy and significant in the equation Δy_t .

The paper states that Ecommerce in India grew so fast that it ranks second preceded by China and it may constitute 4% of GDP within 2020 where India needs improved infrastructure, control fraud e payment and e security, develop e-customs and e-taxation, minimize regulatory gap, and many others policies recommended by several institutions.

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Optimizing the Cropping Pattern in Gezira Scheme, Sudan

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Abstract- The objectives of the study were to determine the optimum cropping pattern and assess the impact of some scenarios on farm income and resources use. The results of LP models revealed that the real cropping was different from the basic cropping pattern, the net farm income in the optimal models was over the current situation by 59.3%, most of the land was allocated to onion crop which was 8.68 feddans, followed by cotton crop which was 6.88 feddans, while sorghum and groundnuts entered in the optimal plan with small areas 1.74, and 0.92 feddans, respectively, wheat and chickpea did not enter in the optimal plan. In the real situation cotton, sorghum, and onion occupied about the same area 4 feddan, followed by wheat and chickpea, 3 feddan, and then groundnuts 2 feddan. Many scenarios were tried by developing the parameters of the free LP model to reflect a range of production options.

Index Terms- Crop pattern, optimization, linear programming model, Gezira scheme, Sudan.

I. INTRODUCTION

The Gezira scheme is the oldest and most important irrigated scheme in Sudan. The Gezira scheme is the area that extends from latitude 13° N to latitude 15° N between the Blue and White Niles. It covers a net cultivable area of little less than one million hectares (about 2.1 million feddans). Gezira scheme consists of two main parts: Gezira main and Managil extension. The main crops grown in Gezira Scheme are cotton, sorghum, groundnut, wheat, vegetables, fruits, and Fodder. It contributes to cash and food crops of the agricultural sector in Sudan [1]. Gezira scheme has adopted different types of crop rotations since its establishment and changes in crop rotation are dictated by scheme management during the period (1925-2005). After the Gezira Scheme Act for the year 2005, farmers are not restricted by a certain crop rotation, where the Act has insured that farmers are free to manage productive and economic determinants in the context of art and the use of technology to upgrade the productivity and maximize their profitability. This Act of 2005, to influence for rotation in scheme and deterioration area under crops cultivated and lead to low yield in recent years and decreasing of profitability. The objectives of the study were to determine the optimum cropping pattern and assess the impact of some scenarios on farm income and resources use.

II. METHODOLOGY

2.1 DATA COLLECTION

Primary and secondary data were used for the study purposes. Primary data were collected by using structural questionnaire using stratified random sampling techniques through direct personal interviewing, where a sample of 150 farmers was collected during season 2011/2012. Secondary data collected from different relevant sources which include Planning and Socio-economic Research Administration of the Gezira schemes, in addition to different documents.

2.2 METHOD OF DATA ANALYSIS

2.2.1 Linear Programming Model (LP)

Determine the optimum cropping pattern and assess the impact of some polices on farm income and resources use were studied through linear programming model.

Defined Linear programming as an efficient way of determining optimum plans only if there are numerous enterprises or processes and numerous restrictions in attaining a specific objective such as maximizing farm profits or minimizing production costs [2]. Linear programming as a method of determining a profit maximization combination of farm enterprises that are feasible with respect to a set of fixed farm constraints [3]. Linear programming was applied in the agricultural sector of Sudan by several individuals among them [4, 5, 6, and 7].

2.2.2 Empirical Specification of the Linear Programming Model

2.2.2.1 Structure of the LP technique:

The objective function of the representative farm model maximizes net farm income after satisfying family requirements from the main food crops. The mathematical form of the model used is as follows:

$$\text{Max } Z = \sum_{j=1}^n C_j X_j$$
$$\text{Subject to } = \sum_{j=1}^n a_{ij} X_j \leq b_i$$

And

$X_j \geq 0$, all $j=1$ to n

Where:

Z = objective function value.

C_j = gross margin per feddan of the j th farm activity i.e. input/output

X_j = the level of the j th farm activity.

a_{ij} = the quantity of the i th resource required to produce one unit of the j th activity i.e. input/output coefficients.

b_i = vector of resource availability.

2.2.3 Linear Programming Model Building

The objective of farming practice in the Gezira scheme is profit maximization after household food security of sorghum.

2.2.3.1 Linear programming model's technical input-output coefficients and resource endowments formulated into a matrix.

(a) Activities set:

The activity set in the model includes the following:

- 1- **Crop production activities:** This includes the production of cotton, sorghum, groundnuts, wheat, onion and chickpea (table 1). The objective function coefficients for the production activities represent the total cost of production per feddan excluding the cost of hired labor. This cost is subtracted from the operating capital streams in the months they are incurred. These production activities are linked with production balance equations and their respective yields per feddan are shown as negative figures in these equations.
- 2- **Crop selling activities:** The selling activities include sales of crops. The objective function coefficients for the selling activities represent average price per unit of sale plus the value of crop residue (for sorghum and groundnuts). The objective function coefficients of selling activities also appear as supplying the operating capital stream in the month where selling takes place (Table 2).
- 3- **Sorghum consumption activities:** The tenants usually consume part of their production from sorghum. The objective function coefficient is zero for these activities (no cost). This activity is linked to sorghum consumption constraint and sorghum production balance equation (Table 1).
- 4- **Sorghum buying activities:** The buying activities are permitted to allow households to satisfy sorghum consumption constraint in case model production could not satisfy this constraint. The objective function value for this buying activity represents the average price household pays for purchased sorghum (Table 2).The purchase price is higher than the average selling price because purchase occurs at periods long after harvest.
- 5- **Hired labor activities:** The Gezira scheme farmers use both family labor (F.L.) and hired labor (H.L.) in conducting their field crop production activities. Table (3) shows the portions of the matrix representing H.L. activities. The labor hiring activities were introduced in the models to supplement the family labor on monthly basis. The unit of the activity is one manday (8 hours of work per day). A standard manday was taken as the effort exerted by a healthy adult in the age of 15-65 years in working day. A one day labor input was assumed to be 0.75 standard manday for women and 0.5 for children and old person [6]. The objective function coefficient of each of the hired labor activities represents average monthly wage rates estimated from the field survey. The coefficients carry negative sign since they draw from the value of the objective function.
- 6- **Capital borrowing activities:** In practice, Gezira scheme advances credit to tenants for cotton crop. Table (4) shows the portions of the matrix representing borrowing activities. Borrowing activities are used to supplement the amount of cash owned by the farmers, and include formal sources of finance mainly the Agricultural Bank of Sudan (ABS). The bank lending terms depend on Morabaha system, where the Morabaha margin for the year 2011 was 12%. This rate appeared as a negative coefficient in the objective function.
- 7- **Transfer capital activities:** Eleven transfer capital activities were included in the model to permit the transformation of capital from one month to another. The coefficients of capital transfer in the objective function carry zero values since it does not involve money transactions. Table (5) depicts the proportion of the matrix representing transfer of capital activities.
- 8- **Capital repayment activities:** This is composed of two types of repayment:-
 - 1- Repayment of Gezira scheme advances which appeared as operating capital for the tenants in the model, it required that the total of the repayments should be paid back at the end of the season.
 - 2- Repayment of the borrowed capital. These two have a zero objective function coefficient and they are linked to their respective constraints (Table 4).

Table (1): Crop production activities in the Gezira scheme Season, 2011/12

Activities	unit	cotton	Sorghum	groundnuts	wheat	onion	chickpea	Dir	RHS
Objective fun		-936.7	-683.5	-1020.5	-1045.9	-1982.5	-787.7		
Constraints									
Total land	Fed	1	1	1	1	1	1	<=	20
Cotton	" "	1						>=	0
Sorghum	" "		1					>=	0
Groundnuts	" "			1				>=	0
Wheat	" "				1			>=	0
Onion	" "					1		>=	0
chickpea	" "						1	>=	0
Jun labour	m.d/fed	1.39	7.25	15.07	0	0	0	<=	36
Jull labour	" "	10.57	3.29	6.18	0	0	0	<=	36
Aug labour	" "	8.97	7.3	6.18	0	0	0	<=	36
Sep labour	" "	5.4	6.63	3.4	0	0	0	<=	36

Oct labour	“ “	3.4	1.82	3.4	1.42	1.54	0	<=	36
Nov labour	“ “	3.4	8.53	7.38	2.52	12.64	8.75	<=	36
Dec labour	“ “	8.8	0	0	3.07	9.48	6.9	<=	36
Jan labour	“ “	0	0	0	4.1	8.24	8.2	<=	36
Feb labour	“ “	0	0	0	3.6	8.24	3.2	<=	36
Mar labour	“ “	2	0	0	1.8	12.92	1.6	<=	36
Apr labour	“ “	0	0	0	0	0	7.62	<=	36
May labour	“ “	0	0	1.27	0	0	0	<=	36
Jun water	CM/fed	0	0	373	0	0	0	<=	8200
Jull water	“ “	292	0	731	0	0	0	<=	8200
Aug water	“ “	547	145	846	0	0	0	<=	8200
Sep water	“ “	877	575	646	0	0	0	<=	8200
Oct water	“ “	990	877	0	0	0	0	<=	8200
Nov water	“ “	788	666	0	320	511	292	<=	8200
Dec water	“ “	183	0	0	800	701	768	<=	8200
Jan water	“ “	0	0	0	864	593	718	<=	8200
Feb water	“ “	0	0	0	570	323	282	<=	8200
Mar water	“ “	0	0	0	0	244	163	<=	8200
Apr water	“ “	0	0	0	0	0	0	<=	8200
May water	“ “	0	0	0	0	0	0	<=	8200
OC Jun	SDG/fed	225	221.5	160.5	0	0	0	<=	17400
OC Jull	“ “	123.3	93.6	277.5	0	0	0	<=	0
OC Aug	“ “	224.8	122	36.4	0	0	0	<=	0
OC Sep	“ “	44.7	36	0	0	454	0	<=	0
OC Oct	“ “	0	0	337.2	242.1	94.7	200	<=	0
OC Nov	“ “	0	210.1	0	279	314.8	133.3	<=	0
OC Dec	“ “	120.6	0	0	229.1	56	120.3	<=	0
OC Jan	“ “	75	0	0	39.3	56	56	<=	0
OC Feb	“ “	0	0	0	0	1007	0	<=	0
OC Mar	“ “	121.5	0	0	54.1	0	31	<=	0
OC Apr	“ “	0	0	0	202.3	0	247.2	<=	0
OC May	“ “	0	0	208.9	0	0	0	<=	0
Cotton prod	Kantar/fed	-5.2						<=	0
Sorghum prod	Sack/fed		-7.8					<=	0
Ground prod	Sack/fed			-14.7				<=	0
Wheat prod	Sack/fed				-8			<=	0
Onion prod	Sack/fed					-80.5		<=	0
Chickpea prod	Sack/fed						-6	<=	0
Sorghum cons	Sack							=	12.5

Source: Constructed from survey data

Table (2): Crops selling, consumption and buying activities in the Gezira scheme, season 2011/12

activities	unit	Cotton selling	Sorghum selling	G.N selling	Wheat selling	Onion selling	Chickpea selling	Sorghum cons	Sorghum buying	Dir	RHS
Obj.function		475	164	102.2	155	48.5	235	0	-170		
constraints											
OC Jun	SDG/fed									<=	17400
OC Oct	“ “		-164							<=	0
OC Nov	“ “			-102.4						<=	0
OC Mar	“ “					-48.5				<=	0
OC Apr	“ “	-475			-155		-235			<=	0
Cotton prod	Kantar/fed	1								<=	0

Sorghum prod-	Sack/fed		1						1	-1	<=	0
Groundnut prod	Sack/fed			1							<=	0
Wheat prod	Sack/fed				1						<=	0
Onion prod	Sack/fed					1					<=	0
chickpea prod-	Sack/fed						1				<=	0
Sorgh- cons	Sack								1		=	12.5

Source: Constructed from survey data

*OC = Operating capital *pro = production *G.N = Groundnut *cons = consumption *fed = feddan

Table (3): Labour hiring activities in the Gezira scheme, season 2011/12

Activities constraints	Objective function			HL 1	HL 2	HL 3	HL 4	HL 5	HL 6	HL 7	HL 8	HL 9	HL 10	HL 11	HL 12
	sign	unit	RHS	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15
Jun labour	<=	M.D	36	-1											
Jull labour	<=	“ “	36		-1										
Aug labour	<=	“ “	36			-1									
Sep labour	<=	“ “	36				-1								
Oct labour	<=	“ “	36					-1							
Nov labour	<=	“ “	36						-1						
Dec labour	<=	“ “	36							-1					
Jan labour	<=	“ “	36								-1				
Feb labour	<=	“ “	36									-1			
Mar labour	<=	“ “	36										-1		
Apr labour	<=	“ “	36											-1	
May labour	<=	“ “	36												-1
OC Jun	<=	SDG	1740	15											
OC Jull	<=	“ “	0		15										
OC Aug	<=	“ “	0			15									
OC Sep	<=	“ “	0				15								
OC Oct	<=	“ “	0					15							
OC Nov	<=	“ “	0						15						
OC Dec	<=	“ “	0							15					
OC Jan	<=	“ “	0								15				
OC Feb	<=	“ “	0									15			
OC Mar	<=	“ “	0										15		
OC Apr	<=	“ “	0											15	
OC May		“ “	0												15

Source: Constructed from survey data

Table (4) Borrowing capital activities in the Gezira scheme, season 2011/12

Source: Constructed from survey data

Activities constraint s	Objective function			Bc1	Bc2	Bc3	Bc4	Bc5	Bc6	Bc7	Bc8	Bc9	Bc10	B11	B12	Cap rep	End cap
	sign	unit	RHS														
OC Jun	<=	SD G	17400	-1													
OC Jull	<=	“ “	0		-1												
OC Aug	<=	“ “	0			-1											
OC Sep	<=	“ “	0				-1										
OC Oct	<=	“ “	0					-1									
OC Nov	<=	“ “	0						-1								
OC Dec	<=	“ “	0							-1							
OC Jan	<=	“ “	0								-1						
OC Feb	<=	“ “	0									-1					
OC Mar	<=	“ “	0										-1				
OC Apr	<=	“ “	0											-1			
OC May	<=	“ “	0												-1		
Cap rep	<=	“ “	0	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1	
End cap	=	“ “	17400														1

*Bc = Borrowing capital

Table (5) Transfer capital activities in the Gezira scheme, season 2011/12

Source: Constructed from survey data

constraint	Activities			Tc 1/2	Tc 2/3	Tc 3/4	Tc 4/5	Tc 5/6	Tc 6/7	Tc 7/8	Tc 8/9	Tc 9/10	Tc 10/11	Tc 11/12
	sign	unit	RHS											
OC Jun	<=	SD G	17400	1										
OC Jull	<=	“ “	0	-1	1									
OC Aug	<=	“ “	0		-1	1								
OC Sep	<=	“ “	0			-1	1							
OC Oct	<=	“ “	0				-1	1						
OC Nov	<=	“ “	0					-1	1					
OC Dec	<=	“ “	0						-1	1				
OC Jan	<=	“ “	0							-1	1			
OC Feb	<=	“ “	0								-1	1		
OC Mar	<=	“ “	0									-1	1	
OC Apr	<=	“ “	0										-1	1
OC May	<=	“ “	0											-1

*Tc = Transfer capital

(b) Constraints set:

The constraints set of the model includes the following:

1- **Land:** The average tenancy is 20 feddan in main Gezira scheme. The total land in the model is restricted as equal to or less than 20 feddans. After Act 2005, the farmers are free to choice crops to grow that means no fixed rotation, the field survey found that the average area cultivated was 4, 4, 2, 3, 4 and 3 feddan for cotton, sorghum, groundnut, wheat, onion and chickpea, respectively.

2- **Labour:** In this study, the minimum available monthly labour (in mandays) to the household was estimated by the survey to be 36 mandays.

3- **Irrigation:** Irrigation was expressed in amount of irrigation water available to the tenant on a monthly basis. The available irrigation water in the Gezira scheme during the growing season was 8200 CM. This amount of irrigation water available represents the right hand side of irrigation constraint, table (1).

- 4- **Operating capital and credit constraint:** In this study, the Gezira scheme advances for cotton are used as operating capital. Additional operating capital was obtained from borrowing, off farm income and crops sales.
- 5- **Sorghum consumption:** Sorghum consumption was estimated from field survey by 12.5 sacks per household per year.
- 6- **Production balance equation:** This refers to the fact that the crop produced is used through sales and/ or consumption.
- 7- **Capital repayment:** Borrowing capital in the model was restricted to be paid back at the end of the season with a 12 percent Morabaha margin.

III. RESULTS AND DISCUSSION

This part gives the results of the linear programming model discussing the basic solution and presents the different scenarios by changing the parameters of the basic model in the sensitivity analysis. The results of the basic model were compared to the actual situation.

3.1 Optimal production plan

3.1.1 Cropping pattern

From table (6), it is clear that most of the land is allocated to onion crop which was 8.68 feddans, followed by cotton crop which is 6.88 feddans, while sorghum and groundnuts entered in the optimal plan with small areas 1.74, and 0.92 feddans respectively, wheat and chickpea did not enter in the optimal plan. In the real situation cotton, sorghum, and onion occupied about the same area (4 feddan), followed by wheat and chickpea, (3 feddan), and then groundnuts (2 feddan). From table (6), it is clear that cotton crop increased from 4 to 6.88 feddans by 72% compared to actual land allocated while onion crop increased from 4 to 8.68 feddans by 117%.

Comparison of the optimal and actual net farm income shows a difference. The actual net return was about SDG 11735.86 while the optimal plan's returns was SDG18697.24 which was more than actual one by 59.3%.

3.1.2 Resources use

The levels of resource use are shown in Table (6). It is clear that there is difference between the actual total land allocated and optimal total land, which was 20 and 18.22 feddans, respectively. It also noticed that the total labor mandays required for the basic solutions were 360 mandays and the actual mandays utilized in the Gezira scheme were 382mandays. In the basic solution, about 83.33% of available family labour was utilized in the Gezira scheme compared to 91.65% in the actual situation. 83.32% of the available hired labour was utilized in the Gezira scheme compared to 86.76% in the actual situation. Percentage of the hired labor out of the total labour in the basic solution was 61.74% as compared to 61.74% in the actual situation. About 83.33% of the total labour available was utilized in the basic solution compared to 88.42% in the actual situation. The total quantity of water required for the basic solutions were 59125.6 C.M and the actual cubic meter utilized in the Gezira scheme are 57982 C.M. In the basic solution, about 60.09% of available water was utilized in the Gezira scheme compared to

58.9% in the actual situation. The result of the basic model there was no cash problem cash except in March and April months. In March and April months there was a shortage in cash to meet harvesting operations.

Table (6): Optimum solutions of the basic model of the Gezira scheme in comparison with the actual situation.

Item	Model	Actual
Total land	18.22	20
Cotton land	6.88	4
Sorghum land	1.74	4
Groundnuts land	0.92	2
Wheat land	0	3
Onion land	8.68	4
chickpea land	0	3
Total labour	360	382
Family labour	137.74	146.15
Hire labour	222.26	235.85
% of F.L/ Total F.L	83.33%	91.65%
% of H.L/ Total H.L	83.32%	86.76%
% of utilized H.L/T.L.	61.74%	61.74%
% of utilized T.L/T.L.	83.33%	88.42%
Total quantity of water requirement C.M	59125.6	57982
% of utilized of water/ available water C.M	60.09%	58.9%
Net farm income SDG	18697.24	11735.86

Source: Program computed

3.2 Sensitivity analysis

Sensitivity analysis is the investigation that deals with changes in the optimal solution due to changes in the data [8]. The basic solutions of the LP models were developed by changing their parameters to present different policy analysis scenarios. These scenarios examined the impact of productivities, cost of production and prices on the crop mix and net farm income of the basic solutions. Table (7) depicts different scenarios of crops combination in the Gezira scheme.

3.2.1 Impact of crops productivities:

Sc1- Increase of productivity of cotton and sorghum crops by 25%

Cotton crop gains foreign currency and sorghum crop considered the crop which meets food security in the Gezira scheme area, Gezira scheme administration and Gezira Research Situation seek to increase the yield of these crops. Increase of productivity of cotton and sorghum crops by 25% in the basic model change net farm income and crops mix. Net farm income increased from 18697.24 SDG to 23411.96 SDG (by 25.2%). Sorghum area increased from 1.7 feddan to 2.08 feddan, while cotton, and onion did not change in areas, groundnuts, wheat, and chickpea did not enter the plan.

Sc2- Restricting sorghum area to the level required to meet consumption:

By restricting sorghum area in the Gezira scheme model to 2 feddans in order to produce 12.5 sacks, which is equal to the amount consumed by family during the year. The net farm income decreased from 18697.24 SDG to 18677.84 SDG (by 0.1%). Sorghum increased from 1.74 to 2 feddan, while groundnuts decreased from 0.92 to 0.22 feddan, and other crops did not change in areas.

3.2.2 The impact of prices:

Sc3- Increased of cotton price by 25%

Cotton price depends on world marketing price, increase demand for cotton in world market lead to increasing cotton prices. Increase price of cotton crop by 25% in the basic model did not change crops mix. It only increased the net farm income from 18697.24 SDG to 22947.5 SDG (by 22.7%).

Sc4- Decrease of cotton and onion price by 25%

Decrease of prices of cotton and onion crops by 25% in the basic model changed net farm income and crops mix. Net farm income decreased from 18697.24 SDG to 6572.3 SDG (by 64.8%). Cotton, groundnuts, and onion areas decreased from 6.88, 0.92, and 8.68 to 6.3, 0.41, and 5.26 feddans, respectively, while sorghum and chickpea increased from 1.74 and zero to 2.8 and 4.72 feddan, respectively, wheat crop did not change in area.

3.2.3 The impact of production cost:

If there is a body (scheme management, farmer union ...etc) supply or provide the inputs (seeds, fertilizers, pesticides and sack) at lower marginal cost price, this will reduce production cost of all crops change scenarios used.

Sc5- Lowering cost of all crops by 25%

Scheme management supply or provide the inputs (seeds, fertilizers, pesticides and sack) at lower marginal cost price, this will reduce production cost of all crops change, lowering costs of all crops by 25% in the basic model changed net farm income and crops mix. Net farm income increased from 18697.24 SDG to 25156.8 SDG (by 34.5%). The groundnuts increased from 0.92 to 1.53 feddan, sorghum decreased from 1.74 to 1.52 feddan, while other crops did not change in areas.

Sc6- Lowering cost of cotton and wheat by 25%

Lowering costs of cotton and wheat by 25% in the basic model did not change crops mix. It only increased the net farm income from 18697.24 SDG to 20288.6 SDG (by 8.5%).

Sc7- Lowering cost of cotton and wheat by 50%

Lowering costs of cotton and wheat by 50% in the basic model did not change crops mix. It only increased the net farm income from 18697.24 SDG to 21920.6 SDG (by 15.6%).

Table (7): Different scenarios of crops combination (in feddan).

Scenarios	Cotton	Sorghum	Groundnuts	Wheat	Onion	Chickpea	Net farm income/SDG
Sc0	6.88	1.74	0.92	0	8.68	0	18697.24
Sc1	6.88	2.08	0	0	8.68	0	23594.12
Sc2	6.88	2	0.22	0	8.68	0	18677.84
Sc3	6.88	1.74	0.92	0	8.68	0	22947.5
Sc4	6.3	2.8	0.41	0	5.26	4.72	6572.3
Sc5	6.88	1.52	1.53	0	8.68	0	25156.8
Sc6	6.88	1.74	0.92	0	6.68	0	20288.6
Sc7	6.88	1.74	0.92	0	6.68	0	21920.6

Source: Compiled by the author

IV. CONCLUSIONS

The results of LP models revealed that the net farm income in the optimal models was over the current situation by 59.3%, and for the basic model has cash problem to meet harvesting operations only for March and April months. The study revealed that there optimal model and all scenarios wheat crop unprofitable did not enter the plan.

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Strategies to ensure successful outsourcing of public service delivery in Kenyan Cities

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Abstract- Kenya experiences public service delivery breakdowns in all her major cities due to politicized public service delivery systems. These interruptions occur despite the huge wage bills and bloated workforces at the county governments. These failures affect delivery of essential services in key areas of garbage collection, roads maintenance, fresh water supply, control of hawkers' activities, healthcare delivery amongst others. This article seeks to recommend strategies that can be adopted to ensure cost-effective quality service delivery and encourage accountability. The article proposes outsourcing of public service delivery from the in-house county governments to competent reliable private providers who can be held responsible throughout the contract periods. The guiding premise is that outsourcing of public services when properly utilized can lead to cost-effective quality delivery of public services using competent private firms. The article acknowledges that outsourcing is not a universal panacea, and that when used carelessly, it can lead to catastrophic results. The article therefore examined several documented cases of both successful and failed public outsourcing contracts to establish best strategies that can be duplicated to succeed in Kenyan cities. The study adopted a multiple case study approach. The case studies are centered on fourteen cities in the USA and one from Germany. The cases comprised of outsourced contracts that are underway and some that have already been terminated. After thorough analysis, the study made the following recommendations: County governments should conduct training programs for their middle level managers and departmental heads on modern ethical procurement and procurement-management procedures to ensure streamlined public outsourcing procurement practice and eradicate elements of corruption in outsourcing process. The Procurement Manual for Works should guide tendering process of all public works in Kenya. County governments and

the private service providers should conduct detailed feasibility analysis, including workable delivery timeframes and fully address "worst-case scenarios" before signing the outsourcing contracts and transferring service delivery functions. Secondly, The decision makers must have clear goals, the scope of the outsourced contract, and the expected outcomes to enable them to effectively plan the major processes, tasks, and milestones, as well as appropriating the associated costs. The county governments should encourage competitive bidding during the tendering process to lower the overall cost. They should match the scope of the contract to the market and to supplier availability to attract the highest number of quality bidders. The county government officials should devote sufficient time to negotiating and crafting the contract document to establish clear expectations, roles, and responsibilities.

Index Terms- Outsourcing, Service Quality, Strategies, County governments

I. INTRODUCTION

Outsourcing has been variously defined by researchers as the procurement option that favors 'contracting out' of services previously performed in-house to an external service provider as a means of increasing organizational efficiency and effectiveness (Li and Choi, 2009; Hamzah et al., 2010). CIPS defines outsourcing as "the process of identifying the most suitable expert third party service provider to undertake the management, administration and

provision of the service in question". "Outsourcing has the potential to depoliticize certain aspects of service delivery, as fixed contracts allow for better budget control and reduce the need for controversial service cuts. In addition, it reduces the need for direct personnel management by shifting these responsibilities to the contractor" (Outsourcing Methods and Case Studies, (2009). "Outsourcing is a useful tool employed by cities across the country (USA) to cut costs, improve quality of service, and raise revenue. Approximately 80 percent of all US cities outsource some service" (Outsourcing in State and Local Governments: (2006). The potential benefits of outsourcing include cost savings, efficiency gains, improved flexibility, access to world-class expertise and focus on core competencies. However, outsourcing also poses numerous risks that must be managed in order for outsourcing to be successful (Kremic, 2006, p.467). "Cities should never outsource functions that are inherently governmental, such as law enforcement, policy making, and public safety. These functions are essential to the well being and quality of life of citizens and therefore should never be subjected to the risk of contractor failure" (Outsourcing Methods and Case Studies, (2009). In addition, public services should only be contracted to selected well-qualified vendors with a proven methodological and technological expertise.

2.0 Literature Review

2.1 Outsourcing in the Public Sector

The Report of an Expert Panel, (2014) had a guarded

view about outsourcing and pointed to challenges and constraints that make it difficult for many state and local governments to create the right conditions and marshal the necessary resources to make outsourcing work. According to the report, research indicates that the anticipated cost savings from competition, fewer managerial constraints, and financial incentives often fail to materialize in practice, particularly when outsourcing initiatives are not designed and managed effectively. Additionally, contract management requires a high degree of skill and expertise and is more costly than is often believed. Governments need to carefully project the costs of these activities and the challenges they pose when making outsourcing decisions. An informed outsourcing decision requires a broad skill set, which will depend in large part on the initial rationale and scope for the project.

Research shows that a thorough risk assessment must be taken before you enter into outsourcing agreements. The local councils must adopt a very cautious approach to outsourcing based on risk minimization (Cox et al, (2012). Barthelemy (2003a, p.93) concluded that hidden costs are one of the greatest risks when outsourcing. Hidden costs occur in selection, managing the contract, and making changes to the contract, all of which can offset any cost savings during the agreement. Indeed, flexibility can only be gained through outsourcing at extra cost to the council or through the development of trust. (Cox et al, (2012). Hidden costs are the most important risk to consider because any costs that arise later may offset any savings from the agreement (Barthelemy, 2003a,

p.93). Research has also shown that councils should not underestimate the high costs incurred during selection and from managing the contract. Additionally, the provider will give you only what you ask for in the contract and will charge additional costs for anything unspecified. Therefore, the council needs to understand every aspect of the service and the requirements before outsourcing and writing a complete contract (Barthelemy, 2003a, p.93)

2.2 Tender process

The main objective of the tendering process is to ensure the “best fit” supplier is selected to supply goods and/or services to the customer, which offers best value for money (CIPS, 2013). The Procurement Manual for Works (PPOA, (2009) should guide tendering process of all public works in Kenya. The manual stipulates the clear procedures that have to be adhered to in the tendering process to provide public services. The outsourcing tender process is lengthy and detailed, and ranges from 18 months to 3 years (Cox et al, (2012). The open invite means that councils must evaluate and respond to all bids. This means councils must set clear requirements to enable companies to bid for the contract and make evaluation easier, which enables them to gain a more thorough understanding of the outsourcing requirements and make more informed decisions (Burnes&Anastasiadis, 2003, p.365). This structured process can allow the council to achieve best value through competition and write “fool-proof” contracts to minimize risk.

As cited by Cox, et al (2012), in the 1980’s the British

government introduced Compulsory Competitive Tendering (CCT), this “involved government or firms using a competitive bidding process to help decide who should have the right to produce or deliver goods or services” within the public sector (Rimmer, 1994, p.79). This process was driven by “marketing and political trends” with the aim of making the public sector more competitive (Marco-Simó, et al, 2007, p.51). It was assumed that market-based competition would be able to provide improved efficiency and lower cost whereas public monopolies provided no incentives to improve performance (Besley&Ghatak, 2003). However, traditional outsourcing contracts in the public sector were often granted to the lowest priced bidder, which can lead to lower quality provision. Thus, the government updated CCT in 1998 to focus on best value rather than simply lowest cost, whether internally or externally (Butler, 2003). Legislation stipulates that public sector agencies must make selection decisions based on best value rather than lowest cost (Butler, 2003). However, Burnes and Anastasiadis (2003, p.362) observe that local councils are legally obliged to outsource to the lowest cost bidder as long as they meet the minimum specifications for the contract.

3.0 Study Methodology

The study adopted a multiple case study approach. The case studies are based on fourteen cities in the USA and one from Germany. The cases comprise of outsourced contracts that are underway and some that have already been terminated. “A case study is an

empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2009). A case study approach was chosen because this type of research is useful when ‘how’ or ‘why’ questions are being asked (Saunders et al, 2007, p.139). The use of multiple case study approach was motivated as Marco-Simó et al (2007, p.59) have argued that we need more “real cases” before “we can generalize the findings”.

As (Flyvbjerg, 2004, p.420) argues, case study approach allows an in-depth examination to develop an enhanced understanding of the subject area and develops areas for further research. Commentators agree that this method allows for a greater understanding of complex issues and is more comprehensive than surveys, due to its ability to “come closer....to the complexity of real organization setting” (Maylor& Blackmon, 2005, p.242). Yin (1984), cited by Gable (1994, p.113-115), believes that a single case study is useful in areas that are under-researched and require exploration, whereas multiple case studies are used to test for patterns and draw comparisons. The purpose of this enquiry was to explore a complex issue in-depth and to identify some common trends rather than to present a generalized industry view.

3.1 Case Studies

Outsourced project	Project outcome	Steps taken prior to outsourcing and lessons learnt
Washington D.C negotiated a 7 1/2 year contract with Affiliated Computer Services (ACS) to install and maintain 16,500 parking meters in 1999 ¹	<ul style="list-style-type: none"> From 1999 to 2005, almost 7,000 tickets were issued to vehicles parked at broken meters and the number of citizen complaints jumped from 3,652 to 89,840 ACS consistently failed to repair parking meters within the 72-hour period specified in the privatization contract During the 7 1/2 year period, ACS billed the District \$644,952 in bagged meter fees, which under the contract it was not entitled to, and received payment without any formal investigation 	<ul style="list-style-type: none"> No Risk- benefit assessment was conducted before outsourcing contract was initiated Auditor estimated that if parking meter management had been retained in-house for the seven year period, it would have cost the city \$8.8 million less than the contract with ACS Outsourcing contract failed to deliver desired results
Denver began a contract with Redflex Traffic Systems to administer its new red light traffic photo enforcement program in 2008 ² .	<ul style="list-style-type: none"> A few months into the contract, Redflex had failed to deliver key data and statistics required in the contract as well as provide support staff, maintenance reports, equipment certifications, and access to live video and still images. 	<ul style="list-style-type: none"> There were no clear, specific, and effective contract requirements established prior to onset of the contract The lack of data from Redflex has prevented Denver from knowing whether the red-light cameras actually deter traffic violations, the chief goal of the program
Texas negotiated a seven-year \$863 million contract with IBM to transfer state records to a centralized computer system ³ .	<ul style="list-style-type: none"> Temporary loss of half of 8 months worth of Medicaid fraud records Failure to meet server backup timeliness targets for which IBM was fined \$900,000 	<ul style="list-style-type: none"> Inadequate time spent negotiating and crafting the contract document to come up with clear guidelines IBM project overseers failed to implement the necessary checks and balances to ensure the project's security
Atlanta, GA outsources its records management functions after it lost its primary records storage facility with the projected sale of its City Hall East building in	Atlanta eliminated the need for its Records Management Division, while preserving City oversight of records management activities.	<ul style="list-style-type: none"> A Records Management Administrative Committee composed of representatives from various City departments was

summer 2009 In response, the City negotiated a \$150,000, 10 year contract with Iron Mountain, Inc. to store City records in a secure facility		<p>created to oversee the contract</p> <ul style="list-style-type: none"> Outsourced contract succeeded in delivering quality services at a lower cost 	sweeping services on select City streets.	effective to outsource this function rather than fully retain it in-house, given the significant cost of sweeper maintenance and labor.	
Richmond, VA has in recent months moved to privatize its municipal fleet operation ⁴	A May 2007 report by the City Auditor estimates a potential savings of \$2.6 million from contracting out these operations. In addition, the cities of Dallas, TX, Huntingdon Beach, CA, and Montgomery County, MD have each successfully outsourced select fleet management functions.	<ul style="list-style-type: none"> The initial request for information called for mandatory performance standards that would tie full payment to meeting time and quality performance benchmarks. Under a contracting agreement, the City would retain a fleet operations manager and staff to oversee and support the private operation while the contractor would be responsible for preventive maintenance, minor and major repairs, body repairs, tire inspection and replacement, and overall management of the operation. 	Philadelphia, PA recently contracted out operation of its waste treatment plant. Previously, the City experienced complaints about the odor and bad aesthetics of its sludge processing facility. In addition, the plant lacked the capacity to fully process liquid sludge into exceptional quality bio-solids and reuse the processed bio-solids effectively ⁵ .	In the end, the privatization is estimated to yield cost savings ranging from \$100 million to \$200 million over the life of the 23-year contract.	Under the terms of the contract, a contractor will take over plant operations and construct a new facility to convert treated waste into pellets that qualify as fertilizer for a broader range of uses.
			Chelsea, MA has outsourced its entire parking enforcement operation. In 1992, Chelsea's parking enforcement program operated at a deficit and annual collections totaled \$150,000 ⁶ .	In 2006, after outsourcing parking enforcement, the City collected over \$1.5 million and received a net surplus of over \$1 million. The cities of Anaheim, CA, West Hollywood, CA, and Montgomery County, MD, have also outsourced parking enforcement and realized substantially increased revenues and a lower parking enforcement cost per hour.	Private operators are often more willing to invest in capital equipment and technology that eventually improve productivity and efficiency, thereby reducing cost.
New York, NY has partially outsourced its 311 municipal call center. In 2001, New York had 45 citywide call centers staffed by almost 1,000 employees. Due to the huge volume of calls to the system for a city of over 8 million people, New York outsourced a portion of call center operations to private vendors for peak periods.	New York found that using contracted call assistants reduces the need for costly permanent personnel during peak periods and services to non-English speaking City residents.	With the election of Mayor Michael Bloomberg in November 2001, came a complete reorganization of the City's call centers into a single 311 service-center.			
Sunnyvale, CA completely outsources traffic signal maintenance. The preventive maintenance and repair of the city's traffic signals have been outsourced for over 10 years.	Due to outsourcing contract success, Newport Beach, CA and Lakewood, CA have also completely outsourced this function	The contract is subjected to a competitive bidding process every one to three years, and is overseen by the city's Division of Transportation and Traffic. Sunnyvale typically negotiates fixed price contracts and requires contractors to put up a performance bond, to protect the City against cost and performance risk.	Berkeley, CA uses private security guards at some city facilities. In 2005, the City contracted with Securitas Security Services, USA to provide security guards at two city office buildings ⁷ .	Berkeley has found it more cost effective to use a contractor to secure public buildings than have City employees provide service for very brief periods of time. Using contracted security guards has also allowed for the flexibility to absorb staffing reductions mandated by budget cuts, without the need to terminate unionized City employees. State governments of Kansas, New Mexico, and Missouri also use private security guards at state office buildings, due to the flexibility and cost savings offered by contracted security.	Clearly defined roles: The guards were responsible for monitoring traffic, providing information to visitors, directing citizens to appropriate city offices, and securing public restrooms at the end of the day
Dallas, TX outsources 60 percent of its street sweeping operations. In recent years, the City negotiated three year contracts for street	Dallas has seen its cost per gutter mile swept fall from \$20 in 2004 to \$17.44 in 2007. Many other cities have also found it more cost	City used a very competitive bidding process,	Washington, D.C. has partnered with commercial landowners to finance construction of a new transit station. In 1998, the government of the District of Columbia developed a Citizens	In the end, the project was projected to generate more than \$1 billion of total public-private investment and over 5,000 permanent jobs in the area around the new station.	In response, the District 's Department of Housing and Community Development and Department of Transportation worked with area commercial landowners to come up with a creative solution to

<p>Plan for Prosperity in the 21st Century that identified areas of the District in need of economic development. The Plan called for the construction of a new, in-fill Metro station at New York Avenue to spur development in the underdeveloped North of Massachusetts (NoMa) corridor.</p>		<p>finance the project's projected \$100 million cost. The landowners agreed to donate land for the new station and pay an annual development fee that generated \$25 million toward the project.</p>	<p>for the system was originally planned for August 31, 2003. The consortium failed to meet this date because the development of the system took much longer than all involved parties had originally expected. This was due to various reasons, including overly optimistic commitments by the consortium, insufficient feasibility checks by the government, and public and political pressure to stick with the original implementation schedule. The toll system finally became operational in January 2005 with a reduced set of functionalities and did not reach complete configuration until January 2006.</p>	<p>billion.</p>	<p>the consortium to meet. By conducting a much more thorough analysis, the parties could have avoided the material, commercial, and reputational damages caused by the long delay and the corresponding legal disputes.</p> <p>The legal proceedings are still ongoing.</p>
<p>San Diego, CA has introduced managed competition to a host of city services, including trash collection and street sweeping⁸.</p>	<p>Foundation estimates that with an expanded scope, the City has the potential to save \$80 to \$200 million per year through the program</p>	<p>Under Mayor Jerry Sanders' 2007 plan, private contractors compete with City staff for a range of non-governmental service contracts, including one-fifth of San Diego's trash collection routes. The City develops a Statement of Work and acquisition plan, and disseminates an RFP to a City agency and private vendors. An independent evaluation board, the Managed Competition Independent Review Board (MCIRB), evaluates the proposals to ensure a level playing field, and then recommends the "best value" proposal to the Mayor. The Mayor then either accepts or rejects the MCIRB recommendation. If accepted, he forwards it on to City Council for final approval.</p>			
<p>Indianapolis, IN began a managed competition process for fleet services in 1995. The City gave its Fleet Services Division (IFS) three years to prepare for a competitive bidding process.</p>	<p>By the end of the initial contract period, IFS had reduced its total costs by 35 percent and managed to successfully underbid all private vehicle repair firms that submitted bids.</p>	<p>IFS focused its efforts on implementing employee-generated reforms and strengthening its cost record-keeping and performance measurement system. These innovations enabled IFS to develop an accurate annual budgeting method and performance-based incentives. IFS also implemented a market-based rate structure for its customers, which resulted in the outsourcing of 20 to 25 percent of its work.</p>			
<p>In 2002, the German federal government signed a contract with a private consortium in which the consortium agreed to develop and install a satellite-based electronic toll road system by which road tolls for trucks using the German highways were to be calculated, monitored, and collected. The start date</p>	<p>In 2005, the German federal government started legal proceedings against the consortium, claiming contractual penalties and lost toll profits in a total amount of approximately €5 billion. The consortium raised counter claims for payment of retained fees in the amount of approximately €1</p>	<p>Based on the available information, it seems that if the federal government and the consortium had conducted a more detailed feasibility analysis, including the actual state of development of the system prototypes, they would have discovered that it was unrealistic to comply with the very ambitious timeframe that the government required</p>			

4.0 Recommendations

After critically evaluating the above case studies on public outsourcing, the study makes the following recommendations, which when fully adhered to can lead to successful replication and yield the same successful results on the Kenyan scene.

1. County governments should conduct training programs for their middle level managers and departmental heads on modern ethical procurement and procurement-management procedures to ensure streamlined public outsourcing procurement practice and eradicate elements of corruption in outsourcing process. Procurement monitors should also be introduced at various stages in the public procurement process to ensure that all public outsourcing arrangements are conducted acquiescently and the concerned

managers do not have conflict of interests. The Procurement Manual for Works (PPOA, (2009) should guide tendering process of all public works in Kenya.

2. County governments and the private service providers should conduct thorough feasibility analysis, including workable delivery timeframes and fully address “worst-case scenarios” before signing the outsourcing contracts and transferring service delivery functions. According to the Report of an Expert Panel, (2014), decision makers must have complete and reliable cost, benefit, and performance data for all functions and services targeted for outsourcing. It is also important to have an understanding of the services offered by potential providers, and of the underlying concept, technology, and financial cornerstones of their proposals.
3. Secondly, The decision makers must have clear goals, the scope of the outsourced contract, and the expected outcomes to enable them to effectively plan the major processes, tasks, and milestones, as well as appropriating the associated costs. As the Report of an Expert Panel, (2014) informs, proper scoping and planning is also important to attracting the right suppliers and setting reasonable expectations. Furthermore, Planners should try to seek advice from potential providers (e.g., at a pre-solicitation public meeting where all interested vendors are welcome) and other technical experts before drafting the solicitation document. A useful practice is to publish requests-for-information (RFIs), which can provide the government with good understanding of the capabilities of the supplier community (Report of an Expert Panel, (2014).
4. Encourage competitive bidding during the tendering process to lower final cost. Match the scope of the contract to the market and to supplier availability to attract the highest number of quality bidders. As the Report of an Expert Panel, (2014) advocates, consider using a mix of public, private, and non-profit providers to avoid “thinning the market” during the contract term; and limit the use of excessively long contract terms while providing opportunities for contract renewal based on performance. After optimizing the supplier base and prior to awarding the contract, there should be a rigorous and objective evaluation of potential suppliers and partners with a view of selecting the “best” suppliers and partners. Seek all relevant information about the reputation, capabilities, and past performance of potential suppliers. A method for evaluating responses and selecting the winner should be in place, including clearly identified and ranked or weighted evaluation criteria.
5. After analyzing the above cases it’s clear that county government officials should devote sufficient time to negotiating and crafting the contract document. As (Cox et al, (2012)

argues, 18 months to three years should be ideal time for negotiating and crafting a contract. Final contracts should establish clear expectations, roles, and responsibilities. Review the appropriate contract term with due consideration for level of partners' investments, performance expectations, risk tolerance, prior performance, and cost associated with timing of renegotiation (Report of an Expert Panel, (2014).

II. CONCLUSION

County governments should conduct training programs for their middle level managers and departmental heads on modern ethical procurement and procurement-management procedures to ensure streamlined public outsourcing procurement practice and eradicate elements of corruption in outsourcing process. The Procurement Manual for Works should guide tendering process of all outsourced public works in Kenya. County governments and the private service providers should conduct detailed feasibility analysis, including workable delivery timeframes and fully address "worst-case scenarios" before signing the outsourcing contracts and transferring service delivery functions. Secondly, The decision makers must have clear goals, the scope of the outsourced contract, and the expected outcomes to enable them to effectively plan the major processes, tasks, and milestones, as well as appropriating the associated costs. The county governments should encourage competitive bidding during the tendering process to lower the overall cost. They should match the scope of the contract to the market and to supplier availability

to attract the highest number of quality bidders. The county government officials should devote sufficient time to negotiating and crafting the contract document to establish clear expectations, roles, and responsibilities.

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Nursing and Midwifery Students' Lived Experiences During Clinical Practice in Palestine

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Abstract

Clinical practice is an integral part of nursing curriculum of pre-registration nursing courses to actively engaging student nurses with knowledge, skills, and attitudes required for their future nursing profession and for the fulfillment of intended learning outcomes. The purpose of this study was to identify nursing and midwifery students' problems during clinical practice at the baccalaureate nursing program in Palestine. A descriptive cross-sectional study with proportionate sampling of 340 students was conducted. The study population was comprised of the second, third and fourth year students enrolled in a baccalaureate nursing and midwifery programs. Research data were collected using a 45-item self-administered questionnaire. Prior to beginning the study written permission was obtained from the school administration and verbal consent from all participants. Research data were analyzed with descriptive and inferential statistics by using SPSS version 23. The study findings showed that 85.2% of the students reported that the teaching staff were not with them during clinical practice, 83.3% that they were not able to transfer theoretic knowledge they had learned into practice, 72.7% that they were used to do tasks other than their primary patient care on the ward, 74.5% that the teaching staff was not able to establish cooperation with the hospital employees. Findings reveal that student nurses in Palestine meet a number of challenges in the clinical learning environment. Therefore, approaches that facilitate learning in clinical practice in beyond creating conducive clinical learning environment are essential.

KEY-WORDS: Clinical practice, Clinical setting, Learning, Lived experiences, Student nurses

I. INTRODUCTION

Theoretical and practical learning experiences are an integrated combination of nursing education aim to enhance the ability of nursing students to comprehensively and systematically resolve the clients' nursing problems, through acquiring knowledge, skills, and attitudes needed to enhance the quality of nursing care (Forsberg et al., 2011; Budgen & Garmoth, 2008). Although clinical experience is one of the most significant sources of stress and anxiety producing components of the nursing program, it is a core part of the baccalaureate nursing curricula. Clinical training, not only gives students the opportunity to transfer what they have learnt during theory into the unfamiliar and complex clinical practice environments (Clynes & Raftery 2008; McKenna & Wellard, 2009; Yang, 2013). It also helps students learn a variety of skills, such as how to establish communication, make decisions and work as a member of a team. Therefore, a constructive clinical teaching environment that provides nursing students with opportunities for the development of confidence and competence, and with a focus on student learning needs rather than health care service delivery needs, is essential (Croxon and Maginnis, 2009).

Administrators of University Schools for Health Science and Nursing Schools in Palestine have adopted preceptor as a method of organizing students' clinical experiences and supervision. Preceptor, supervisor and mentor are often used synonymously and interchangeably in the literature (Yonge et al., 2007). For this study, the term preceptor has been chosen and defined as the staff nurses who have the competencies, abilities and who agree to work with nursing students to provide them with opportunities to reinforce their knowledge with clinical practice (Budgen and Gamroth, 2008). Budgen & Garmoth (2008) suggested that education in the clinical environment allows students to become socialized into the norms and culture of the nursing profession. Therefore, learning in the clinical practice should be effectively facilitated; in order to adequately prepare nursing students to perform the role of a professional nurse upon graduation (Fitzgerald et al. 2011).

The goal of nursing education is to "develop independent, purposeful critical thinkers who can support the clinical reasoning necessary for practice" (Ellerman, Kataoka-Yahiro, & Wong, 2006). Learning in the clinical practice takes place when students apply what they have learned in classroom situation and practiced in a simulation laboratory into the reality of nursing. As students and nurses utilize the nursing process to assess, diagnose, plan, implement, and evaluate their patients' potential and actual issues, they will become better clinical decision makers and improve professional judgments (Huckabay, 2009).

Several authors show that there is a gap in integrating theoretical learning and skills to practice which have had an impact on students learning in clinical skills (Ip and Chan 2005; Allan, 2011; Chan, 2013; McKenna & Wellard, 2009). Thus, they were unable to transfer knowledge and theory learned in their nursing program to actual practice which had negative consequences on patient outcomes (Benner et al., 2009; Tanner, 2006). Furthermore, this lack of exposure to expert thinking affects experienced nurses as well, who are unable to progress to a higher level of proficiency. The inability to retrieve knowledge transcends into a failure to recognize patient conditions and respond appropriately.

This paper describes undergraduate nursing student's perception toward factors that influenced their clinical learning experiences. However, according to a review of the literature, there are few quantitative studies have been done on the challenges nursing students are faced with in the clinical learning environment; unfortunately, such studies are lacking and these challenges are still unknown in Palestine. Knowledge about the perceived factors that influence learning in nursing students is essential in any student centered learning environment and will assist nurse educators to develop appropriate teaching strategies for the

clinical learning environment. Since clinical practice periods are a vital component in the curriculum of pre-registration nursing courses, it is important to evaluate the students' experiences of their supervision and whether the intended learning outcomes are reached. Accordingly, this study aimed to explain the challenges of the nursing students in the clinical learning environment.

BACKGROUND

Since a supportive clinical learning environment has a positive influence on the students' professional development, a poor learning environment can have contrary effects on their professional development process (Chesser-Smyth, 2005). The unpredictable nature of the clinical training environment can create some problems for nursing students. These problems have been reported by several researchers in the literature. The most common factors contributing to these problems include the first clinical experience, fear of making mistakes, performing clinical skills, faculty evaluation, the teaching staff, and the inadequacies in supplies and equipment and the environment of the clinical settings (Melincavage, 2011; Shabana et al., 2012; Anthony and Yastik Baxter, 2011; Levett-Jones et al., 2009; Aydin et al. 2007).

In a study conducted by Tulubas & Karadag (2007) in nursing schools it was reported that 21.6% of the students had experienced problems with teaching staff in the clinical settings. Lack of student preceptor relationships were found to be obstructive factors for learning, while good interpersonal relationship, communication and support between staff and students create conducive environment for students learning in the clinical setting (Kelly, 2007). Another study carried out Deniz & Karakulak (2006) at Aydin School for Health Sciences, the results revealed that 51.3% of the students reported that their clinical instructor did not give adequate guidance in the clinical setting, 62.4% that they were closely checked by the guidelines, that the teaching staff did not introduce the student on the ward, and 56.9% that they were not fairly assessed on the ward. In another study 73.9% of the nursing students reported that they had experienced problems with ward nurses (Tulubas & Karadag 2007).

In another study conducted at Antalya School for Health Sciences 84% of midwifery and nursing students expected the teaching staff to be in control of the ward, to prepare students for new procedures, to know ward procedures, and help the ward staff and students form positive relationships. At the same time 31% of the students wanted teaching staff to trust the students, be tolerant, respectful and supportive (Keskin & Calikan 2006). In another study examined clinical practice in Sweden, Lofmark and Wikblad identified lack

of opportunity for the nursing students to practice in the clinical area as a problem; suggesting that lack of opportunity for the nursing students to practice affects the conversion of the theoretical knowledge to practice (Lofmark and Wikblad, 2002).

Lack of learning opportunities for students in clinical settings to competently and safely care for patients could result in a nursing graduate who has not met the required standards and competences of the profession. This lack of opportunity to develop required competencies could adversely affect the nursing students' learning and eventually the care rendered to patients (Lawal et al., 2016). Clynes and Raftery (2008) reported that providing students with feedback from mentors, preceptors and nurse educators during clinical learning helps them to gain confidence as through feedback they know their progress.

Finally, a previous study showed that, 56.3% of the nursing students thought that clinical instructors needed to take more responsibility on the ward, 55% that there needed to be more communication between the student, clinical instructor and nurse, 35% that nurses needed to give more support to students, and 43.7% that they should not be made to do non-nursing tasks (Ozcan and Shukla, 1993).

Methodology

Design: A descriptive cross-sectional study design was utilized. A stratified sample of 280 nursing and midwifery students was recruited. Approximately more than half of the sample was female. The selected students were approached because they have a particular knowledge or enough clinical practice to compare what is learned from theory. We excluded bridging students because most of these students have had working experience in the hospitals and it would be hard for them to relate to the theory-practice gap. Only students from second, third, and fourth year were approached. The first year students were excluded as they were only exposed to clinical training at the faculty labs.

Setting and sample: The sample was derived from students who had experienced clinical practice among the students in the department of nursing and midwifery sciences in Al-Quds University in Palestine. A stratified sample of 340 nursing and midwifery students was recruited. Approximately more than half of the sample was female. The selected students were approached because they have a particular knowledge or enough clinical practice to compare what is learned from theory. We excluded bridging students because most of these students have had working experience in the hospitals and it would be hard for them to relate

to the theory-practice gap. Only students from second, third, and fourth year were approached. The first year students were excluded as they were only exposed to clinical training at the faculty labs.

In Palestine, nursing education is mostly taught over through 3-year hospital based apprenticeship programs and is carried out in hospitals and in the community. All nursing students are enrolled in university based, 4-year baccalaureate program in which clinical experience starts in the second year of study. Clinical practice forms about 50% of the total program as required by the Ministry of higher education of Palestine. Clinical preceptorship is given by faculty based preceptors, supported by registered nurses assigned to the clinical area. Students visit a number of public and private hospitals, community health centers and schools for clinical experience. The number of students assigned to units varies widely and is often dictated by the health institutions.

Data collection and instrumentation

Data were collected on a self-administered questionnaire. It was developed by the researchers as guided by the literature (Özaltın 1993, Erdil 1993, Tulubas & Karadag 2007, Aydın et al. 2007). Nursing students were asked about the factors they felt affected their learning experience in the clinical area. The questionnaire was divided into five sections: the first section defined problems students had with teaching staff in clinical practice; the second section defined problems with ward personnel; the third section defined problems with inadequate equipment, supplies and physical conditions; the fourth section defined problems with students themselves; and the final section defined problems with the curriculum. The student's perceptions of an ideal learning environment were also sought using mainly Likert-type with response options ranging from "I Agree" (1), "I Disagree" (2), "I don't know" (3). The instrument was reviewed by five clinical and educational specialists and pretested among 30 students not included in the study population resulting in minor modifications to questions relating to the clinical learning experiences of students. A Cronbach alpha score of 0.82, a high level of internal consistency was recorded by the instrument. Data were collected three days in November 2016, during students' regular classes.

Ethical Issues

Prior to beginning the study ethical approval and permission were granted by the administration of the school of nursing. The purpose of the study and how the data would be used were explained to the students and they were reminded that no names or identification numbers were required on the

questionnaire. Written informed consent was obtained from the students before the questionnaires were administered. The 30 students who participated in the development of the questionnaire also did so voluntarily. All completed questionnaires were then stored in a locked filing cabinet to maintain confidentiality and anonymity.

Data analysis

The data analysis was performed using the statistical package for the Social Sciences (SPSS) for windows version 23. Descriptive statistics (frequency, distribution, mean) were used to analyze the data.

RESULTS

A total of 330 students from the first, second and third years of the Bachelor of Nursing Program from one University College participated in the study; 83 students from the second year, 124 from the third year and 123 from the fourth year.

Problems students experienced in clinical areas

1- Problems with teaching staff

Almost all (85.2%) of the students reported that the clinical instructors were not with them during clinical practice, 83.3% that they were not able to transfer theoretic information they had learned into practice, 74.5% that cooperation with the hospital employees was not provided, 78.8% that there were no objective assessment criteria for students on the ward, 72.7% that they perceived being closely checked according to guidelines was a problem, and 56.1% that the students were treated inconsistently (Table 1).

Table 1 Frequency and percentages of variables that related to the problems with Clinical instructors

Item	Frequencies & Percentages		
	Agree	Disagree	Don't know
I am not able to find teaching staff to be able to practice one-on-one	281 (85.2)	46 (13.9)	3 (0.9)
I hesitate getting guidance or asking questions of teaching faculty	137 (41.5)	184 (55.8)	9 (2.7)
I am not able to get feedback about tasks done from teaching staff	120 (36.4)	193 (58.5)	16 (4.8)
Clinical instructor talk about my inadequacies in inappropriate settings and with an inappropriate manner	104 (31.5)	210 (63.6)	16 (4.8)
Clinical instructor cause students to lose their confidence with severe criticism	109 (33.0)	201 (60.9)	18 (5.5)
Clinical instructor do not give positive feedback	114 (34.5)	202 (61.2)	14 (4.2)
Clinical instructor do not support students doing interventions	143 (43.3)	174 (52.7)	13 (3.9)
Clinical instructor are inconsistent with students	185 (56.1)	129 (39.1)	16 (4.8)

Clinical instructor evaluate students very closely with guidelines	240 (72.7)	85 (25.8)	5 (1.5)
I cannot transfer theoretic knowledge into practice	275 (83.3)	52 (18.2)	3 (0.9)
Clinical instructor do not assess students objectively	260 (78.8)	60 (18.2)	10 (3.0)
Clinical instructor are not able to ensure cooperation with ward personnel	246 (74.5)	75 (22.7)	9 (2.7)

2- Problems on wards associated with inadequacies in supplies, instruments and physical conditions

Environmental problems experienced by the students on the wards were not having a room for changing clothes(84.9%), not having an area for meetings together with teaching staff (75.8%), not having sterile gloves to use during procedures (66.7%), and not having antiseptic solution and towels for their hands (61.2%) (Table 2).

Table 2 Distribution of students' problems with inadequate equipment, supplies and physical conditions on wards

Item	Frequencies & Percentages		
	Agree	Disagree	Don't know
Wards being inadequate for student practice	120 (36.4)	150 (45.5)	60 (18.2)
Not having a room for students to change clothes and lockers	280 (84.9)	41 (12.4)	9 (2.7)
Not having a room for joint meetings with teaching faculty and students	250 (75.8)	64 (19.4)	16 (4.8)
Not being able to comfortably establish communication with ward personnel	104 (31.5)	210 (63.6)	16 (4.8)
Not having enough sterile/ disposable gloves for use	220 (66.7)	100 (30.3)	10 (3.0)
Not always having available antiseptic solution and towels for hands	202 (61.2)	114 (34.5)	14 (4.2)
Not being able to adequately meet nutritional needs	143 (43.3)	174 (52.7)	13 (3.9)

Table 3 Distribution of students' problems with hospital employees

Item	Frequencies & Percentages		
	Agree	Disagree	Don't know
Not supporting students' taking initiative on wards	281 (85.2)	46 (13.9)	3 (0.9)
Being excluded by ward personnel	137 (41.5)	184 (55.8)	9 (2.7)
Not being able to be use knowledge and experience	120 (36.4)	193 (58.5)	16 (4.8)
Not being able to comfortably establish communication with ward personnel	104 (31.5)	210 (63.6)	16 (4.8)
Not being treated with patience and tolerance by ward personnel	230 (69.7)	82 (24.8)	18 (5.5)
Not serving as teachers for case studies	114 (34.5)	202 (61.2)	14 (4.2)
Not being able to work completely effectively in primary patient care	143 (43.3)	174 (52.7)	13 (3.9)
Facing negative behaviours	185 (56.1)	129 (39.1)	16 (4.8)
Being used to do tasks other than patient care	240 (72.7)	85 (25.8)	5 (1.5)
Not creating an environment in which procedures learned in class could be practiced	275 (83.3)	52 (18.2)	3 (0.9)

DISCUSSION

The findings obtained from the study demonstrated that a variety of students' problems with issues related to students, instructors, clinical settings and teaching-learning process. were determined.

According to the study results the most common problem experienced by students was they find difficulty in transferring theory into practical clinical situations (Smith et al., 2007). Previous studies have shown that students were not being able to transfer topics that they had been taught in the classroom into practice. The results of this study are consistent with previous study results (Sharif & Masoumi 2005, Buyukyoruk 2007). In a study by Atalay et al. (1993) students have difficulty transferring theoretic knowledge into practice because of their fear of harming patients, fear of health care personnel and teaching staff reactions, and difficulty getting patients to accept their practice.

The results of our study imply our students on the wards were having only one teaching staff member with them (Table 1). This problem is not just one at our university or with our students but is a general problem in university schools for health science in worldwide, including Palestine. The most obvious reason for this problem is the role of the university teacher has changed, from that of a clinically skilled practitioner to a role where emphasis is placed on classroom teaching, administrative tasks and research activity (Saarikoski et al., 2009). Teachers themselves found that giving time for clinical practice competed with the demands of academia for classroom based teaching, publishing and research activity (Löfmark et al., 2012). The

literature indicates that availability of teaching staff in clinical settings have a distinguished advantage because of their ability to be familiar with learning outcomes for clinical practice and how it can be reached and assessed, in addition, they can make links between theory and practice (Gillespie and McFetridge, 2006). On the other hand, few authors said that to teach effectively, teachers must update their skills by participating in care (Pegram and Robinson, 2002) while other authors deem that through reading, writing and research, the nursing teachers can maintain effective teaching and knowledge in the clinical area (Barrett, 2007).

According to our research results the teaching staff were not able to establish cooperation with ward employees, were not able to develop objective assessment criteria for students on wards, were not patient and tolerant with students, supervised students more from the guidelines, and acting inconsistently with students. The results of other studies on this subject are consistent with ours (Table 2). In this study it was shown that students thought that the teaching staff was inadequate for guidance in clinical settings, that they were closely checked according to the guidelines, that the teaching staff did not recognize students on the wards, that students were not assessed fairly, that the teaching staff were judgmental, and that they were merely judged. Students wanted the teaching staff to show them more positive attitudes and behaviors (Keskin & Caliskan 2006, Deniz & Karakulak 2006).

Other problems widely experienced by our students in clinical sites were being used for tasks other than primary patient care, being excluded from clinical practice and not being shown tolerance. In other studies conducted on this subject as well students reported widespread experience with problems associated with health care employees on wards (Ozcan et al. 1993, Tulubas & Karadag 2007). In the study by Özcan 61.4% of nursing students reported that ward nurses were demanding, critical and belittling and 42.6% that they were expected to do non-nursing tasks (Ozcan et al. 1993). In the study by Atalay et al. (1993) ward nurses wanted students to do tasks of assistant personnel or had them do their own personal tasks.

Students who refused to comply with these requests were subjected to negative behavior by nurses. The results of the Atalay et al. study are consistent with the results of our study. In our universities our students are taught patient-centered care and are directed by teaching staff to refuse to do task-centered procedures and non-nursing tasks. However because students do not always have teaching staff with them they may be excluded from wards for rejecting non-nursing tasks and may perceive themselves to be unnecessary on the ward. Health occupational high school students who agree to do every task given them

on wards are better choices by ward nurses. Other studies support our study results that students are used for tasks other than primary patient care.

According to our research results students experienced problems with the scarcity of resources/equipment, and physical conditions on wards, such as not having a place to change clothes, not having areas where they can have joint meetings with clinical instructors, not having sterile gloves available for doing procedures, not having antiseptic solution and towels for their hands (Table 3). In the study by Bayraktar (1993) 21.9% of the students perceived not having a place to change clothes and 15.8% not having a break room to be a problem. In the study by Atalay et al. (1993) 95% of the students thought there were inadequate supplies, equipment and physical conditions on wards. The results of our study are consistent with other study results.

Nursing students' perceptions regarding disparities between what was learnt in class and simulation laboratory and the actual practice in clinical practice have been shown in earlier studies, in Turkey (Sari and Elcigil, 2008); in Jordan (Safadi et al., 2012)

Conclusion

Clinical education is a vital component of the nursing curriculum. A supportive and co-operative clinical learning environment is of paramount importance in attaining the students' professional development. It has been determined that the most influential elements affecting the students in the area of clinical practice are the clinic nurses, preceptors and patients. An environment that positively influences students' progress towards developing professionalism is highly recognized. These nurses of tomorrow deserve the very best preparation in clinical practice as they are the future of the discipline (Mannix et al., 2006). Therefore, nursing programs should invest in recruiting, training and developing their teaching staff to prepare students effectively for the challenges of the nursing profession.

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The Media Prism: A Linguistic Analysis of the Presentation of Events by News Reportage

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Abstract- A newspaper in its individual survival among the mass media is supposed to be more ethical than other media because, it is the newspaper that shapes the opinion and can construct the opinions in both progressive as well as regressive ways. The analysis of the news reportage and or editorial view points supposes to reflect the way and the prism of the news medium through which it looks at the event coverage published by it.

In this paper, a closer look has been taken at one news report on a significant incident, which took place during Gaza war 2014. The purpose of the analysis is to present the way reporters treat the events by examining the thematic and linguistic structures used in the report. This paper is an analysis of the thematic structure of the report, that is, how information is organized and sequenced and what topics are upgraded, downgraded, included or excluded in the text. Also included here is an examination of strategies of mitigation, accentuation, vagueness, etc., and quotation patterns which journalists use in reporting on the incidents. In addition, the text's linguistic structures focusing particularly on the transitivity and lexical selections have been examined.

The news report was published on 29th of July, 2014 by *The Washington Post*. The report is significant since it concerns the gruesome killing of ten Palestinian children at the hands of Israeli soldiers on the very first day of Eid – the holy day of Muslims; the day which is supposed to be merry making and joyful time for children.

Index Terms- Gaza War 2014, Hamas, Israel, Critical discourse analysis, The Washington Post, News Reportage.

I. INTRODUCTION

1.1. The Gaza War: A Glimpse in the History

The real Palestinian Israeli conflict started about 60 years ago when the Israelis displaced the Palestinians from their homeland; from their towns and villages. In the beginning the conflict was between Arab countries and Israel. But the Arabic countries themselves were not independent or free; most of them were under the British or French mandate. This made it impossible to fight a real war against Israel in order to free Palestine from the Israeli occupation. Most of the Palestinians became refugees in Gaza strip, then West bank and in some Arab countries; mainly in Jordan, Syria and Lebanon.

In the year 1956 Israelis attacked Gaza strip and Egypt. Both England and France, who were angry with the Egyptian president Nasser because, he nationalized the Suez Canal, supported them. The Israelis occupied Gaza strip, but after a few months they were forced to withdraw their forces owing to the

Russian and American warning. In the year 1965, the Palestinians founded the (P.L.O) Palestinian Liberation Organization, which has led the Palestinian Israeli conflict since then. Fatah has been the strongest and most popular faction in the PLO.

The Palestinian resistance factions are divided into two groups ' religious and secular. The religious factions are mainly two; Hamas, which is leading religious faction, and the Islamic Jihad, which is smaller and less popular. Although there are a number of secular resistance factions in Palestine, Fatah is considered the strongest; biggest and most popular among them. Another important resistance movement is the popular front for the liberation of Palestine. The other factions are marginal and they have a relatively small effect on the Palestinian struggle and resistance.

After that some other Palestinian Factions came into existence and have participated actively in the resistance against Israel. For the PLO the main goal has been to liberate Palestine and to make the Jews living in Israel go back to their original countries, all over the world. The armed struggle began in 1965 and continued till 1993 when a peace conference was held in Madrid (Spain). Four Arab sides were present in the conference, Egypt, Jordan, Syria and the Palestinians. Both the Arab side and the Israeli side hoped that the conference would lead to real peace and the negotiations between the Arabs and the Israelis began.

But in the year 1995 Rabin, the Israeli P.M, was assassinated by a Jewish extremist and since then things have been getting worse and deteriorating between the Palestinians and the Israelis. A number of meetings and conferences have been held between the two sides but without any substantial results. These meetings and conferences were held in SharmAsheikh (Egypt), Alaqaba (Jordan) and Camp David and Annapolis (USA). The last twenty years witnessed two Palestinian Intifadas (uprising). In 1987 the first Intifada broke out and lasted until 1993 with the Madrid Peace conference. The second Intifada broke out in the year 2000 and it was called (Al Aqsa) Intifada after Al Aqsa Mosque in Jerusalem. From the very beginning of Al Aqsa intifada the Palestinians have been suffering bitterly at the hands of the Israeli forces. The Israeli forces have been conducting a series of incursions into Palestinian areas in the West Bank and Gaza Strip destroying houses assassinating people mostly civilians and razing large areas of Palestinian agricultural land. Every day a number of people are killed and wounded by the Israeli forces. Some other people are assassinated or arrested. The Israeli forces conduct daily incursions into the West Bank and Gaza Strip large areas of Palestinian agricultural land in Gaza strip and West Bank are razed or confiscated to build Jewish settlements or the

annexation wall. Israeli forces usually shell the Palestinian residential areas killing and injuring a number of civilians. From time to time a number of Palestinian houses are destroyed as part of the continuing campaigns of retaliation against the families of Palestinians accused of involvement in the attacks against Israeli targets. The Israeli forces usually impose a partial or total siege or closure on Gaza Strip and the west bank. As a result of the Israeli Policy and aggression the Palestinian people have been suffering from very miserable and bad conditions. More than 70% live under the line of poverty and more than 60% are unemployed. People suffer from shortage of necessary goods such as food and clothing. Gazans live in a real prison since they can't travel abroad because the crossing points are closed.

The Israeli policy in West Bank has caused a great suffering and misery for the Palestinians. In addition to the curfew, which is usually imposed on the cities and villages, there are hundreds of Israel military checkpoints throughout the West Bank. These check points separate the West Bank cities and villages from each other and cause big problems and suffering for the people.

A dramatic and painful incident happened in the summer of 2007. Hamas controlled and dominated Gaza Strip by force and as a result Gaza Strip has since then been separated from the West Bank with the Palestinians having two political entities; a government in Gaza and another one in Ramallah. This has really weakened the Palestinians cause both locally and internationally. The moment Hamas started controlling Gaza, things started to take a different scale as Israel considered Gaza, as a threat due to Hamas dominance over it. Being led by Hamas Gaza suffered three tragic wars one in 2009, 2012, and 2014. My concern in this study is the 2014 war as it was the longest and the most tragic one and it is still affecting people in Gaza on a daily basis.

1.2. Journalism: Role of News Paper Reportage

News as per Fowler's (1991: 4) is basically a practice of making social reality and this process is dynamically produced, transmitted and imbibed in and through language. This understanding resonates with view that news is a depiction of the world in language; for language is a semiotic encryption, which foists a structure of values, social and economic in origin, on whatsoever is represented; and hence unavoidably news, like any other discourse, constructively patterns that of which it speaks. News is a representation in this sense of construction; it is not a value-free reflection of 'facts'.

Possibly the most crucial means of media impact comes from the language of news that requires the frames and linguistic structures qualifying individuals of a social group to convey and express their opinions about their proximate environment and the remote world 'out there'.

Ours is a highly mediated, a multifaceted world, in which the news media are abundant and dominant sources of knowledge-sharing, ways for setting of agendas and windows for the shaping of opinions. Moreover, the media play a substantial role in the diffusion and inculcation of a social group's values, beliefs and ideologies, and at the same time they are profoundly pivotal in constructing, influencing or challenging how one social group – in a broad sense – perceives, relates to, and represents 'other' social groups (Amer, 2008)

1.2.1. Journalism: Ethical Considerations

The notion and treatment of "news" as discourse representation could not be more evident than in reading a news item about a high-impact political event say, a Palestinian attack against Israelis or an Israeli army incursion into occupied Palestinian territories in news coverage of the war by The Washington Post (hereafter the WP), the British daily *The Guardian*, the Palestinian newspaper *Al-Ayyam* or the Israeli daily *Ha'aretz* etc. What we would see in these papers are surely different and probably competing 'representations' of the same reality; each representation has its specific frames, meanings, structures and conditions of news production and reception.

Pondering into the nuances of language of newspapers as discourse representation, the representation has been viewed following Hall (1997), as "the production of meaning through language" (p. 16), and this meaning-production practice is socially and culturally conditioned because meaning "does not inhere in things, in the world. It is constructed, produced. It is the result of a signifying practice – a practice that produces meaning, that makes things mean" (p. 25). Minimizing the risk of redundancy, it is important to accentuate here that news texts do not constitute transparent, objective carbon copies of the reality 'out there', but they are often the product of overlapping socio-economic, cultural, ideological, and personal dimensions and contexts. Again, another quote from Fowler (1991: 10) drives the point that:

"Anything that is said or written about the world is articulated from a particular ideological position: language is not a clear window, but a refracting, structuring medium. If we can acknowledge this as a positive, productive principle, we can go on to show by analysis how it operates in texts".

Therefore, starting from the proposition that there are often disparate and sometimes-conflicting representations of the same social reality, critical discourse analysts zoom their analytical gaze on the way a specific representation is produced and legitimized. This is often done through an analysis of both the linguistic manifestations integral to such a discourse representation and the wider contexts within which this representation is produced.

II. RATIONALE OF THE STUDY

The Rationale Of The Study, "The Media Prism: A Linguistic Analysis of the Presentation of Events by News Reportage", accounts for conclusion(s) drawn on the basis of analysis of various parts of the newspaper Report and its coverage aiming at confirmation of the construction of legitimate actor(s) and its alignment for prejudice(s), towards any of the actors in Gaza war, within its representations.

This study interests not only to give an account of what journalists actually stated, rather attaches more to identifying the meanings and forms which journalists employ in constructing and evaluating political actors and their violent actions during the war. A special attention has been to how linguistic structures help contribute to the legitimation or delegitimation of political actors and their actions along with their potential effects on the way readers are positioned to comprehend the war and how stereotyping has been constructing as the resultant of the process of nomenclature.

III. METHOD AND APPROACH

Within the framework of Critical Discourse Analysis (CDA), an analytical framework has been worked out, which is fashioned keeping in view the Fairclough's (1992) and van Dijk's (1991, 2001) CDA models. The analytical framework aspires at (1) inspecting discourse meanings by the way of investigating topics and propositional meanings communicated in the texts, (2) examining surface structures through analyzing certain syntactic, semantic, and pragmatic features of the texts and (3) connecting the forms and meanings of the newspaper discourse to their ideological, political, cultural and institutional contexts in order to locate the study goals well.

Based on this analytical framework, the main topics, which emerged from the data analysis and are dominant throughout the whole text corpus has been recognized. Data analysis involves examining propositional content and key textual properties such as lexical and syntactic selections, metaphors, presuppositions, intertextual traces of other voices and discourses and patterns of exclusion, inclusion, mitigation and emphasis.

In addition to looking at the whole text corpus, not any op-ed was selected for given to the main objectives of the study those can be treated as third person ideas outside the WP family and two news reports and two editorial write-ups by the editorial board reflecting the personal views of the WP, for a detailed critical discourse analysis. Since news headlines occupy a prominent role in news reporting, a transitivity analysis of news headlines about violence in order to determine how headline editors generally define and evaluate the violent acts of Palestinian and Israeli actors has been provided besides news reports and the editorials.

Finally, the findings of (inter)textual analyses have been bonded to the processes and contexts of news production and reception, which relate to how the WP covers the War. These involve political and cultural contexts, economic factors, news gathering routines and editorial policies which are basically invisible to the readership but are comprehended in the linguistic and other semiotic choices journalists make in their texts.

Therefore, the analysis of editorial discourse on any event needs to account for both the textual choices adopted and the social constructions and the cultural climate in which an editorial discourse is embedded.

IV. ANALYSIS OF THE NEWS REPORT

On 29th of July 2014 The WP published this news report. The news report analysis focuses on the way an important incident is constructed including the linguistic resources available to the reporter in her/his representation of actors and their actions.

A significant research into the reports available has been made to finally choose the present news report. In this news report The WP is reporting the killing of 10 Palestinian children on the first day of Eid-ul-Fitr, one of the most important Muslim festivals celebrated all over the world after fasting for one whole month the month of 'Ramadan'. Since, the day of Eid-ul-Fitr, being festive in its nature, is supposed to be the happiest day and if parents lose their kith and kin on this day; it is of course painful. Nonetheless, the WP has reported this as the following:



Screenshot: the News Report obtained from online, the WP – July 29, 2014.

This incident was so important that it captured the front-page headlines of various newspapers released on July 29, 2014 with a big typography banner headline reading 10 Palestinian children killed. The way news papers treated this news headline with large style and size, which was stretched across the front page, may indicate that the headline's editor wanted to

emphasize and magnify the offensive not only to show that 10 children were killed.

Though, the WP treated the headline in the same way as shown above in the screenshot. Although very clear, styled large but the way it reads the headline is totally ambiguous as, "Netanyahu warns Israel to prepare for long Gaza conflict, as at least 10 more are killed." A very clear semantic ambiguity can be

seen in the headline. Since the reader encounter such a headline, which consists of two clauses, the first tells about Israeli prime minister warning Israel to prepare for some long conflict in Gaza and the next clause talks about 10 more dead. And this kind of ambiguity in both clauses of the headline makes readers understand different news than the reality itself.

Reading the first clause one feels that the offensive is taking place by the Palestinian actors and Israel needs to be cautious. Likewise, the second clause provides misleading news of killing of ten more 'people' as if more killing took place before not by Israel but even by the Palestinian actors. One more thing to take into consideration here is that they didn't even mention the identity of the dead, whether they are Palestinian or Israeli, men or women, children or adults and so on. With this kind of ambiguity of this news headline, the readers will not be able to understand the news from the headline.

Thus the headline does not show hence conceals the actual agent or a direct agent for the offensive of killing. Furthermore, the construction of the second clause of the headline is in passive voice and is a dependent clause. The passivation and relational dependency in the clause reveals that the editor has chosen a style to conceal the direct agent. In fact, the ten children were killed as a result of Israeli offensive that also on the eve of Eid-ul-Fitr.

Now let's take a look at the first paragraph of the report which reads:

"Israel will press its air and ground offensive in the Gaza Strip, Prime Minister Benjamin Netanyahu said Monday, preparing his country for a longer and bloodier campaign and dashing hopes that the three-week-old conflict would end soon."

The paragraph consists of three clauses. In the very first of this paragraph one can see that the first clause reads about future plans of Israel and so does the second one but the third one reads about the present situation. In the first clause i.e. *"Israel will press its air and ground offensive in the Gaza Strip"* the editor chooses to the future tense which entails that something against Israel has happened already and so Israel needs to increase air and ground offensive. It symbolizes Israeli anger and hence speaks about the Israeli plans as an affirmation has been given by the Israeli Prime Minister, which can be read in the second clause, *"Prime Minister Benjamin Netanyahu said Monday"*. Further, it talks about preparation for, *"longer and bloodier campaign"*.

The editor's choice to adopt the comparative degree *long* and *bloody* induces presupposition among the audience that something long and bloody has already happened and now preparation for *longer* and *bloodier* is going to happen, however the actor here is concealed and can't be figured out. Finally, it reads about dashing of the hopes for ending the conflict. Hence the backgrounding of the Israeli agency is clear as seen in the paragraph.

The second paragraph reads the rejecting of appeals for an immediate cease-fire from the US, the UN and others by the Israeli PM. The rejecting of the appeals is cited for two different reasons. One is that Israel wants to keep the offensive going on unless it neutralizes all the tunnels through which Hamas infiltrates Israel. The other reason cited as the protection of Israeli citizens and its children. Though, this paragraph hints on Israel being the agent of the action but it tries to substantiate its offensive with the reasons cited. The line that reads, *"the tunnels,*

he said, have the sole purpose of destroying our citizens, killing our children." This line invokes human ethical concerns for their children and thus justifies the statement. However, this statement conceals the death of Palestinian children killed by the Israel. In this way the WP obviously shows its prejudice towards the Israel and reports in a way as if it reports for the justification and advocacy of their offensive.

Netanyahu's justifying statement can be taken as a word play creating and endorsing a myth of security concerns. The words used by him while defining the tunnels are a nice word play that arrives at the myth of security concern. For instance, tunnels (= Hamas tunnels) sole purpose (= only motive) in his statement, *"the tunnels have the sole purpose of destroying our citizens, killing our children"*. The security concern can be treated as a myth as this type of security is at the cost of the lives of Gaza people and their children.

The newspaper has reported this 'myth' in support of the justification for the Israeli attacks on Gaza people and their children. This statement of the prime minister also takes a levy on striking stereotypes on Gaza's resistance groups. As the phrase 'sole purpose' used in the statement can be taken as a stereotyping token for Hamas for it conveys the image of Hamas as some blood thirsty group who want to destroy the otherwise 'peaceful and peace loving Israel'.

The third paragraph of the same report which reads, *"Israel's antagonist, the Islamist militant organization Hamas, which controls the Gaza Strip, continued to unleash deadly mortar and rocket fire, triggering air raid sirens across Israel"* has been drafted carefully by choosing certain lexical items building different phrases that define the Hamas unlike the Israel. Here it needs to be emphasized that in the previous report and throughout this report as well, the word Israel has been used as 'Israel' only and has not been served with any adjective unlike the word 'Hamas' to define it.

Nonetheless there are two phrases in this paragraph which are used for Hamas, *'Israel's antagonist'* and *'the Islamist militant organization'* to define it. The two phrases need to be analyzed for their occurrence. The structure these phrases build is that of an adjective phrase. So, the two adjectives have been served before the word 'Hamas' in order to define and to tell more about Hamas. Thus these two phrases define Hamas as the Israeli opponent who are an Islamist militant organization. Whereas Hamas has an already its political definition served in many books and literature which can be summed up as a Palestinian Sunni-Islamic organization which is governing authority of the Gaza Strip. Here I am just trying to show that the WP is prejudiced towards Israel and that is why it needs to define Hamas. This defining as an Israel's antagonist, Islamist militant organization' conveys the negative meaning of Hamas which diminishes the role of Hamas as Palestinian national.

The WP is supposed to be fair otherwise, given to the definitions of Journalism. But it chooses different words, which serve as adjectives to create or degrade the image of an organization. The lexical item, the noun militant used for the Hamas clearly shows that the WP is reporting as if being the ally of the Israel. This usage of the word *militant* clearly shows stereotyping of Hamas. Because, if Hamas is a militant organization that means Israel can be a legitimate one in whole

of the war going on. This way, the WP is legitimizing the Israeli offensive also.

Now keeping in view the above paragraphs and the content, it can be concluded that after reading about Israel's plans, their justification and the use of adjective phrases for the Hamas the WP is displaying its biasness towards Israel.

However, the next paragraph of the news report, '*In Gaza City, explosions Monday rocked a neighborhood and left at least 10 people dead, including children playing on a street, as a brief lull on one of Islam's holiest days gave way to fresh attacks and tragedy*' connects to the second part of the headline of this news report which is *as 10 more are already dead*. This paragraph reads about the explosions that rocked a part of Gaza city leaving 10 people and children dead. It misses the agent behind explosions and speaks nothing clear about the 10 people whether they are Palestinians or Israeli. Since the incident happened on one of the holiest days and it is assumed to pave way for fresh attacks and tragedy. Again the question is about the agent but the agent that will start the 'fresh attacks and tragedy'.

After talking about the number of casualties reported by the Palestinian health officials, the next paragraph reads about Hamas blaming Israeli airstrikes for the tragedy. The transitivity in the shape of material process can be has been adopted by the WP to report the agent of the action which comes out as 'Israeli air-strikes' and the human agent – Israel, for that matter. Also, the agent has been cited as an 'alleged' one which is not clear whether it were the Israeli air-strikes or not. Because the word *blame* has been used to describe the agent of the action as follows:

Hamas officials blamed Israeli airstrikes for the blasts at the al-Shati camp, also called Beach Camp. A spokesman for the Israel Defense Forces denied firing at the neighborhood and attributed the explosions to failed rocket launches from Gaza militants.

Furthermore, the claim of Hamas has been denied by the Israeli Defense Forces' spokesman and attributed the same to Gaza militants, which may be other than Hamas also. Thus the agent of the action cannot be clearly defined here. Moreover, the agent of the action as per the claim of the Israeli Defense Forces' spokesman is a material agent i.e. 'the failed rocket launches' and this phrase provides a simultaneous perception of failure of Gaza militant's action and the safe side of Israeli military. It can also be compared with the meanings of weakness and strength respectively.

The backgrounding of the agent is clearer in the next paragraph of the report in which it has been a general statement made rich enough to the audience to conclude that the offensive was an unwanted tragedy which both of the 'assumed agents' have denied. The report says both Israel and Hamas has denied the responsibility of the action.

It needs to be noted here that I used the term 'assumed agents' that shall mean Hamas and Israel. As both are antagonistic to each other and are the two prominent agents of the Gaza war, 2014.

Later on the news report reads Hamas statement that talks about the revenge that the occupation has to face at their hands. The word 'occupation' used by the Hamas has no elaboration by the news editor. So, it cannot be slammed over the Israel as it

hints to be Israel because it is a statement of Israel's antagonist in the Gaza.

While reading the statement of the UN Security Council that calls for a humanitarian cease-fire ahead of Eid and beyond, the report adds Benjamin Netanyahu's statement in which he rebuffs the call for cease-fire supporting his rejection statement by demonstrating insecurity of Israeli citizens. In this way the report hints at somewhat legitimacy of the Israel.

4.1 Quotation Patterns

Adding to the reporter's description of the incident, much of the text is devoted to different accounts of and verbal reactions to the incident with quotes from Israeli, American and Palestinian newsmakers. As a main component of news reportage, journalists draw on other voices and news sources as a strategy to enhance the credibility of the reportage and sometimes to convey a dramatic, vivid live broadcast of the events taken place. Bell (1991) points out that a quotation "adds to the story the flavor of the newsmaker's own words." (p. 209).

Similar to the news report on the Ground Incursion and children killing incident, the reporter in the reports rely more on Israeli sources in accounting for and reacting to the event. The sources quoted on the Israeli side are institutional, authoritative figures such as Army officials, the Prime minister and other ministers which according to (Bell, 1991) make their views more credible and newsworthy than citing individuals. There are some paragraphs, which include direct or indirect quotations from Israeli sources e.g. "They are really stressed. They have to work very hard to achieve meaningful or strategic developments," said Kobi Michael and Kobi Michael is Senior Research Fellow at the Jerusalem Institute for Israel Studies (JIIS)

While journalistic constraints such as access and availability of news sources may determine the type and frequency of news sources, this pattern of using senior named Israeli officials to explain the events, makes their account of events more credible compared with that of ordinary people whose objectivity and credibility may be questioned. For example, the reporter makes an effort at including the Palestinian account of the incident, in paragraphs 5, 6, 12 and 15 of this report is only included after the Israeli version of the event is well established. Further, the Palestinians' account, contrasted with official Israeli official statements, which are portrayed as being less reliable. The expected contradictory accounts from Israeli and Palestinian sides do not, however, translate into how the reporter treats the event. Rather, s/he seems to attach more weight to the Israeli official account of the incident and her own observations seem to back this account, as clearly indicated in the usage of words chosen.

4.2 Perspective and Authorial Evaluation

In addition to the reliance on direct and indirect quotes, the reporter also includes her own perspective and evaluations of the situation. Perspective refers to the viewpoint or position which reporters write from or identify with in reporting on a particular event (van Dijk, 1991). In this report the paragraphs 3, 10, 14, and 17 are particularly illustrative examples of a subjective process of foregrounding certain aspects of the situation and deemphasizing and excluding other aspects.

For instance, in paragraph 26 of this report, the reporter makes an implicit reference to Palestinian actors in the clause “a murderous terrorist organization”. Not only does this reference suggest a negative evaluation of Palestinian actors, nevertheless also it ironically emphasizes themes of irrationality, lawlessness and inexplicable violence.

[26] Netanyahu heaped scorn on the U.N. statement, saying it focused on “the needs of **a murderous terrorist organization** that is attacking Israeli civilians and does not address Israel’s security needs, including the demilitarization of the Gaza Strip.”

V. CONCLUSION

The overall conclusive remark of this paper can be hence summed up as the Washington Post on Gaza War 2014 is biased and prejudiced in constructing and reinforcing Israeli narrative. Moreover, the newspaper has been observed tried legitimize Israel and its actions on the contrary delegitimize Hamas and Palestinian Agents and their actions. Through backgrounding the Israeli agent whenever and any violent action is taking place against the Palestinians by using passivation, backgrounding and other linguistic features that can be seen on the analysis. Finally, one can say that the Washington post needs to be more reasonable when choosing its resources to cover a newsworthy incident and to take into consideration all the angles of a certain

reportage to show the reality rather than concealing it in favor of an agent against the other.

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Program Implementation In Affirmative Action Women's Empowerment Women In The Working Group Of The Assembly Of Papua

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Abstract- This study aimed to describe and analyze the factors that affect the implementation of affirmative action programs within the framework of the advocacy process protection, empowerment and bias against women in the political sphere by the Women's Working Group MRP. Related to the findings of a number of influential factors in the process of implementation of affirmative action policies to empower women of Papua, there are three factors that affect the implementation of this policy, namely Content Policy, Capacity Implementor, Stakeholder Support.

Index Terms- program, affirmative action

I. INTRODUCTION

Gender mainstreaming is a manifestation and a global commitment to respect for human rights. it relates to equality of opportunity and treatment for men and women in performing the roles of political, economic and social culture in the life of society and state. According Indar Parawansa (1997) gender equality in development, which means that (1) women are as representative of half the population; (2) development involves men and woman to its potential; (3) not only health, nutrition, and health of children but also included the areas of education, industry / production, social, cultural, and others proportionally; (4) the improvement and development experience, self-awareness, as well as the creativity of men and women; (5) women and men are included as participants and decision makers.

From the perspective of national development with emphasis on the democratic process in order to create opportunities and equal treatment for women and men, meaning it has to the principles of state obligations, including: (1) prevent discrimination against women; (2) prohibits discrimination against women; (3) identification of discrimination against women and to take steps to improve it; (4) implementing the sanctions for acts of discrimination against women; (5) provide support for the enforcement of women's rights and encourage equality, and justice through proactive measures; (6) increasing the de-facto equality of women and men.

This is one of the three basic principles of the convention of women. Gender equality has not been fully realized, because of the strong influence of socio-cultural values that are patriarchal. The values of these places men and women in positions and roles of different and unequal. This condition is

characterized by the freezing of roles, double burden, subordination, marginalization and violence against women. It all started on the discrimination against women which cause women do not have access, opportunity and control over the development and do not benefit from development that is not fair and equitable to men. In addition, inaccuracies understanding of religious teachings often cornered the position and role of women in family and society. As a result of the low educational and health status of women, inequality and justice against women also occurs in development. The low opportunities that are owned by women for work and business, as well as lower their access to economic resources, technology, and information. Although income working women contribute significantly to income and family welfare, women are still considered earner and family workers.

The phenomenon of gender inequality is exacerbated by the limited involvement of women in decision-making processes in public policy established by the legislature and the executive. In addition to the limited number of women as decision-makers, public policy is not gender sensitive is also affected by the lack of gender awareness among decision makers and incomplete data and information about gender. In addition, there are still weaknesses partnership relationship between government and society as well as institutions that have the vision to empower women in the planning, implementation, monitoring, and evaluation of development policies and programs. So it becomes an interesting study of implementation are studied in perspective, because a variety of factors may be supporting to achieve the intended policy objectives in terms of gender equality.

On the other hand the implementation of the special autonomy for Papua Province as stipulated in Law No. 21 of 2001 also gave a lot of hope that should be able to become a locomotive for the acceleration of development in Papua, so that Papua can be aligned with other regions in Indonesia. In fact, entering the 14th year of this (2001-2014) implementation of the special autonomy in Papua is considered not optimal even appeared demonstration of the failure of special autonomy in the welfare and empower indigenous Papuans. Similarly, Law No. 21 of 2001 is a valuable strategic policy in order to improve services and the acceleration of development and the empowerment of all people in the province of Papua, especially indigenous Papuans. Through this policy is expected to reduce the gap between the Papua Province and other provinces in Indonesia, as well as provide opportunities for indigenous Papuans to act in its territory as well as actors of development goals.

Over the normative context as noted above is a special autonomy for Papua Province is basically giving wider powers to the provincial government and the Papuan people to organize and take care of themselves in the framework of the Unitary Republic of Indonesia. Wider powers means also include the authority to regulate the use of natural resources in the province of Papua for the greater prosperity of the people of Papua, empowering potential economic, social and cultural rights owned including giving a significant role for indigenous Papuans through its representatives to be involved in the process of formulation of regional policies, determining strategy of development by respecting the equality and diversity of community life in Papua Province. As a result of the introduction of special autonomy, then there are different enforcement given to the Government of Papua Province.

Several facts motivating factor tendency to establish gender equality in the region of Papua as outlined above, it seems unable to give a positive effect for the creation of idealism that leads to empowerment and Traffic of women in the political sphere, at least be able to open a more positive space in the political process there. One thing and another, different driving factors referred to above seems not yet fully based on the relationship of various things, such as has not been the integration into the realm of social culture of Papua, organizational factors that do not support efforts towards the promotion of gender and other factors that have not been analyzed more in depth by experts on public policy implementation.

From the standpoint of the socio-cultural, Papua province was built, developed and implemented based on the number of basic values derived from the customs of the people of Papua, nationalism, which is based on universal principles of humanity and respect for democracy and human rights. These basic values is a fundamental principle and the atmosphere mysticism people of Papua, became the philosophy of Law No. 21 of 2001 on Special Autonomy for Papua Province is implicitly stated in the preamble to weigh, containing a number of recognition and commitment of the Government of the Republic of Indonesia. Recognition in question is related to the factual conditions in Papua before the implementation of the Special Autonomy Law and a number of important agenda improvements that will be implemented in the era of special autonomy, namely:

Representative of women in the MRP in question is to be able to represent all levels to the lowest. It represents the interests of women only to districts / cities but to the villages as well as attention to issues primordial in society. Therefore the Papua People's Assembly as an institution empowerment of the people of Papua are not only concerned with urban women or educated, but for women who are not educated even to have local knowledge which can be used as reference in taking a policy that will be implemented by the community and all women in the province of Papua.

The participation of women is definitely on the Papua People's Assembly membership by itself can provide aspirations of Papuan women in the form of advice, assessment and consideration of the draft regulations or areas that do not harm women and ensure the establishment of equality and justice in all areas of life.

MRP is an institution cultural representation of Papuans who have certain powers. This means that such authority is

limited to matters or certain aspects only. The scope of certain powers within the framework of the protection of the rights of indigenous people of Papua based on the respect for tradition and culture, empowerment of women and strengthening religious harmony (Muhammad A. Musa'ad and Renida J. Toroby, 2006: 62).

One substance that studies in the perspective of local government advocacy policy implementation within the framework of the process of protection, empowerment and alignments to women in politics is to explain various phenomena associated with the various characters of problems in the process of implementing the policy set forth in the form of advocacy programs. The relationship between the relevant agencies and social and cultural phenomenon became the main focus in this study. Based on the above description of the phenomenon is that the study concentrated on various questions as follows: What are the factors that affect the implementation of affirmative action programs, in the form of protection advocacy, empowerment and bias against women in the political sphere by the Women's Working Group MRP ?. Objective : To describe and analyze the factors that affect the implementation of affirmative action programs within the framework of the advocacy process protection, empowerment and bias against women in the political sphere by the Women's Working Group MRP.

II. RESEARCH METHODS

The type and location of research

Based on these objectives, the approach used in this study is a qualitative research paradigm is based on a qualitative descriptive approach.

This research was conducted in the Office of the Papua People's Assembly (MRP) on grounds that one element of the MRP is a female element that one authority is channeling aspirations, attention to complaints of indigenous peoples, religious groups and women and facilitating follow-up resolution.

The research instrument

With regard to the instruments used in this study, the main instrument used is interview, observation guidelines and documents related to the research problem developed in the field and after analysis to be research documents.

Data analysis technique

Data analysis technique used in this study is qualitative data, following the concept of Miles and Huberman, (2009: 16-20).

III. RESULTS AND DISCUSSION

A. Factors Affecting Implementation of Affirmative Action Program in Women's Empowerment

There are three factors that affect the implementation of this policy, namely, (1) Content Policy, (2) Capacity Implementor, (3) the support of stakeholders. These three factors are the authors conclude and authors take on some similarities

that put forward by policy experts about the factors that influence public policy implementation.

As a form of affirmative policies in order to empower women in Papua special autonomy as outlined in article 23 letter e and Article 47 of Law No. 21, 2001 also in MRP Decision No. 1 / MRP / 2014 on the Establishment of Activity Plan and Schedule of Events MRP Women's Working Group Session Year 2014 Advocacy Program in the framework of protection, empowerment and alignments in the political sphere, namely the right to political representation. Many women do not play a role in politics, among others due to the limited opportunities and confidence for women as policy makers and decision makers with public interests. It also limited the proportion of women in the executive and legislative branches.

1. Content Policy

The contents of the policy is a means to overcome the problems of the public. The contents of a policy will affect the success of the implementation of the policy so that the contents of a policy must be clear and unequivocal and encapsulate the political accommodate the interests of the entire stakeholders. Implementation of policies may fail because it is still vague contents of a policy.

Grindle (1980), is determined by the content and the context of policy implementation. The basic idea is that once the policy is transformed, then the implementation of the policy carried out. The success is determined by the degree of implementability of the policy.

Associated with factors that affect the implementation of the program affirmations seen from the contents of policies that affect the implementation very closely related to the purpose of a policy is made. The purpose of a policy is made by the Head of Development Planning Agency at Sub-National Level Papua Province, Moh. A. Musa'ad, stating that

"The commitment of the Government and the people of Papua for reform has spawned awareness and new ideas in handling various problems that characterizes the lives of people in Papua full diversity of social, cultural life of local communities on the one hand with the diversity of people from outside Papua on the other side. Accumulated issues pressing upon the people in Papua province has resulted in reduced public confidence in the seriousness of the Government of the Republic of Indonesia to build a society in Papua province. This doubt the situation could have been utilized by certain parties to provoke the creation of distrust to the Government with political propaganda that would lead to the hostility people of Papua with the Indonesian Government. If this is not anticipated either, it will be a threat to national integration. This situation is also exacerbated by the approach pattern ever undertaken by the Government of the new order that is both repressive approach to security through the DOM that in fact lead to human rights violations that result in improved sentiment Papuan people against the government at the time, the which then make it as a memoria passionis or memories of people Suffering." (Interview, dated February 22, 2015).

Another thing also expressed by Plt. Chief Representative of Komnas HAM Papua Province, Frits B. Ramandey, that :

"The interests of a policy is essentially to resolve the issue or provide a way out of a problem. Special autonomy policy is a

policy that is created and becomes a middle ground of the problems that occurred in the land of Papua on the form of a rejection response to regional autonomy, expansion and demands for independence. Demands for political reform that occurred in areas in Indonesia also have an impact on the Papua. the demands of justice, improvement of living standard, the requirements of justice, the prosecution of human rights violations, improvement of broad political participation and the quality of democracy is a reality that can be accepted by the Central Government that the policy was raised.

Chairman of the Working Group on Women MRP, Deborah Motte, stated that:

"The contents of the policy of women empowerment in the special autonomy law is showcased in SK MRP No. 1 in 2014 is aiming to increase the representation of women in the legislature or in Parliament either DPRD Province, Regency and City Council in Papua. However, the problem is that SK MRP is only limited to giving consideration to the nomination submitted by political parties. SK why only give due consideration was strongly associated with MRP authority that is given consideration and approval only. It all depends on the political parties. But we are grateful that the policy of 30% representation in the nomination process should be fulfilled because if there is no sanction given to political parties. Well to achieve representation in parliament that is the obstacle for women to be on their own." (Interview, dated February 4, 2016).

Betty Puy, Head of Women Empowerment Jayapura, states that:

"The contents of the empowerment policy that we do is a national policy with goals set even nationally for the empowerment of women. Policy-related affirmations are usually done mostly by the MRP agency, but we of service usually ready to assist in implementing the policy in terms of facilitating it." (Interview, dated 12 April 2016).

Public policy directed at problem-solving process, and therefore public policy born because there is a problem. The problems can be solved well if the policy-making process involving all the components and the target group (target group). Has an important role in policy development and policy is a process of any change, where the change was geared towards the better.

In the international community the idea of recognition referred to as affirmative action policy (the policy of affirmative action) which aims to provide opportunities and privileges to minority groups certain previously disadvantaged socio-political and historical for a certain period of time so that one minority group controlled access to resources and have the ability and equal opportunity to participate in social processes in various fields. Affirmative policies generally adheres to the principles of equality and discrimination. The assumption of minority groups in a weak position and do not have adequate resources for healthy competition and normal (Widjojo, et al, 2009).

Based on the research it turned out that the contents of the policy of SK MRP No. 1 Year 2014 on the Establishment of Activity Plan and Schedule of Events Working Group on Women MRP Session Year 2014 Advocacy program in the framework of protection, empowerment and alignments in the political sphere, namely the right to political representation, does not describe the problem women's empowerment but its implementation only

limited appeal related to women's working group MRP 30% representation of women in the nomination process, which is also in the process of implementation is coordinated by the Office of women's empowerment District Jayapura and Jayapura City but only a facilitator to deliver material. While about 30% representation of women in the process of nomination by the political party is already a national provision. One could even say that the contents of the policy in the Women's Working group MRP is also no impact on the representation of women in legislative bodies. Case in Jayapura district legislature that has only one female.

Capacity Implementor

Implementor capacity (organizational structure, human resources support, coordination, supervision and so on. The organizational structure is too hirakis will certainly hamper the implementation process. Government delays in the implementation of Government Regulation on the MRP which is the spirit of special autonomy in Papua, which affects the exercise of the rights, duties and authority of the Papua People's Assembly. As stated by DR. Muh.A. Musa'ad, Head of Development Planning Agency at Sub-National Level Papua Province, that:

"As a result of the delay on the MRP PP government set as one of the important institutions in the implementation of special autonomy in Papua, then of course this will have an impact on the effectiveness of Special Autonomy. It is based on the grounds that some of the dimensions of the political process in this matter of governance and development in Papua province as the embodiment of Special Autonomy policy can not take place as it should. Specific local regulations as regional legal instruments can not be made, because under the terms of applicable laws formulation process should involve MRP ". (Interview dated February 22, 2015).

The same was stated by Head of Women Empowerment Jayapura, Betty Puy, that:

" To implement the empowerment of women, especially in the city of Jayapura, we usually conduct internal discussions in the office to discuss the work program, outlining the work, set a time of activity, set goals to be achieved that are sustainable not exhausted its responsibility activities are also depleted. Hence Women Empowerment Jayapura City has five pilot villages on women's empowerment activities in the villages are always ongoing and we always keep an eye on. Even from this activity, the women have been able to create jobs for people in the village, for example in the manufacture of ceramics, in the village Skouw, manufacture woven bags, tissue box and wallet in the village Tobati and Wood Island. All of these activities are financed from the budget of the city of Jayapura and the father of the mayor give attention to these activities, even less so with his wife down to Ensure On direct that activities there. "(Interview, dated 12 April 2016).

Chairman of the Working Group on Women MRP, Deborah Motte, also revealed that:

"We must honestly admit that in order to implement programs to empower women, we still need a lot of guidance and input from various parties, which is why we always coordinate with the Provincial Women Empowerment and urban districts.

But not only that we also work closely with the Centre for Women's Studies in Cenderawasih University to conduct studies in advance of the program made by the Working Group MRP woman, before we execute it. One example of our cooperation is about handing hundred days without violence against women, it is a program of cooperation with the Agency Papua Province Empowerment, Women Empowerment Jayapura City and Women Empowerment Jayapura district. (Interview, dated February 4, 2016).

Frits. B. Ramandey, Plt. Chief Representative of Komnas HAM Papua Province, that:

"Looking at the function which is intended to represent and protect the indigenous people of Papua, it can be said that the presence of MRP is a special case within the government system of special autonomy in Papua. If we learn from the experience of handling cases of genuine protection of indigenous peoples (indigenus people) around the world, it can be said that the presence of this MRP is special in special autonomy in Papua. With the presence of MRP, the Papuan indigenous peoples are represented so that it can supervise, determine and helped plan the development that took place on its territory. With the presence of MRP, ensure that the acting Governor and deputy Governor of Papua will always be held by indigenous people for MRP decisive. To realize the establishment of the MRP agency which became the main spirit of the special autonomy status should be given more powers to carry out all its functions including the function of each working group in implementing its decisions, including the women's working group to implement the protection and empowerment of women. However I noticed that women's working group has not worked up to carry out the task function. I see that the availability of funds or budget to finance enough activities, but in terms of human resources, MRP or specifically also for women's working group should be supported by the presence of skilled staff or something to help implement a program to implement the program. It is important to set aside a number of demands which we have witnessed in Papua to dissolve the MRP because they have been unable to protect the rights of indigenous Papuans basic protection even against women ". (Interview, date, August 18, 2014).

Following the idea of politics-administration dichotomy, the most authoritative institution to implement the policy is an executive or government. Goggin et.al (1990: 120) defines the capacity of the organization as an integral element of an organization involving: (a) the structure; (B) the mechanism of action or coordination between the units involved in the implementation; (C) human resources in the organization; and (d) the financial support and resources needed for the organization's work.

So that policy objectives can be achieved with good, then the capacity of organizations to involve four elements must be in optimal condition or mutual support between one another, namely: the design of appropriate organizational structures. The accuracy can be seen as a correspondence between the mission to be accomplished by the characteristics of the task environment in which the organization works so as to increase the capacity of the organization as implementor. Then the human resource capacity to meet the needs of organizations such as knowledge, skills, and a good personality. No less important is the adequacy of financial resources to carry out activities in the implementation process.

Statutes as well as the adequacy of the elements associated with the formation of organizational capacity will greatly affect the quality of the organization implementers. Quality elements of the organization roomates in turn will determine how the organization is able to perform its role implementers as well (Erwan Agus Purwanto and Dyah Ratih Sulistyastuti, 2012: 128-129).

Crosby (1996, in Erwan Agus Purwanto and Dyah Ratih Sulistyastuti, 2012: 129), to identify the elements of organizational capacity, among others; (A) the ability to bridge the various interests; (B) the capacity to mobilize and maintain support; (C) the ability to adapt to new tasks and has a frame work to perform a learning process; (D) the ability to recognize changes in the environment; (E) ability to lobby and advocacy; (F) has the ability to monitor and control the implementation; (G) have a good coordination mechanism; (H) has a mechanism to monitor the impact of the policy.

Implementation involves a cross-sectoral, with a character so the policy implementation process inevitably involves many actors, organizations and even other levels of governments vary.

Policies can be achieved by either, if the capacity of organizations to involve four elements must be in optimal condition or mutual support between one another, namely: the design of appropriate organizational structures. The accuracy can be seen as a correspondence between the mission to be accomplished by the characteristics of the task environment in which the organization works so as to increase the capacity of the organization as implementor. Then the human resource capacity to meet the needs of organizations such as knowledge, skills, and a good personality. No less important is the adequacy of financial resources to carry out activities in the implementation process. Statutes as well as the adequacy of the elements associated with the formation of organizational capacity will greatly affect the quality of the organization implementers. Quality elements of the organization which in turn will determine how the organization is able to perform its role implementers as well (Erwan Agus Purwanto and Dyah Ratih Sulistyastuti, 2012: 128-129).

Based on the research it turned out that the MRP in general as a formal political institutions (supra political structure) at the provincial level is an organization that serves as the institution cultural representation of Papuans who have certain authorities to protect the rights of the Papuan people based on respect of the customs and culture, empowering women and strengthening religious harmony. These institutions play a role in realizing the development of Papua in the future. But it turns out after the implementation of special autonomy in Papua in 2001 the newly formed institution this side in 2005.

Delays in the formation of the MRP is then of course this will have an impact on the effectiveness of Special Autonomy. It is based on the grounds that some of the dimensions of the political process in this matter of governance and development in Papua province as the embodiment of Special Autonomy policy can not take place as it should. Specific local regulations as regional legal instruments can not be made, because under the terms of applicable laws formulation process should involve MRP.

In the framework of the implementation of special autonomy established Papuan People's Assembly (MRP), which is the cultural representation of indigenous Papuans. MRP has

certain authorities to protect the rights of the Papuan people, based on respect for local customs and culture, empowering women and strengthening religious harmony. DPRP composed of members chosen and appointed by the legislation in force, with the arrangement, position, assignment of authority, rights and responsibilities of membership, leadership and fittings DPRP regulated in accordance with legislation. The Provincial Government is the Governor and the other provincial governments. While the MRP members are natives of Papua, consisting of representatives of indigenous, religious representatives and representatives of women. Why MRP? MRP exists because the mandate of the special autonomy law. The presence of MRP gives color in governance in Papua and simultaneously increase the superstructure of governance in Papua. MRP has a certain authority in governance in Papua, as well as to protect indigenous Papuans and the empowerment of women. For institutions it was supposed to have written authority again is not simply to give consideration and approval but must also be given legislative authority in particular.

As has been described above that the delay in the formation of MPR also affect the implementation of government policies, both national and local policies. Local policies have only over the authority of the MRP in providing consideration and approval of the Governor and Deputy Governor are indigenous Papuans. It is then more impressed that the presence of MRP as a cultural representative body of indigenous Papuans no longer perform their duties and functions to protect the rights of the Papuan people so that more demonstration carried out pliers and demands to dissolve the MRP.

3.Support stakeholders

Enforcement of the special autonomy for Papua Province as stipulated in Law No. 21 of 2001 gives a lot of hope that should be able to become a locomotive for the acceleration of development in Papua, so that Papua can be aligned with other regions in Indonesia. In fact, entering the 15th year of this (2001-2016) implementation of the special autonomy in Papua is considered not optimal even appeared demonstration of the failure of special autonomy in the welfare and empower indigenous Papuans.

This legislation is seen as an instrument that is expected to stimulate the acceleration of development in Papua. This assumption is based on that special autonomy policy leeway representative for unrevealed three basic values of the construction of adequacy (sustenace), self (self-esteem), and freedom (freedom). Through the special autonomy policy is expected to improve the availability and distribution expansion of basic needs, improved living standard, as well as increased attention to the cultural values and humanity (Muhammad Abud Musa'ad, 2012: 61).

Protection of the rights of indigenous Papuan women as a form of affirmative policies in order to empower women in Papua special autonomy as outlined in paragraph e of article 23 of Law NO. 21 of 2001 regulating the MRP obligations, namely; a) Retain and maintain the integrity of the Unitary Republic of Indonesia and serve the people of Papua Province; b) practice Pancasila and the 1945 Constitution and to obey all laws and regulations; c) Fostering the preservation of indigenous life and

culture of the organization of indigenous Papuans; d) To foster religious harmony, and; e) Encouraging women's empowerment. As well as Article 47 of Law No. 21 of 2001 states that "to uphold the human rights of women Provincial Government is obliged to foster, protect the rights and empower women with dignity and make every effort to position them as equals to men". The women's rights equal to the rights of men, when we talk about women as a member of society. In the era of reform and in the special autonomy issues concerning women should be more raised to the surface, with the hope that women can have public roles in decision-making.

Sociological fact, that the position and status of women were worried about in the domestic level, the public, and the state showed a blurred portrait Papuan women who become the object of violence and marginalization. It is necessary for the protection of the rights of women, especially in the field of political rights in political representation. For that we need a specific policy on quotas for women and sanctions for political parties who did the quota provisions, to provide opportunities for indigenous Papuan women's representation in the legislature and executive.

Many women do not play a role in politics, among others due to the limited opportunities and confidence for women as policy makers and decision makers with public interests. It also limited the proportion of women in the executive and legislative branches. Political ethics not considered fair and just cause is not secured equal opportunities for women to get a position and a portion of the balance in the political field as well as set out in the legislative elections law that gives a 30% quota for female representation.

MRP is an institution cultural representation of Papuans who have certain powers. This means that such authority is limited to matters or certain aspects only. The scope of certain powers within the framework of the protection of the rights of indigenous people of Papua based on the respect for tradition and culture, women empowerment and strengthening of religious harmony.

Related to that stakeholders support from local government in order to empower women in politics, the Head of Development Planning Agency at Sub-National Level Papua Province, argued that:

"The local government of Papua province through the Governor Lukas Enembe, strongly supports the program-program related to the empowerment of women, even in every SKPD The governor ordered that if any work programs related to women's empowerment then it should be implemented, even Firm empowerment of women there in the provinces and districts of the city have always received attention from pa governor. Related local government support on the budget for women empowerment programs, everything has been contained in the budget, even for MRP also provided a budget for women empowerment programs. So the point that local authorities always give an appreciation of programs or activities to empower women in all sectors." (Interview, dated February 22, 2015).

Head of the Jayapura City Empowerment, Betty Puy, also said the same thing stakeholders related support in implementing women's empowerment program, that:

"Jayapura city government has always provided support in the form of a women's empowerment program facilities.

Amenities such as nets and netting cages for women who keep fish. As for the women's groups that perform activities normally prepared woven mix color poster paints, and other facilities that could help women activities. After that we did not stay silent but we do monitoring to check progress of the activities undertaken in each of the village. Related venture capital did we give but little interest once for the return while we are working with the Bank of Papua for remittance. (Interview, dated 12 April 2016).

Chairman of the Working Group on Women MRP, Deborah Motte, also revealed that:

"We must honestly admit that in order to implement programs to empower women, we still need a lot of guidance and input from various parties, which is why we always coordinate with the Provincial Women Empowerment and urban districts. But not only that we also work closely with the Centre for Women's Studies in Cenderawasih University to conduct studies in advance of the program made by the Working Group MRP woman, before we execute it. One example of our cooperation is about handing hundred days without violence against women, it is a program of cooperation with the Agency Papua Province Empowerment, Women Empowerment Jayapura City and Women Empowerment Jayapura district. (Interview, dated February 4, 2016).

By Plt. Chief Representative of Komnas HAM Papua Province, Frits B. Ramandey, states that: "The name of the national program or programs that are specifically created by specialized institutions such as the MRP had an obligation to support local government agencies. Why? Because of this institution born from the mandate of the law 21. This means that the MRP agency has the authority to protect against indigenous Papuans or perform the task the empowerment of women in accordance with the duty of every working group that is in the MRP. We of human rights Komnas also strongly supports the empowerment of women because women also have the right to equal with men. Women should be given space to work, space access to communicate with the outside world, political, economic and sector or other fields that can lift the status and dignity. That the rights of women should be supported. I think not only the government but also other stakeholders which have sided with the empowerment of women should endorse a program created by the MRP. (Interview, dated August 18, 2015).

stakeholders related to the support of family or male / husband on the empowerment of women in politics, although the patriarchal culture is strongly held in people's lives.

Anthropologists Cenderawasih University, Hanro Yonathan Lekitoo, states that:

"I saw that, rooted patriarchal culture in Papua community in general and the social construction rooted more favorable to men the reason for the lack of representation of women in this Parliament. In the district of Jayapura, patriarchal culture oriented in the leadership system Ondoafi (male authority) have great influence on the political orientation of society, so that the ideal leader is a form of masculinity leader. In this social construction of men more privileged role in the public sphere, while women put in a private space. In the public space, all the roles occupied by men so automatically, public policy will be oriented to the interests of men, it will be taking place in the

sectors of political, economic and cultural life. "(Interview, dated August 12, 2015).

Head of Women Empowerment Jayapura, Betty Puy, stating that:

"The biggest challenge in implementing the work program of empowerment of women is a cultural factor. Not an easy thing to convince men that women also have the same rights as men. We Empowerment of Jayapura City agency must work hard to convince it. We should provide guidance on an ongoing basis to women who nurtured addition to show evidence or facts of the work of women. Examples are when the legislative elections in 2014 and then we Arm women with political rights, but when there are women who did not managed to get votes and seats in parliament Jayapura, not only KPU Jayapura City is the target of the anger of the men but the Office of Empowerment single woman becomes the target of complaints even intimidation. But I think there is another part of the women can be empowered not only in politics, back to my example of the success of the five pilot villages empowerment of women at this time and it finally paid the husband also support Reviews their wives in our program for the empowerment of cooperation. It's a long process, so do not give up to the challenge. Challenges that will Make us strong in all situations. (Interview, dated 12 April 2016).

Chairman of the Commission of Jayapura District, Lidia Mokay, also said the same thing, that: "I take the example I just, before I became a member of the Regency Jayapura two periods, I was a member of the Association of Women I fale (one village in District Sentani, Jayapura district) working for women in the village, I was with some friends women Sentani trying to convince the male political rights, the right to life equal to men that are owned by women Sentani. Because we know how the position of women in traditional structures that women should not speak out, who are just taking care of eating in the kitchen, looking for food to feed his family. This process we do constantly, until now I entrusted served as Chairman of the Association of Women I fale (IPI). In fact, until I became a member of the Regency Jayapura first period and the second period then serves as Chairman KPU. The process to convince men about women's rights was quite long, and the process should not be stopped to be always on and always we do. I believe that there will be times when the awareness of men to support the independence of women. (Interview, dated March 11, 2016). Acting Head of Komnas HAM Representative in Papua province, Frits B. Ramabey, also conveyed the more load on appeal to men, that:

"It is a joy when men see his sister, wife or friend see her succeed, so let leave culture or habits that are keeping women and give room for the right for women to be Able to access condition to give life to all of us. We know that women are strong, so give him room to build strength and we will enjoy the results together. (Interview, dated August 18, 2015).

Daniel Mazmanian and Paul Sabatier outlining implementation model, known as A Framework for Policy Implementation Analysis, argues that the important role of public policy implementation is the ability to identify the variables that affect the achievement of the purposes of the formal on the overall implementation process and one of the variables in question stakeholder. The nature of the support is public concern that are momentary pose Certain Difficulties, due to push the

level of success of a policy implementation is needed touch of support from citizens. Because the mechanism of public participation is very important in the process of implementing public policy in the field. The changes to be achieved by a public policy will be very successful if at the community level, citizens have the resources and community attitudes conducive to the policies being offered to them. There is a kind of local genius (local wisdom) which is owned by the residents who can influence the success or lack of success of the implementation of public policy. And it is highly influenced by the attitudes and resources owned by citizens (Leo Agustino, 2008: 148).

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Based on the research it turned out that the support of stakeholders can be distinguished on the institutional support of the local government and indigenous people. The support given by the local government in order to carry out the implementation of MRP Decree No. 1 of 2014 is the support of the Papua provincial government to provide a budget of budget MRP special autonomy to institutions to exercise powers, duties and functions, as proposed by DR. Moh. A. Musa'ad, Head of Development Planning Agency at Sub-National Level Papua Province. obligations of local government is to give support to the MRP agency to implement the program of work on women's empowerment, as proposed by Frits B. Ramandey, Acting Chief Representative of Komnas HAM Papua Province. In addition to the form of budgetary support, support for the provision of facilities and cooperation with both the District Women Empowerment and Women Empowerment Jayapura city also must be provided to the MRP agency in carrying out its duties. MRP women's working group also recognizes that women's empowerment program in implementing the working group of women also need help in the form of guidance and coordination with the Women's Studies Center of the Cenderawasih University.

Support also comes from the other stakeholder groups of indigenous peoples. Given the position of women in the structure of society that recognizes the structure of patriarchal culture, the women must get permission and blessing of both husband and extended family. Based on the results of the study are indeed found many obstacles when women will be a career in politics because politics is regarded as a man of his world. But over time the girls will surely get the space and opportunity to be able to carry out the wishes and objectives so that women will also be equal to men.

B. Women's Empowerment Policy Implementation Model

With regard to research on the implementation of an affirmative action policy carried out by the Women's Working Group Majelis Rakyat Papua, the authors recommend to the parties involved in this case is the Women's Working Group Papuan People's Assembly, and local governments are involved in providing resources in the form of a budget to fund the implementation of the program affirmative action made by the working group MRP sourced from special autonomy fund allocations.

In order that the implementation of affirmative action programs in the empowerment of women in Papua can be accomplished and provide a space for Papuan women working in politics in general legislative institutions in particular, there should be a gradual, continuous and comprehensive with attention to the factors that influence in the implementation of affirmative this action, which is the content of the policy factor, capacity and support stakeholders implementor.

Ideally, the birth of public policy is an attempt to address the problems faced by the community (public) in the region. Because public policy is an attempt to address the problem of the public, it is fitting that effort oriented to the public interest. Community participation is considered crucial in the development of policies, because the society that most citizens understand and experience the needs and problems that it faces. Leaning on the real conditions in society, the policy created will also be accepted by society as normal at the same time has a valid effective.

The formulation of state policy would be easier to learn when to use a particular approach or model. Political experts have developed various kinds of approaches or models that can help us to understand the political life (political life) administration, the wisdom, and so on.

The model can be interpreted as a theory, the thought processes that can be used to solve the problem. The model policy is a policy theory. Thus it can be used for setting good a setting as the substance of the administration and in the normative substance. Speaking of settings, it is done in various ways, can be followed by proper regulation of coercion, may be by arrangement only benefit a person or group of people or for everyone, but if all ways are classified so that it will be able to give color to any policy formulation (H. Faried Ali and H. Syamsu Alam, 2012: 95).

Model policies (policy models) is a simple representation regarding selected aspects of a problem condition prepared for specific purposes. Exactly as a policy issue that is building the mental based on conceptualization and specification of the elements of the problem conditions, policy models an artificial reconstruction of reality in a region extending from energy and environment to poverty, welfare and crime. Model policies can be said to be a concept, charts, graphs or equations. They can be used not only to describe, explain and predict the elements of a problem condition but also to improve it by recommending a series of measures to solve specific problems. The model policy is never a literal description of the problem situation. Just as a matter of policy, policy model is a tool for preparing artificially imaginatively and interpret our experience of the problem situation.

Model helpful policy should even exist. Policy model is a simplification of system problems (messes) by helping to reduce complexity and make it manageable by the policy analysis. Policy models can help distinguish between things that are essential and which are not essential from the problem situation, reinforce the relationship between the factors or variables are important and help to explain and predict the consequences of policy choices. Policy models can also play an active and critical role in policy analysis to encourage analysts to make assumptions explicit themselves and to challenge conventional ideas and methods of analysis. Lastly, the use of policy models is not a matter of choice, because everyone uses several models. Told by Jay Forester policy model makers :

"Everyone uses the model constantly. Each person in his personal life and his business instinctively use models to make decisions. Mental images of the world around you that you can bring to mind is the model. A person does not have a city or state government or in his head. He just has selected concepts and the relationships he used to display the real system. Mental images is

a model. All the decisions we make on the basis of the model. The problem is not the use or perpetuate models. The problem is choose among many alternatives ". (William N. Dunn, 2003: 232-234).

In this study the authors found that there are other factors that influence the implementation of an affirmative action program is that cultural factors. Its main characteristic is the existence of social relations based on the position and the role of inter-related. The social structure of a society should not be seen as containing systems of social bonds. If that view is no, then there is a risk of encountering chaos conception. To facilitate the understanding of the social structure, we must begin with social relationships, the way citizens interact, things are said and done in relation to each other. There is also their ideas about their relationship, the conception of each of the other parties, the understanding and strategies and expectations that guide their behavior. Both patterns of behavior and conceptual system has a structure, in the sense of not chaotic or haphazard, but both of these is a different structure types (Keesing, 1989: 208-209).

Investigations social structure Papuans that the anthropologist describes several forms of social relations that organize social life a whole social life which is based on kinship and embodied in kinship terminology system as well as the inheritance of his descendants. The understanding of the term kinship important because it requires the rights and obligations that should be played in the unity of its social life. Pouwer (1966) grouped Papuans into four types of kinship systems:

1. The classification of relatives member parallel cousins with the same terms with a sibling. The same term to refer to the father as well as his fellow brothers mother's father and brother. Papua ethnic groups belonging to this type are: People Biak, Iha, Waropen, Senggi, Marind-anim, Humboldt Bay, and Mee. He calls this type as a type of Iroquois.
2. Grouping which use the same term to refer to siblings and cousins all cross and parallel. Ethnic groups belonging to this type are: the Hatam-Manikion, Mairsai, Mimika, Asmat and the East Coast Sarmi. It is classified as type Hawaiian.
3. Classification cousins cross matrilineal and patrilineal with different terms and for cross-cousins are influenced by the level of generation and are not symmetrical. The name for the boy's mother's brother (MSB) is the same as the mother's brother (MB). The term for the boys father's sister (FZS) is the same for boys sister (ZS). The ethnic classified in this group are people Awyu, Dani, Meibrat, Mek in Bintang mountains and Muyu. It is classified as a type of Omaha.
4. The classification of kinship flexibly, as the system type 1 and 2. The group belonging to this type is the Bintuni, Tor and the West Coast Sarmi. Except classification based on kinship terms, the Papuans are also distinguished by the principle of inheritance. There are two principles of inheritance descent namely (a) through the paternal line or patrilineal and contained in the Meibrat, Mee, Dani, Biak, Waropen, Wandamen, Sentani, Marind-anim and Nimboran). (B) through bilateral principle is through the lineage of the father and mother, are present in the hinterland Sarmi. (C)

community based structures ambilateral or ambilineal, which were sometimes arranged according to maternal lineage or father. Contained in the Yagai, Manikion, Mimika (De Brijn 1959: 11 of van der Leeden, 1954, Puwer, 1996). It is classified as a type of Iroquois and Hawaiian.

5. The Papuans also recognize the division of society into phatry or moiety that is divided into two half people. In the Asmat is aipmu and aipem. On the Dani - Waita-Waya. the Waropen - buriworai - buriferai, and so on. See the article by Mansoben (1974, 1995); Held, 1947; Kamma, 1972; Schoorl, 1957; Heider, 1979-1980).

In each indigenous community found a process of "political", where there are people who lead, reorganizing the organizational structure, acquiring and using power. In a society as a system we see certain problems that must be solved through certain formal political organization, for example, maintaining internal order, allocate power in making decisions about the group's activities. So it can be said that the political organization of a society is the rules or tasks are to be used to solve these problems, regardless of whether there are formal governmental organizations or not (Keesing, 1992: 38-39).

We have seen that the community leaders worked in a variety of circumstances. The same is also encountered in the Papuan people, that they have a political system in regulating the life of each tribe are multi-ethnic.

Papuans know the system that governs relations or relations between citizens in various activities of daily life based on their respective cultures. Papuans know the political system or political system of traditional leadership, according to Sahlins (1963) and Mansoben (1995) there are four types of political systems or in Papua namely (1) big man or men of authority: obtained through achievement. Source of power lies in the ability of the individual, material wealth, intelligence diplomacy / speech, the courage to lead the war, the physical body of a large, generous nature (Sahlins, 1963; Koentjaraningrat, 1970; Mansoben, 1995). The exercise of power is usually run by a single person. The ethnic embracing these systems are the Dani, Asmat, Mee, Meibrat, Muyu. (Mansoben, 1995). (2) the Kingdom Political System: This system is based on seniority birth inheritance and clan. Weber (1972: 126) said that as a traditional bureaucracy are on the way to recruit people to sit and bureaucracy. Usually they are recruited have a certain relationship with the authorities, such as family relationships and friendships. Here there is a clear division of authority tasks, the orientation center is trade. This type is found in Raja Ampat, Onim peninsula, MacCluer bay (bay berauw) and Kaimana. (Mansoben, 1995: 48) (3) Ondoafi Political System: This system is the inheritance of the position and the traditional bureaucracy. Region / territorial power of a leader is limited to one village and social unity composed of a group or sub-ethnic group only and orientation center is religion. There is the eastern part of Papua; Nimboran, Gulf Humboldt, Tabla, Yaona, Skou, Arso, Waris (Mansoben, 1995: 201-220). (4) Mixed Leadership System. According Mansoben (1985) there are also other systems that reveal characteristics of achievement and inheritance system called mixed system. Meanwhile, according to Sahlins, leadership system characterized by inheritance (chief) are

classified into two types, namely the imperial system and the system Ondoafi. The second major difference lies in the political system element wide range of power and political orientation. Systems mixture leadership, leadership positions acquired through inheritance and accomplishment or based on individual abilities (achievement and descent). This type is found in the bay population Cenderawasih, Biak, Wondama, Waropen, Yawa and Maya (Mansoben, 1995: 263-307).

IV. CONCLUSION

Influential factor in the process of implementation of affirmative action policies to empower women of Papua, are at least three factors that affect the implementation of this policy, namely:

1. Content Policy

Policy content of SK MRP No. 1 Year 2014 on the Establishment of Activity Plan and Schedule of Events Working Group on Women MRP Session Year 2014 Advocacy program in the framework of protection, empowerment and alignments in the political sphere, namely the right to political representation, did not elaborate on issues of women empowerment but its implementation only limited appeal related to women's working group MRP 30% representation of women in the nomination process, which is also in the process of implementation is coordinated by the Office of women's Empowerment Jayapura District and Jayapura City but only a facilitator to deliver material. While about 30% representation of women in the process of nomination by the political party is already a national provision. One could even say that the contents of the policy in the Women's Working group MRP is also no impact on the representation of women in legislative bodies. Case in Jayapura district legislature that has only one female.

2. Capacity Implementor

Based on the research it turned out that the MRP in general as a formal political institutions (supra political structure) at the provincial level is an organization that serves as the institution cultural representation of Papuans who have certain authorities to protect the rights of the Papuan people based on respect of the customs and culture, empowering women and strengthening religious harmony. These institutions play a role in realizing the development of Papua in the future. But it turns out after the implementation of special autonomy in Papua in 2001 the newly formed institution this side in 2005.

Delays in the formation of the MRP is then of course this will have an impact on the effectiveness of Special Autonomy. It is based on the grounds that some of the dimensions of the political process in this matter of governance and development in Papua province as the embodiment of Special Autonomy policy can not take place as it should. Specific local regulations as regional legal instruments can not be made, because under the terms of applicable laws formulation process should involve MRP. Delays in the formation of MPR also affect the implementation of government policies, both national and local policies. Local policies have only over the authority of the MRP in providing consideration and approval of the Governor and Deputy Governor are indigenous Papuans. It is then more

impressed that the presence of MRP as a cultural representative body of indigenous Papuans no longer perform their duties and functions to protect the rights of the Papuan people so that more demonstration carried out pliers and demands to dissolve the MRP.

In the framework of the implementation of special autonomy established Papuan People's Assembly (MRP), which is the cultural representation of indigenous Papuans. MRP has certain authorities to protect the rights of the Papuan people, based on respect for local customs and culture, empowering women and strengthening religious harmony. DPRP composed of members chosen and appointed by the legislation in force, with the arrangement, position, assignment of authority, rights and responsibilities of membership, leadership and fittings DPRP regulated in accordance with legislation. The Provincial Government is the Governor and the other provincial governments. While the MRP members are natives of Papua, consisting of representatives of indigenous, religious representatives and representatives of women. Why MRP? MRP exists because the mandate of the special autonomy law. The presence of MRP gives color in governance in Papua and simultaneously increase the superstructure of governance in Papua. MRP has a certain authority in governance in Papua, as well as to protect indigenous Papuans and the empowerment of women. For institutions it was supposed to have written authority again is not simply to give consideration and approval but must also be given legislative authority in particular.

3. Stakeholder Support

Support stakeholders can be distinguished on the institutional support of the local government and support of indigenous peoples. The support given by the local government in order to carry out the implementation of MRP Decree No. 1 of 2014 is the support of the Papua provincial government to provide a budget of budget MRP special autonomy to institutions to exercise powers, duties and functions. The obligation of local government is to give support to the MRP agency to implement the program of work on women's empowerment. In addition to the form of budgetary support, support for the provision of facilities and cooperation with both the District Women Empowerment and Women Empowerment Jayapura city also must be provided to the MRP agency in carrying out its duties. MRP women's working group also recognizes that women's empowerment program in implementing the working group of women also need help in the form of guidance and coordination with the Women's Studies Center of the Cenderawasih University.

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Agency Problem Public Service Agency In Rsu-Bahteramas City Area Public Service Kendari

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Abstract- Agencification public service in the form of public service agencies at the local hospital Bahteramas have occurred since 2010. sorting, autonomy and accountability as agencification element as part of efforts to improve health services. In this context, the Southeast Sulawesi provincial government as the perpetrators have been entrusted to the agent who is in the hospital, especially the line manager to make optimum efforts to achieve the target set. This study aimed to analyze the public service agencification Regional General Hospital Bahteramas sorting aspect, where autonomy and accountability managerialism. This study used a qualitative approach. Qualitative research is research that focuses on the interpretation and understanding rather than explanation and prediction and natural. Agencification public services in hospitals Bahteramas not go well. In addition to problems in aggregating, managerialism limited autonomy and accountability.

Index Terms- Services, Publick, Agencification

I. INTRODUCTION

The changing pattern of government management of public services continues to grow, along with the development concept *New Public Management* concept agencification. With agencification public service institutions must be able to improve performance to improve the quality of service to the community, through the principles of disaggregation, autonomy and accountability managerialism (Pollit et al, 2004). The doctrine of new public management (NPM) emphasis on practice management business organization by separating the public institutions that make policy by executing operations by applying basic principles such as greater attention on autonomy, discretion and flexibility in the management of public *institutions*, evaluation of accountability for achievement the results. Pollit (2001) states The main characteristics of the NPM including variants agencification management system is the emphasis on output and outcomes, indicators and performance standards, more autonomous forms of organization, relationship-based performance contracts and the priority value of efficiency and individualism.

Provision of manager autonomy allow each agency to focus on the pursuit of results without the humpty of the structure itself or from outside such as the effect of the forces political. Implication expected with autonomous agents, this could generate a positive thing in the form of organizational efficiency and achieve the goal Organization. While accountability and control functions are necessary to compensate for the autonomy

of the agency. Dimensions it describes the relationship between the actor mechanism that acts as a controller with controlled. Ministry or local government acting as the controller, while the agent is a party controlled. Control conducted through the authority of the rules, procedures, or standards in a hierarchical manner. Second through structural controls, which the actor with a higher authority influence decision through hierarchical lines (Lukman, 2013).

Lukman (2013) explains that one approach that could be used to explain agencification in the context of public service agencies other than managerialism, public choice theory and transaction cost economics is the theory of the agent and the principal. This theory is described in many economic, political and organizational behavior. Principal is the party requiring the services of goods and services while the agent is the party that provides goods and services. So it can be seen as a contractual model between two or more people, where one party called the agent and the other is called WWTP process. Agents are considered to have the knowledge and skills are more than adequate in providing services than the principal. In the agency theory, the government is the principal contracting to buy the services of the agent. The agent is ideally a pure autonomous government agency or semi-autonomous in providing public services. Broadly speaking, *agency theory* is intended to solve two problems. First, the agency problem arises when the desires of principal and agent opposite and it is expensive for the principal to verify what is done by the agent. Secondly, the issue of dividing the risks arising from the principal and agent have different attitudes towards risk (Eisenhardt, 1989).

The literature of public administration in Indonesia has not provided an explanation of the regional organization of public service agencification particularly from the perspective or a review of agency theory especially in health care as in RSU-Agency Public Service Area Bahteramas, Kendari, Southeast Sulawesi. Agencification in the form Agency Public Service Area To the region is increasing, but is still a little explanation about the characteristics of empirical relations agency principal regional organization. Research using agency theory or agency perspective more in companies or private organization. As for the environment, better government on budget issues. For example, Halim Abdullah (2010), explain the behavior of bureaucrats who wants to maximize his budget. Executive submitted a budget that could enlarge his agency. Actual executive opportunistic behavior in this shopping nomination of the which is proposing real activity is not a priority, allocating expenditure component that is not important in an activity, proposed the amount of expenditure that is too large for the budget components of each activity and increase the budget for activities that are difficult, to

measure the results. Us does not provide explanation komphrensif how the elements - elements of the agency as described in Eisenhardt (1989) it can provide an effect on the relationship between principal and agent as well as its impact on organizational performance in government to achieve her goal. Agencification public service in the form of public service agencies at the local hospital Bahteramas have occurred since 2010. The disaggregation, autonomy and accountability as an element agencification according Hood (1995) & Pollit et al (2004) as part of efforts to improve health services. In this context, the Southeast Sulawesi provincial government as a principal has entrusted to an agency that is the rum ah sick, especially line managers to make optimum efforts to chase the target.

Functioning of the agent can be problematic agency. That Arise because of the desire of principal and agent opposite and their problems due to the risk sharing. Agency potential problems to occur in any organization, especially if the organization is Increasingly large. By normative, RSU- Regional Public Service Agency Bahteramas is part of the local government the which is managed by applying the principles agencification. Principal RSU- Regional Public Service Agency has delegating authority to reviews those who have the expertise to manage the managerial RSU- Bahteramas Regional Public Service Agency. In practice, the provision of management Southeast Sulawesi Province government authorities and the health ministry to agents as a manager RSU- Regional Public Service Agency Bahteramas has given rise to agency problems.

Problems in the RSU - Regional Public Service Agency Bahteramas much in keeping with the assumption in the theory of agency. Subject, assuming humans for example, emphasizes that people always put the interests of his own, always seek to avoid risk and have limited rationality. Regarding the organization, there is a conflict of interest between the parties concerned, the existence of asymmetric information between the *principal* and the *agent*. Information is also likely to be able to be bought traded by the agent.

Among existing models, models Eisenhardt (1989) has a complete element that can be used to explain agencification in the form of public service agencies in RSU- Bahteramas Regional Public Service Agency. Information systems, risks, uncertainties and incentives results could explain the phenomenon of the principal and agency relationships there. RSU- Organization Regional Public Service Agency Bahteramas require adequate explanation about the characteristics of agency theory perspective in public service agencification happened there. In this connection the question arises from, whether the agency theory perspective suitable as models confirmed Eisenhardt (1989). The acyl of research h is intended for analyzing agencification public services Regional General Hospital Bahteramas aspects of disaggregation, autonomy and managerial accountability.

II. RESEARCH METHODS

This study used a qualitative approach. Qualitative research is research that focuses on the interpretation and understanding rather than explanation and prediction and happen naturally (Creswell, 2003). According to Irawan (2006),

qualitative research has Typical studies for questioning the meaning of an object in depth. Where researchers should Become the main instrument in data collection with direct observation object researched.

The research is descriptive. Descriptive within the meaning describe a systematic, factual and accurate characteristics of the object under investigation, it is in line with the aim of descriptive type of qualitative Because this research using inductive logic where the use of the concepts used are not intended to protect the direction of research, but rather serve as a foundation for Researchers to understand the reality Examined. Using qualitative methods, the study intends to focus on the perspective of agency theory or approach in public service agencification RSU- Bahteramas Regional Public Service Agency in health. Selection of qualitative approach in this study is based on the suitability of epistemologi construction of the theoretical model. This study uses agency theory of Eisenhardt (1989) in the public service as described agencification Pollit and friends - friends. Agency theory according to Eisenhardt (1989), consists of dimension - dimension among others information systems, uncertainty of the results, and the risk. While Agencification according Pollit et al states will go well if the loading dimensions of disaggregation, autonomy and control and accountability. This could explain the phenomenon of the principal and agency relationships that occur in RSU- Bahteramas Regional Public Service Agency. The theoretical constructs reflect a qualitative relationship so that the proper approach to analyzing qualitative approach.

III. RESULTS AND DISCUSSION

Agencification Public Services

In connection with agencification public service delegated by the provincial government of Southeast Sulawesi, in the body RSU- Regional Public Service Agency Bahteramas was also undertaking efforts - efforts to make meaningful changes that aim to improve services to the public, so that the vision and mission that has been formulated start from the provincial level to RSU- Regional Public Service Agency Bahteramas can be achieved. Where vision General Hospital Regional bahteramas is "Hospitals Featured In health care referrals, education and penel itian in Southeast Sulawesi. To achieve its vision or need significant change from the perspective of performance and management, so that the benefits can be felt by the entire community Southeast Sulawesi. Interest agencification public services as proposed by Verhoest (2010) is to improve the quality of service to the community in order to promote the general welfare through the i implementation of central and local government tasks productive, efficient and effective.

In conjunction with the perspective of agency theory, then agencification is an effort to repair and improve the quality of public services through disaggregation, autonomy and control and accountability of the organization. In this case RSU- Regional Public Service Agency bahteramas (agent) as a principal health services to the community can work more productive, efficient and effective. To discuss this agencification, will use three-dimensional agencification proposed Pollit et al (2004) the which is as follows :

1. Narrowing

Separated structure

Disaggregation is one of the main factors that determine agencification public services, especially in public health services. Disaggregation is meant here is the existence of a separate structure and function as well as regulation or legislation - specific legislation that strengthens the existence of an organization or agency. In conjunction with agencification health services, RSU-Regional Public Service Agency Bahteramas not separated, which does not have the structure and Functions own right, separate from the parent -Right before. This is consistent with the proposed AR as head Regional General Hospital Bahteramas, that:

RSU - Regional Public Service Agency Bahteramas part remains structurally separated from the local government. Because of his wealth and assets owned by RSU- Regional Public Service Agency automatic Bahteramas Also a wealth of areas that are not separated, so Also with other bureaucratic institutions. Although Agency Public Service Area derive revenue from services rendered (Interview, 15April 2016). This was confirmed statements LA, as an assistant to the provincial government Sultra 3 which states:

Regional Public Service Agency RSU Bahteramas in running t duties as principal and function reference-reviewed southeast Sulawesi provincial regulations. Thus Spake RSU-Bahteramas Regional Public Service Agency is a subordinate of the local government and is an extension of local government. They are structurally separate from the provincial government. Therefore, its status is not totally independent. I think that despite the autonomy the which is owned primarily in finance, but the hospital is still part of the provincial government of South East Sulawesi. Position Hospital technically and operationally under and responsible to the Governor (Interview, 18 April 2016).

Based on existing documents, hospital duties referring to regulations 5, 2008 on the organizational structure and to said technical Local institutions are RSU Southeast Sulawesi and patterns of governance RSU Southeast Sulawesi province. RSU-Regional Public Service Agency Bahteramas was originally a working unit at the regional government actually subject to the provisions in terms of financial management and regional countries are. The difference from the usual bureaucratic unit is that most of them were formerly working unit manager of state revenues not invite. Sa host Generally this work receive public funds from the non-tax revenues for providing service to the community. Therefore, the financial management system and pattern PNPB inadequate in terms of improving the quality of service to the community, especially for the working sat non-tax revenues, the government created public finance management pattern.

From the facts stated above, s, Effectively, the concept of agency is not separate from government organization or ministry of the parent as implemented by the BLU in Indonesia by said separation structurally agency of government or ministry of the parent is a variant of the form agent. simply separating the functions of local government holding itself without removing it from the parent ministry organizational structure. in general, agencification theory is the separation of policy functions (regulator) with a public service function in the organizational structure of government. The first function performed by the

head office policy while the latter are the offices that carry out the assignment. Ideally agency leader or regional mandates in a form of a performance contract to the chief executive body of public service in implementing the program or some Similar programs that will professionally managed.

Separation is an ideal form to deliver services that are transparent, customer-oriented, effective and efficient (Verhoest et al., 2010). Separation (dis aggregation) the financial governance of the government agency that receives public revenue in the form of work units outstanding (bureaucratic institutions) with a working unit regional public service agency is a way for the government bureaucrats public service agencies. Practice bureaucratization of business or corporate style is applied to the bureaucratic institutions that receive PNPB / other legitimate PAD. He aims for the government agencies to be more focused and autonomous in providing services to the public without restriction structural and bureaucracy. Hierarchy and chain of command of a unit slackened as the hallmark of bureaucratic institutions. Therefore, the spirit distribute and separate organizational unit of government in the form Agency Public Service Area is also expected to Realize efficiency and high productivity as well as customer satisfaction in the provision of public services.

Thus Spake Bahteramas RSU an agency that functions goodbye to the provincial government in the organization but either legally, and Formally structurally separated from its mother it. The pattern of BLU in Indonesia was consciously choose the type of this variant is the which is structurally separate from the parent ministry or local Governments. Therefore, independent status is not pure as the agency that is in countries that apply a full autonomy variants such as in Japan and Tanzania.

Essentially there is separation or hived-off is done depends on the degree of independence in terms of organization or operation of the agency. The first is a form of semi-autonomous agency without legal independence and structural (separately by the government or the parent ministry) and because of its close to the parent ministries or government agencies. Financial sources much depends on government bureaucracies, but still have autonomy. Second, the shape is completely separate agency to ministry or parent institution, usually the degree of autonomy that is mainly offer section with personnel and finances, and there is also formed based on specific legislation. The main financial resources derived income through agency. In fact, RSU Bahteramas still heavily dependent on government funding in the budget financing is primarily Southeast Sulawesi province in addition to the state budget and his own income as an agency. This is a portrait of its semi-autonomous nature.

In the semi-autonomous pattern, P he Government determines the mission and objectives of the main medium-term each agency included with a description of the fiscal plan, Efforts to improve the efficiency and quality of services as possible can be counted and measured. On the basis of the main objectives of each agency subsequently the make medium-term plan. The medium-term work plan must still be approved by both Governments pus at the parent or the parent ministry. Based on the medium-term plan of each agency conduct its operational activities while the government should and manages how

operating costs of each agency. The same pattern Also Applies to the RSU Bahteramas as stated the director of the hospital, AR :

In preparing the plan of our organization should be guided by the provincial RPJMD for the medium term and Local Government Work Plan (RKPD) for each year. Although, as a Regional Public Service we also draw up a strategic business plan and business plan budget of course referring to the Government Work Plan (RKPD) and RPJMD that we created earlier. All the plans were reported and must be approved by the governor (Interview, 15April 2016).

In Regulation No. 61/2007 on Technical Guidelines for Financial Management Public Service Board stated that the Public Service Board is the regional work units (SKPD) or Work Unit at the Regional Work Units within local government that was formed to provide services to community in the form of provision of goods and / or services sold for profit without priority, and in conducting its activities based on the principles of efficiency and productivity. The meaning of this definition is as follows :

(1) The Public Service Board is a local device, have a meaning that the Public Service Board assets are assets that are not separated area.

(2) Area devices can implement Financial Management Public Service Board is the regional work units (as Budget User) or Work Unit at the Regional Work Units (as the Budget Authority).

(3) To provide services to the public in the form of supply of goods and / or services sold without priority for-profit, have an understanding that the Regional Work Units or the work unit to provide services directly to the public and not solely for profit.

(4) The activities are based on principles of efficiency and productivity, means that the Public Service Board is applied in the context of the budget and increase of the efficiency of service to the community.

From the definition it can be concluded that the Public Service Board included in the local government quasi-public goods. For the Public Service Board area besides Must comply with Regulation 23 of 200 5 Also must comply with Regulation interior minister No. 61 Year 2007 on Technical Guidelines for Regional Public Financial Management Service and the work unit BLU is expected to implement a financial management According to the basic principle of Law No. 17 of 2003 and Law No. 1 of 2004 the which is the first step renewal of public sector financial management, to improve services to the community. From that sense can be Viewed Reviews their common goals between BLU (center) with the Public Service Board is established to provide the public with no priority for profit. The difference lies in who could be the Public Service Board. Working units can be Public Service Board is the regional work units or work units SKPD. Regional Work Units (Local Government Unit) is a device on the local government areas as the budget / goods. While working unit on the regional work units are part of the local work units who carry out one or more programs. Therefore, Public Service Board is the SKPD then separate legal status from the local government. This means that still have the same position with the SKPD another, equally responsible to the head region. The difference is the financial management course. Domiciled as a government agency (not the state assets set aside), this in accordance with the principle of

BLU in PP 23 Year 2005 on the Financial Administration of the Public Service that BLU is part of the achievement of the goals of the state ministries / agencies / local authorities and therefore no separate legal status from the BLU line ministries / agencies / local authorities as a central institution.

Lukman (2013), describes since 2005, the Indonesian government Began to introduce the concept of agencification as bureaucratic reform Efforts. However, agencification implemented in Indonesia in practice Differ greatly from the concept that has been Adopted by some developed countries such as the Australian government. If many of Reviews These countries to form a new institute that works to provide public services, the Indonesian government does not change the existing institutions. The Indonesian government just issued laws that guide the work units of government institutions that want to be a Public Service Board. BLU is agencification product where there is a pattern of financial management roomates extinguishing specifically between institutions that have been set with the Public Service Board with agencies working unit in general. Some agencies already received the title as the BLU is like as the central hospital, domestic Several universities and institutions managing public funds. In theory, BLU professionally managed and follow-practice business practices such as private parties. In fact, institutional reform is not yet fully reflect changes in corporate governance because of the dimensions of the budget, management, and employee recruitment policy is still the responsibility of its parent.

Agencification concept Adopted by the government of Indonesia should be Able to Emulate agencification formed by many developed countries, especially in terms of providing public services. Thus Spake every institution who have Similar tasks can be managed da n combined into one management by embracing the concept of agencification. If it is implemented, the public organization that provide social assistance or subsidies Directly to the public will be managed by an agent called public service agencies. In Indonesia, an association between the government and the operator called purchasing-provider agreement a contract of performance defined by the government as print a WWTP and BLU as a service provider. In this case, the government is using the agent as an arm of government that will exercise the functions of government to improve the efficiency and effectiveness of public services. The challenge now is how to implement the idea is to blend the structure, culture and organizational climate prevailing in unit BLU is still thick with bureaucratic work culture.

Separation, disaggregation or separation that occurred in Indonesia, including in RSU Bahteramas more segregationist system of financial governance. Separation (*dis aggregation*) the financial governance of the government agency that receives public revenue in the form of regular working unit (the bureaucratic institutions) with a working unit Regional Public Service Board. Practice bureaucratization way of business or corporation is applied to the bureaucratic institutions that receive PNPB / other PAD legitimate. It aims for the government agencies to be more focused and autonomous in providing services to the public without any structural barriers and bureaucracy. Therefore Regional Public Service is part of the parent ministry or part of a government / regions, the wealth of the country has by BLUD automatically also a wealth of

countries / regions that are not separated, as well as in Constitution bureaucracy. Although BLUD derive revenue from services Provided, but it is treated as non-tax revenues / other legitimate PAD. Therefore, all the assets and goods, or the wealth of the country / region in another form Obtained BLU D Auto is also the capital of a country / region.

In terms of relations with the state ministries / parent institutions or local government, the Public Service Board remains part structurally separated from the parent ministry / local government agencies in the Public Service Board Although some in other countries there are separate from the parent ministry. A special characteristic of the Public Service Board granted discretion or autonomy of public service delivery to Achieve efficiency by still guided at top performance results.

Has a regulation or Act - Special Act

With a special law has more benefits at the agency where there are rules roomates Regulate in detail the agency's governance, relationship with parent organization and other aspects. Although in practice that the establishment of agencies can be produced from a special study, the agency forming system and does not require legislation that specifically. Regional Public Service Bahteramas, as stated AR, as the director is as follows:

Processes into the management of the Public Service Board was Initially no command of the governor to prepare a proposal document Public Service Board. This document then we discuss with the health department, department of finance and assets and the Parliament. The report was conveyed to the governor by the provincial secretary. After that, the provincial government proposed late into the center, both the domestic ministries, finance and health ministries. Often at me process a year and finally approved (Interview, 15April 2016).

Meanwhile, Deputy Director 3 District General Hospital Bahteramas, AK states :

Initially there was a visit of Commission board of health centers to the people's representatives Attended Southeast Sulawesi, the head of health and the head of the hospital. Then proposed to the governor, the council in order to coordinate with regional representatives and then created document preparation administrative and technical documents (Interview, 18 April 2016).

To Become a Regional Public Service Board, Regional General Hospital Bahteramas have to prepare administrative documents that must be done by the prospective Public Service Board - Regional Work Units or any candidate for Regional Public Service Employment unit. Administrative document to be prepared by the candidate Regional Public Service as Mentioned above items, namely the letter of intention, the pattern of governance, strategic planning, minimum service standards (SPM), a financial report or prognosis of the financial statements, and the last audit report, All the files of this document is delivered or delivered to the secretary of the area before it is submitted to the head region. Then the secretary of the administrative area to check the documents on the proposed candidates for the Public Service Board, the regional work units or prospective Regional Public Service, Labour units by the regional secretariat and if everything is complete, then forward it

to the regional secretary of the regional heads to be assessed and determined.

In the hospital Bahteramas profile document shows the process of regional work units into the Public Service Board, roomates Began October 27, 2008 when it formed a working group of constituent documents Public Service Board, by decree of the director of the General Hospital of Sulawesi southeast No. 1199 / 1.3 Rome General Hospital / X / 2008. This change in status in addition to existing directives Also in line with the demands of the public service so that local Governments open up the space to public services such as hospitals Able to provide a good service to the community. Then, according by laws - laws Hospital No. 44 in 2009 and to improve the quality of service, the General Hospital of Southeast Sulawesi province has been a public service agency areas defined by decree No. 653 Southeast Sulawesi governor in 2010. In 2012 the hospital moved location and changed its name to general hospitals Bahteramas Southeast Sulawesi Province.

In fact at that moment, s , effectively, the basic rules in the implementation and management of the BLU is Government Regulation No. 23 Year 2005 on the Financial Management of Public Service Board 's Government Regulation No. 58 Year 2005 on Regional Financial Management and subsequently poured in more detail in Regulation of the Minister of the Interior No. 61 Year 2007 on Technical Guidelines for Financial Management Public Service Board . According to the hospital director RSU- Public Service Board, Bahteramas has met the requirements to be set into a Public Service Board, . Some of these requirements include requirements Substantive and Technical Requirements. The technical requirements to be met by candidates for Public Service Board, is the performance of services in the field of duties and functions feasible maintained and enhanced its achievements through the Public Service Board, upon the recommendation of the district secretary for Work Unit area or the head of the regional work units for units of work. Performance of regional finance work units or units of a healthy, indicated resources by the level of capability of the service revenues are Likely to Increase and efficient in financing expenses.

From the above, can thus be understood that the central government through the Ministry of Interior and the financial issuing what is called the policy framework for the establishment of agency executives. The idea of creation of agency executives RSU Bahteramas this out of a review team formed by the government of the province that special work. The main task of the team is to develop a concept of area and function of government that can run it, and reviewing the possibilities for creating a governance structure that, and rationalize Realize agent and public organizations such. Government Provincial expect the formation of Regional Public Service Board, was in public administration and public service provision can be run in a way that most effectively and efficiently as possible, and ensure that the operations are designed to providing the best service for consumers and maintain the responsiveness of what is required by the customer.

The birth of agency executives at the start with the advent of laws - laws state finances and the state treasury to introduce the concept of public service agencies. Later revealed to Government Regulation No. 23 Year 2005 on BLU Financial

Management and Government Regulation No. 58 Year 2005 on Regional Financial Management and subsequently poured in more detail in Regulation of the Minister of the Interior No. 61 Year 2007 on Technical Guidelines for Financial Management Public Service Board. Rules at the top is a legal framework that allows each ministry to create an agency executive more autonomous to be able to create efficiencies and improved quality of public services. Regulation also provides a framework that regulates how the responsibility, accountability and governance of the agency, as well as the agency relationship with the parent ministry. Another consideration in the formation of an executive agency is developing the agency's ability to earn income on the basis of *cost recovery*, whether a ministry that has a greater role as a policy maker or not, and also whether the agency made a significant contribution.

From the explanation above, it appears that the existence of the agency in the form of the BLU / Public Service Board, in Indonesia is not formed by a special law that regulates in detail on the governance of the agency, relationships with ministries and other aspects, He was not born from the bureaucratic and political process of the parliament through the establishment of a law. Indonesia is different from Australia and the UK where P The government established the agency there need legislation that specifically for agencies that have autonomy and treatment of different government organizations usual. Organization of national and regional existing and interest revenues (non-tax) agencification pattern granted by the central government, in the form of limited autonomy or semi-autonomous in financial management, so it is not a pure separation or disaggregation.

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2. Managerial Autonomy

Autonomy simply defined by the extent to the which an organization is free to manage own choices regarding internal arrangements (Pollit et al, 2004). Autonomy closely related to the decision-making or discretionary, the which means that how much an organization can Decide Independently Considered something to something important. Autonomy managerial include providing flexibility to an organization in terms of human resource management, finance and organization.

Autonomy in terms of human resource management in an agency Independently Allows the agency to establish the system of pay, promotion (reward), or the evaluation and sanctions. Unlike the system of centralized government organizations, the agency aims to express the relationship between personal through personnel administration and improve mobility and economies of

scale, as well as reducing nepotism for public officials. With this human autonomy, the agency in possible to speed up the procedure or the movement of employees with leniency rules made by the government. It is expected that the right man on the right job much More Effectively applied autonomy or discretion in terms of human resources. The interview with the Director of the hospital, AR stated :

From the side of the wage freeze, we are still bound by the provisions the which sets out the provincial government. Cost of the employees here already Civil Servants so that the rules attached to the employee is still connected with government regulations. Similarly in the promotion and sanctions. For example the appointment of vice-president and director of the Agency through consideration of Position and Rank mechanisms that exist in the provincial government. Although in Certain respects us as the Public Service Board, actually be Able to do outsourcing or contract against an employee who is not from Civil Servants. However, the hospital has not had a hospital employee Bahteramas civil service. With the existing financially we can actually hire employees Independently According to the needs, the recruitment of employees that differed from the usual recruitment of Civil Servants. This is made possible by government regulations (Interview, 15 April 2016).

The second managerial autonomy, related to finance. D In the event of financial autonomy or flexibility Gives each manager of the agency to use all the financial resources to generate higher returns. Autonomy or financial flexibility is started in the form of convenience in the draft budget preparation, execution of payment (billing), the use of the budget over the next year, format or rules of accounting systems, management of income and savings, acquisitions and asset sales, cash management or debt long term, the creation of business branches up to financial organizations participation. This is different from traditional government bureaucracy have financial rules Considered the which is rigid, uniform shape and with a very detailed format, Including as tightness or control of all financial flows. The concept of the use of the budget on traditional hierarchical bureaucratic agencies are budget maximization (absorption in full and trying to enlarge the budget) and usually without any relationship to the goals and performance. In terms of accounting, using the traditional bureaucratic and allow cash basis accounting financial incentives through budgeting regime.

Acquisition and sale of all the resources strictly regulated and must advance through the approval of a higher organization. Capital expenditures controlled separately from current expenditure. Strict controls every financial activity in the traditional bureaucratic hierarchical organization carried out by the government or the ministry of finance to consider the overall macro economy and the sustainability of the state budget in the long term as well as to minimize the misuse of the state budget. RS Bahteramas facts that occurred, according to the results of interviews with Vice Director 3, AK states :

We could use the money directly and the rest of the user can be used in the next year or in the carry-over. As I recall corresponding PP 23 of 2005 state revenue management mechanism provides convenience to the agency that regulates state revenues. Hospitals Public Service Board, not on be required to deposit all the reception area has been charged before

using it for operational funds. In other words we can use all receipts directly to the shopping Public Service Board, is concerned. Here k authority special that does not apply to institutions other than the bureaucracy of Regional Public Service, (Interview, 18 April 2016).

Although, there are also several types of procurement of goods and services which the RSU Bahteramas, still follows the general pattern of ordinary institutions which have to go through such a common procedure should be through an auction process such as parking services. BLU possible to procure goods different from Presidential Decree No. 54 Year 2010 concerning Procurement of Government Goods and Services as long as there are reasons of efficiency and effectiveness as set out in Regulation 23 of 2005 on Financial Management and Regulation of the Minister of Finance BLU 08 / PMK.02 / 2006 on Procurement of Goods and Services BLU. Vice Director 3, AK said :

There are still some are still using our procurement regulation 54 of 2010 as a reference in the procurement of goods and services BLU even though the funds are derived from service revenues of our own such as parking services (Interview, 18 April 2016).

In terms of doing a debt, the agency pick limitations. Generally though BLU and the Public Service Board, it is possible to Obtain long-term loans on the basis of approval of finance ministers but the procedure is lengthy. Director of the hospital, AR explained:

We were not able to perform its debt agreements against third parties directly because of the risk to be borne by the provincial government. For the Public Service Board, , government area carefully consider every decision of debt carried , if not essential. I think the provincial government has a standard assessment of an institution which will be given autonomy in terms of debt should be considered selectively by looking at the financial capability of the area and the agency. The loans we are in PIP that my knowledge on behalf of the provincial government and means the region's debt, not debt Home Regional General Hospital (Interview, 15 April 2016)

Emitter autonomy to performing loans is relatively low at the agency with regard to durability and sustainability aspects of financial (*fiscal sustanaibility*) on the economy of the local government and the agency itself. If the loan is not managed properly and *prudently* (caution) will indeed be cause greater risk of financial crisis and the budgetary burden in the future.

In the issue of tariffs that are part of input is important for agencies that produce services and products. Because the agency provide the service rate received by the agency could be a *fee*, tax or other forms depending on the type of services provided, whether it is health, the provision of goods, and so on. Traditional bureaucratic agencies hampered by government rules in getting income rates that had been set before. In the hospital bahteramas also still do a pattern like this. Director of the Regional General Hospital Bahteramas, AR propose:

Until now the tariffs of the drug, the cost of the room, medical and other support services are still determined by regulation southeast Sulawesi governor, which are adjusted annually based on the input RS, finance and revenue departments and health authorities (Interview, 15April 2016).

Recently managerial autonomy is related to the residual autonomy in their policy. Namely the freedom to Decide on the content and results of the main policies. Operational autonomy policy is about a set of activities and procedures in the primary processes. Autonomy is a strategic policy on choice of policy instruments and output, the purpose and effect. Related involvement in making decisions about the organization, provision of policy autonomy by entering higher organ to the agency is simply to Decide and interpret a policy on a case-specific cases. Deputy director 3 Regional General Hospital, AK said:

To my knowledge the autonomy that we have is still very limited, because we are the same as the regional work units within the province of Southeast Sulawesi. There are some that we have the authority where its adoption only level head of the hospital, for example the remuneration policy or medical services, procurement of goods such as drug provision stipulated also by the director, we submit the notification by letter or report. Similarly if there is cooperation with companies and NGOs in the establishment of a free health service, and the means used just set head of the hospital (Interview, 18 April 2016)

Although the Government Institutions BLU enjoy the revenue earned from the service, and on the other hand the government also as a parent gives most freedom and flexibility and the autonomy in public service delivery. Freedom, flexibility and independence given is not full because it is still regulated and bound by the government as a parent. This is the Public Service Board / Local which is actually an ordinary government agency, but enjoy the most freedom and flexibility to autonomy in financial management and administration, although not yet fully detached from its parent control (government).

Conditions different agencies in our country with the Director of each agency in many other countries eg Japan and Australia where the director appointed and accountable to the parent or the minister responsible for the agency in A Certain period of time. The authority and discretion on matters Relating to both the number of employees, recruitment, and salary system based on the merit system has actually been delegated to each agency director, and this discretion lot in implemented in full. Autonomy policy owned by BLU / Public Service Board, thus more residual. Where policy has not been set by the parent or the government implemented to generate certainty to the decision public service agency director himself. The authority is not yet determined or provincial governments such as medical services or remuneration committees, for example, or SK procurement of health services and cooperation of certain drugs. Although with autonomy or flexibility was still gaining control and steering Andari parent .

From some of the above description, the hospital public service agency Bahteramas area has a lot of limitations in this managerial autonomy. Regarding human resources, many still bound by the provincial government and the majority are employees stationed at the provincial hospital, limitations are also included in the promotion, sanctions and gifts. Regarding financial management, has had autonomy or flexibility as the use of direct revenue, the budget excess can be carried over and so on. Although there is still a bit limited in the procurement of certain goods and services are still as common as parking services institutions. Subject to hold the debt still has to rely on

the provincial government as well as in terms of rates, the cost of room and the price of drugs is still determined provincial governments through regulation of the governor. Last relating to autonomy in policy making residual, already owned but still got control of the provincial government.

This pattern is in line with the results of research Lukman (2013) who conducted research in several public service agencies. According to him, although still limited autonomy process or managerial flexibility committed by agencies can walk slowly. P no initial phase severely restricts the granting of autonomy of finances and personnel. Although that case, gradually the government may loosen the rules relating to the financial system and personnel agencies, and allow it to freely choose how expenditures are spent in a cumulative overall spending. This Allows each agency to finance itself fully with how to Increase cost Reviews their revenue from the fees charged by the agency to its customers. this agency was given the freedom in defining the terms of the revenue they will use to cover the operational expenditure of their breakthrough in the use of income received revenues are not enough to cover the operational expenditure, but Also all cost-charges for services provided. In fact, interestingly, is also Reviews their income used to refund the cost of capital that had been used Previously. It exerted a great influence on the degree of independence of the agency to use every resource efficiently. According Verhoest et al. (2010), Undue freedom or autonomy given to managers as well for setting the rates is important Because It Allows it to adjust the cost structure. In addition, the leadership of the agency can maximize budgets to deliver services to the fullest and demonstrate the performance of new or extras as well as to improve organizational slack.

3. Managerial Accountability *Performance Contract*

The third side is accountability. Accountability, the which is accountable for the management of resources and policy implementation in Achieving the goals set periodically. Implementation of good governance requires transparency, namely the obligation to the disclosure of information that is timely, clear, and can be compared on the state of the financial and operational performance. The most important thing in the implementation of good governance is the accountability in the management of resources, as well as the implementation of policies in achieving the goals set periodically are realized in the form of accountability by the leadership of BLU.

In view of managerial accountability, Pollit et al (2004), to see it from the side of the contract that is built on relationships with providers as well as buyers contained in the principal agent theory. The relationship between the agencies and the local government or the ministry based on the full or semi contractual usually associated with the performance. I de reversed Reviews their contractual mechanism between the principal and the agency is anticipating failure of an agency to fulfill the agreement has been made in advance of the performance to be Achieved. The mechanism of this performance contract gives the principal the right to act in and evaluation on the basis of the contract of employment, Including the possibility of replacing the leadership the agency relationship (contractual) with the

principal agency theory is that both sides, either the principal or the agent is placed on the same legal basis.

Although term contracts and controls used in building the relationship between the principal or the agent, but there is a common ground between Reviews These two concepts, the which gave birth to two important instruments in the control mechanism or a contract between an actor with other actors items, namely the performance and accountability. Performance and accountability are closely interwoven with the control mechanism and control of the agencies, even though the agency is not an entity that is truly independent, or rather semi-autonomous entities, the difference only lies in the mechanism of referrals to the agency or institution of traditional bureaucracy.

In the form of semi-autonomous agency, any action or activity related institutions linearly with performance or the performance of the result. The focus on performance results is of course different from the traditional approach of bureaucratic administration with an emphasis on inputs and procedural correctness. The focus on performance results can be further elaborated in the form of *output* or *outcomes*, not inputs and processes. Similarly, accountability, where there is one party that does accountability alias liability to the other party on the achievement of certain objectives. Accountability of an agency that was formed as a separate unit of the which functions with the parent ministry can also be Formulated in the form of efficiency, effectiveness and responses.

In terms of accountability are good, working relationship between the principals with agencies constructed as set out in the Key Performance Indicators / KPI or *key performance indicators*, KPI is an important feature for the program *agencies*. The main target is made of the approval of the public service set by the principal and the agency each year. In these targets also to r graft annual targets. Target can be changed in the current year, but must be approved by the principal with no clear reason. Target jointly agreed are set forth in the document template that contains the settings in the policies, objectives, basic principles, financial, personnel, and governance. KPI should emphasize on *output*. Even so, the use of KPI as an arrangement between the principal and the agency does not run good as expected. Based on interviews with AR, Director of the General Hospital of bahteramas states:

Each year we signed the contract performance is usually the same as the existing targets in the plan on the regional work units (Work Plan). But he was more a summary of the main targets to be pursued in one year. Among other contents of service efficiency targets. In terms of accountability Also hospitals required to compile the report include the following reports r Realization budget, balance sheet, current Reports L k axles, accompanied Performance Report. The results we report to the governor (Interview, 15April 2016).

S, as a special inspector in the Inspectorate Sulawesi southeast states: To my knowledge there was the performance of the contract, but our investigation is not based on it. I think the contract was too much formality, Because if the targets is not Reached by observations I have no sanctions, if in private companies that may be the source of a major evaluation of the performance assessment. (Interview, 19April 2016) A proposed as chairman of the Ombudsman Southeast Sulawesi :

Related accountability, my observation is often overlooked by the provincial government and hospitals. At the hospital there is a performance contract made between the governor with the leadership of the hospital, but it was only in the document and not proceed with the evaluation of the performance was good. To my knowledge, sanction or reward never applied to hospitals that perform ugly, as our findings several times. Perhaps because of promotion or transfer system leaders there are still using the usual mechanism and this pattern could be because hospital officials also came from civil servants themselves, so that sanctions or rewards to state employees adhere to the rules of ordinary civil servants. Control and accountability impressed as symbolic and only contained in the formulations alone. If the hospital management coming from public servants, I believe the removal of non-performing below target or unsatisfactory easier to implement (Interview, 19 April 2016).

From the picture above Appears that the provincial government is less or not interested in the managerial accountability that is portrayed in the performance report hospital. L Reports on the performance of hospitals as only are composed on the table. The provincial government was not impressed Utilize Also supervisory mechanism well as the supervisory board. Due to the reluctance that there is no pressure to each agency to Achieve Certain targets. Not only that, the environment and auditing systems are weak, especially from the supervisory board aggravating ministerial control over the performance accountability of hospitals. report monitoring agencies and government owned less utilized examiner and a formality. All this Because The performance of existing contracts are not enforced, not Achieving the targets and a bad performance does not give rise to sanctions. The pattern of managerial accountability is indeed typical of countries - developing countries as well as the results of research J Caulfield (2002) in Tanzania. There auditing process is very weak. Monitoring and evaluation should be carried by the parent ministry also does not run as expected. No evaluation of the performance of the agency, but the performance of this agency is more geared to the performance of the agency employee not to the results achieved by the agency . There is little evidence that the performance is good or bad done by each agency will impact every decision will be a resource that will be obtained by agency. Thus, in the system of agencies there , contractual performance is not so meaningful or may be said that it only has an effect that is relatively very small. In fact there control and accountability of the use on the basis of a contract that includes stated targets and performance for the results to be achieved by each agency. However, in reality the practice of control over the performance as outlined in the joint has not been going well.

According to Lukman (2013), associated with accountability activities in the form of a report, if the report has implications for both the governance of the BLU Also participating improve. The creation of hospitals BLU governance is good, then will be able to create internal harmony BLU management operations, where it will have on BLU Ultimately Enhance optimal performance, the which is the goal of establishment of PPK-BLU. BLU Leaders should be concerned and has the responsibility Directly in improving performance. The ability to measure performance is one of the Prerequisites for BLU hospital leadership to Mobilize resources Effectively and

Gave direction on strategic decisions regarding the development of the hospital BLU come in the future.

Control of the Provincial Government

This dimension describes the relationships or mechanisms actor who ACTED as interim controller or an actor who ACTED as the control. P he Government of the region to act as a controller, while the agency's hospital was controlled party. Relationships-control control this reciprocal relationship of mutual need. Principals can control through authority commanded by the rules, procedures, or standards with a hierarchical manner. Also is the form of structural controls, the which the actor with the higher authorities to influence agency decisions through hierarchical lines and accountability.

S, as saying the special tour in Southeast Sulawesi Inspectorate states:

We as Government Officials in the field of supervision do against all SKPD Including Bahteramas Regional General Hospital. We checked out all the planned program in one year. So measured in accordance with R Plan of the Local Government (RKPD) during each year of the budget, nor can perform checks on specific request of the governor Directly good, local people's council representatives and the public. As for our review by forming a team where the team checked Directly in the field or we Examined from an existing report or a copy of which was addressed to us, for example, a copy of the supervisory board of the hospital. The results of the examination of toll we the governor, Legislature and Regional General Hospital own. We depend on the results of the next party. What do the evaluation, sanctions and others (Interview, 19 April 2016). He further stated : Ideally leadership of Regional Public Service Board, it should be based on a particular time frame and no evaluation mechanism against them either in the middle or end of the tenure. Constraints leadership Public Service Board, as civil servants complicates the implementation of this ideal. Situation is different if the leadership of the non-civil servants. Practices in the corporate world of business or give an example that the owners of companies more Easily download replace the director of the company that owns in the Midst of a task for performing below standard with Appropriate compensation Previously approved the contract between the principal and the agent (interview, 19 April 2016)

Moderate AK, Deputy Director 3 District General Hospital Bahteramas states: Each year we were Examined by the inspectorate to use budget revenue and expenditure, besides Also we never checked by an auditing firm representative in Southeast Sulawesi. We are always ready to be questioned Because We do management properly and transparently. In addition we are aware as part of a vital object, the governor Also frequently conduct direct examination or direct visits Suddenly (without notice) and provide direct guidance on improvements to be done. Being in terms of accountability as our institution is Able to account for the budget with the tasks and functions that we have through financial reports and accountability reports (LAKIP) annually. I think the governor watched him pack (Interview, 18 April 2016).

Specifically in terms of control actually has no mechanisms for oversight and control exercised by the provincial government to the agency via the agency or board of supervisors

that function the same as commissioner in the company. The provincial government has the systems and control mechanisms of the agency in the presence of a committee of independent is to Evaluate the performance of its and its financial statements. Although, in the rules the leader of the Public Service Board, responsible to the regional head through the district secretary, but with the supervisory board can connect Directly with the governor's hospital. The number of members of the Supervisory Board each Public Service Board, Regional Work Units or the Public Service Board, Unit 5 Board work supervisor at Public Service Board, established by decision of the head of the upper area of the proposed head of the regional work units. The main task of the supervisory board of the Regional Public Service Board, is to supervise the management of the Public Service Board, the which is conducted by the management officer. The supervisory board Also must report the performance of its duties to the head area on a regular basis at least once a year and at any time if necessary. While the obligation of the supervisory board Public Service Board, which give opinions and suggestions to the regional head of the RBA proposed by management officer, reporting to the head of the region about the performance of Regional Public Service Board. Following the progress of the Public Service Board, and provide opinions and advice to the head area on any matter of importance to the management of the Public Service Board giving advice the management officer in the execution and management of the Public Service Board, the evaluation and assessment of both financial and nonfinancial performance, and providing advice and important records management officer to be Followed by the Public Service Board and monitor the follow-up results of the evaluation and performance assessment. AK, Deputy Director 3 District General Hospital Bahteramas states:

I think the board of trustees effective as an height extension Government in the area of monitoring, evaluating and fostering Regional Public Service Board. Many of the entries are given to us as operators Our mutual cooperation and this cooperation leads us actually produces services for citizens and the local government itself. The board of trustees along Intern Unit Inspection (SPI) as an internal watchdog successfully assist our management in terms of maintaining and oversee wealth Regional Public Service Board accuracy of financial systems and management policies in the application of business practices are good. the presence of both (the supervisory board and SPI) is useful for hospitals (Interview, 18 April 2016) Medium me According to Chief Ombudsman of the Republic of Indonesia Southeast Sulawesi, Mr. A stated:

The results of our recent inspection of the service around the province agencies, Regional General Hospital Bahteramas included in the category of red, the which means the service element as defined public service law No. 25 of 2009 is still far from optimal. Our tests should not happen if they are correct - correct functioning. To my knowledge this council it retired, and there is background as teachers. Sounded just for - for a seat on a successful team Elected governor. Should be filled power experts in accordance with the activities of the Regional Public Service eg health background so the existence of the supervisory board effective in supervising / monitoring hospitals (Interview, 19 April 2016).

According to Per the rules of the interior minister No. 61 of 2007 did to be proposed as supervisory board of the Public Service Board, prospective members must have criteria include own dedication and understand the issues related to the Public Service Board. Competence in the field of management, finance, human resources, and is committed to improve the quality of public services. As well as not been declared bankrupt or has never been a member of the board of directors or board of supervisors Commissioners or convicted of causing an entity bankrupt or people who never commit criminal adverse area.

IV. CONCLUSION

Agencification public services in hospitals Bahteramas not run properly. In addition to problems in aggregating, Autonomy managerial and limited accountability. The main issues arise in health care associated with information asymmetry though not complex but occur and give rise to adverse selection and moral hazard in the General Hospital of Bahteramas. In addition due to the election of a contract based on the behavior of the dominant, is also linked to the willingness and capacity of the agent and the principal there.

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Biochemical Study of the Effects of Some Heavy Metals on Oxidant / Antioxidant Status in Gasoline Station Workers /Basra-Iraq

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Abstract- This work aims to study the effects of exposure to the vapors of motor gasoline (vehicles fuel), on the antioxidants, trace elements and oxidative stress (MDA), on workers of gasoline station. Results showed that increased duration of the work in the filling station lead to significantly increase in levels of Pb, Hg, Cd and MDA, decreased levels of Se, Cu, Zn, Mg, SOD, CAT, GPx, GRx, GST, ALAD, GSH and TAC. Furthermore, MDA showed positive correlation ($P < 0.001$) with Pb, Hg, Cd, negative correlation ($P < 0.001$) with SOD, ($P < 0.01$) with GRx and ALAD, ($p < 0.05$) with Se, Zn, Mg, GSH, CAT and GRx and non-significantly ($P > 0.05$) negative correlation with Cu and of GST. Level of Pb was negatively correlation with GRx, ALAD ($P < 0.01$), while ($p < 0.001$) with TAC, GSH, GST, GPx and SOD, and ($P < 0.05$) with CAT. Also, Hg gives negative correlation ($P < 0.001$) with TAC and SOD, ($P < 0.05$) with CAT, GPx, GRx, ALAD and ($P > 0.05$) with GSH and GST. Moreover, Cd showed negative correlation with levels of TAC and SOD ($p < 0.001$), ($p < 0.05$) with GSH and ALAD, CAT and GPx, and ($P > 0.05$) with GRx, GST in workers, compared to healthy control.

Keywords: Gasoline station workers, Heavy metals, Trace elements, Antioxidants, Oxidative stress.

INTRODUCTION

Gasoline or petrol, is a complex manufactured mixture that does not exist naturally in the environment. It consists mostly of several hundred hydrocarbons obtained by the fractional distillation of petroleum that have boiling points from approximately 40°C to 180°C. The hydrocarbons present in the gasoline mixture include alkanes, or straight chain C5 to C12 compounds also known as paraffins, iso-paraffins, or branched-chain compounds of the same size; alkenes, or olefins, which are unsaturated linear and branched-chain hydrocarbons; and naphthenics, or saturated cyclic hydrocarbons. Also included in the gasoline is aromatic compounds (principally benzene, toluene, ethyl-benzene, and xylene) 1.

Exposure to gasoline may occur by: Breathing vapors at a service station when filling the car's fuel tank, Working at a service station, Using equipment that runs on gasoline, such as snow thrower, Drinking contaminated water and Being close to where gasoline has spilled or leaked into the soil. Certain workers have a greater risk of exposure to gasoline vapors. These include service station attendants, drivers of gasoline tank trucks, workers at bulk loading terminals and marine loading docks, workers who remove and service underground storage tanks and gasoline pipelines, workers who find and clean up gasoline spills and leaks, and refinery workers 2.

Several studies show that inhaling or swallowing large amounts of gasoline can cause death 3-4. Inhalation of $\geq 5,000$ ppm gasoline vapor (20,000 ppm for 5 minutes) has been shown to be lethal. It has been postulated that the cause of death following inhalation or ingestion of high concentrations of gasoline is either central nervous system depression due to asphyxia leading to respiratory failure, or cardiac sensitization to circulating catechol amines leading to a fatal arrhythmia 4.

Damage to cells caused by free radicals, is believed to play a central role in the aging process and in disease progression 5. Antioxidants are our first line of defense against free radical damage, and are critical for maintaining optimum health and well being. The need for antioxidants becomes even more critical with increased exposure to free radicals. Pollution, cigarette smoke, drugs, illness, stress, and even exercise can increase free radical exposure 6. The human antioxidant defence system consists of both enzymatic and non-enzymatic systems.

There are several enzymic systems that catalyze reactions to neutralize free radicals and reactive oxygen species. These enzymes include: Superoxide Dismutases (SOD), Catalases (CAT), Glutathione Peroxidases (GPx), Glutathione Reductases (GRx) and Glutathione Transferases (GST). These form the body's endogenous defence mechanisms to help protect against free radical-induced cell damage (11). These enzymes also require co-factors such as selenium (Se), iron (Fe), copper (Cu), zinc (Zn) and manganese (Mn) for optimum catalytic activity. SOD, CAT, GPx, GRx, GST and some minerals like Se, Mn, Cu and Zn are known as the first line defence antioxidants. While non-enzymatic defense systems are scavenger antioxidants GSH by binding ROS. Glutathione plays a key role in maintaining proper function and preventing oxidative stress in human cells.

The aim of the work is to obtain the effects of pollution (gasoline station workers) and the effect of pollution period on heavy metals (Pb, Cd and Hg), essential trace elements (Se, Zn, Mg and Cu) and biochemical parameters (TAC, SOD, CAT, GRx, GPx, GST, GSH and ALAD). Also study correlation between (Pb, Cd, Hg and MDA) and the levels of essential trace element (Se, Zn, Mg and Cu) and some biochemical parameters (TAC, SOD, CAT, GRx, GPx, GST, GSH and ALAD).

MATERIAL AND METHOD

This study was carried out on peoples who work in gasoline stations from different areas of Basra governorate (Andalus Station, Jubailah Station, Dinar Station and Shabib Station). The study was included 50 workers exposed to different gasoline derivatives for not less than 1 years with an age range between 18 to 56 years (Mean \pm SD = 30.45 \pm 9.31) years and controlled with 50 healthy individuals (non-workers) aged between 18 to 50 years (Mean \pm SD = 30.27 \pm 10.37) to assess the health of gasoline station workers.

About (10 ml) of the blood was drawn from a forearm vein of each fasting worker in gasoline station and control subjects. (5 ml) were added into EDTA containing polypropylene tubes and shaken gently to be used for measurement the concentration of Se, Pb, Hg, Cd and ALAD. The remaining (5 ml) of whole blood transferred to plain tube and allowed to clot on ice, and then centrifuged in (402 Xg) for (15 minutes). The obtained sera immediately use in digestion procedure for determining Mg, Zn, Cu and estimate other parameters included (SOD, CAT, GST, GPx, GRx, MDA and TAC), and others of sera were stored in deep freezing at (-20°C) until using. The concentrations of Se was determined using hydride generation method⁷. The concentrations of Mg, Zn and pb in standards and samples solutions were measured by flame atomic absorption spectrometry (AAS) (GBC 933 Plus)⁸ while the concentrations of Cu, Cd were measured by flameless atomic absorption spectrometry (AA500-PG)⁸⁻⁹. Moreover Hg was measured by Atomic Absorption Spectrometry using cold vapor apparatus AAS (Shimadzu AA-630-12)¹⁰. MDA, TAC, SOD, CAT, GRx, GST, GPx, ALAD and GSH were measured according to the methods of (Burtis & Ashwood, 1999)¹¹, (Koracevic et al., 2001)¹², (Winterboun et al., 1975)¹³, (Mueller et al., 1997)¹⁴, (Delides et al., 1976)¹⁵, (Habig et al., 1974)¹⁶, (Rotruck et al., 1984)¹⁷, (Katsumaro, 1974)¹⁸ and (Burtis & Ashwood, 1999)¹¹ respectively

STATISTICAL ANALYSIS

The data were statistically analyzed according to the t-Student's test using the variance analysis Version 17, SPSS Inc, Chicago). The obtained results were expressed as (mean values and standard deviations) are presented in tables. The level of $p < 0.05$ was considered as statistically significant, and as a highly significant at $p < 0.01$.

RESULTS AND DISCUSSION

Table I shows the comparison of various trace elements and heavy metals of blood in workers with healthy control group. A highly significant ($p < 0.01$) decrease in Se, Zn, Cu and Mg with ($p < 0.05$) was recorded in gasoline station workers, whereas heavy metals (pb, Hg and Cd) were found to be elevated ($p < 0.001$).

The results of different biochemical parameters in gasoline station workers and control group were listed in table (2). The results showed that the level of MDA in serum was increased in workers compared to healthy controls ($p < 0.001$). Also, the results found there is a significant decrease of biochemical parameters with the workers of gasoline station when compared with the control group in: TAC ($P < 0.05$), Cu/Zn-SOD ($P < 0.001$), CAT ($P < 0.001$), GRx ($P < 0.001$), GST ($P < 0.001$), GPx ($P < 0.001$), ALAD ($P < 0.01$) and GSH ($P < 0.001$).

Trace elements play a vital role in human body to perform the functions properly. These elements should be present in the body in appropriate amounts and must be available for reacting with other elements to form critical molecules as well as to participate in various important chemical reactions¹⁹. Then, decreased levels of whole blood Se in gasoline station workers may be due to increased oxidative stress that requires increased utilization of Se as antioxidant by binding with vitamin E and as a cofactor of GPx to scavenge free radical, which acting to detoxify tissue peroxidation²⁰. These observations are in concordance with the findings of other studies²¹.

Also, The present results indicated that the lower levels of serum Zn in gasoline station workers may be due to reduced levels of antioxidant enzyme SOD. The antioxidant properties of zinc have been demonstrated in vitro zinc may exert its antioxidant effect by decreasing the susceptibility of essential -SH groups of proteins to oxidation and by competing with pro-oxidant metals such as iron and copper for biological binding sites²². The lower levels of Cu concentration in serum of gasoline station workers may be due to the interaction of hydroquinone, the one metabolites of benzene, with Cu and Zn components of SOD enzyme and release Cu of the enzyme. Then the reaction between the released Cu and H₂O₂ generates reactive oxygen species and initiate lipid oxidation chain reactions, So Cu deficiency leads to a two fold increase in the peroxide processes²³.

Decreased levels of Mg might be due to its high utilization rate, suggesting that this Mg may be used to protect against oxidative stress. It has been established that oxidative stress is induced by both the increases in free radicals and the disturbance of the free radical scavenging system in worker of a gasoline station. On the other hand, it is possible that reduced level of Mg reflects low intake, excessive sweating or due to interaction Mg with heavy metal²⁴ which resulted in decreasing of antioxidant defense system in gasoline station workers.

The air in the work environment usually contains a number of chemicals like heavy metals, which are inhaled and absorbed by the body, pose a potential risk to workers health. The high levels of Pb, Hg and Cd in workers possible that the results from the inhalation of air contaminated with these metals, eating foods contaminated as a result of some bad habits when workers such as not washing hands contaminated, or enters the body through the skin and not use the protective clothes²⁵. Also, elevated level of Cd come from smoking during occupational exposure as well as in the case of iron, calcium and protein deficiency in the body will increase the absorption of Cd and thus increases the concentration of Cd in the body and cause lipid peroxidation by increasing free radicals ROS and cause many of diseases²⁶.

The decrease of antioxidant refers to its utilization which prevents the cellular damage from free radicals, therefore a decrease in TAC, SOD, CAT, GRx, GST, GPx and GSH was observed. The increases in MDA level in worker of gasoline station may explain that the gasoline undergoes hepatic metabolism, generating hydroquinone, phenol and other compounds with the ability of redox cycling, which might cause excess generation of ROS²⁷. Therefore the lipid peroxidation increased, that means increased of MDA.

Moreover, it has been observed that decreased level of serum GSH in workers could represent an adaptive response to increased oxidative stress and free radicals generation that oxidized thiol group of GSH and decline reduced glutathione level. The inhibition of ALAD activity is one of the most sensitive diagnostic indicators of lead exposure²⁸. In the present study, there was a significant decrease in the whole blood ALAD activity levels (18.164 ± 0.866 Vs. $24.90 \pm 1.205 \mu\text{mol/L}$, $P < 0.01$) in workers. The whole blood ALAD is an enzyme contain thiol groups that is particularly susceptible for oxidation²⁹. Therefore, decreasing in the activity of whole blood ALAD results from the oxidation of the -SH group of ALAD by ROS which is generated in gasoline station workers as a result of exposed workers to numerous heavy metals.

Depending on the period workers in gasoline station, the group was subdivided into two groups as listed in table 3. The results were indicated that Pb, Cd, Hg and MDA were increased significantly with increasing of the period of gasoline station workers, Increase the accumulation of these elements within the body and led increase of ROS and MDA. For other hand, the results indicated that trace element Se, Zn, Cu and Mg decreased significantly with the increase of the period of gasoline station workers. Low levels of Se, Zn, Cu and Mg in workers could represent an adaptive response to increased oxidative stress and free radical generation which results from exposure to gasoline and heavy metals.

Moreover, the results indicated that TAC was decreased significantly with increasing of the period of gasoline station workers. The increase level of heavy metals from pollution as the period of pollution increased might increase ROS and decrease TAC³⁰. In contrast to our study³¹. Also, the results show that an increase of the period of pollution, cause excess generation of ROS, therefore the enzymatic and non-enzymatic antioxidants levels decreased to reduce the oxidative stress that might be produced from the ROS.

The correlation coefficient between determined parameters in workers of gasoline station were conducted and presented in Table 4 and we found a negative and significant correlation between serum MDA level and level of elements (Se, Zn and Mg) in gasoline station workers ($r = -0.320$, -0.331 , -0.287 , $r = -0.351$, $r = -0.310$ and $r = -0.033$ with $P < 0.05$) respectively. Moreover, serum MDA level showed a negative correlation, without significance with Cu level and GST ($r = -0.146$ and $r = -0.121$ $P > 0.05$).

These results possible to explain the elements (Se, Zn, Cu and Mg) that possess antioxidant properties in addition to being an integral part of antioxidant enzymes such as GPx, SOD, so the increased generation of ROS in workers at filling stations lead to increased lipid peroxidation and MDA level, therefore decreased levels of these elements in the workers as a result of their use in protecting cells against the harmful excitement caused by ROS. Moreover, the present results revealed that the serum MDA was positively and highly significantly correlated with Pb, Hg and Cd in workers of gasoline station ($r = 0.723$ with $P < 0.0001$ and $r = 0.455$, $r = 0.536$ with $P < 0.001$) respectively. This positive correlation could be explained through the ability of these element to generate ROS by depletion glutathione, and protein-bound SH groups, resulting in the production of reactive oxygen species. As a consequence, increased lipid peroxidation (increased MDA)³². Moreover, the Cd can compete with metals in protein binding sites³³ leading to the release of Fe+2 and Cu+2 ions, causing increased production of reactive oxygen species and increased of MDA end products of lipid peroxidation process.

The results confirmed that Pb level was negatively and highly significantly correlated with Se, Zn and Cu ($r = -0.511$, $r = -0.616$ and $r = -0.476$, $P < 0.01$) respectively. Furthermore, a negative correlation with no significant, has been shown between pb and Mg level ($r = -0.245$, $P > 0.05$). These results may be due to that Pb can bind to Se and form highly bonded Se-Pb complexes, which have been proposed as a mechanism for Se protective effect in Pb toxicity³⁴. These results were probably due to that Pb can interact with trace metals (especially Zn) at the stage of their intestinal absorption and distribution in tissues as well as with their biological functions. Also found increased Pb concentration causes, a decrease in Cu absorption from the gastrointestinal tract³⁵.

Also in this study it is observed that the correlation between the level of Pb and TAC, SOD were highly significant negative ($r = -0.39$, $r = -0.733$, $p < 0.001$) and significant with CAT ($r = -0.295$, $p < 0.05$). The reason is probably due to an increased level of Pb in the blood causes increase production of free radicals and decrease availability of antioxidant reserves to respond to the resultant damage, that mean decreased level of TAC this agree with similar results³⁶.

The decreased SOD activity in gasoline station workers is probably due to the interaction of pb with Cu molecule. As SOD is a Zn-Cu containing enzyme, hence pb exposure induced Cu deficiency resulted in decreased erythrocyte SOD activity. Zn, which serves as a cofactor for SOD enzymes, is also replaced by Pb, which is another factor behind the inactivation of SOD³⁷. CAT contains heme as the prosthetic group, the biosynthesis of which is inhibited by Pb and resulted in decrease erythrocyte CAT activation³⁸. Furthermore, Pb concentration showed a negative correlation, highly significance with GRx, ALAD, GST, GPx and GSH ($r = -0.392$, $r = -0.587$ with $P < 0.01$ and $r = -0.395$, $r = -0.381$, $r = -0.455$ with $p < 0.001$) respectively. Depressed levels of GRx, GST and GPx were all found to correlate with depressed GSH levels in occupationally-exposed workers³⁹. Another reason GRx has a disulfide bond in its active site, but Pb interferes with the disulfide bond and inhibits the enzyme. This inhibition prevents the reduction of GSSG, making cells more susceptible to oxidative damage⁴⁰. ALAD is a thiol-containing enzyme. Pb binds to the -SH group of this enzyme, making it inactive. Also decreased activity of ALAD result from interaction Pb with enzyme functional groups (Zn). ALAD affinity for lead is 25 times that for zinc, lead and zinc appear to compete for a single metal-binding site⁴¹.

From results of this study noticed that there was a negative and significant correlation between Hg level in blood and level of Se ($r = -0.170$, $P < 0.05$). Also, found Hg level was negatively and highly significantly correlated with another elements in serum Zn, Mg and Cu ($P < 0.001$, with $r = -0.579$, $r = -0.299$ and $r = -0.401$) respectively. Furthermore, Hg level showed a negative and high significant correlation with TAC and SOD ($r = -0.300$ and $r = -0.534$, $P < 0.001$) respectively. Also, a significantly negative correlation was observed between Hg level and activity of CAT, GRx, GPx, ALAD in workers of gasoline station ($r = -0.201$, $r = -0.213$, $r = -0.291$ and $r = -0.342$, $p < 0.05$). Furthermore, there was a negative correlation, but not significant ($r = -0.147$ and $r = -0.188$, $P > 0.05$) between Hg level and levels of GST and GSH, Table 4. Se can achieve a protective effect, either by directly binding to Hg or serving as a cofactor for GPx, and thereby facilitating its ROS scavenging activity⁴².

Hg is known to markedly alter the metabolism and function of some essential trace elements, such as Se, Zn, Cu and Mg by competing for ligands in the biological system. In such cases, a deficiency of a certain essential element may result because of interference with its absorption⁴³. The scavenger role of antioxidant enzymes in removing toxic electrophiles helps the cell to maintain its internal environment to a limited extent at lower concentration of Hg. An increase in the oxidative stress may be due to a decrease in the antioxidant defenses or due to an increase in the processes that produce oxidants⁴⁴. In this study, Hg initiates lipid peroxidation by generating free radicals and thereby interfering with the antioxidant system of the cell. This toxicity may be due to mercury-induced alterations in membrane integrity via the formation of ROS and the perturbation of antioxidant defense mechanisms. Hg also inhibits the activities of free radical quenching enzymes such as CAT, SOD and GPx⁴⁵.

GSH is an important intracellular antioxidant that spontaneously neutralizes several electrophiles and reactive oxygen species, whereas GSH/GSSG ratio maintains the redox status of the cell. In addition, GSH can also be a substrate for GPx, GRx and GST, and is involved in the enzymatic detoxification reactions for ROS. Most of these enzymes become inactive also due to direct binding of the metal to the enzymes' active sites, if the sites contain -SH groups⁴⁶. The decline in levels of erythrocyte ALAD of gasoline station workers might be due to ability heavy metal mercury to oxidize -SH group in this enzyme or from competes Hg with Zn in ALAD, making ALAD inactive.

The results of this study show that there was a negative and highly significant correlation between level of Cd and levels of Se and Cu ($r = -0.368$ and $r = -0.441$, $P < 0.001$). Also found significant negative correlation between Cd and Zn in gasoline station workers ($r = -0.95$, $P < 0.05$). Moreover, there was a negative with no-significant correlation between Cd and Mg ($r = -0.207$, $P > 0.05$), Table 4.

Cd interacts with Se may be induced by heavy metals exhibiting a high affinity for Se. Heavy metal influence bioavailability, uptake, transport, and physiological activity of Se. Se used as an antioxidant to protect cell from ROS generated by Cd and because ability of Cd to interact with Se and caused reduce level of Se and inhibition activity of GPx that containing Se in the active site. The reduced level of Cu and Zn with increased level of Cd may result from Cd susceptibility to displace Cu and Zn⁴⁷, this leads to reduce concentration of these metals. And a lot of studies show the ability Cd to interaction with Zn, Cu, Mg, Se and other metals⁴⁸, thus reduce its concentration in the body. Furthermore, Cd showed a negative and highly significant correlation with TAC and SOD ($P < 0.001$ with $r = -0.55$ and $r = -0.553$). This result may explain that Cd caused oxidative stress by ROS generation from replacing Fe and Cu in numbers of cytoplasmic and membrane proteins, which in turn would release and increase the concentration of unbound Fe and Cu ions. These free ions caused oxidative stress via the Fenton reaction⁴⁹, thus reduce the enzymatic and non-enzymatic antioxidant to protect cell from oxidative stress and that leads to decreased total antioxidant capacity with increased Cd level in blood of workers. In this result, we have demonstrated that Cu, Zn-SOD activity is strongly inhibited by Cd. It has also been demonstrated that Cd can replace Zn to reduce SOD activity⁵⁰. Cd is similar to another heavy metals like Pb and Hg, all have electron-sharing affinities that can result in formation of covalent attachments with thiol groups of proteins, when GSH is depleted by any metal, GSH synthesizing systems start making more GSH from cysteine via the γ -glutamyl cycle, however, if GSH depletion continues because of chronic metal exposure. Several enzymes in antioxidant defense systems may protect this imbalance.

CONCLUSION

Conclusion was drawn from the study that, an increase exposure of petroleum pollutants and heavy metals Pb, Cd, Hg led to an increase in the oxidative stress MDA for station workers. This is due to decrease in the trace elements, enzymatic antioxidant and non-enzymatic levels and an increase in the oxidants especially in the last period of work and decrease levels of trace elements and TAC, SOD, CAT, GPx, GST, GRx, GSH, ALAD with increased period of working. This behaviors might suggest that workers subject to petroleum pollutants must supply with antioxidants dose especially with increasing period of exposure.

RECOMMENDATION

Further study may be taken other parameters such as red blood cell counts, hemoglobin, haematocrit mean corpuscular hemoglobin and platelet counts and also had the determination of kidney function tests (urea, creatinine and uric acid) and liver function enzyme activities (aspartate aminotransferase and alanine aminotransferase) in worker exposure to gasoline.

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Table Title

Table 1. Levels of Essential trace element and Heavy metal in serum and whole blood of gasoline station workers and healthy control.

Table 2. Levels of Enzymatic and Non-Enzymatic Antioxidants in serum and whole blood of gasoline station workers and healthy control.

Table 3. The biochemical parameters of gasoline station workers at different periods of working, and control .

Table 4. Coefficient of correlation (r) between determined parameters in workers of gasoline station (n = 50).

Table 1. of Levels

		Se	Zn	Cu	Mg	pb	Hg	cd	
		(ng/ ml)	(µg/ml)	(µg/ml)	(µg/ml)	(µg/ml)	(ng/ ml)	(µg/ml)	
	Mean ± SD	49.129±2.011	0.637±0.0283	0.2471±0.038	13.96± 1.009	0.704 ± 0.017	29.635±4.28	0.0531 ± 0.0022	
	SE	0.2844	0.0040	0.0053	0.1427	0.0024	0.6053	0.00031	
	Range	66.20 - 30.50	1.19- 0.13	0.4 - 0.14	19.14- 8.59	1.04-0.35	37 -21	0.1 - 0.03	
	95 % C.I	Lower	43.5471	0.5584	0.1416	11.1590	0.6568	17.7547	0.0469
		Upper	54.7121	0.7155	0.3526	16.7609	0.7512	41.5173	0.0591
C n= 50	Mean ± SD	68.679±3.204	0.892±0.0412	0.6333 ±0.044	15.5±1.325	0.2674± 0.013	14.70±2.636	0.0177 ± 0.0011	
P-value		HS	HS	HS	S	HS	HS	HS	

elements in serum and whole blood of gasoline station workers and healthy control.

		MDA	TAC	SOD	CAT	GR _x	GST	GP _x	protein	GSH	ALAD	
		($\mu\text{mol/L}$)	(mmol/L)	($\mu\text{mol/L}$)	(K/ml)	($\mu\text{mol/L}$)	($\mu\text{mol/L}$)	(U/mg protein)	(mg/ml)	($\mu\text{mol/L}$)	($\mu\text{mol ALA/L of erythrocyte}$)	
Gasoline station workers n=50	Mean \pm SD	5.744 \pm 0.132	1.153 \pm 0.035	1.1258 \pm 0.031	0.258 \pm 0.01	14.532 \pm 1.324	3.616 \pm 0.1315	4.747 \pm 0.181	0.521 \pm 0.050	1.054 \pm 0.0416	18.164 \pm 0.866	
	SE	0.0187	0.0050	0.0044	0.0014	0.1872	0.01859	0.0256	0.0071	0.0058	0.1224	
	Range	7.99 – 3.20	1.79 – 0.18	1.52 – 0.36	0.48- 0.20	39.90- 2.89	6.56 – 1.90	7.76 -2.04	2.08 -0.03	1.86 -0.37	16.2-12	
	95 % C.I	Lower	5.3775	1.0540	1.0392	0.2297	10.8566	3.2509	4.2445	0.0379	0.9385	15.7610
		Upper	6.1104	1.2515	1.2124	0.2863	18.2074	3.9810	5.2494	0.0662	1.1695	20.5671
C n=50	Mean \pm SD	2.254 \pm 0.568	2.543 \pm 0.034	1.83 \pm 0.1997	0.7157 \pm 0.073	36.168 \pm 1.934	7.576 \pm 0.6815	9.267 \pm 0.4056	0.831 \pm 0.02	1.85 \pm 0.145	24.9 \pm 1.205	
P-value		HS	S	HS	HS	HS	HS	HS	HS	HS	HS	

C: Health Control, n: Number of subjects, Values represent means \pm SD (Standard deviation), SE: Standard Errors, Range: is the difference between the highest and lowest values in the set, C.L: Confidence limits (Lower and Upper), P- value: N.S (P> 0.05), S (P< 0.05), HS (P< 0.01) indicate the level of significance in comparison with the corresponding control value.

Table 2. Levels of Enzymatic and Non –Enzymatic Antioxidants in serum and whole blood of gasoline station workers and healthy control.

C: Health Control, n: Number of subjects, Values represent means \pm SD (Standard deviation), SE: Standard Errors, Range: is the difference between the highest and lowest values in the set, C.L: Confidence limits (Lower and Upper), P- value: N.S (P> 0.05), S (P< 0.05), HS (P< 0.01) indicate the level of significance in comparison with the corresponding control value.

Table 3. The biochemical parameters of gasoline station workers at different periods of working, and control

Parameter	Control group n=50		(1-5 year) n=32		(> 5 year) n=18	
	mean	SD	mean	SD	mean	SD
Se (ng/ml)	68.679	3.204	50.083	2.31	48.175	1.981
Zn (μ g/ml)	0.892	0.0412	0.646	0.0301	0.628	0.0252
Cu (μ g/ml)	0.6333	0.0443	0.2462	0.0214	0.2480	0.029
Mg (μ g/ml)	15.5	1.325	14.504	0.7401	13.416	0.331
Pb (μ g/ml)	0.2674	0.0132	0.699	0.0192	0.7092	0.01454
Hg (ng/ml)	14.70	2.636	26.68	3.822	32.59	3.311
Cd (μ g/ml)	0.0177	0.0011	0.0356	0.00133	0.0698	0.0031
MDA (μ mol/L)	2.254	0.568	5.46	0.185	6.028	0.1237
TAC (mmol/L)	2.543	0.0342	1.219	0.0448	1.087	0.0305
SOD (U/ml)	1.83	0.1997	1.1607	0.02525	1.091	0.0425
CAT (K/ml)	0.7157	0.0734	0.3172	0.0104	0.1982	0.016
GRx (U/L)	36.168	1.934	14.86	0.9942	14.205	1.8639

GST (U/L)	7.576	0.6815	4.1491	0.1398	3.084	0.0946
GPx (U/mg protein)	9.267	0.4056	6.0105	0.1708	4.485	0.1612
GSH (µmole/L)	1.85	0.1450	1.2907	0.0494	0.8173	0.0314
δ-ALAD (µmol ALA /min/ L of erythrocyte)	24.900	1.205	20.932	0.423	15.396	0.636

Table 4. Coefficient of correlation (r) and P-value between determined parameters in workers of gasoline station (n = 50)

parameter	MDA		Pb		Hg		Cd	
	r=	P-value	r=	P-value	r=	P-value	r=	P-value
Se	-0.320	S	-0.511	HS	-0.170	S	-0.368	HS
Zn	-0.331	S	-0.616	HS	-0.579	HS	-0.441	HS
Cu	-0.146	N.S	-0.476	HS	-0.401	HS	-0.441	HS
Mg	-0.287	S	-0.245	N.S	-0.299	HS	-0.207	N.S
Pb	0.723	HS	---	---	---	---	---	---
Cd	0.536	HS	---	---	---	---	---	---
Hg	0.455	HS	---	---	---	---	---	---
TAC	-0.671	HS	-0.39	HS	-0.300	HS	-0.55	HS
SOD	-0.792	HS	-0.733	HS	-0.534	HS	-0.553	HS
CAT	-0.351	S	-0.295	S	-0.201	S	-0.217	S
GRx	-0.310	S	-0.392	HS	-0.213	S	-0.224	N.S
GST	-0.121	N.S	-0.395	HS	-0.147	N.S	-0.251	N.S
GPx	-0.684	HS	-0.381	HS	-0.291	S	-0.330	S

GSH	-0.033	S	-0.455	HS	-0.188	N.S	-0.200	S
ALAD	-0.675	HS	-0.587	HS	-0.342	S	-0.365	S

P- value: N.S (P> 0.05), S (P< 0.05), HS (P< 0).

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Integrals Involving H-function of Several Complex Variables

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Abstract- In this paper, the author presented certain integrals involving product of the multivariable H-function with exponential function, Gauss’s hypergeometric function and Fox’s function. The results derived here and basic in natural and many include a number of known and new results as particular cases.

Index Terms- Hypergeometric function, Exponential function, H-function, Multivariable H-function.

I. INTRODUCTION

The Gaussian hypergeometric function is of fundamental important in the theory of special functional. The important of this function lies in the first that most all of the commonly used function of applicable mathematics, mathematical physics, engineering and mathematical biology are expressible as its special cases.

The series

$${}_2F_1(a, b; c; z) = \sum_{n=0}^{\infty} \frac{(a)_n (b)_n z^n}{(c)_n n!} \tag{1}$$

where $(a)_n$ is the Pochhammer symbol defined by

$$(a)_n = \begin{cases} a(a+1) \dots (a+n-1) & n \in N \\ 1 & n = 0 \end{cases} \tag{2}$$

is called the Gauss’s hypergeometric series of the famous German mathematician Carl Friedrich Gauss (1777-1855) who in the year 1812 introduced the series. It is represented by the symbol ${}_2F_1(a, b; c; z)$ and is called the Gauss’s hypergeometric function also.

In 1961 Charles Fox [2] introduced a function which is more general than the Meijer’s G-function and this function is well known in the literature of special function as Fox’s H-function or simply the H-function. This function is defined and represented by means of the following Mellin-Barnes type contour integral

$$H[z] = H_{p,q}^{m,n}[z] = H_{p,q}^{m,n} \left[z \begin{matrix} (a_j, \alpha_j)_{1,p} \\ (b_j, \beta_j)_{1,q} \end{matrix} \right] = \frac{1}{2\pi i} \int_L \theta(s) z^s ds \tag{3}$$

where for convenience

$$\theta(s) = \frac{\prod_{j=1}^m \Gamma(b_j - \beta_j s) \prod_{j=1}^n \Gamma(1 - a_j + \alpha_j s)}{\prod_{j=m+1}^q \Gamma(1 - b_j + \beta_j s) \prod_{j=n+1}^p \Gamma(a_j - \alpha_j s)} \tag{4}$$

and Z is a suitable contour of the Mellin-Barnes type which runs from $-i\infty$ to $+i\infty$, separating the poles of $\Gamma(b_j - \beta_j s), j = 1, \dots, m$ from those of $\Gamma(1 - a_j + \alpha_j s), j = 1, \dots, n$. An empty product is interpreted as unity the integers m, n, p, q satisfy the inequalities $0 \leq n \leq p, 0 \leq m \leq q$; the coefficients $\alpha_j = (j = 1, \dots, p), \beta_j = (j = 1, \dots, q)$ are positive real numbers, and the complex parameter $a_j = (j = 1, \dots, p), b_j = (j = 1, \dots, q)$ are so constrained that no poles of the integrand coincide. Owing to the popularity of the special functions, those are defined in (1) and (3) (c.f [4],[3] and [5]), details regarding these are avoided.

The H-function of several complex variables, defined H. M. Srivastava and R. Panda [5], by means of the following Mellian-Barnes type contour integral

$$H[z_1, \dots, z_r] = H_{p,q;p_1,q_1;\dots;p_r,q_r}^{0,n;m_1,n_1;\dots;m_r,n_r} \left[z_1 \begin{matrix} (a_j, \alpha_j^1, \dots, \alpha_j^r)_{1,p} : (c_j^1, \gamma_j^1)_{1,p_1} ; \dots ; (c_j^r, \gamma_j^r)_{1,p_r} \\ (b_j, \beta_j^1, \dots, \beta_j^r)_{1,q} : (d_j^1, \delta_j^1)_{1,q_1} ; \dots ; (d_j^r, \delta_j^r)_{1,q_r} \end{matrix} \right]$$

$$= \frac{1}{(2\pi i)^r} \int_{L_1} \dots \int_{L_r} \phi_1(\xi_1) \dots \phi_r(\xi_r) \psi(\xi_1, \dots, \xi_r) z_1^{\xi_1} \dots z_r^{\xi_r} d\xi_1 \dots d\xi_r \tag{5}$$

where

$$\psi(\xi_1, \dots, \xi_r) = \frac{\prod_{j=1}^n \Gamma(1 - a_j + \sum_{i=1}^r \alpha_j^i \xi_i)}{\prod_{j=m+1}^{p_i} \Gamma(a_j - \sum_{i=1}^r \alpha_j^i \xi_i) \prod_{j=1}^q \Gamma(1 - b_j + \sum_{i=1}^r \beta_j^i \xi_i)}$$

$$\phi_i \xi_i = \frac{\prod_{j=1}^{m_i} \Gamma(a_j^i - \delta_j^i \xi_i) \prod_{j=1}^{n_i} \Gamma(1 - c_j^i + \gamma_j^i \xi_i)}{\prod_{j=m+1}^{q_i} \Gamma(1 - d_j^i + \delta_j^i \xi_i) \prod_{j=n+1}^{p_i} \Gamma(c_j^i - \gamma_j^i \xi_i)} \tag{6}$$

where integers n, p, q, m_i, n_i, p_i and q_i are constrained by the inequalities $0 \leq n \leq p, q \geq 0, 1 \leq m_i \leq q_i$ and $0 \leq n_i \leq p_i; \forall i = 1, \dots, r; z_1, \dots, z_r$ are complex variable. L is a suitable contour of the Mellien-Barnes type running from $-i\infty$ to $+i\infty$, in complex ξ_1 -plane. Details regarding existence conditions and various parametric restrictions of H-function several complex variables.

II. REQUIRED RESULTS

We shall require the following results in the sequel:

The Mellin transform of the H-function follows from the definition (3) in view of the well-known Mellin inversion theorem. We have

$$\int_0^\infty x^{s-1} H_{p,q}^{m,n} \left[ax \left| \begin{matrix} (a_j, \alpha_j)_{1,p} \\ (b_j, \beta_j)_{1,q} \end{matrix} \right. \right] dx = a^{-s} \theta(-s)$$

$$= a^{-s} \frac{\prod_{j=1}^m \Gamma(b_j + \beta_j s) \prod_{j=1}^n \Gamma(1 - a_j - \alpha_j s)}{\prod_{j=m+1}^q \Gamma(1 - b_j - \beta_j s) \prod_{j=n+1}^p \Gamma(a_j + \alpha_j s)} \tag{7}$$

where

$$A = \sum_{j=1}^n \alpha_j - \sum_{j=n+1}^p \alpha_j + \sum_{j=1}^m \beta_j - \sum_{j=m+1}^q \beta_j > 0,$$

$$|\arg a| < \frac{1}{2} A\pi, \delta = \sum_{j=1}^m \beta_j - \sum_{j=1}^n \alpha_j > 0$$

and

$$-\max_{0 \leq j \leq m} [Re(b_j/\beta_j)] < \max_{0 \leq j \leq n} [Re\{(1 - a_j/\alpha_j)\}]$$

Lemma 2.1 From Rainville [4], we have

$$\sum_{n=0}^\infty \sum_{k=0}^\infty A(k, n) = \sum_{n=0}^\infty \sum_{k=0}^n A(k, n - k) \tag{8}$$

III. MAIN RESULTS

In this section we have evaluated certain integrals involving product of the H-function several complex variables with exponential function, Gauss's hypergeometric function and Fox's H-function.

Theorem 1:

$$\int_0^t x^{\rho-1} (t-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; ax^\zeta (t-x)^\eta) \times H_{p,q}^{0, n; m_1, n_1; \dots; m_r, n_r} \left[\begin{matrix} y_1 x^{\mu_1} (t-x)^{\nu_1} \\ \vdots \\ y_r x^{\mu_r} (t-x)^{\nu_r} \end{matrix} \right]$$

$$\begin{aligned}
 & \left. \begin{aligned} & (\alpha_j, \alpha_j^1, \dots, \alpha_j^r)_{1,p}; (c_j^1, \gamma_j^1)_{1,p_1}; \dots; (c_j^r, \gamma_j^r)_{1,p_r} \\ & (b_j, \beta_j^1, \dots, \beta_j^1)_{1,q}; (d_j^1, \delta_j^1)_{1,q_1}; \dots; (d_j^r, \delta_j^r)_{1,q_r} \end{aligned} \right] dx \\
 & = e^{-zt} t^{\rho+\sigma-1} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} t^{(\zeta+\eta-1)k+u} \times H_{p+2,q+1; p_1, q_1, \dots, p_r, q_r}^{0, m+2; m_1, n_1, \dots, m_r, n_r} \left[\begin{matrix} y_1 t^{(\mu_1+v_1)} \\ \vdots \\ y_r t^{(\mu_r+v_r)} \end{matrix} \right] \\
 & \left(1 - \rho - \zeta k; \prod_{i=1}^r \mu_i \right), (1 - \sigma - (\eta - 1)k - u; \prod_{i=1}^r v_i) (\alpha_j, \alpha_j^1, \dots, \alpha_j^r)_{1,p}; \\
 & (b_j, \beta_j^1, \dots, \beta_j^1)_{1,q}, (1 - \rho - \sigma - (\zeta + \eta - 1)k - u; \prod_{i=1}^r (\mu_i + v_i) : \\
 & \quad \left. \begin{aligned} & (c_j^1, \gamma_j^1)_{1,p_1}; \dots; (c_j^r, \gamma_j^r)_{1,p_r} \\ & (d_j^1, \delta_j^1)_{1,q_1}; \dots; (d_j^r, \delta_j^r)_{1,q_r} \end{aligned} \right] \quad (9)
 \end{aligned}$$

where

$$f(k) = \frac{(\alpha)_k (\beta)_k \alpha^k}{(\gamma)_k k!} \quad (10)$$

provided

- (i) $\mu \geq 0, \nu \geq 0$ (not both zero simultaneously)
- (ii) ζ and η are non-negative integers such that $\zeta + \eta \geq 1$
- (iii) $A_i > 0, \beta < 0 : |\arg y| < \frac{1}{2} A_i \pi \quad \forall i \in 1, \dots, r$ where

$$\begin{aligned}
 A_i &= \sum_{j=1}^n \alpha_j - \sum_{j=n+1}^{p_i} \alpha_{ji} + \sum_{j=1}^m \beta_j - \sum_{j=m+1}^{q_i} \beta_{ji} \\
 \beta_i &= \frac{1}{2} (p_i - q_i) + \sum_{j=1}^{q_i} b_{ji} - \sum_{j=1}^{p_i} a_{ji} \\
 & \quad Re(\rho) + \mu \max_{0 \leq j \leq m} [Re(b_j/\beta_j)] > 0 \\
 & \quad (iv) \quad Re(\sigma) + \nu \max_{0 \leq j \leq m} [Re(b_j/\beta_j)] > 0
 \end{aligned}$$

Proof:

$$\begin{aligned}
 & e^{-zt} \int_0^t x^{\rho-1} (t-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; \alpha x^\zeta (t-x)^\eta) H_{p,q; p_1, q_1, \dots, p_r, q_r}^{0, m; m_1, n_1, \dots, m_r, n_r} \\
 & \times \left[\begin{matrix} y_1 x^{\mu_1} (t-x)^{\nu_1} \\ \vdots \\ y_r x^{\mu_r} (t-x)^{\nu_r} \end{matrix} \right] \left. \begin{aligned} & (\alpha_j, \alpha_j^1, \dots, \alpha_j^r)_{1,p}; (c_j^1, \gamma_j^1)_{1,p_1}; \dots; (c_j^r, \gamma_j^r)_{1,p_r} \\ & (b_j, \beta_j^1, \dots, \beta_j^1)_{1,q}; (d_j^1, \delta_j^1)_{1,q_1}; \dots; (d_j^r, \delta_j^r)_{1,q_r} \end{aligned} \right] dx
 \end{aligned}$$

Now we replace $e^{(t-x)z}$ with $\sum_{u=0}^{\infty} \frac{(t-x)^u z^u}{u!}$ and express the hypergeometric function and H-function several complex variables with the help of (1) and (5) respectively, to get

$$e^{-zt} \int_0^t x^{\rho-1} (t-x)^{\sigma-1} \sum_{u=0}^{\infty} \frac{(t-x)^u z^u}{u!} \sum_{k=0}^{\infty} \frac{(\alpha)_k (\beta)_k a^k x^{\zeta k} (t-x)^{\eta k}}{(\gamma)_k k!}$$

$$\times \frac{1}{(2\pi i)^r} \int_{L_1} \dots \int_{L_r} \phi_1(\xi_1) \dots \phi_r(\xi_r) \psi(\xi_1, \dots, \xi_r) y_1^{\xi_1} x^{\mu_1 \xi_1} (t-x)^{v_1 \xi_1}, \dots, y_r^{\xi_r} x^{\mu_r \xi_r}$$

$$(t-x)^{v_r \xi_r} d\xi_1 \dots d\xi_r dx$$

$$= e^{-zt} \int_0^t x^{\rho-1} (t-x)^{\sigma-1} \sum_{u=0}^{\infty} \sum_{k=0}^{\infty} \frac{(\alpha)_k (\beta)_k a^k x^{\eta k} (t-x)^{\eta k+u} z^u}{(\gamma)_k k! u!}$$

$$\times \frac{1}{(2\pi i)^r} \int_{L_1} \dots \int_{L_r} \phi_1(\xi_1) \dots \phi_r(\xi_r) \psi(\xi_1, \dots, \xi_r) y_1^{\xi_1} x^{\mu_1 \xi_1} (t-x)^{v_1 \xi_1}, \dots, y_r^{\xi_r} x^{\mu_r \xi_r}$$

$$(t-x)^{v_r \xi_r} d\xi_1 \dots d\xi_r dx$$

Now by using (8) the above result reduces to

$$= e^{-zt} \int_0^t x^{\rho-1} (t-x)^{\sigma-1} \sum_{u=0}^{\infty} \sum_{k=0}^n \frac{(\alpha)_k (\beta)_k a^k x^{\eta k} (t-x)^{(\eta-1)k+u} z^{u-k}}{(\gamma)_k k! (u-k)!}$$

$$\times \frac{1}{(2\pi i)^r} \int_{L_1} \dots \int_{L_r} \phi_1(\xi_1) \dots \phi_r(\xi_r) \psi(\xi_1, \dots, \xi_r) y_1^{\xi_1} x^{\mu_1 \xi_1} (t-x)^{v_1 \xi_1}, \dots, y_r^{\xi_r} x^{\mu_r \xi_r}$$

$$(t-x)^{v_r \xi_r} d\xi_1 \dots d\xi_r dx$$

Interchanging the order of integration and summation, we obtain

$$= e^{-zt} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} \times \frac{1}{(2\pi i)^r} \int_{L_1} \dots \int_{L_r} \phi_1(\xi_1) \dots \phi_r(\xi_r) \psi(\xi_1, \dots, \xi_r)$$

$$\left\{ \int_0^t x^{\rho+\zeta k+\sum_{i=1}^r \mu_i \xi_i - 1} (t-x)^{\sigma+(\eta-1)k+u+\sum_{i=1}^r v_i \xi_i - 1} dx \right\} y_1^{\xi_1}, \dots, y_r^{\xi_r} d\xi_1 \dots d\xi_r$$

where $f(x)$ is given by (10)

On substituting $x = t\tau$ in the inner x -integral, the above expression reduces to

$$= e^{-zt} t^{\rho+\sigma-1} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} t^{(\zeta+\eta-1)k+u} \times \frac{1}{(2\pi i)^r} \int_{L_1} \dots \int_{L_r} \phi_1(\xi_1) \dots \phi_r(\xi_r)$$

$$\begin{aligned} & \psi(\xi_1, \dots, \xi_r) t^{\sum_{i=1}^r (\mu_i + v_i) \xi_i} \left\{ \int_0^1 s^{\rho + \zeta k + \sum_{i=1}^r \mu_i \xi_i - 1} (1-s)^{\sigma + (\eta-1)k + u + \sum_{i=1}^r v_i \xi_i - 1} ds \right\} \\ & y_1^{\xi_1}, \dots, y_r^{\xi_r} d\xi_1 \dots d\xi_r \\ & = e^{-zt} t^{\rho + \sigma - 1} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} t^{(\zeta + \eta - 1)k + u} \frac{1}{(2\pi i)^r} \int_{L_1} \dots \int_{L_r} \phi_1(\xi_1) \dots \phi_r(\xi_r) \\ & \psi(\xi_1, \dots, \xi_r) \frac{\Gamma(\rho + \zeta k + \sum_{i=1}^r \mu_i \xi_i)}{\Gamma(\rho + \sigma + (\zeta + \eta - 1)k + u + \sum_{i=1}^r (\mu_i + v_i) \xi_i)} \\ & y_1^{\xi_1} t^{(\mu_1 + v_1) \xi_1}, \dots, y_r^{\xi_r} t^{(\mu_r + v_r) \xi_r} d\xi_1 \dots d\xi_r \end{aligned}$$

Finally, interpreting the contour integral by virtue of (5), we obtain

$$\begin{aligned} & = e^{-zt} t^{\rho + \sigma - 1} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} t^{(\zeta + \eta - 1)k + u} \times H_{p+2, q+1; p_1, q_1, \dots, p_r, q_r}^{0, n+2; m_1, n_1, \dots, m_r, n_r} \left[\begin{matrix} y_1 t^{(\mu_1 + v_1)} \\ \vdots \\ y_r t^{(\mu_r + v_r)} \end{matrix} \right] \\ & \left(1 - \rho - \zeta k; \prod_{i=1}^r \mu_i \right), (1 - \sigma - (\eta - 1)k - u; \prod_{i=1}^r v_i) (a_j, \alpha_j^1, \dots, \alpha_j^r)_{1, p}; \\ & (b_j, \beta_j^1, \dots, \beta_j^r)_{1, q}, (1 - \rho - \sigma - (\zeta + \eta - 1)k - u; \prod_{i=1}^r (\mu_i + v_i) : \\ & \left. \begin{matrix} (c_j^1, \gamma_j^1)_{1, p_1}; \dots; (c_j^r, \gamma_j^r)_{1, p_r} \\ (d_j^1, \delta_j^1)_{1, q_1}; \dots; (d_j^r, \delta_j^r)_{1, q_r} \end{matrix} \right] \end{aligned}$$

Theorem 2:

$$\begin{aligned} & \int_0^z x^{\rho-1} (t-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; ax^\zeta (t-x)^\eta) \\ & \times H_{p, q; p_1, q_1, \dots, p_r, q_r}^{0, n; m_1, n_1, \dots, m_r, n_r} \left[\begin{matrix} y_1 x^{-\mu_1} (t-x)^{-v_1} \\ \vdots \\ y_r x^{-\mu_r} (t-x)^{-v_r} \end{matrix} \right] \left(a_j, \alpha_j^1, \dots, \alpha_j^r \right)_{1, p}; \left(c_j^1, \gamma_j^1 \right)_{1, p_1}; \dots; \left(c_j^r, \gamma_j^r \right)_{1, p_r} \\ & \left(b_j, \beta_j^1, \dots, \beta_j^r \right)_{1, q}; \left(d_j^1, \delta_j^1 \right)_{1, q_1}; \dots; \left(d_j^r, \delta_j^r \right)_{1, q_r} \right] dx \end{aligned}$$

$$\begin{aligned}
 &= e^{-zt} t^{\rho+\sigma-1} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} t^{(\zeta+\eta-1)k+u} \times H_{p+1,q+2; p_1, q_1, \dots; p_r, q_r}^{0, n; m_1, n_1, \dots; m_r, n_r} \begin{bmatrix} y_1 t^{-\mu_1 - v_1} \\ \vdots \\ y_r t^{-\mu_r - v_r} \end{bmatrix} \\
 & \quad (\alpha_j, \alpha_j^1, \dots, \alpha_j^r)_{1, p}, (\rho + \sigma + (\zeta + \eta - 1)k - u; \prod_{i=1}^r (\mu_i + v_i) : (c_j^1, \gamma_j^1)_{1, p_1}; \dots; (c_j^r, \gamma_j^r)_{1, p_r}) \\
 & \quad (\rho + \zeta k; \prod_{i=1}^r \mu_i), (\sigma + (\eta - 1)k + u; \prod_{i=1}^r v_i) (b_j, \beta_j^1, \dots, \beta_j^r)_{1, q}; (d_j^1, \delta_j^1)_{1, q_1}; \dots; (d_j^r, \delta_j^r)_{1, q_r} \Big] \\
 & \hspace{15em} (11)
 \end{aligned}$$

provided

$$\begin{aligned}
 &Re(\rho) - \mu \max_{0 \leq j \leq n} [Re\{(a_j - 1)/\alpha_j\}] > 0, \\
 &Re(\sigma) - v \max_{0 \leq j \leq n} [Re\{(a_j - 1)/\alpha_j\}] > 0,
 \end{aligned}$$

along with the sets of conditions (i) to (ii) given with theorem-1 and $f(k)$ is given by (10).

Theorem 3:

$$\int_0^t x^{\rho-1} (t-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; ax^\zeta (t-x)^\eta)$$

$$\times H_{p,q; p_1, q_1, \dots; p_r, q_r}^{0, n; m_1, n_1, \dots; m_r, n_r} \begin{bmatrix} y_1 x^{\mu_1} (t-x)^{-v_1} \\ \vdots \\ y_r x^{\mu_r} (t-x)^{-v_r} \end{bmatrix} \begin{bmatrix} (\alpha_j, \alpha_j^1, \dots, \alpha_j^r)_{1, p}; (c_j^1, \gamma_j^1)_{1, p_1}; \dots; (c_j^r, \gamma_j^r)_{1, p_r} \\ (b_j, \beta_j^1, \dots, \beta_j^r)_{1, q}; (d_j^1, \delta_j^1)_{1, q_1}; \dots; (d_j^r, \delta_j^r)_{1, q_r} \end{bmatrix} dx$$

$$\begin{aligned}
 &= e^{-zt} t^{\rho+\sigma-1} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} t^{(\zeta+\eta-1)k+u} \times H_{p+1,q+2; p_1, q_1, \dots; p_r, q_r}^{0, n+1; m_1, n_1, \dots; m_r, n_r} \begin{bmatrix} y_1 t^{\mu_1 - v_1} \\ \vdots \\ y_r t^{\mu_r - v_r} \end{bmatrix} \\
 & \quad \left(1 - \rho - \zeta k; \prod_{i=1}^r \mu_i\right), (\alpha_j, \alpha_j^1, \dots, \alpha_j^r)_{1, p}; \\
 & \quad \left(\sigma + (\eta - 1)k + u; \prod_{i=1}^r v_i\right), (b_j, \beta_j^1, \dots, \beta_j^r)_{1, q}; (1 - \rho - \sigma - (\zeta + \eta - 1)k - u; \prod_{i=1}^r (\mu_i - v_i), \\
 & \quad (c_j^1, \gamma_j^1)_{1, p_1}; \dots; (c_j^r, \gamma_j^r)_{1, p_r} \\
 & \quad (d_j^1, \delta_j^1)_{1, q_1}; \dots; (d_j^r, \delta_j^r)_{1, q_r} \Big] (12)
 \end{aligned}$$

provided $\mu > 0, v \geq 0$ such that $\mu - v \geq 0$,

$$\begin{aligned}
 &Re(\rho) + \mu \max_{0 \leq j \leq m} [Re\{b_j/\alpha_j\}] > 0, \\
 &Re(\sigma) - v \max_{0 \leq j \leq n} [Re\{(a_j - 1)/\alpha_j\}] > 0,
 \end{aligned}$$

along with the sets of conditions (i) to (iii) given with theorem-1 and $f(k)$ is given by (10).

Theorem 4:

$$\int_0^t x^{\rho-1} (t-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; ax^\zeta (t-x)^\eta)$$

$$\times H_{p,q;p_1,q_1^i;\dots;p_r,q_r}^{0,n;m_1,n_1^i;\dots;m_r,n_r} \left[\begin{matrix} y_1 x^{\mu_1} (t-x)^{-\nu_1} \\ \vdots \\ y_r x^{\mu_r} (t-x)^{-\nu_r} \end{matrix} \middle| \begin{matrix} (a_j, \alpha_j^1, \dots, \alpha_j^r)_{1,p}; (c_j^1, \gamma_j^1)_{1,p_1}; \dots; (c_j^r, \gamma_j^r)_{1,p_r} \\ (b_j, \beta_j^1, \dots, \beta_j^r)_{1,q}; (d_j^1, \delta_j^1)_{1,q_1}; \dots; (d_j^r, \delta_j^r)_{1,q_r} \end{matrix} \right] dx$$

$$= e^{-zt} t^{\rho+\sigma-1} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} t^{(\zeta+\eta-1)k+u} \times H_{p+2,q+1;p_1,q_1^i;\dots;p_r,q_r}^{0,n+1;m_1,n_1^i;\dots;m_r,n_r} \left[\begin{matrix} y_1 t^{\mu_1-\nu_1} \\ \vdots \\ y_r t^{\mu_r-\nu_r} \end{matrix} \right]$$

$$\left(1 - \rho - \zeta k; \prod_{i=1}^r \mu_i \right), (a_j, \alpha_j^1, \dots, \alpha_j^r)_{1,p}; (\rho + \sigma + (\zeta + \eta - 1)k + u; \prod_{i=1}^r (\nu_i - \mu_i),$$

$$\left(\sigma + (\eta - 1)k + u; \prod_{i=1}^r \nu_i \right), (b_j, \beta_j^1, \dots, \beta_j^r)_{1,q};$$

$$\left. \begin{matrix} (c_j^1, \gamma_j^1)_{1,p_1}; \dots; (c_j^r, \gamma_j^r)_{1,p_r} \\ (d_j^1, \delta_j^1)_{1,q_1}; \dots; (d_j^r, \delta_j^r)_{1,q_r} \end{matrix} \right] \quad (13)$$

provided $\mu \geq 0, \nu > 0$ such that $\nu - \mu \geq 0$,
 $Re(\sigma) - \mu \max_{0 \leq j \leq n} [Re\{(a_j - 1)/\alpha_j\}] > 0$,
 $Re(\rho) + \nu \max_{0 \leq j \leq m} [Re\{b_j/\alpha_j\}] > 0$,

along with the sets of conditions (i) to (iii) given with theorem-1 and $f(k)$ is given by (10).

Theorem 5:

$$\int_0^t x^{\rho-1} (t-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; ax^\zeta (t-x)^\eta)$$

$$\times H_{p,q;p_1,q_1^i;\dots;p_r,q_r}^{0,n;m_1,n_1^i;\dots;m_r,n_r} \left[\begin{matrix} y_1 x^{-\mu_1} (t-x)^{\nu_1} \\ \vdots \\ y_r x^{-\mu_r} (t-x)^{\nu_r} \end{matrix} \middle| \begin{matrix} (a_j, \alpha_j^1, \dots, \alpha_j^r)_{1,p}; (c_j^1, \gamma_j^1)_{1,p_1}; \dots; (c_j^r, \gamma_j^r)_{1,p_r} \\ (b_j, \beta_j^1, \dots, \beta_j^r)_{1,q}; (d_j^1, \delta_j^1)_{1,q_1}; \dots; (d_j^r, \delta_j^r)_{1,q_r} \end{matrix} \right] dx$$

$$\begin{aligned}
 &= e^{-zt} t^{\rho+\sigma-1} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} t^{(\zeta+\eta-1)k+u} \times H_{p+2,q+1: m_1, n_1, \dots, m_r, n_r}^{0, m+1: m_1, n_1, \dots, m_r, n_r} \begin{bmatrix} y_1 t^{-\mu_1+v_1} \\ \vdots \\ y_r t^{-\mu_r+v_r} \end{bmatrix} \\
 &\left(1 - \sigma - (\eta - 1)k - u; \prod_{i=1}^r v_i\right), (a_j, \alpha_j^1, \dots, \alpha_j^r)_{1,p}; (\rho + \sigma + (\zeta + \eta - 1)k + u; \prod_{i=1}^r (\mu_i - v_i), \\
 &\quad \left(\rho + \zeta k; \prod_{i=1}^r \mu_i\right), (b_j, \beta_j^1, \dots, \beta_j^r)_{1,q}; \\
 &\left. \begin{matrix} (c_j^1, \gamma_j^1)_{1,p_1}; \dots; (c_j^r, \gamma_j^r)_{1,p_r} \\ (d_j^1, \delta_j^1)_{1,q_1}; \dots; (d_j^r, \delta_j^r)_{1,q_r} \end{matrix} \right] \quad (14)
 \end{aligned}$$

provided $\mu > 0, v \geq 0$ such that $\mu - v \geq 0$
 $Re(\rho) + \mu \max_{0 \leq j \leq m} [Re(b_j/\alpha_j)] > 0,$
 $Re(\sigma) - v \max_{0 \leq j \leq n} [Re\{(a_j - 1)/\alpha_j\}] > 0$

along with the sets of conditions (i) to (iii) given with theorem-1 and $f(k)$ is given by (10).

Theorem 6:

$$\begin{aligned}
 &\int_0^t x^{\rho-1} (t-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; ax^\zeta (t-x)^\eta) \\
 &\times H_{p,q: p_1, q_1, \dots, p_r, q_r}^{0, m: m_1, n_1, \dots, m_r, n_r} \begin{bmatrix} y_1 x^{-\mu_1} (t-x)^{v_1} \\ \vdots \\ y_r x^{-\mu_r} (t-x)^{v_r} \end{bmatrix} \begin{matrix} (a_j, \alpha_j^1, \dots, \alpha_j^r)_{1,p}; (c_j^1, \gamma_j^1)_{1,p_1}; \dots; (c_j^r, \gamma_j^r)_{1,p_r} \\ (b_j, \beta_j^1, \dots, \beta_j^r)_{1,q}; (d_j^1, \delta_j^1)_{1,q_1}; \dots; (d_j^r, \delta_j^r)_{1,q_r} \end{matrix} dx \\
 &= e^{-zt} t^{\rho+\sigma-1} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} t^{(\zeta+\eta-1)k+u} \times H_{p+1,q+2: m_1, n_1, \dots, m_r, n_r}^{0, m+1: m_1, n_1, \dots, m_r, n_r} \begin{bmatrix} y_1 t^{-\mu_1+v_1} \\ \vdots \\ y_r t^{-\mu_r+v_r} \end{bmatrix} \\
 &\quad \left(1 - \sigma - (\eta - 1)k - u; \prod_{i=1}^r v_i\right), (a_j, \alpha_j^1, \dots, \alpha_j^r)_{1,p}; \\
 &\quad \left(\rho + \zeta k; \prod_{i=1}^r \mu_i\right), (b_j, \beta_j^1, \dots, \beta_j^r)_{1,q}; (1 - \rho - \sigma - (\zeta + \eta - 1)k - u; \prod_{i=1}^r (v_i - \mu_i),
 \end{aligned}$$

$$\left[\begin{matrix} (c_j^1, \gamma_j^1)_{1,p_1}; \dots; (c_j^r, \gamma_j^r)_{1,p_r} \\ (d_j^1, \delta_j^1)_{1,q_1}; \dots; (d_j^r, \delta_j^r)_{1,q_r} \end{matrix} \right] \quad (15)$$

provided $\mu \geq 0, \nu > 0$ such that $\nu - \mu \geq 0$,
 $Re(\sigma) - \mu \max_{0 \leq j \leq n} [Re\{(a_j - 1)/\alpha_j\}] > 0$,
 $Re(\rho) + \nu \max_{0 \leq j \leq m} [Re\{b_j/\alpha_j\}] > 0$,

along with the sets of conditions (i) to (iii) given with theorem-1 and $f(k)$ is given by (10).
 The integrals (11) to (15) can be proved on lines similar to those of integral (9)

1. Particular Cases

Putting $r = 2, t = 1$ and $\eta = 0$ in (9)(11)(12)(13)(14) and (15) the following known as well as new results may be realised:

(i) Integral (9) reduces to the results:

$$\int_0^1 x^{\rho-1} (1-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; ax^\zeta (t-x)^\eta) \times H_{p,q;p_1,q_1;p_2,q_2}^{0,n;m_1,n_1;m_2,n_2} \left[\begin{matrix} y_1 x^{\mu_1} (1-x)^{\nu_1} \\ y_2 x^{\mu_2} (1-x)^{\nu_2} \end{matrix} \right] \\ (a_j, \alpha_j^1, \alpha_j^2)_{1,p}; (c_j^1, \gamma_j^1)_{1,p_1}; (c_j^2, \gamma_j^2)_{1,p_2} \\ (b_j, \beta_j^1, \beta_j^2)_{1,q}; (d_j^1, \delta_j^1)_{1,q_1}; (d_j^2, \delta_j^2)_{1,q_2} \Bigg] dx \\ = e^{-z} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} \times H_{p+2,q+1;p_1,q_1;p_2,q_2}^{0,n+2;m_1,n_1;m_2,n_2} \left[\begin{matrix} y_1 \\ y_2 \end{matrix} \right] \\ (1-\rho-\zeta k; \mu_1, \mu_2), (1-\sigma+k-u; \nu_1, \nu_2) (a_j, \alpha_j^1, \alpha_j^2)_{1,p}; (c_j^1, \gamma_j^1)_{1,p_1}; (c_j^2, \gamma_j^2)_{1,p_2} \\ (b_j, \beta_j^1, \beta_j^2)_{1,q}, (1-\rho-\sigma-(\zeta-1)k-u; \mu_1+\nu_1, \mu_2+\nu_2) : (d_j^1, \delta_j^1)_{1,q_1}; (d_j^2, \delta_j^2)_{1,q_2} \Bigg] \quad (16)$$

where,

$$f(x) = \frac{(\alpha)_k (\beta)_k a^k}{(\gamma)_k k!}$$

(ii) Integral (11) reduces to the results:

$$\int_0^1 x^{\rho-1} (1-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; ax^\zeta (t-x)^\eta) \times H_{p,q;p_1,q_1;p_2,q_2}^{0,n;m_1,n_1;m_2,n_2} \left[\begin{matrix} y_1 x^{-\mu_1} (1-x)^{-\nu_1} \\ y_2 x^{-\mu_2} (1-x)^{-\nu_2} \end{matrix} \right] \\ (a_j, \alpha_j^1, \alpha_j^2)_{1,p}; (c_j^1, \gamma_j^1)_{1,p_1}; (c_j^2, \gamma_j^2)_{1,p_2} \\ (b_j, \beta_j^1, \beta_j^2)_{1,q}; (d_j^1, \delta_j^1)_{1,q_1}; (d_j^2, \delta_j^2)_{1,q_2} \Bigg] dx \\ = e^{-z} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} \times H_{p+1,q+2;p_1,q_1;p_2,q_2}^{0,n;m_1,n_1;m_2,n_2} \left[\begin{matrix} y_1 \\ y_2 \end{matrix} \right]$$

$$\left. \begin{aligned} & (\alpha_j, \alpha_j^1, \alpha_j^2)_{1,p}, (\rho + \sigma + (\zeta - 1)k - u; \mu_1 + \nu_1, \mu_2 + \nu_2) : (c_j^1, \gamma_j^1)_{1,p_1}; (c_j^2, \gamma_j^2)_{1,p_2} \\ & (\rho + \zeta k; \mu_1, \mu_2), (\sigma - k + u; \nu_1, \nu_2), (b_j, \beta_j^1, \beta_j^2)_{1,q}, : (d_j^1, \delta_j^1)_{1,q_1}; (d_j^2, \delta_j^2)_{1,q_2} \end{aligned} \right] \quad (17)$$

where,

$$f(x) = \frac{(\alpha)_k (\beta)_k a^k}{(\gamma)_k k!}$$

(iii) Integral (12) reduces to the results:

$$\begin{aligned} & \int_0^1 x^{\rho-1} (1-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; ax^\zeta (t-x)^\eta) \times H_{p,q;p_1,q_1;p_2,q_2}^{0,m;m_1,n_1;m_2,n_2} \left[\begin{matrix} y_1 x^{\mu_1} (1-x)^{-\nu_1} \\ y_2 x^{\mu_2} (1-x)^{-\nu_2} \end{matrix} \right] \\ & \left. \begin{aligned} & (\alpha_j, \alpha_j^1, \alpha_j^2)_{1,p}; (c_j^1, \gamma_j^1)_{1,p_1}; (c_j^2, \gamma_j^2)_{1,p_2} \\ & (b_j, \beta_j^1, \beta_j^2)_{1,q}; (d_j^1, \delta_j^1)_{1,q_1}; (d_j^2, \delta_j^2)_{1,q_2} \end{aligned} \right] \\ & = e^{-z} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} \times H_{p+1,q+2;p_1,q_1;p_2,q_2}^{0,m+1;m_1,n_1;m_2,n_2} \left[\begin{matrix} y_1 \\ y_2 \end{matrix} \right] \\ & \quad (1 - \rho - \zeta k; \mu_1, \mu_2), (\alpha_j, \alpha_j^1, \alpha_j^2)_{1,p}; \\ & \quad (\sigma - k + u; \nu_1, \nu_2), (b_j, \beta_j^1, \beta_j^2)_{1,q}, : (1 - \rho - \sigma - (\zeta - 1)k - u; \mu_1 - \nu_1, \mu_2 - \nu_2), \\ & \quad \left. \begin{aligned} & (c_j^1, \gamma_j^1)_{1,p_1}; (c_j^2, \gamma_j^2)_{1,p_2} \\ & (d_j^1, \delta_j^1)_{1,q_1}; (d_j^2, \delta_j^2)_{1,q_2} \end{aligned} \right] \quad (18)
 \end{aligned}$$

where,

$$f(x) = \frac{(\alpha)_k (\beta)_k a^k}{(\gamma)_k k!}$$

(iv) Integral (13) reduces to the results:

$$\begin{aligned} & \int_0^1 x^{\rho-1} (1-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; ax^\zeta) \times H_{p,q;p_1,q_1;p_2,q_2}^{0,m;m_1,n_1;m_2,n_2} \left[\begin{matrix} y_1 x^{\mu_1} (1-x)^{-\nu_1} \\ y_2 x^{\mu_2} (1-x)^{-\nu_2} \end{matrix} \right] \\ & \left. \begin{aligned} & (\alpha_j, \alpha_j^1, \alpha_j^2)_{1,p}; (c_j^1, \gamma_j^1)_{1,p_1}; (c_j^2, \gamma_j^2)_{1,p_2} \\ & (b_j, \beta_j^1, \beta_j^2)_{1,q}; (d_j^1, \delta_j^1)_{1,q_1}; (d_j^2, \delta_j^2)_{1,q_2} \end{aligned} \right] dx \\ & = e^{-z} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} \times H_{p+2,q+1;p_1,q_1;p_2,q_2}^{0,m+1;m_1,n_1;m_2,n_2} \left[\begin{matrix} y_1 \\ y_2 \end{matrix} \right] \\ & \quad (1 - \rho - \zeta k; \mu_1, \mu_2), (\alpha_j, \alpha_j^1, \alpha_j^2)_{1,p}; (\rho + \sigma + (\zeta - 1)k + u; \nu_1 - \mu_1, \nu_2 - \mu_2), \\ & \quad (\sigma - k + u; \nu_1, \nu_2), (b_j, \beta_j^1, \beta_j^2)_{1,q}, :
 \end{aligned}$$

$$\left[\begin{array}{l} (c_j^1, \gamma_j^1)_{1,p_1}; (c_j^2, \gamma_j^2)_{1,p_2} \\ (d_j^1, \delta_j^1)_{1,q_1}; (d_j^2, \delta_j^2)_{1,q_2} \end{array} \right] \quad (19)$$

where,

$$f(x) = \frac{(\alpha)_k (\beta)_k a^k}{(\gamma)_k k!}$$

(v) Integral (14) reduces to the results:

$$\int_0^1 x^{\rho-1} (1-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; ax^\zeta)$$

$$\times H_{p,q;p_1,q_1;p_2,q_2}^{0,n;m_1,n_1;m_2,n_2} \left[\begin{array}{l} y_1 x^{-\mu_1} (1-x)^{v_1} \\ y_2 x^{-\mu_2} (1-x)^{v_2} \end{array} \middle| \begin{array}{l} (\alpha_j, \alpha_j^1, \alpha_j^2)_{1,p}; (c_j^1, \gamma_j^1)_{1,p_1}; (c_j^2, \gamma_j^2)_{1,p_2} \\ (b_j, \beta_j^1, \beta_j^2)_{1,q}; (d_j^1, \delta_j^1)_{1,q_1}; (d_j^2, \delta_j^2)_{1,q_2} \end{array} \right] dx$$

$$= e^{-z} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} \times H_{p+2,q+1;p_1,q_1;p_2,q_2}^{0,n+1;m_1,n_1;m_2,n_2} \left[\begin{array}{l} y_1 \\ y_2 \end{array} \middle| \begin{array}{l} (1-\sigma+k-u; v_1, v_2), (\alpha_j, \alpha_j^1, \alpha_j^2)_{1,p}; (\rho+\sigma+(\zeta-1)k+u; \mu_1-v_1, \mu_2-v_2), \\ (\rho+\zeta k; \mu_1, \mu_2), (b_j, \beta_j^1, \beta_j^2)_{1,q}; \\ (c_j^1, \gamma_j^1)_{1,p_1}; (c_j^2, \gamma_j^2)_{1,p_2} \\ (d_j^1, \delta_j^1)_{1,q_1}; (d_j^2, \delta_j^2)_{1,q_2} \end{array} \right] \quad (20)$$

where,

$$f(x) = \frac{(\alpha)_k (\beta)_k a^k}{(\gamma)_k k!}$$

(vi) Integral (15) leads to the result:

$$\int_0^1 x^{\rho-1} (1-x)^{\sigma-1} e^{-zx} {}_2F_1(\alpha, \beta; \gamma; ax^\zeta)$$

$$\times H_{p,q;p_1,q_1;p_2,q_2}^{0,n;m_1,n_1;m_2,n_2} \left[\begin{array}{l} y_1 x^{-\mu_1} (1-x)^{v_1} \\ y_2 x^{-\mu_2} (1-x)^{v_2} \end{array} \middle| \begin{array}{l} (\alpha_j, \alpha_j^1, \alpha_j^2)_{1,p}; (c_j^1, \gamma_j^1)_{1,p_1}; (c_j^2, \gamma_j^2)_{1,p_2} \\ (b_j, \beta_j^1, \beta_j^2)_{1,q}; (d_j^1, \delta_j^1)_{1,q_1}; (d_j^2, \delta_j^2)_{1,q_2} \end{array} \right] dx$$

$$= e^{-z} \sum_{u=0}^{\infty} \sum_{k=0}^n f(k) \frac{z^{u-k}}{(u-k)!} \times H_{p+1,q+2;p_1,q_1;p_2,q_2}^{0,n+1;m_1,n_1;m_2,n_2} \left[\begin{array}{l} y_1 \\ y_2 \end{array} \middle| \begin{array}{l} (1-\sigma+k-u; v_1, v_2), (\alpha_j, \alpha_j^1, \alpha_j^2)_{1,p}; \\ (\rho+\zeta k; \mu_1, \mu_2), (b_j, \beta_j^1, \beta_j^2)_{1,q}; (1-\rho-\sigma-(\zeta-1)k-u; v_1-\mu_1, v_2-\mu_2), \end{array} \right]$$

$$\left[\begin{array}{l} (c_j^1, \gamma_j^1)_{1,p_1}; (c_j^2, \gamma_j^2)_{1,p_2} \\ (d_j^1, \delta_j^1)_{1,q_1}; (d_j^2, \delta_j^2)_{1,q_2} \end{array} \right]_{(22)}$$

where,

$$f(x) = \frac{(\alpha)_k (\beta)_k a^k}{(\gamma)_k k!}$$

IV. CONCLUSION

The H-function of several complex variables, presented in this paper, is quite basic in nature. Therefore, on specializing the parameters of this function, we may obtain various other special functions such as Fox's H-function, Meijer's G-function, Wright's generalized Bessel function, Wright's generalized hypergeometric function, Mac-Robert's E-function, generalized hypergeometric function, Bessel function of first kind, modified Bessel function, Whittaker function, exponential function, binomial function etc. as its special cases, and therefore, various unified integral presentations can be obtained as special cases of our results.

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Social Behaviour of Sensory Challenged Children in an Inclusive Education Environment

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Abstract- Social behaviour is the core component of psychosocial development. The social behaviour of Sensory Challenged Children (SCC) can be fostered through awareness, exposure, encouragement, motivation, and practice. An attempt has been made in the present study to foster and enhance social behaviour among SCC attending inclusive schools in Bangalore city. The sample consisted of 100 SCC, in the age group of 10-15 years, they were divided into two groups (Experimental group comprising of 50 SCC and control group comprising of 50 SCC). Purposive sampling method was used to select the samples. Self-structured rating scale was used to assess social behaviour of SCC. The research design for the present study included a pre and post-test with an intervention programme. Data collected was analyzed using both descriptive and inferential statistics. The study revealed that the intervention programme had positive influence on social behaviour of SCC. The result of the present study highlights the need for emphasizing and fostering the interpersonal behaviour, communication behaviour, self-related behaviour and assertive behaviour among sensory challenged children.

Index Terms- Sensory challenged Children (SCC), Inclusive Education Environment (IEE), Social Behaviour (SB).

I. INTRODUCTION

An individual with disabilities such as blindness, deafness, deaf-blind, visually impaired and hearing impaired are referred to as sensory challenged children. Because of their impairment they cannot be deprived of their education as education is a fundamental right of every child and there is no child who 'cannot learn'. It is a powerful instrument for social change which initiates upward trend in the social structure by bridging the gap under the umbrella of 'inclusive education' between sensory challenged and non-disabled children. Loreman, Deppler and Harvey (2006), define inclusion of children with different abilities in all aspects of schooling that other children are able to access and enjoy. School is socializing agencies where in children learn a particular pattern of behaviour and norms that is prevalent in the society. For achieving this goal, inclusive schools has to adapt certain teaching strategies, social and instructional needs and demands of all children in classroom and must prepare sensory challenged children to adapt and learn appropriate social behaviour.

Social behaviour involves more than one individual with the primary function of establishing, maintaining, or changing a

relationship between individuals, or in a group or society (Roger Abrantes, 2012). Children are social beings but very few are socially adaptable from their childhood years. Sensory challenged children struggle to be socially adaptable in an inclusive education environment due to the challenges and limitations to learn and become accustomed to appropriate social behaviour. The limitations and challenges of sensory challenged children leads to limited interpersonal relationship, develop ignorance and also find it difficult to get along with their peers and teachers. Therefore in order to adapt socially appropriate behaviours, sensory challenged children should be allowed to establish and maintain positive relationship through interaction (verbal as well as non-verbal) at school.

Inclusive education environment plays a very important role among sensory challenged children to learn, get along with others, and become competent to their peers academically. Tolan, Gorman-Smith and Henry (2001), also highlighted that teachers and school plays a large role in how students develop academically and behaviourally. It is place where sensory challenged children are their peers are well equipped to manage individual differences consistently. According to Barbour, et.al., (2014) peers have an ability to influence a child's social behaviour as they spend less time at home and more time at school. Therefore, school-based social behaviour is a better way of improving the behaviour of both sensory challenged as well as non-disabled children. This will enable them to develop appropriate behavior within and outside the classroom, make them more diligent and aware of their social rights, rules and regulations. These behaviours can be established and enhanced through interaction, which can be either verbal or non verbal, depending on their capabilities, impairments and limitations. Thus, the social traits like sharing, cooperating, being empathetic, and taking turns while interacting with their peers enhances their social behaviour in an inclusive school (Graydon Gordian, 2012).

Through constant exposure, encouragement, motivation, reinforcement and practice, sensory challenged children can be helped to enhance their social behaviour.

Hence emphasis has been made in the present research to study the social behaviour of sensory challenged children in an inclusive education which in turn enables them to learn, develop and participate without creating a barrier and hindering their development.

II. METHOD

Objective: The study aimed to assess the social behaviour of sensory challenged children in an inclusive education environment.

Methodology: The present study comprised of the pre-test and post-test method with an intervention program. The intervention program was planned to foster positive and appropriate social behaviour among sensory challenged children in an inclusive education environment.

Sampling: Purposive sampling procedure was used to identify the sample. Further inclusive schools catering to the educational needs of sensory challenged children in Bangalore city, were identified for the study. One hundred sensory challenged children aged between 10-15 years were selected for the present study. They were subdivided into experimental group and control group [Experimental group comprising of 50 sensory challenged children and Control group comprising of 50 sensory challenged children]. Intervention programme for experimental group was conducted for 50 sensory challenged children.

Tools Used: A self-structured rating scale was developed and standardized by the investigator was used to assess social behaviour of sensory challenged children. The scale consisted of basic profile and information related to interpersonal behaviours, communication skills, self-related behaviour and assertive behaviour. A five point ratings of Always, Frequently, Sometimes, Rarely and Never was used. The positive items were given a score of 5 -1 and a score of 1-5 was given for negative items.

Method of data collection:

Rapport building: Rapport building is only an element which paves way for data collection in a conducive environment. Hence a personal rapport was established with school authorities with letter of permission so as to receive total co-operation at the time of the study. Further a rapport was also established with sensory challenged children so as to create a comfort zone in order to elicit accurate information for the study.

Pre – test: was conducted to both experimental and control group to assess the existing social behaviour of sensory challenged children.

Intervention programme: was conducted for sensory challenged children. Appropriate activities for intervention programme were designed to suit the needs of sensory

challenged children so as to improve the dimensions of social behaviour. The intervention programme was carried out 3 days a week through the use of different techniques such as puzzles, projects, origami, physical activities etc. Each session of the intervention programme was made interactive for sensory challenged children to participate actively. The subjects were provided with incentives like school supplies in order to encourage and motivate them in activities.

Post test: was conducted to sensory challenged children for both control group and experimental group to assess the social behaviour after the implementation of the intervention programme. Descriptive statistical analysis was used to analyze the data on the objective formulated.

III. RESULTS AND DISCUSSION

Basic profile of the respondents

The respondents for the present study were divided into two groups the experimental group and control group. Both the experimental group and control groups consisted of 76% of visually impaired children and 24% of hearing impaired. Majority of sensory challenged children from both experimental and control group (60%) were males. 100% of sensory challenged children from experimental group and 44% of sensory challenged children from control group were in the age bracket of 14-15 years.

With regard to family profile of the respondents majority of respondents from both experimental (92%) and control group (94%) belong to nuclear family. 56% of sensory challenged children's father had an educational qualification up to high school whereas, majority (42%) of sensory challenged children's fathers from control group had an educational qualification up to 10th standard. Whereas, majority of the respondent's mothers' from both experimental (48%) and control group (58%) had an educational qualification up to high school. With regard parents employment 92% of fathers from both experimental group and control group were employed whereas equal percentage of mothers (70%) from both experimental group and control group were employed. In the area of family income majority of respondents from experimental group (48%) and control group (70%) had a monthly income of Rs 5000 to Rs 10,000.

Social behaviour of sensory challenged children in an inclusive education environment of experimental group and control group

Dimensions of Social Behaviour	Experimental Group					Control Group				
	Pre-test		Post-test		Significance of t value	Pre-test		Post-test		Significance of t value
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
Interpersonal Behaviour	20.86	6.75	46.54	3.45	23.9552**	22.00	6.91	19.20	7.51	1.9401 ^{NS}
Communicative Skills	24.20	4.91	36.50	2.71	15.5087**	24.88	5.37	22.94	6.29	1.6586 ^{NS}
Self related Behaviour	25.54	2.92	24.06	1.55	3.1657**	29.16	4.02	28.76	3.90	0.5050 ^{NS}
Assertive Behaviour	20.06	6.36	40.36	2.43	21.0843**	23.88	3.86	20.10	6.42	3.5683**

** Significant at 1% level, NS - Not significant

Personality development of the child is influenced by his/her social behaviour. The data of the above table depicts the mean score of both pre and post- test. The data reveals at the time of post -test in the dimension of *interpersonal behaviour* there is an enhancement and improvement among sensory challenged children which is found to be strongly significant with the 't' value being 23.9552. The findings of the present study is also supported by the study carried out by Geisthardt & Munsch(1996), who highlighted that learners with disabilities report greater levels of loneliness, isolation and interpersonal conflict at school. They rely less on peers for social support when dealing with an academic or interpersonal problem than learners without disabilities.

In the aspect of *communication skills* there is an improvement among sensory challenged children. This could be attributed to the fact that sensory challenged children are more associated, encouraged and refined to communicate his or her needs effectively. The intervention programme designed in the present study through exposure, awareness and co-operation had positive patterns of behaviour which in turn, has influenced their communicative skills. The findings of the study is in concordance with the study carried out by Stockely (1994), highlighting that often social communication skills are delayed and immature in some visually impaired adolescents and young adults, and whilst behaviour within the peer group may be apparently normal, social interactions with adults and with unfamiliar peers may be inhibited or inappropriate. But there appears to be increasing recognition that some children with a visual impairment develop slower than others and may follow a different sequence of development, with usual behaviours being learnt in a different order.

In the dimension of *Self-related behavior* the data reveals that there is a decline in the post-test scores of sensory challenged children with the 't' value being strongly significant (3.1657). This signifies that sensory challenged children understood the importance of developing appropriate interpersonal behaviour, which made sensory challenged children not to exhibit their self-related behaviour so as to maintain a cordial relationship with their peers.

Assertive behavior is a behavior in which a child stands up for his/her rights though being sensory challenged in such a way that the rights too are not violated. It commands respect for that child's behavior. Assertive behavior is an honest, direct and appropriate expression of one's feelings, beliefs, and opinions. The data reveals that that there is an enhancement and improvement among sensory challenged children which is found to be strongly significant with the 't' value being 21.0843. According to Child Magazine (2004, 2010) assertiveness improves self -confidence as well as ability to make choices. It will also help to withstand peer pressure which in turn will help children to develop the concept of compromise and to take others feeling's into account.

Thus, it can be inferred from the present study that with the influence of intervention programme and providing exposure to

interact with their peers, proved to be very beneficial to sensory challenged children in shaping their behaviour.

IV. CONCLUSION

Social behaviour is a very important aspect which contributes to the development among sensory challenged children in an inclusive education environment. It provides a foundation for sensory challenged children to understand the practical implication of social behaviour. It also enables them to behave in a socially appropriate behaviour which influences their future life in the society. Therefore the social behaviour of sensory challenged children in an inclusive education environment should be enhanced through constant interaction with their peers, encouragement, reinforcement and practices. Results in the present study also indicated that intervention programme has influenced the dimensions of social behaviour. Thus it can be inferred that from the time of enrolment, sensory challenged children should be provided with an intervention to enhance their social behaviour.

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Detection of Quarantine Pathogen *Pectobacterium caratovorum* in Potato Seed Lots Imported to Sri Lanka

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Abstract- The majority of countries today follow stringent quarantine regulations to prevent the entry of pests into their countries especially with the seed stocks. *Pectobacterium caratovorum* is one of the significant bacterial pathogens of various horticultural crops around the world and a quarantine pathogen of seed potato in Sri Lanka. This research focused on detection of quarantine pathogens associated with imported seed potato consignments. Seed potato samples were collected from the intercepted consignments at the entry ports. Microbial DNA extraction protocol was optimized. Extracted DNA was sequenced using Ion Torrent Next Generation Sequencing technology by amplifying 400 bp V1-V2 region of 16S rRNA gene for the detection of bacterial pathogens. The recovered sequences were aligned with 16s rDNA in NCBI, Greengenes and SILVA databases for the detection of bacteria associated with the samples. Further, sub species level of the quarantine pathogen was identified by PCR amplification. The optimized DNA extraction protocol enabled faster isolation of microbial DNA from seed potato tubers and DNA was sufficient for PCR amplification and Next Generation Sequencing (NGS) analysis. Out of twenty four samples analyzed by NGS, the quarantine pathogen *Pectobacterium caratovorum* was detected only in one sample. In addition, subspecies level was confirmed as *Pectobacterium caratovorum* subsp. *caratovorum*. As this pathogen is the causal organism of soft rot and black leg diseases of potato, detection of the pathogen in asymptomatic potato tubers indicate the risk of latent infections associated with the imported seed lots.

Index Terms-Next Generation Sequencing, Quarantine, *Pectobacterium caratovorum*, Seed potato

I. INTRODUCTION

Diseases can drastically reduce the yield and quality of potato tubers therefore, relative freedom from pathogenic microbes is of major importance in potato production. However, potato plant and its tubers are vulnerable to many diseases and multiple pathogenic microbial species present within infested tubers [12].

Detection of microbial pathogens is one of the most critical quarantine operations as plant pathogens belong to very diverse groups. Certain pathogens cause visible symptoms distinct enough for quick disease identification. However, in many situations, visual appearance is not clear enough for exact diagnosis of the problem [5]. As a result, identification of the actual pathogen becomes a challenging task and a highly time consuming process. Therefore, the tools used for diagnosis purposes must be sensitive enough for accurate detection of the presence of pathogen nucleic acids even extremely in low amounts. In addition, it should provide sufficient specific information to identify the genetic variants of whatever pathogens available [1].

Generally, hybridization and amplification based molecular markers are powerful, reliable and offer advantages over morphological and biochemical alternatives of microbial detection [3]. PCR assay is superior to other techniques in its simplicity, rapidity and sensitivity in detection of a target DNA fragment [12]. However, it has been identified that the latent infections of many quarantine plant diseases had escaped from detection by routine diagnostic assays such as PCR or nucleic acid hybridization which are only suited for the identification of specific and well characterized pathogens [1].

Soft Rot Enterobacteriaceae (SRE) are recognized among the top 10 most important bacterial pathogens in agriculture. Of all *Pectobacterium* species infecting potato *Pectobacterium caratovorum* subsp. *caratovorum* has the widest host range worldwide [2]. *Pectobacterium caratovorum* subsp. *caratovorum* is polyphagous and therefore identification of these subspecies is important for potato growers in making adequate crop rotation choices to avoid field contamination problem. It is a serious pathogen of field plants causing soft rot and black leg diseases. In addition, *Pectobacterium caratovorum* subsp. *caratovorum* was identified as the responsible agent of stem rot and vascular wilt symptoms of hydroponically grown plants [6]. Tubers with latent infections will not develop the disease under suitable environmental conditions but anaerobic conditions in the field promote soft rot and black leg diseases in the crop [4]. Therefore, it is importantly essential for the farmers to use the pathogen free seed stocks for cultivation to prevent disease invasions. As *Pectobacterium caratovorum* subsp. *caratovorum* exists within the tuberosity lenticels or vascular system of potato tubers, the disease control methods under field conditions are unsuccessful [2]. Therefore, laboratory tests using reliable and sensitive molecular techniques for assessing seed tuber contamination incidence is important [9].

Next generation sequencing technology can potentially provide an ideal platform for identifying almost all known and unknown microbes present in any particular host [1]. The present study focused on application of 16s rDNA based approaches for microbial pest detection of seed potato imported to Sri Lanka using Ion Torrent Next Generation Sequencing (NGS). These studies lead the benefit of NGS for a large scale study of microbial populations by exploring the whole nucleotide sequence content of a sample.

II. MATERIALS & METHODS

A. Plant Material Collection

The seed potato tubers randomly sampled from the imported consignments at the entry ports of Sri Lanka were collected from the pathology division of National Plant Quarantine Service- Katunayake, Sri Lanka. The seed potato tubers within the consignments were not found to be infected with any quarantine important disease by visual observation. The collected seed tubers were separately stored in a cold room under 4 °C at the National Plant Quarantine Service.

B. Microbial DNA Extraction from the Imported Potatoes

The seed potato tubers were crushed and the extract was directly used for PCR amplification for pathogen detection. In parallel, the seed tuber parts especially from the stolon end and the eyes of potato tubers were ground manually and added into 15 ml of LB media. It was shaken at 120 rpm for 12 hrs. and centrifuged at 12400 g for 10 min to obtain the microbial pellet. The pellet was washed twice with a wash buffer (50 mM TrisHCl & 5 mM EDTA of pH 8.0) under 12400 g for 10 min and lysed with a lysis buffer (100 mM Tris HCl & 100 mM EDTA of pH 8.0, 1.5 M NaCl) with vortex for 5 min. The homogenized mixture was centrifuged at 12400 g for 15 min. The resulting supernatants were then centrifuged under 12400 g for 15 min with 75 µl of NaOAC and 1:1 ice-cold isopropanol added along the wall of the tube. The pellet was washed with 70% ethanol and re-centrifuged at 12400 g for 10 min. Ethanol was completely removed by air drying. The DNA was re-suspended in de-ionized water.

C. Ion Torrent Next Generation Sequencing and Analysis

The Ion PGM HiQ Sequencing Kit which includes reagents and materials for sequencing upto 400bp inserts was used together with Ion PGM HiQ template preparation kit compatible with Ion PGM HiQ Sequencing Kit. The Ion 318 Chip v2 was used on the Ion PGM System. DNA sequencing was performed on an Ion Torrent sequencing machine at Credence Genomics Pvt. Ltd. Colombo, Sri Lanka. Twenty four DNA samples were sequenced for bacterial identification. Hyper variable region of bacterial 16S rRNA gene was amplified using oligonucleotides, prepared into single-ended libraries of 400 bp size followed by Next Generation Sequencing on Ion Torrent PGM. Sequences of twenty four meta-genomic samples were recovered from ion torrent personal genome machine and aligned with the 16s rDNA of representative fragments. The DNA sequences were mapped to the NCBI-nt (26:10:2015), WGS (06:10:2014), Greengenes, Silva databases using QIIME version 1.9.0 and Credence Infectious Panel Pipeline 1.1.0.

D. PCR Amplification for Detection of Pathogen at the Subspecies Level

Based on the results obtained by NGS analysis, genomic DNA extracted from seed potato tubers were further screened with the species specific PCR to identify the quarantine pathogens upto sub species levels. *Pectobacterium caratovorum* subsp. *caratovorum* specific 312bp DNA fragment was amplified for the confirmation of the quarantine pathogen upto sub species level. PCR amplification was carried out using 1 µl of DNA template in a 20 µl reaction containing 1 µl of 10 µM primers (Ec001 F: 5'-CGGTTACGATCAGCGTCTCG-3' and Ec001R 5'- GATGTGCCGATGCCGATAC-3') and GoTaq Hot Start Master Mix (Promega) following the manufacturer's protocol. The following cycling conditions were used: initial denaturation of 95 °C for 5 min, 30 cycles of 94 °C for 30 sec, 62°C for 30 sec, 72 °C for 30 sec. An additional final extension for 10 min at 72 °C was then performed.

III. RESULTS

A. Use of Crushed Potato Extract and DNA from Potato Tubers for Analysis

The application of PCR in seed tuber analysis is restrained by the time consuming extraction of microbial DNA from potato tubers. However, it has been identified that direct use of crushed potato extract is ineffective in PCR amplification. The DNA isolation method optimized in this study yielded microbial DNA from the seed potato tubers in satisfactory amounts (**Figure 1**). The quality and quantity of DNA obtained by using this simple DNA extraction protocol was indicated by successful PCR amplification and NGS. The DNA obtained by using the optimized extraction protocol could be free of co-extracted PCR inhibitors which resulted the successful 16s rRNA amplification (**Figure2**).

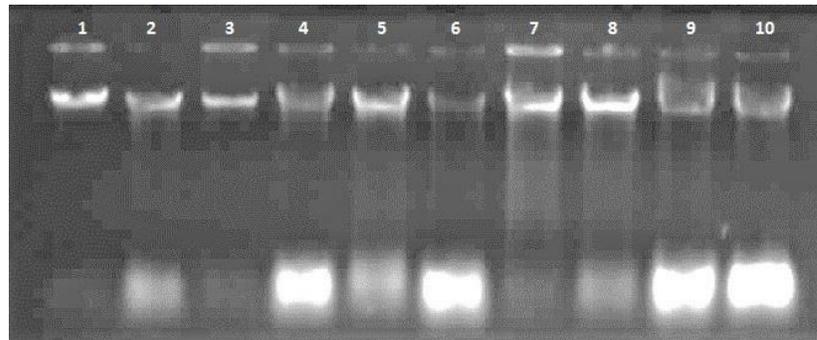


Figure 1: DNA extracted from seed potato samples. Lane 1-10: DNA samples

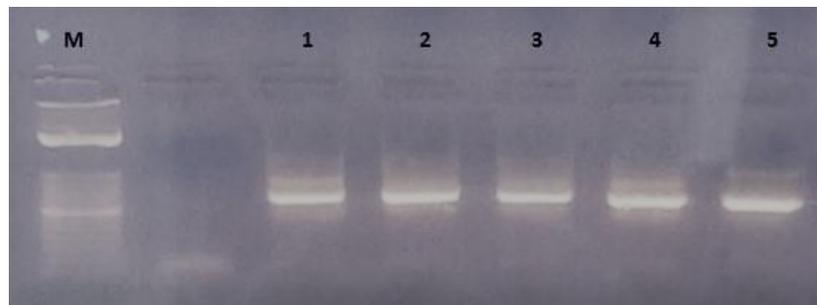


Figure 2: Amplification of V1-V2 region of 16s rDNA from Microbial DNA extracted from seed potato M: 100bp Marker; 1,2,3,4: DNA samples; P: Positive control

B. NGS Analysis of Bacterial Populations

Ion Torrent Next Generation Sequencing analysis generated number of microbial endophytes colonized within potato tissues. Average 16-80 bacterial species per sample were detected by NGS which revealed a greater prevalence and diversity of microbes in the analysed seed potato. The sequence analysis resulted the presence of quarantine pathogens *Pectobacterium caratovorum* only in one analysed sample. Together with the quarantine pathogen, this sample contained high proportions of microbes from the species *Staphylococcus xylosus* and *Staphylococcus succinus*. The other detected species *Raoulterra planticola*, *Leuconostoc mesenteroides*, *Lactococcus lactis*, *Citrobacter freundii* were also identified as abundant genera present in the seed potato sample. Furthermore, the quarantine pathogen *Pectobacterium caratovorum* was detected under 0.2% low abundance level. However, the detection of low abundance microbes enabled identification of asymptomatic latent infections within the sample (**Table 1**). Maximum likelihood phylogenetic trees were inferred for the 16S rDNA fragments (Data not shown).

Five common bacterial phyla *Actinobacteria*, *Bacteroidetes*, *Firmicutes*, *Proteobacteria* and *Spirochetales* were detected in all analysed 24 samples. Among them, the abundance of bacteria belonging to the phyla *Proteobacteria* was exceeding 50% which included *alpha*, *beta*, *gamma* and *delta* *proteobacteria* species in high abundance.

C. PCR analysis of the DNA with the primers specific for *Pectobacterium caratovorum* subsp. *caratovorum*

Pectobacterium caratovorum identified by NGS was confirmed for the detection of subspecies level as *Pectobacterium caratovorum* subsp. *caratovorum* using the specific primers. The amplification was reproducible and revealed one major product of 312 bp in length. No amplification of target sequence was observed in negative samples (**Figure 3**).

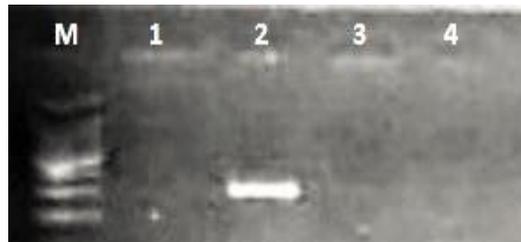


Figure 3: Amplification of seed potato DNA with *Pectobacterium carotovorum* subsp. *carotovorum* specific primers M: 100bp Marker; Lane 1-4: Seed potato samples

Table 1 : Identified bacteria in one sample of imported seed potato by Next Generation Sequencing Analysis.

Species	Relative Abundance
Staphylococcus xylosus	79.61 %
Staphylococcus succinus	12.55 %
Raoultella planticola	2.16 %
Leuconostoc mesenteroides	1.57 %
Lactococcus lactis	1.18 %
Citrobacter freundii	0.59 %
Brenneria rubrifaciens	0.2 %
Enterobacter kobei	0.2 %
Enterobacter sp. 638	0.2 %

Species	Relative Abundance
Enterococcus avium	0.2 %
Ewingella americana	0.2 %
Hafnia psychrotolerans	0.2 %
Pantoea anthophila	0.2 %
Pectobacterium carotovorum	0.2 %
Staphylococcus gallinarum	0.2 %
Staphylococcus haemolyticus	0.2 %
Yersinia kristensenii	0.2 %
Yersinia mollaretii	0.2 %

DISCUSSION

This study revealed significant associations of microbes in the imported seed potato consignments to Sri Lanka. The attempts initially taken to use the crushed potato extract for direct PCR amplification was ineffective. The decreased sensitivity could be attributed to PCR interfering compounds present within the potato extract and the low abundance of bacteria in the sample. In latent infection, the bacteria may be found in all parts of tissues however, their density is usually low. When the pathogen populations are low, they need to be enriched above detection level. Most methods used for identification of soft rot and back leg causing bacteria require isolation of viable cells from samples and purification of bacteria prior to analysis [2]. In the present study, initial incubation of crushed potato with liquid LB acts as a common enrichment medium for bacteria available within the potato tissues to increase bacterial cell number. This enrichment medium creates conditions that stimulate growth and multiplication of bacteria possibly facilitating the detection of all available pathogens within the sample including the endophytes. It is similarly important as microbial endophytes that colonize potato tissue are widespread and some of the non-pathogenic endophytes could also turn into phytopathogens that are able to induce infection symptoms [11]. Therefore, developed protocol allows multiplication of available pathogens which possibly enables isolation of most of the bacteria in the samples.

In potato tubers, microbes are more commonly present in the stolon end and frequently found in the lenticels and suberized wounds [2]. Therefore, tissues especially from the stolon end was taken for analysis. In many protocols an antioxidant such as DIECA (diethyldithiocarbamic acid) is used in very low concentrations (0.05%) during enrichment to protect bacteria cells from oxidative stress due to the release of the plant compounds [2]. However, any chemical was not applied in this extraction protocol to remove the

phenolic contaminants. The DNA extraction protocol developed in this study was found to be very much effective to obtain quality DNA in sufficient amounts. The extracted DNA was sensitive enough for both PCR and NGS analysis.

Molecular detection studies for bacteria are commonly performed by analyzing the prokaryotic 16S ribosomal RNA gene (16S rRNA) which is approximately 1,500 bp long and it contains nine variable regions interspersed between conserved regions. The variable regions of 16S rRNA are frequently used in phylogenetic classifications such as genus or species levels in diverse microbial populations [10]. Ion Torrent next generation sequencing of 400bp fragment of V1-V2 region of bacterial 16S rDNA was quite reproducible. As expected, greater numbers of species-level classifications were obtained where average 20 - 80 species per sample were detected. In addition, NGS technology based on 16S rRNA analysis showed higher sensitivity to detect low prevalence bacteria within the samples. The relative abundance level of the identified quarantine pathogen *Pectobacterium caratovorum* was 0.2%. However, Ion Torrent NGS analysis failed to detect the pathogen upto subspecies levels. NGS sequencing experiments produce millions to billions of short sequence reads at a high speed [7] but unable to amplify more than two or three fragments of the nine variable regions of 16s rRNA gene which may affect the detection of sub species levels.

NGS has currently gained increasing attention in the field of plant pathology. However, analysis of microbes using this technology remains computationally challenging and both time and resource intensive, making the approach prohibitive in the routine plant pathogen diagnostic assays [8]. Ion Semiconductor next-generation sequencing (Ion Torrent) offers rapid chemistries that make it amenable for adaptation as a plant pathogen diagnostic tool, so it was selected as the sequencing platform in this study. In addition, the 16S rDNA sequence mapped with four different databases; NCBI-nt (26:10:2015), WGS (06:10:2014), Greengenes and Silva with 98-100% similarity verifying the reliability of data analysis and providing the level of accuracy for quarantine diagnosis.

CONCLUSIONS

The risk of latent infections of quarantine pathogen *Pectobacterium caratovorum* subsp. *caratovorum* was identified in imported seed potato consignments. The developed simple DNA extraction method and amplification based detection by using NGS can be successfully employed in analyzing latent infections of seed potato tubers in plant quarantine diagnosis activities.

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Centralized Spam Over Internet Telephony (SPIT) Control on VoIP

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Abstract- Voice over IP is becoming increasingly a valid alternative to traditional telephony networks because of its low cost, higher flexibility and easy integration. On the other hand Spam over IP Telephony (SPIT) is increasing because of the same very benefits. There have been numerous proposals in regard to prevention of SPIT however it is very difficult to place a call under the category of SPAM or not on the basis of computations since it totally relies on the uneasiness caused to the end user. Black Listing and Grey Listing are well known methods in SPIT prevention which is based on analyzing call detail records. This paper proposes a method of controlling the SPAM centrally through a server based on Grey Listing and Black Listing recording SPAM flag based on the digits entered by end user on the termination or during the call.

I. INTRODUCTION

Increasing popularity of VoIP has made it a valid alternative for traditional telephone setups for corporate environments. The ease of setup, flexibility of usage and lesser cost has made it very popular among multinational setups. At the same time the same very features are misused by companies for their own benefits. Besides all other security threats Spam Over Internet Telephony (SPIT) is one of the popular method used for advertising business through phone using VoIP. The attackers use the low cost feature of VoIP to exploit this security threat. SPIT in other words is similar to spam emails on internet. In email spamming a victim receives dozens of irrelevant emails used for marketing or other purposes. If SPIT attacks are not controlled and VoIP keeps on expanding as valid alternative it may result in continuous ringing of phones in a corporate environment similar to email spamming i.e. email arriving every minute or so.

II. TYPES OF SPIT ATTACKS

Telemarketing

It is one of the most common attacks that occur on VoIP environments. Surveys [1] suggest that an average American receives 2 to 3 calls minimum each day targeted for telemarketing. Telemarketers target victims of a particular domain or business for acquiring their services or products. VoIP has enabled many companies to open off shore offices to run such telemarketing campaigns at very low cost.

Call Bots

Call bots are somewhat similar to telemarketers except the fact that calls are generated by computers or pre recorded

machines and they utilize a pre defined list of numbers and message is typically the same throughout.

III. EXISTING COUNTERMEASURES FOR SPIT

Different techniques and algorithms have been designed to control SPIT attacks [2][3][4] however each has its pros and cons. Below is a brief overview of the existing techniques.

Blacklist and Whitelist Filtering: This method compares the identity of a caller with a pre-defined list of identities, if the number is in the whitelist the call is allowed otherwise the call is dropped. The numbers in the black list are known as malicious callers and number in white list are known as trusted callers.

Greylisting: If a user calls for the first time his number is put into a temporary list called grey list and immediately after that caller is said to call again if he does, it is placed in the white list otherwise it is placed in black list.

SIPFW: SIP Firewall is implemented in this method. It uses a fingerprinting model. Active Fingerprinting creates SIP messages manually to obtain specific answers. Passive Fingerprinting does not make any changes to existing message.

Content Filtering: This method was originally designed for spam email filtering. In VoIP it requires speech recognition which involves significant computations.

User Reputation: This method is applied by the VoIP Service Provider (VSP). Each VSP maintains Call Detail Records (CDR) data of its users and analyze them basing on the SPAM index. If the caller crosses the index the call is blocked.

Pattern Anomaly Detection: This method uses probabilistic model of call arrival and algorithm defines if the incoming call is SPIT or not. It is based on statistical data and deterministic models.

Turing Test: This method asks caller a question if the answer is correct the call is allowed. This method is not very successful in case of telemarketers however it works fine with call bots.

Call Rate: This method checks the calling frequency of a caller if it's more than certain limit the call is blocked otherwise it goes through.

Problems with existing methods

Since all the existing methods require significant computations during the checking process and an authentic caller may not like such delay to pass through the security check. Similarly sometimes computations may result in error since spam in case of VoIP is totally based on users consent. Some calls may actually be spam calls but after callee has received the call, it may not be spam anymore. Similarly there might be scenarios

where a same call is spam for one user and same call is not a spam for another user. Call bots can be placed under the category of SPAM calls for all users but in case of telemarketing some users may like to know about promotional updates and better offers from other companies and some user may not like it at all. Nevertheless marking call as SPAM or not is based on the end users consent.

Existing methods do not allow any such ability to the end user to mark the call as SPAM. Consent Based [5] method is still under standardization by Internet Engineering Task Force (IETF). Using user consent would significantly reduce the computations involved thus reducing the delay in call setup.

IV. CONSENT BASED SPAM MARKING MODEL

This method is simple and does not involve many computations or algorithms. It requires all calls to be routed through the central server (IP Private Branch Exchange - IP PBX) which already exists in most of the corporate environment based on VoIP. Once the call is established, the session is monitored for any Dual Tone Multiple Frequency (DTMF) from the end user. If any DTMF is detected it is evaluated on the basis of value assigned to it in server. DTMF can only be either the two cases discussed below.

- **SPAM Mark:** If end user presses the key defined to mark SPAM then the caller will be marked as SPAM. This could be defined in company policy and can be different for different companies. In our model we use digit 1 as SPAM Mark.
- **Not SPAM Mark:** If end user presses the key defined to no SPAM mark then the caller will be marked as legit caller. This digit could vary from company to company. In our model we use digit 0 as no SPAM Mark.

A sample model is illustrated below in Figure 1.

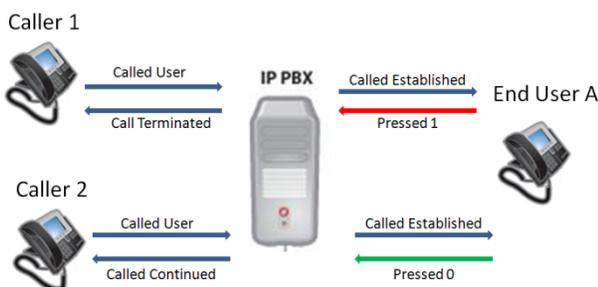


Figure 1. Simple feedback for two different callers

Fig. 1 shows a simple feedback collected from end user for two different callers. End User A has marked caller 1 as SPAM and caller 2 as no spam. While the end user marks a caller with SPAM or NO-SPAM a flag table is maintained at server for both the callers as shown.

Caller	Status	Reported By	Count
Caller 1	SPAM	End User A	1

Caller 2	NOT- SPAM	End User A	1
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Table 1. SPAM list table

Table 1 is maintained at servers end and used for filtering the calls when a user calls again. Each SPAM is recorded against the user who reported it as SPAM. This would ease the issue of one caller SPAM for one user and NOT-SPAM for another user. Count keeps the track of each number reported SPAM how many times with time stamp.

Depending on the number of users in an organization a threshold level can be defined for SPAM index. If 10% of the users report the number as SPAM it is marked as SPAM or otherwise as per company policy. Call bots can be determined more quickly since they use a sequential series of number listings. If a call is reported 3 times within 5 minutes, the caller is a computer generated message since it is using a list of sequential numbers. Same scenario stays true for the telemarketers too. If a telemarketer is trying to make calls in the same organization at different numbers and is reported SPAM by 3 users he'll be flagged as SPAM.

Once the user marks the number as SPAM the caller is redirected to pre-recorded message stating that his number has been marked as SPAM if he considers this an error he should contact the network administrator of the company.

There could be scenarios in which user forgets to give feedback for the call. In those cases if the called number already has the feedback in the SPAM list table then nothing is done but if that's not the case server initiates call back to end user requesting feedback of the latest call received by him.

The method of SPAM list table reduces the need of two separate lists, white list and black list [5]. One single list is used to scan all incoming calls. If the call has SPAM flag marked lower than 10% the call is allowed if not the call is redirected to pre-recorded message. Let's see how incoming calls are scanned in VoIP environment.

V. SIP PROTOCOL IN VOIP

Session Initiation Protocol (SIP) is an application layer protocol most widely used to create, maintain and terminate multimedia sessions. SIP supports five different types of services namely: User availability, User location, User capabilities, Session setup and Session management. Different components used by SIP are:

- UAC (User Agent Client) – client that starts the signalling
- UAS (User Agent Server) – Server that responds to agent
- Proxy Server – receives connection request and forwards them if end user is not in its domain
- Redirect Server – Sends the destination information to the requester
- Location Server – receives registration request and updates its database

A look at SIP packet structure will help us determine how incoming calls can be analysed. Below is a sample SIP request[6] for initiating a call:

```
INVITE sip:user@sipserver.com SIP/2.0
(Message Headers)
```

```
Via: SIP/2.0/UDP 10.10.10.10:5060
From: "Me" <sip:me@sipserver.org>;tag=a0
To: "User" <sip:user@sipserver.org>
Call-ID: d@10.10.10.10
CSeq: 1 INVITE
Contact: <sip:10.10.10.10:5060>
User-Agent: SIPTelephone
Content-Type: application/sdp
Content-Length: 251
(Message Body)
v=0
o=audio1 0 0 IN IP4 10.10.10.10
s=session
c=IN IP4 10.10.10.10
m=audio 54742 RTP/AVP 4 3
a=rtpmap:4 G729/8000
a=rtpmap:3 GSM/8000
```

The *From* field clearly indicates the origin of call. Our main concern is with this field. All incoming calls are routed through the SPAM list table. The SIP identity of incoming caller is stripped from the message header and matched with the Caller field in the table. Below is the priority of incoming calls analysis using SPAM Table:

IF Status = Nil
 (Call is allowed, feedback call generated after call)

IF Status=NOT_SPAM and Count > 0
 (The call is allowed)

IF Status= SPAM and Count < 10
 (The call is allowed)

IF Status=NOT_SPAM Count > 0 AND Status = SPAM Count > 0
 (If *To* Field in message header matches the destined user who marked it NOT_SPAM the call is allowed otherwise it is blocked)

IF Status= SPAM Count > 9
 (Call is blocked)

IF Status= SPAM and Count > 2 where Last Count – Present Count = updated in less than 90 secs
 (Call is blocked)

The above mentioned statements cover almost all the scenarios discussed in section V. These statements are written considering the SPAM Index value to be 10. All the incoming calls whose SPAM index is 10 will be blocked. SPAM index can be a variable value set by network administrator.

VI. CENTRALIZED CONTROL

All the numbers that cross the SPAM index are reported to VSP on periodical basis. A black list is maintained at VSP if let's say 5 organization report the number is SPAM it should be black listed and stopped from making any further calls. However a

warning should be issued when the number is reported each time so that organization may stop SPIT. This would enable the calls to be blocked right after they originate and reach their VSP. This centralized control will enable better control of SPIT. Once the VSP receives the number reported as black list, VSP can also send the number to other VSP's for monitoring. That will enable more quick marking of SPIT callers.

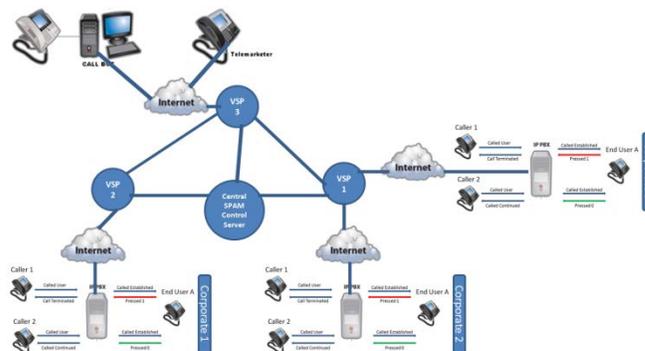


Figure 2. Central Server to Control SPIT

The Fig. 2 shows a central SPAM Control Server, which is maintaining list of all blacklisted numbers reported by all VSP's. It also sends the update of blacklisted number from one VSP to other VSP's and once they also confirm it as SPAM caller that number is sent to all VSP's marking it as SPIT. This central control will even enable to control the SPIT at a global level since all SPAM numbers are reported to a central server.

VII. CONCLUSION

Though SPIT hasn't gain significant importance in market yet, but if VoIP keeps on expanding at its current rate, so will SPIT and it might become similar as email spamming. The concept of central server can control SPIT attacks significantly but it might come with a slight disadvantage of delay in call setup though very lesser than traditional scanning techniques. But again if the situations in which a corporate is receiving SPIT call at a high rate a little delay in analyzing the call is better than wasting few minutes and bugged by a call bot or telemarketer. And central server may grow effectively with time in controlling the SPIT since the reported numbers will be maintained and updated periodically. And the method still holds good for people who still want to receive the promotional offers.

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E governance in Local Bodies in India

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Abstract- India is 2nd largest country after China based on its population. Even whole country is divided based on different language, region, rituals and lots many differences. Efficient governance of such large country with such diversity is tough task. Government of India is aggressively using Information and Communication Technologies in their daily work to provide SMART (Simple, Moral, Accountable, Responsive and Transparent) governance to every citizen of India. The tools, technology and methods used in E-Governance application provide a roadmap for effective and timely delivery of services at the door step of citizen. Majority of regular interaction of government and citizen is done through Local Bodies of government. Local Body is classified in Urban Local Body (ULB) and Rural Local Body (RLB). Purpose of this paper is to examine E-Governance implementation in Local Bodies in India.

Index Terms- e governance, Urban Local Body (ULB), Rural Local Body (RLB), Municipal Corporation, Municipality, challenges in e governance implementation, NeGP

I. INTRODUCTION

Every governments are aggressively using information and communication technologies in their everyday work. As a consequence, the study of e-government has increased in last two decades and many approaches to describe e-government and develop digital government research have been evolved.[1][2]. One of the way to e-government understanding describes the evolution of e-government initiatives in terms of their degree of technological and organizational sophistication.[1][2][3]. The major demand on government is that it should be more receptive to fulfil every requirement of citizens instantly, without wasting time. Citizens are expecting 365 X 24 access for many government work. This can be achieved through E-Governance only.

The terms “E-Governance” and “E Government” is sometimes used interchangeably, but E Government is just as subset of E-Governance. We can say that E-Government is an application of E-Governance. This uses the latest technologies of information and communication technology (ICT) and to make government more efficient, effective and to provide transparent services[4].

To achieve this goal, the government is focusing more to avail government services to citizens through Internet. So, E-Governance is a broader thing that deals with the whole range of the relationship and networks within governments regarding the usage and application of ICT. E-Government is a small discipline dealing with the development of online government services to the citizen and businesses such as e-tax, e-transportation, e-procurement, e-participation etc. The “E” part of both e-government and e-governance stands for the electronic platform or infrastructure that enables and supports the networking of public policy development and deployment.

II. DEFINITION OF E-GOVERNANCE :

Different governments and organizations are defining ‘E-Governance’ as per their aims and objectives.

E-Governance is define by Word Bank as[5] “*E-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/ or cost reductions.*”

As per UNESCO’[6] E-Governance is “*Governance refers to the exercise of political, economic and administrative authority in the management of a country’s affairs, including citizens’ articulation of their interests and exercise of their legal rights and obligations. E-Governance may be understood as the performance of this governance via the electronic medium in order to facilitate an efficient, speedy and transparent process of disseminating information to the public, and other agencies, and for performing government administration activities.*”

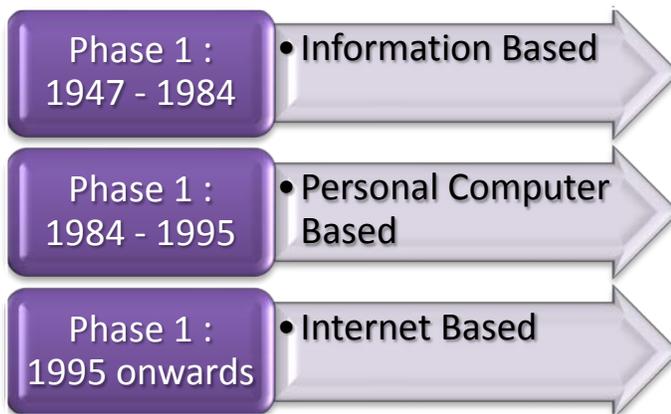
Advantage of E-Governance:

- Increase citizen participation in government process

- Interaction between industry and Government can be improved.
- Delivery of Government services in better manner.
- Cost reduction in availing/providing government service for both Government and Citizen.
- Citizen empowerment by providing access to all information.
- Service reaches to citizen rather citizen reach for service.
- Citizen can avail all information of Government through a single window at any time and any location with a device having Internet connection.
- Decrease corruption.
- More efficient and convenience way of utilizing government services.
- Eliminate human errors in the manual process.
- Sharing information and finding to other government agencies easily and rapidly.

III. EVOLUTION OF E-GOVERNANCE IN INDIA

Evolution of E-Governance in India can be considered in three phases[7]



- Phase I: 1947-1984 Information based E-Governance
- Phase II: 1984-1995 Personal Computer based E-Governance
- Phase III: 1995-onwards Internet based E-Governance

Major milestones in this evolution process are listed here.

1950s, where computer is required to use for National Level Planning.

1966. Bhabha Committee recommend requirement of establishment of Department of Electronics (DoE) to support electronics and computer industry.

One of the bigger milestone was the establishment of the National Informatics centre (NIC) in 1977 under Department of Electronics.

Establishment of Computer Maintenance Corporation (CMC) in 1975 was another milestone for E-Governance in India.

A new IT policy was introduced in India in 1984 which impacted by 100% growth in number of computers in India at 50% reduced cost[8].

In 1987, National Informatics Center Network (NICNET) was launched. After NICNET, District Information System of the National Informatics Centre (DISNIC) was introduced, which is to computerize all district offices with free hardware and software so all can take part in E-Governance initiative.

A National Task Force on Information Technology and Software Development was constituted in May 1998[9].

By 2000, Indian Government had identified 12 point minimum agenda for implementing E-Governance in all union Ministries / Departments.[10].

The National E-Governance Plan (NeGP) was defined by the Department of Electronics and Information Technology (DEITY) and Department of Administrative Reforms & Public Grievances (DAR&PG).

The Union Government approved the National E-Governance Plan (NeGP), comprising of 27 Mission Mode Projects (MMPs) and 10 components on May 18, 2006.

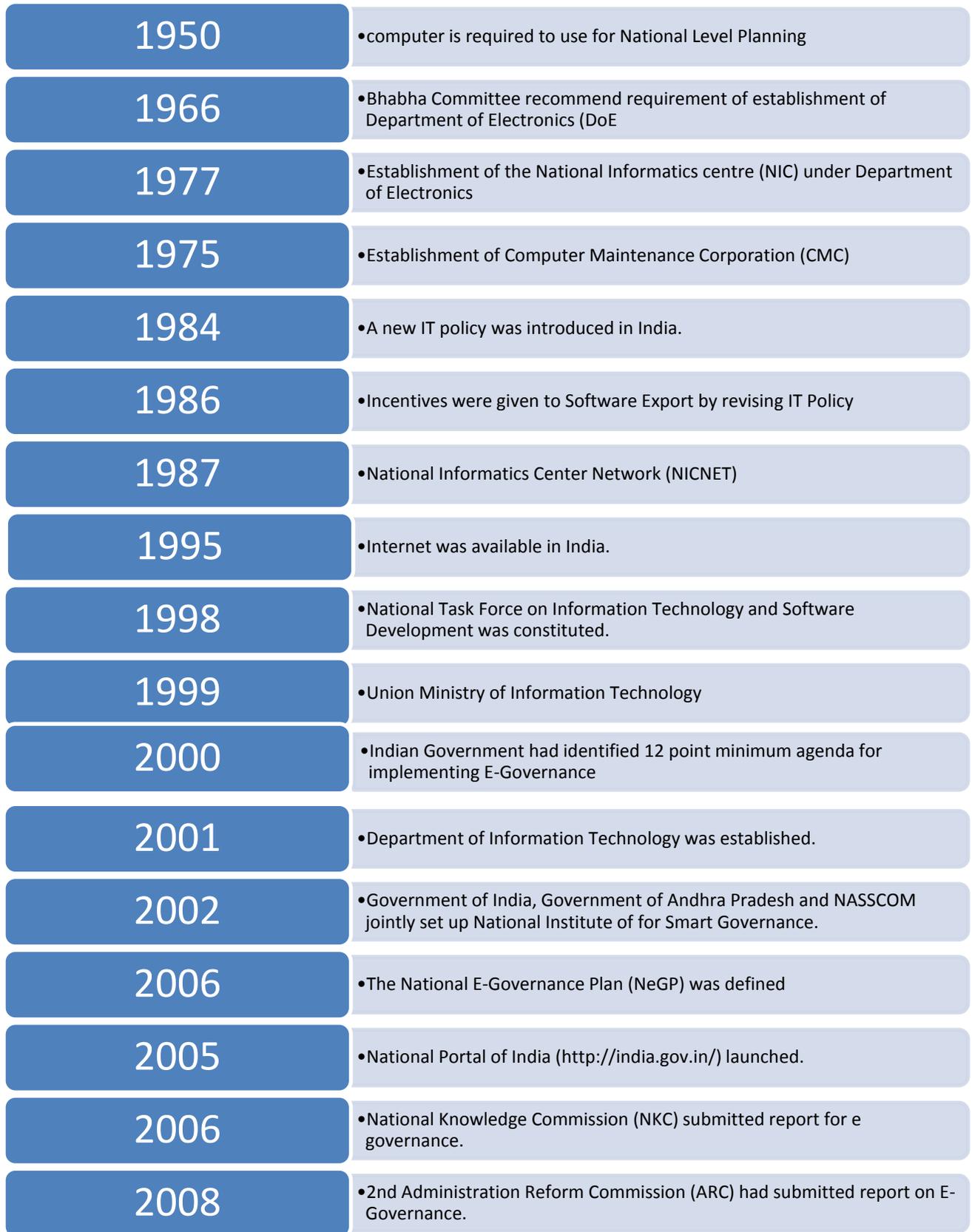


Figure 1 Evolution of e governance in India

IV. FOUR PILLARS OF E GOVERNANCE

For implementation of e governance basic requirement is infrastructure. As per our NeGP, government has decided 4 infrastructural pillars for implementation of e governance.

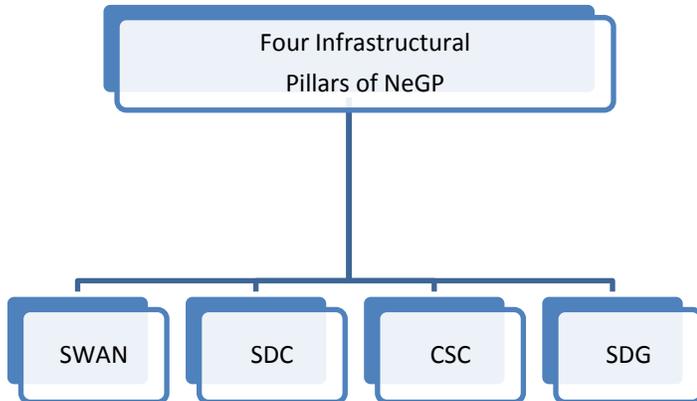


Figure 2 Infrastructural pillars of E Governance

They are listed as under.

- State Wide Area Network (SWAN)
- State Data Centre (SDC)
- Common Service Centre (CSC)
- Service Delivery Gateway (SDG)

SWAN :Government has sanctioned the State Wide Area Networks (SWANs) implementation across the country, in March, 2005 at a total expenditure of Rs.3,334 crore to be given by the Department over a period of five years. Under this Scheme, technical and financial help will be provided to the all States/Union Territories (UTs) for establishing SWANs to connect all State/UT Headquarters, District Headquarters and Block Headquarter, in a hierarchical structure with a minimum bandwidth capacity of 2 Mbps per link. Each of the State / UT can enhance the bandwidth up to 34 Mbps between SHQ and DHQ and up to 8 Mbps between DHQ and BHQ depending upon the utilization[11].

SDC :State Data Centres are defined so that every state can consolidate services, applications and infrastructure to provide efficient electronic delivery of Government to Government (G2G), Government to Citizen (G2C) and Government to Business (G2B) services. State Data Centre would provide many functionalities [12].

- Central Repository of the State

- Secure Data Storage
- Citizen Information/Services Portal
- Remote Management
- Disaster Recovery
- Online Delivery of Services
- State Intranet Portal etc..

CSC :Large population of India is living in rural area only. Government can develop applications providing E Governance services, Internet can be avail to every village/ nearby area using SWAN, but government can not force each and every person living in India to use personal Internet access. This is basic reason for approving Common Services Centres. A main use of CSCs is that it will offer services in rural areas, including application forms, certificates, and utility payments such as electricity, telephone and water bills etc...

SDG :Various Local, State and Central government had started to implementation of e governance applications. All government systems are using different platform and technologies for E Governance solutions, and it is very difficult to make interoperability between these heterogeneous platforms. This is the reason for implementing various Service Delivery gateways (SDG), which will work as standards based messaging switch between various heterogeneous applications and providing seamless interoperability and sharing of data across different government applications. [13].

V. E GOVERNANCE IN LOCAL BODIES

Local Body for e governance consist of Urban Local Body (ULB) and Rural Local Body (RLB).

74th Amendment was enacted there are three categories of Urban Local Body[14]:

- Mahanagar Nigam (municipal corporation)
- Nagar Palika (municipality)
- Nagar panchayat (notified area council, city council)

74th Amendment was enacted there three categories of Rural Local Body

- Zilla Panchayat (District Panchayats)
- Mandal Or Taluka Panchayats
- Gram Panchayats

Various duties of Local Bodies are as under

- Planning for economic and social development
Urban planning including town planning
- Water supply domestic, Industrial and commercial purposes
- Regulation of land-use and construction of buildings
- Roads and bridges
- Urban forestry
- Fire services
- Public health, sanitation, conservancy and solid waste management
- Burials and burial grounds, cremations, cremation ghats/grounds and electric crematoria
- Provision of urban amenities and facilities such as parks, gardens, playgrounds
- Cattle pounds, prevention of cruelty to animals
- Street lighting
- Slum improvement and up gradation
- Parking lots, bus stops and public conveniences
- Registration of births and deaths
- Preventive Health Care

Above services are such that every citizen is directly connected with it. For all those services, if citizen required to go to municipal office, need to stand in queue, even after that it is quiet possible that it may take many days to get service. Instead of that, if every citizen can avail these services online through e governance than all citizen can get service sitting at home using Internet.

Various states of India had started implementation of e-governance for local bodies.

Few examples of implementation of e governance in Urban Local Bodies are.

UTTAR PRADESH	HTTP://E-NAGARSEWAUP.GOV.IN/ULBAPPS/
MADHYA PRADESH	http://www.mpenagarpalika.gov.in
ODISHA	https://www.ulbodisha.gov.in/
RAJASTHAN	http://urban.rajasthan.gov.in
GUJARAT	No Common Webportal. Every municipal corporation is having their own website.
TAMILNADU	http://www.tn.gov.in/cma/

Figure 3 Example of E Governance implemented in ULB in few states

Above figure shows e governance implemented in few states of India. As per above facts we can observe that various states had

tried to implemented e governance for local body in different manner. We will discuss implementation strategy for various states.

- Uttarpradesh : UP state had implemented e governance in local body through portal <http://e-nagarsewaup.gov.in/ulbapps/>. Using this portal every citizen of state can get online facility for many services. User just need to select city and service from portal and than user can book/get respective service. This service is developed by National Informatics Centre,U.P State Unit ,Lucknow. Another implementation of e governance in UP is using portal for every municipality like Nagar Palika Parishad npp(*) in where * is city name. For eg nplalitpur.in where city name is Lalitpur
- Madhyapradesh : MP state had implemented e governance in local body through portal <http://www.mpenagarpalika.gov.in>. By using this central portal, citizen of MP can get many e governance services.
- Odisha : Odisha had implemented e governance in ULB by <https://www.ulbodisha.gov.in>. In this portal, citizen of Odisha can select District and than ULB. After that can get portal for respective ULB.
- Gujarat : No central portal for implementation of all ULBs. Various Municipal Corporation had implemented their own portal for providing e governance to citizen of respective corporation. For eg Rajkot municipal corporation is having portal www.rmc.gov.in.
- Tamilnadu :Tamilnadu state had implemented e governance for local bodies using portal <http://www.tn.gov.in/cma/>. This portal is handled by Commissionerate of Municipal Administration, Tamilnadu and having links of all ULB websites. Still all Municipal corporation of Tamilnadu are having their own developed portal by which their citizen are getting e governance services. For example Madurai corporation is providing e governance facility by <http://www.maduraicorporation.co.in/> portal.

SUMMARY

Author had studied implementation of Urban Local Body done by various states of India. As per our study, different state had implement e governance in Urban Local Bodies as per their own analysis. Online portal implementation is done by hiring any third party professional company by every states. Due to this differences, there is no common solution is available nation wide for ULB e governance. In place of it, if implementation is defined and designed nation wide than government can define common way of implementation of e governance services which can be used by all citizen of India. Advantages of common

implementation is that only one portal having common User Interface which can be available in vernacular languages is used for e governance in ULB. By having common implementation, every states and union territories citizen are having access of e governance for ULB. This solution saves time and cost of analysis and implementation for every states.

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Seasonal Variations in the Physico Chemical Parameters of River Tawi and Its Ecological Best Designated Use

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Abstract- River Tawi, the life line of the people of Jammu, provides water for the essential requirements of life to the inhabitants. However, the river is continuously subjected to tremendous anthropogenic pressure resulting in the degraded water quality. In this study, water samples from river Tawi were monitored for various physico-chemical parameters like dissolved oxygen, EC, TDS, pH, temperature, Calcium, Chloride, Magnesium, Sodium, Potassium, Nitrates and Phosphates on monthly basis for two consecutive years at four preselected stations with a view to evaluate its ecological best designated use for various purposes. The study indicates that the quality of water substantially decreases at downstream stations thereby rendering the water unfit for human use.

Index Terms- River Tawi, Physico-chemical, Anthropogenic pressure.

I. INTRODUCTION

Rivers as life giving watercourses have nurtured communities for millennia and most developmental activities are still dependent upon them. River water finds multiple applications in every sector of development like agriculture, industry, transportation, aquaculture, public water supply, etc. However, since old times, rivers have also been used for cleaning and disposal purposes. Huge loads of waste from industries; domestic sewage and agricultural practices find their way into rivers resulting in large scale deterioration of water quality. Harvesting of river waters to the point of choking off environmental flows is bound to prove ruinous in the long term even if it provides immediate benefits. Thus, there arises a need for monitoring water quality of our rivers to evaluate their production capacity, utility potential and to plan restorative measures for their conservation. (Datar and Vashistha, 1992; Das and Sinha, 1993; Agbaire and obi, 2009; *Mary et al.*, 2011 and Patel and Datar, 2014)

River Tawi, an important tributary of river Chenab and glory of Jammu division of J&K (India) is the sole source of drinking water supply to the inhabitants of Jammu. Besides, river water is also a victim of various anthropogenic pressures viz., dumping of solid waste, discharge of municipal and domestic sewage. Vehicle washing, bathing activities, sand mining, dredging, etc which have degraded its water quality (Mushtaq, 2007). Thus, present study on the water quality monitoring of river Tawi was carried out along its course in the vicinity of Jammu city with a view to evaluate its ecological best-designated use.

II. MATERIALS AND METHODS

Location and Sampling

River Tawi originates from Seoj Dhar (Bhaderwah), an upland space enclosed by the meeting of the two ridges of Dhauladhar range, a branch of Central Himalayan axis at an elevation of about 1400 ft. The river is fed by a number of streams of 1st and 5th order during its journey of 128 kilometers through middle and sub-Himalayas till it emerges into plains near Jammu city where it is subjected to innumerable anthropogenic pressures that effect its water quality. The flow of the river is perpetual and considerable though of much varying volume.

For the present water quality monitoring study, 4 sites were preselected along the longitudinal profile of river Tawi at a stretch of about 12-13 kms depending upon the degree of exposure of anthropogenic influences (Fig. 1). Sampling of the river water was done at these sites. Various physico-chemical parameters like temperature, pH, dissolved oxygen, carbonates, bicarbonates, calcium, magnesium and chloride were determined on the spot following A.P.H.A (1985) and Adoni (1985) whereas, for the analysis of other parameters like, BOD, nitrates, phosphates, EC, TDS, sodium and potassium water samples were brought in plastic bottles to the laboratory. The data was then statistically analyzed.

III. RESULTS AND DISCUSSION

The physico-chemical characteristics of river water exhibited a well marked seasonal and spatial variations which have been discussed as:

DO of the river water recorded a well marked variations at different stations. In upstream stations (S-I & S-II), its value ranged from 4.0- 9.6 mg/l and in downstream stations it ranged from 2.8-8.6 mg/l (Fig.4) Moreover, the maximum for DO concentration was recorded during winter months and minima during summer months. A lower temperature is known to favour greater dissolution of oxygen in water. It is well documented that DO in good quality stream / rivers is usually more than 6 ppm to promote proper growth of fish and other aquatic organisms (ANZECC, 1992). Thus, in the upstream section, DO level indicates good quality water whereas, the DO concentration falls in downstream stations at a distance of about 13 km from the S-I. This depletion of DO in the river water may be on account of the high organic load in the form of municipal and domestic sewage and other similar activities that reach the lower section thereby causing its depletion (Obasi and Balogun, 2001 and Ovrawah and Hymore, 2001). Thus, river water in this stretch is not fit for its multiple use and the present data also indicates that the water

stretch recovers from the organic pollution through its self purification capacity in the downstream stations.

The temperature was found highest during summer and lowest during winter at all the preselected study stations (Fig.2) and didn't recorded much significant variations (Sujitha *et al.*, 2011). Temperature of water is known to affect pH, alkalinity and (Fig.14 and 15) DO concentration (Komal *et al.*, 2007). pH of the river Tawi also recorded significant variations both seasonal as well as temporal (Fig.3). At the upstream stations, the pH ranged 7.8-8.4 (2005) and 7.7-8.7 (2006) while the range was 7.2-9.2 and 7.1-8.6 during both the years of present study. Also, it was observed that pH recorded its maximum values during winter. Though, pH of water of river Tawi was alkaline throughout the study period but it was more alkaline at the upstream sites as compared to downstream stations. The lowering of pH at the downstream sites seems to be due to greater input of sewage (domestic as well as municipal). According to Central Pollution Control Board (CPCB, 1996), 70% of the pollution in rivers is from untreated sewage. Alkaline pH is considered to be good for promoting high primary production. The EC of water sample ranged between 40-120 umhos/cm at all the study stations during the study period (Fig.5).

The TDS concentration also showed an increasing trend along the longitudinal profile (Fig. 6). Moreover, TDS conc. was found to be higher in winter which may be attributable to low H₂O depth due to snow in higher reaches. Increase may be account of increment in municipal and domestic drainage from the city into the Tawi basin.

IV. IONIC COMPOSITION

The variations in cation composition of the river water viz., Ca²⁺, Mg²⁺, N⁴⁺ and K⁺ and Cl⁻ are shown in (Fig. 7,8,9,10 and 11). Ca²⁺ which is a major component of natural waters comes mainly from the rocks, seepage, drainage, waste water, etc. Ca²⁺ generally recorded its value from 8.8-56.9 mg/l at upstream stations of river Tawi but increased at downstream where it varied between 12.08-68.9 mg/l. The low calcium content in upstream indicated less solubilisation of Calcium. But the high calcium concentration at downstream stations is an indication of greater precipitation of Ca²⁺ in this zone in form of CaCO₃ (Raina *et al.*, 1982).

Mg²⁺ is required as an essential nutrient for plants as well as for animals and a conc. of 30 ppm is recommended for drinking waters. The Mg²⁺ conc. was in the range of 5.3-42.7

mg/l in the upstream sections of river Tawi for the both the years of present study but the concentration at the downstream section of river varied between 5.3-37.9 mg/l thereby exhibiting a mixed trend of distribution (Fig. 8).

However, an inquisite study of the table Fig.8 reveals that during both the years, Mg²⁺ cation concentration was higher at the downstream (S-III). TDS value also showed downstream increment thereby indicating substantial solubilisation of Mg salts in downstream water.

The percentage of sodium ions is an important parameter in deciding the suitability of water for irrigation. The sodium levels were low (Fig. 9) in the upstream stations. Thus, water is suitable for drinking and irrigation. However, at the downstream stations the Na⁺ levels were elevated to the range of 123.9 – 153.1 mg/l. Such levels of Na⁺ though within the limits may prove hazardous for the crops when used for irrigation. Another essential nutrient element in natural waters is K⁺. The concentration of potassium (0.9-5.5mg/l) in the upstream which elevated upto 15.3-20.1 mg/l in the downstream stations. The maximum concentration of K⁺ ion was noticed during summer months (Fig.10).

In inland water, excess of Cl⁻ is taken as an index of pollution. Higher values of Cl⁻ in fresh water may be due to sewage discharges, contamination from reflux leachates discharge of effluents from chemical industries, irrigation drainage, organic decomposition and use of soaps and detergents. The mean values of chloride exhibited a monsoon increment on account of the greater influx from catchments area due to rains. Higher values of Chloride noticed in the downstream stations was on account of the greater exposure to the aforesaid anthropogenic pressures (Fig.11).

Nitrates in river water promotes high primary productivity and an excess of NO₃ in surface water is taken as a warning for algal blooms (Sujitha *et al.* 2011). However, the NO₃ levels were quite low, varying from 0.06-0.71 mg/l during both the years of present study (Fig.12).

Moreover, the Phosphate is present in natural waters as soluble phosphates and organic phosphates. The concentration of available phosphate was low in the upstream water, ranging from 0.012-0.053 (mg/l).

The phosphates increased in the range (0.024-0.321) mg/l was high enough to cause eutrophication. Agricultural runoff containing phosphates fertilizers as well as waste water containing detergents etc, tend to increase PO₄³⁻ pollution in the downstream section of river Tawi. (Fig.13).

Table: Drinking water quality standards as recommended by USPH, WHO and BIS

Parameters	USPH standards	WHO standards	BIS standards
Colour	Colourless	-	5
Odour	Odourless	-	Unobjectionable
Taste	Tasteless	-	Agreeable
pH	6.8-8.5	6.5-9.2	6.5-8.5
DO	4.0-6.0	-	3.0
TDS	500	500	500
Cl	250	500	250

SO ₄	250	250	200
NO ₃	<10	45	45
F	1.5	0.5	1.0
PO ₄	0.1	-	-
Ca	100	100	75
Mg	30	150	30
COD	4.0	10	-

V. CONCLUSION

Based on the parameter values of pH, EC, TDS, Na, Po₄, DO and the maximum permissible limits for the parameters. It may be concluded that in the upstream of river Tawi water is suitable for drinking, bathing, fisheries, irrigation etc. following the water quality criteria for various designated best use as outlined by ADSORBS (1982).

However, the increased values of the above discussed parameters at downstream stations gave an indication of degraded H₂O quality brought about by anthropocentric interferences thereby rendering the water unfit for drinking, bathing, etc.

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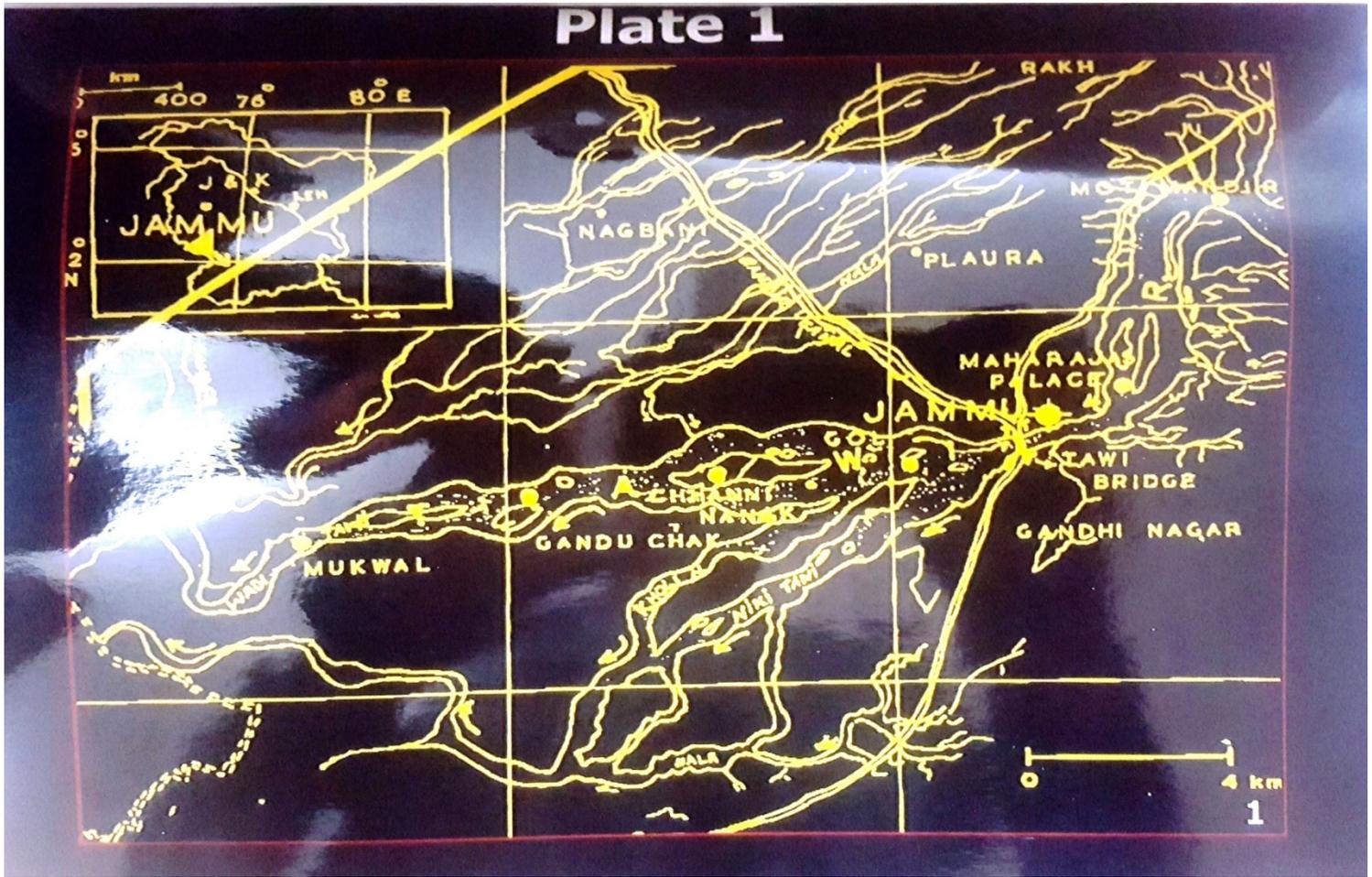


Fig-1

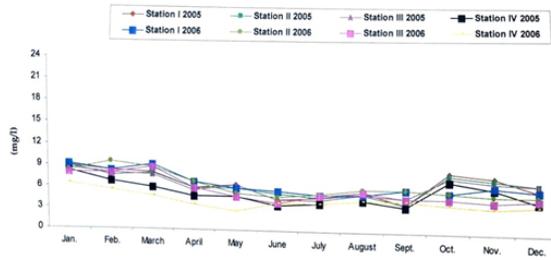


Fig-4 Seasonal variations in the dissolved oxygen (mg/l) at the study stations of river Tawi (Jan., 2005 - Dec., 2006).

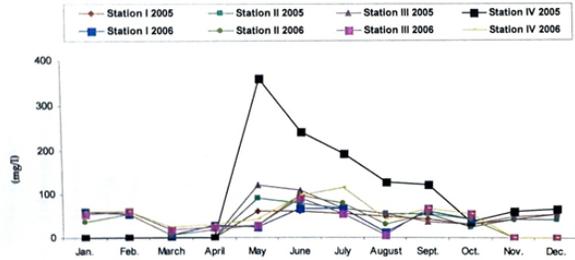


Fig-14 Seasonal variations in the carbonate (mg/l) at the study stations of River Tawi (Jan., 2005 - Dec., 2006).

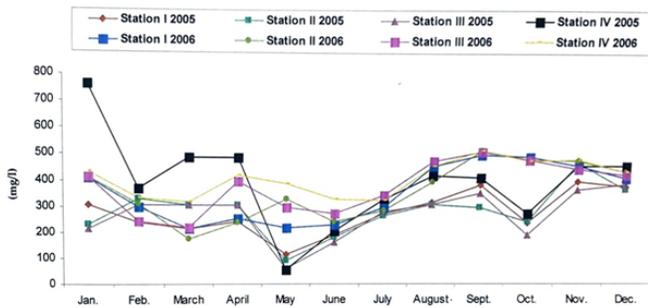


Fig-15 Seasonal variations in the bicarbonate (mg/l) at the study stations of river Tawi (Jan., 2005 - Dec., 2006).

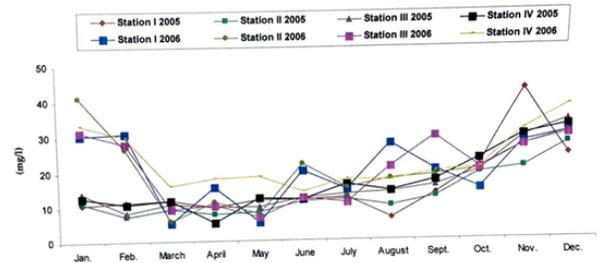


Fig-8 Seasonal variations in the magnesium (mg/l) at the study stations of river Tawi (Jan., 2005 - Dec., 2006).

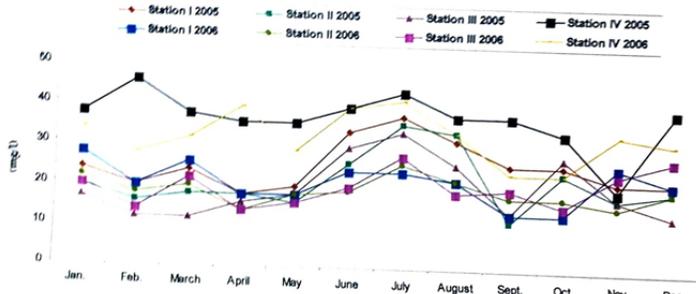


Fig-11 Seasonal variations in the chloride (mg/l) at the study stations of river Tawi (Jan., 2005 - Dec., 2006).

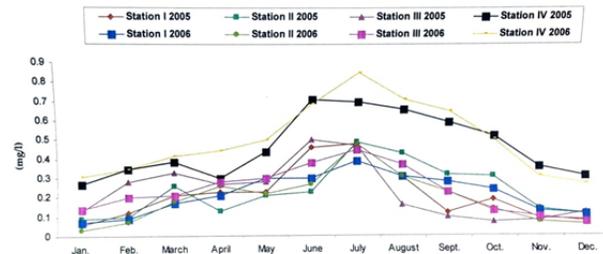


Fig-12 Seasonal variations in the nitrates (mg/l) at the study stations of river Tawi (Jan., 2005 - Dec., 2006).

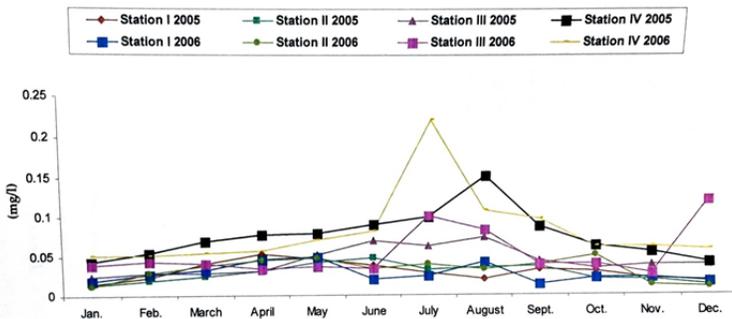


Fig-13 Seasonal variations in the phosphates (mg/l) at the study stations of river Tawi (Jan., 2005 - Dec., 2006).

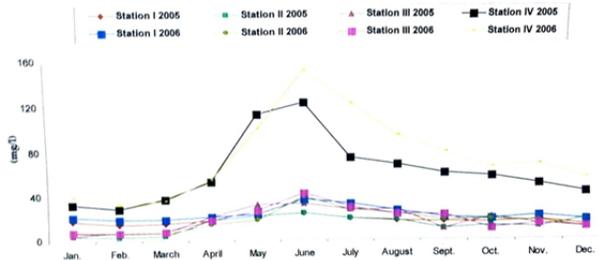


Fig-9 Seasonal variations in the sodium (mg/l) at the study stations of river Tawi (Jan., 2005 - Dec., 2006).

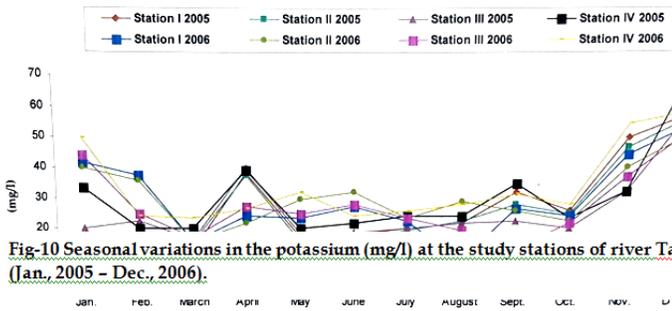


Fig-10 Seasonal variations in the potassium (mg/l) at the study stations of river Tawi (Jan., 2005 - Dec., 2006).

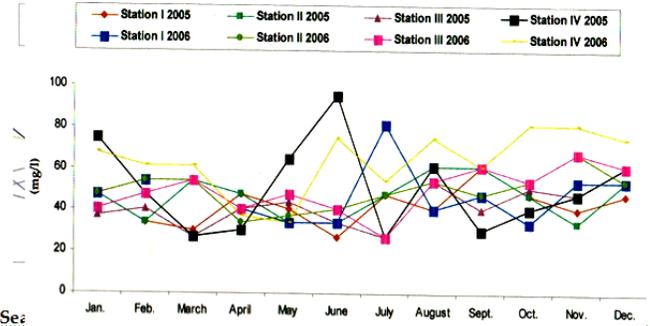


Fig-6 Seasonal variations in the total dissolved solids (mg/l) at the study stations of river Tawi (Jan., 2005 - Dec., 2006).

Fig-7 Seasonal variations in the calcium (mg/l) at the study stations of river Tawi (Jan., 2005 - Dec., 2006).

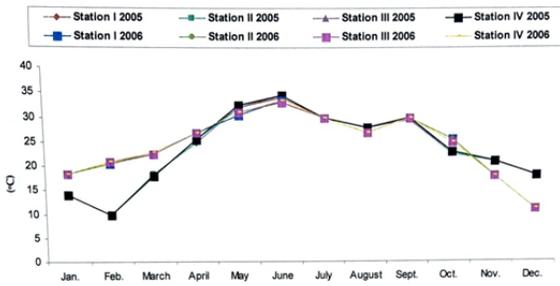


Fig-2 Seasonal variations in the water temperature (°C) at the study stations of river Tawi (Jan., 2005 - Dec., 2006).

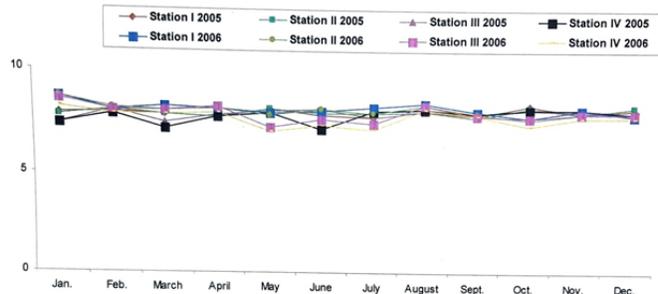


Fig-3 Seasonal variations in the pH at the study stations of river Tawi (Jan., 2005 - Dec., 2006).

Study of Diverse Religious Belief of Filipino College Students ---- Based on the Research Conducted at Bulacan State University

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Abstract- It is no doubt that Philippines has undergone an immense diversification all over the world. As a country where the religious belief that reigns is Catholicism, the researcher focused on the college students at Bulacan State University. The researcher conducted this research through the dissemination of questionnaires among students, induction and statistics, analysis and summary, to understand the religious psychology and behavioral characteristics of Filipino college students in the new age. Also, the perceptions of diverse religious beliefs and the view about the development of Catholicism in Philippines are given strong emphasis. In the end, the researcher aims to extrapolate the religious values of Filipino college students under the background of diversification.

Index Terms- Bulacan State University, College Students, Diversification, Philippines, Religion

I. INTRODUCTION

The culture, history and religion of Philippines

Philippines is one of the archipelagic country of Southeast Asia. It is recorded that there are many times of trade communication between ancient China and Luzon (the northern area of Philippines) and Sulu in ancient Chinese history books. The Arab established the regime in the 15th century, the Dutch discovered the island. The Spanish invaded Luzon in 1565, and named the Philippines by King Philip II of Spain, which began three hundred years of colonial experience. After the Spanish-American war in 1898, the Philippines have been ruled by the United States, and were occupied by Japan during the Second World War. After World War II, with several domestic political struggling, finally the independence country of the republic of the Philippines has been established. (Callao Man' Could Redraw Filipino History: Discovery News. DNews.)

As the collision and communication of race, religion, and, culture in long history, the Philippines also become the most volatile place in Southeast Asia. Until today, there is still conflict with Islamic group in Mindanao (the southern area of the Philippines). Most population of the country comprises Malay, Chinese, Arabs, Spanish, Indians, Americans, etc. Due to many times of colonial experience, this Southeast Asian country has been influenced by western countries deeply.

The Arabs first brought Islam in the country, and then the Spanish colonizers brought Catholicism, which makes the Philippines become the biggest Catholic country in Asia. The US

ruled the Philippines and spread the Protestant Christianity. Also, the Philippines have been influenced by ancient Chinese through profound Confucianism, Buddhism, Taoism, and other Chinese folk religion from a large number of Chinese immigrants in modern China.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

Undeniably, Philippines has undergone a lot of ups and downs during the entire time of history. The current policy on the separation of church and state has offered an open environment for religious beliefs. It has an era significance of the research of the Philippines about religious ideology development. The Philippine college students represent a group of high quality of the cultural, economic. This group's religious belief also represents the national belief strength and belief direction in the future. It has important social significance of the research on the present college students' religious belief in the Philippines. The writer focused on the college students at Bulacan State University, through the questionnaire, induction and statistics, analysis and summary, to understand the religious psychology and behavior characteristics of Filipino college students in new age, to analyze their religious behavior and change, and try to discuss the future direction of religious belief.

The table below represents three Philippine domestic religious official inquiry statistics in recent years, to reflect the variation of religious belief.

Table: Main Religious Belief in Philippines

Religion	1960s	2000s	2015s
The Roman Catholic Church	83.8	80.9	80.58
Protestant Christian denominations	6	11.6	12.63
Islam	4.9	5	5.57
Buddhism	0.1	-	0.05
Philippine Independent Catholic Church	5.2	-	0.15
Primitive Religion	2.1	-	0.19

The research of religious belief of college students at Bulacan State University

The Bulacan State University located in Malolos, Bulacan in Philippines, is a comprehensive university funded by the national government, is founded in 1904. During the school year 2016-2017, there are 25,403 students, including the Philippines local students 25,390, 11,663 boys and 13,727 girls, 13 international students. (Bulsu, mis.Dept.)The non-Missionary school is good for the justice of the survey, and the object of the survey is all Filipino. In view of the undergraduate students, divided by the major, are the average distribution in pedagogy, management, literature, economics, and law. Sampling to issue 255 questionnaires, 253 taken back, recovery is 99%. Including 62 boys, accounted for 25%, 191 girls, accounting for 75%.

The Questionnaire topic mainly embarks the students' subjective feeling, covers the uncertain item selection, uncertain option and free answer. The survey focuses on the college students' understanding and feeling of religion in new era, from their own status, psychological feelings, future development aspects, to reveal the religious values of the Philippines' college students.

The basic situation of the religious belief of college students

Table 1: The proportion of religious belief of college students

Do you believe in religion?	Believer	None believer	Total
I believe in religion	240	0	240 (94%)
I don't believe in any religion	11	2	13 (6%)

In this survey, there is 94% which are 240 college students believe in religion, 6% which are 13 college students do not believe in any religion. The religious belief coverage rate has reached more than 90% in college students of the Philippines. The Philippines is still a universal religious country. However, few students do not believe in any religion, there are only 2 students who are not religious believers. It seems that most college students both religious believer (those who believe in religion from the heart) and even some of the students who do not believe in any religion are still practical believers because of the familial religious tradition.

Table 2: The multiplicity of religious belief of college students

How many religions do you believe?	The Roman Catholic Church or Protestant Christian denominations	The Roman Catholic Church and Protestant Christian denominations	The Roman Catholic Church and other religions
believe in 1 religion	153 (75%)		
believe in 2		23	4

religions (13%)		(11%)	(2%)
believe in more than 2 religions			25 (12%)

It can be seen that 75% which are 153 students believe in 1 religion, the Catholic or Protestant Christian. 13% which are 27 students believe in 2 religions, and 23 students of this group believe in both Catholic and Protestant Christian, 4 students believe in both Catholic and other religions. 12% which are 25 students believe in more than 2 religions, students of this group believe in Catholic as the first belief, and still believe in other religions. Although single religious belief still accounts for most college students in the Philippines, but in the view of the religious exclusivity, the 25% of multiple beliefs should not be ignored.

Table 3: The variety of religious belief of college students

What is your religion?	Total
The Roman Catholic Church	183(72%)
Protestant Christian denominations	67(26%)
Buddhism	
Islam	
Philippine Independent Catholic Church	3
Primitive Religion	
Agnosticism	1

In the survey, 72% which are 183 college students believe in Catholic, 26% which are 67 students believe in Protestant Christian, and few other religious beliefs. Visibly, the Catholic Church is still a major religion for college students in the current time, and the Protestant Christian is the second. The Catholics and the Protestant Christians are all from Christianity in the beginning, the Filipino people's religious belief which is mainly influenced by western religions.

1. The comparison of the way of becoming a believer of college students

Table 4: The familial situation and religious belief

How do you attain your religion?	The Roman Catholic	Protestant Christian	Others	Total
Born in religious family	170	47	4	221 (88%)
Self choice afterworld	14	15	1	30 (12%)

In the survey, 88% which are 221 college students are born in a religious family and become innate religious believers, 12% which are 30 college students choose the religion by themselves in the acquired environment. The innate religious factors accounted more than self-choice religious belief. In the group of believers between the Catholics and Protestant Christians, the rate of inherent religion of the Catholics is higher than the Protestant Christians. The heritage of the Catholics mainly depends on the following generation of religious traditions, differently; the Protestant Christians has attracted more and more people actively to choose it in the acquired environment.

Table 5: Inner demand of religious belief of college students

Reason you believe in certain religion	Born in religious family	Self choice afterworld	Total
Worship for God	164	21	185
Influence from school education	14	2	16
For happiness in future world	13	1	14
For happiness in present life	12	3	15
For spiritual ballast	7	2	9
Due to the help from religion community	8	-	8
Due to a big suffering in life before	5	1	6

As the survey reveals, whether the innate religious or self-choice belief in the acquired environment, most students, 185 specifically, believe in religion worship for God from the heart. Visibly, students have a strong faith for supernatural power, and longing for the power of God to bring the satisfaction of spirit which is all the final pursuit of their religious belief. Besides, the surrounding environment also plays an important factor that influence college students' in their religious belief.

Table 6: What problems you think you have in life?

	Selections
Social problems	102(30%)
Cannot be independent	57(17%)
Too much school work	54(15%)
Family problems	47(14%)
Disappointment with the future	25 (7%)
Bad situation in love	22 (6%)
Always feel lonely	20 (5.8%)

Bad body situation	17 (5.2)
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This is a multiple choice question, we can tell from the options, nearly 30% of students, 102 specifically, think that they have social problems, 17% of students which constitutes 57, exactly, think they cannot be independent, 15% which constitutes to 54 students have too much school work, 14% which constitutes to 47 students have family problems. Around 94% of the total students believe in religions, most of them are still in their interpersonal ability, study pressure, life pressure, and familial discord in real trouble, and there are also mental depressed pessimism problems. Since the rapid economic development of 20th century has brought social negative influence, including interpersonal emotional indifference, conflicts of sharp, life pressure increasing, the spirit world collapse, etc. Visibly, both the Catholic and the Protestant Christian, cannot obscure the earthly pain of believers, religion cannot completely fill the spiritual emptiness and anguish.

2. *The basic situation of the religious experience of college students*

Table 7: The subjective feelings of the religious belief of college students

Attitude to religion	Selections
Adore	171(68%)
Rely on	39(16%)
Revere	18 (7%)
Mysterious	17 (6.77%)
Not interested	5 (2%)
Reject	1 (0.23%)

From the options ratio, most students' religion emotion is adore, accounted for 68% which constitutes 171 students, followed by 16% of students which numbers to 39 is rely on. Evidently, like other religious groups, college student also worship the strength of religion, and the comfort of religious belief, yearning for the religion from the heart.

Table 8: The Existence of religion

How do you think the existence of religion?	Believer	Non-believer	Total
God's creation	186	5	191
Human being's creation	52	8	60

With the group of students who do not believe in any religion, the number of them who think religion is a human being's creation is more than the number of them who think religion is God's creation. Only 22% of the respondents, which constitutes to 52 students, think that religion is the creation of human beings. Human being's creation is the atheism of religion,

religion is the product of the human being thought development in a certain stage.

Table 9.1: The comparison of belief in multiple religion

How do you think religion influence yourself?	believer of 1 religion	believer of more than 2 religions	believer of 2 religions	Non-believer of any religion
Strong	115	11	12	1
Common	64	13	15	7
Less	6	1		4

Table 9.2: Comparison of belief in the Catholicism and the Protestant Christianity

From the above data, in the group of believers in 1 religion, more than half of students which accounts to 115 think that religion has a strong impact on them, and the more religions they believe, the less impact inflicted on them. Secondly, in the group of believers in 1 religion, to contrast it with the Catholicism and the Protestant Christianity, it is found that most the Catholics which constitutes to 75 students think that religion has less influence on them, but most the Protestant Christians which constitutes to 46 students think religion has strong influence on them.

Table 10: Are you willing to spread your belief?

	The Catholics	The Protestant Christians
Very much	108 (58%)	55 (81%)
May or may not	74 (40%)	13 (19%)
No	3 (2%)	-

From the subjective intention, 81% of the Protestant Christians which constitutes to 55 students are willing to spread their religion very much, the ratio is greater than 58% of the Catholics which constitutes to 108 students, and nearly half of the Catholics which constitutes to 74 students take a vague attitude of spreading belief.

3. *The participation of the religious activities of college student.*

Table 11: How do you practice your religious activities?

	The Catholics	The Protestant Christians	Others
By yourself	95 (44%)	20	1
With religion groups	59 (28%)	37	2
At home	47 (22%)	14	
At school	13 (6%)	5	

Contrasting the two religions, the religious activities of the Catholics which practiced by themselves accounts for 44% of respondents which constitutes to 95 students. However, students who join in religious group activities account to 28% or 59 students. On the other hand, most Protestant Christians who practice their religious activities by themselves accounts to 20 students; students who join in religious group activities account to 37 students. Visibly, the Protestant Christians is more inclined with religious group activities than the Catholics.

How do you think religion influence yourself?	Catholicism	Protestant Christianity
Strong	75	46
Common	82	14
Less	6	5

Table 12: How frequent do you join religious activities?

	The Catholics	The Protestant Christians	Others
Usually	36 (20%)	37 (56%)	
Sometimes	117 (64%)	23 (34%)	
Rarely	29 (16%)	7 (10%)	3

This question aims to investigate the enthusiasm of participating in religious activities. From the table, most of the Catholics only participate in religious activities sometimes, accounting for 64% which constitutes to 117 students. With the Protestant Christians, students attend religious activities in the majority – 56% which constitutes to 37 students. From the point of actual religious experience, the Protestant Christians line power is higher than the Catholics.

4. *The attitude of the diverse religion of college students.*
 4.1 *The attitude of the religion different from own*

Table 13: Will you join different religious activities?

	The Catholics	The Protestant Christians	Others
Yes	66	30	
No	41	24	3
Not sure	58	14	

It can be seen from the table, whether Catholics, 60 students, or Protestant Christians, 30 students, will choose to participate in other religious activities. It is a big premise that the Catholics and the Protestant Christians both practice exclusivity from joining religious activities. From the feedback, the students do not subjectively feel obvious sense of constraints with and restrictions of religion.

Table 14.1: How do you think of the coexistence of many different religions in a country?

	The Catholics	The Protestants Christians	Others
Should be mono-religion	24	18	1
Harmful to social stability	29	5	1
Beneficial to society development	113	40	3

Table 14.2: How do you think of the religion different from yours?

	The Catholics	The protestant Christians	Others
Admit its existence	140	48	3
It should not exist	4	4	
Interested in	35	13	1

Table 14.3: Which religion you may have more interest to touch?

	Respondents
Protestant Christian denominations	102
The Roman Catholic Church	33
Buddhism	20
Islam	8
All of the religions	4
Taoism	2

Hinduism	2
Scientology	1
The Orthodox Eastern Church	1
Confucianism	1
Japanese Shinto	1
Atheism	1

From the above three tables, it can be seen that both the Catholics and the Protestant Christians, most students which are 140 students and 48 students still admit other religions, and there are 113 students and 40 students who think that the coexistence of various religions in a country is conducive to society development. Secondly, about less than half of total number of students which constitutes to 74 are interested to touch other religions. In proportion, the Protestant Christian denomination becomes the most popular religion, which constitutes to 102 students. It is more than triple the number of the Catholic Church. The main reason why they choose is that they think that the Protestant Christian faith is more strong and pure. The third is the Buddhism, which has 20 student respondents. They think Buddhism spirit has strong universality and can meet the needs of people's lives in the current time.

4.2 The attitude of the development of Catholicism in new time

Table 15: Do you think you change your religion?

	The Catholics	The Protestant Christians	Others
Yes	9	3	
No	140	60	4
Not sure	31	6	

From the point of students' subjective view, both the Catholics and the Protestant Christians, the vast majority of students which constitutes to 140 students and 60 students, respectively, do not think of changing their existing religious belief. Evidently, religion has stability, permanent and internalized influences on the part of the believers, hence, students have a firm faith for their beliefs.

Table 16.1: Has Philippines been influenced by globalization?

	Respondents
Yes	196
Less	51
None	6

Table 16.2: How do you think of the future of Catholicism?

	The Catholics	The Protestant Christians	Others
Optimistically developing	140	35	2
Suffering attacks	16	12	
Declining gradually	19	24	2

Table 16.3: Do you think Catholicism need innovation?

	The Catholics	The Protestant Christians	Others
Yes	98	37	4
No	33	7	1
Not sure	40	23	

Table 16.4: What is the insufficiency of Catholicism you think?

	The Catholics	The Protestant Christians	total
Deviated from the original meaning of the Bible	23	5	28
Weakening religious faith inside	23	5	28
The lack of religious internal unity	22	6	28
The decline of gospel spread business	19	3	22
The closed and exclusive character of the Catholics	18	4	22
The decline of the church activity	17		17
The absolutism of the doctrine of Catholicism	16	1	17
The corruption of the Catholic church	13	5	18
The lack of communication between Catholics	10	2	12
The reduce of congregations support	8		8
Also worship for God and the virgin Mary besides Jesus	5	4	9
The shock from Rationalism and	5		5

Atheism			
The contradiction between the church and the government	3		3

According to the characteristics of most Catholic people in the Philippines, the researcher designed the problem to investigate the opinion of college students about the development of Catholicism in the Philippines. Comprehensively, most students whose number accounts to 196 think that the Philippines has been influenced by globalization. Even there are differences in religious beliefs, most of the Catholics, 140 students, and the Protestant Christians, 35 students, believe that the development of Catholicism in the Philippines is positive, but there are 98 Catholic students and 37 Protestant Christian students who generally believe that the Catholic Church needs to be reformed. However, there are also a significant number of students who believe that Catholicism is declining, and the ratio of the choice of the Protestant Christians, 24 students significantly, is higher than the Catholics which constitutes to 19 students.

From the answer of students in objective questions, they think that the biggest 3 problems of the Catholics which all constitutes to 28 students is that its doctrine has deviated from the original meaning of the Bible and do not abide by the classical spirit of Christ. For the Catholics, their inner beliefs are becoming weakened, have lack of internal unity and mutual assistance, and are unsatisfactory both in spirit and operation. Moreover, there is a disadvantage of a loose management, internal corruption and influence reduction in church. Many students point out that in religious meetings, the church is always autocratic, does not consider the views and demands of believers, pushes the believers to accept the claim by rigid thinking, and causes the believers to have psychological disgust.

III. WRITE DOWN YOUR STUDIES AND FINDINGS

A. Bits and Pieces together

1.1 The Catholic is still in the dominant faith

From the survey, most of the college students are Catholics, and do not think of changing their religion. In the historical aspect, the Spanish religion, politics, language policy of rule has carried on the three hundred years of preaching to the Philippines. During the time of new air route, the Spanish royal family has a big enthusiasm on the spread of religion, the imperial power, the church, the priest, the absence of effort on religious rule and the spread the Gospel, which laid a solid foundation to the Catholic development in the Philippines. In the practical aspect, the spread of Catholicism is mainly by generation to generation, the family blood is the main link of religious belief. This kind of form is stable. Also, Catholicism belongs to western religions, it is easier to understand and accept the western ideas and system from the Catholic Church. The political and economic system in the Philippines as well is based on the pattern of the west. The religion aims to give thought to the political and economic system; the political and economic system is to give the support to religion. In the psychological aspect, the reason of most of the Catholic students who believe in religion is the worship for God, and adore for the Catholicism.

Visibly, the believers absolutely get the demand and satisfaction from Catholicism.

Under the action of these three aspects, both in reality and subjectivity of the Philippine Catholicism, all have steady foundation and the power of continuation. So, until today, the Philippines is still the biggest Catholic country in Southeast Asia.

1.2 An open attitude to religion of college students

As can be seen from the survey, the majority of students does not reject other religions, are interested to touch and admit the existence of other religions, and are open to take part in other religious activities. Based on the gathered data, college students respect the existence of personal freedom to believe in religion. Some believes in Catholicism, some commits themselves to being Protestant Christian, and quite a number of students believe in 2 or more religions. Students choose their own religion in acquired environment. But in either case, they generally believe that the coexistence of various religions is conducive to the development of the society. Furthermore, with the progress of social system and technological civilization, especially after World War II, there was the rise of the idea of global atheism for a period of time, leading more and more Filipino college students began to admit the atheism of religion.

The reason is that the Philippines have been influenced by western liberal ideas, especially American culture and thought. The United States aided the Philippines after World War II. In terms of higher education, the United States has offered a chance for study, communication, and access. There were Americans who came to the Philippines to teach, in the same way there were Filipinos who went to the United States to enjoy American education, which lead to the rise of Protestantism in the Philippines since almost all of the teachers from the U.S. are Protestant Christians. A large number of reserved American culture and thought has filling the Philippines higher education community. Because of the age characteristic and economic characteristic, college students become the most vulnerable and the most direct reaction groups of the free and open attitude of religious belief.

1.3 The Protestant Christianity becomes the majority option of college students

The Philippines is actually an immigrant country, many college students are multinational half-blood, and there are resident population of diversity and complexity. In the 19th century, Americans adopted a policy of religious extrusion; it has made a part of the Philippines converted to Protestant Christians. After World War II, the Philippines entirely depends on the economic and political assistance of the United States. By social system working, the Protestant Christians naturally enter the Filipino college students' choice of religious belief associated with the culture and thought of the United States.

From the surveys, the Protestant Christians are strong; the believers have risen to 25% in recent years. The Protestant Christians are more enthusiastic to spread their religion. They participate in religious activities by joining religious groups which is conducive to internal unity and mutual assistance, and strengthens the relationship among believers. Protestant Christians participate in religious activities more often than the Catholics. Protestant Christians also has stronger line power both in psychological belief and religious experience. Therefore, the

number of students choosing to touch the Protestant Christianity is the most, almost twice of the number of the Catholics. Above all, we can tell the great influence of the Protestant Christianity.

IV. GET PEER REVIEWED

V. IMPROVEMENT AS PEER REVIEWER COMMENTS

VI. CONCLUSION

The prospect of religious belief of Filipino college students

1. The Philippines' Catholics has been suffering challenges in the new period

Just like the independent Catholics of the Philippines, national revolution and the campaign against the church in the later, it is the need of era and people to reflect the local religion. Since 20th century, with the influence of globalization, information are becoming more and more profound. On October 11, 1962, it is a Catholic modern revolution that the second Vatican council meeting has made greatly revised about the basic doctrine and practice according to the new period. According to the survey, the majority of college students think that the Philippines has been influenced by globalization, the Philippine Catholicism necessarily will go through the conflict and adaptation under the new period.

In conclusion, the frequency of Catholic college students participating in religious activities is less. To practice religious activities by themselves often and to have less contact with religious groups, most of them also think that less influence of religion to themselves, leads to little enthusiasm to spread their religion. The most important is, it can be seen that the big deficiency of the Catholics from the answer of other students. There is a declining trend of church management, spread of Gospel, religious beliefs, and a normal phenomenon of the erosion of the Catholic priests – a large number of priests and monks give up the career as a result of the reluctance to accept the Catholic tradition, single pledge and obey the pledge, and the weakness of unproductive and authoritarian doctrines of the Catholic church, most believers think the Catholics need to reform to more to match the needs of the Filipinos in life and beliefs.

Visibly, the Philippines' Catholicism is in the period of bottlenecks, and it is inevitable that the globalization influences the Catholicism in the Philippines.

2. The diverse religious values of Filipino college students

Since the 50s of the 20th century, the whole world of mainly western countries has developing fast in economy, science and technology, and culture. Some countries have even entered the "modernization." Religious diversity, is a namely religious phenomenon by the modern period. Diversification, is decentralization and secularization, no longer abide by a sectarian, the religious beliefs has gradually, slowly, long-term to become socialization. There are developments in multiple religions, different sects, and different religious beliefs and

behaviors that communicate to each other and keep the balance. (Ma Rong 2011)

Globalization has weakened regional differences and ideological differences, diversity provides a variety of channels and the possible of religious belief, secular give people the freedom to choose religious belief and practice it. From the feedback of students, most of the believers still have social difficulties and family and economic troubles, so the tendency of secularization of religion is also in order to meet the needs of people in real life. Most students admit that the rationality of other religions, will take part in other religious activities, and are interested in touch other religions, some students believe in multiple religions, that is the religious diversity for real. Huntington described the religious diversity: "this is a hypothesis that exists in the religion, above the 'real', therefore the religious coexistence is a fundamental basis, to transcend self centralism and superiority, also transcend the compatible."

College students hold a tolerance attitude for the religious exclusiveness, regional and antagonistic, whether the Catholics and the Protestant Christianity or other religions, it can be coexist peaceful. The external constraint of the church and family is weakening, instead of the pure belief in the heart of the believers in definition. As shown in the survey, most of the students believe in religion in worshipping God. It can be seen that Filipino college students presents a rational and modern religious diversity values in the new period.

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Variation in Growth and Yield of Tomato at Different Transplanting Time

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Abstract- The present study was carried out to examine the effect of different planting dates on growth, flowering and fruit yield of tomato during November 2013 to April 2014. Three transplanting were done at an interval of 10 days. The different transplanting dates were; December 10, December 20 and December 30. The experimental results showed that different planting dates showed significant influence on growth and reproductive characters of tomato including fruit yield. The first transplanting date, December 10 resulted in improvement of all the attributes including increased plant height (63.54 cm), leaf number (33.3), flower number (71.15 days), fruit number (41.98 days), number of flowers plant⁻¹ (150), number of fruit plant⁻¹ (86.08) and yield per hectare (85 t) compared to 2nd transplanting date, December 20 and 3rd transplanting date, December 30. Therefore, it is suggesting that earlier transplanting produced higher fruit yield of tomato.

Index Terms- Tomato; Transplanting time; Yield

I. INTRODUCTION

Tomato (*Lycopersicon esculentum* L.) is a fruit producing annually cultivated vegetable fruit crop under the family of Solanaceae (Haque *et al.*, 1999). It is native to Western South America and use as a nutritious edible fruit throughout the planet that is grown in both greenhouse and field conditions (Smith, 1994). Tomato is generally grown in the winter season in Bangladesh. Typically, it is herbaceous, 1 to 3 m in height that often sprawl over the ground. The fruit type of tomato is berry with variable in size and weight found in different varieties that can contribute to yield. It contains a large quantity of water (%), calcium (%) and Niacin all of which are of great importance in the metabolic activities of man (Olaniyi *et al.*, 2010). BARI (2010) showed that ripen tomato contains 94 g water, 0.5 g minerals, 0.8 g fibre, 0.9 g protein, 356 mg carotene, 0.12 mg vitamin B-1, 0.06 mg vitamin B-2 and 27 mg vitamin C in each 100 g. At present, it consumes as a raw salad, cooked or as processed food item such as Sauce, Ketchup, Jam, Jelly etc. Climate change is a major threat for crop production not only Bangladesh but also all over the world. Tomato production in Bangladesh is commonly affected due to adverse environmental conditions. In some areas of our country particularly in the northwestern part, the night temperature falls even sometimes go below 5-6°C in late December to January, which results

remarkable yield loss in tomato. Thus late time of sowing or transplanting-induced cold injury exhibit a significant reduction on both growth and yield of tomato. Therefore, this experiment was conducted to examine the influence of different time of transplanting on morpho-physiology and yield of tomato.

II. METHOD AND MATERIALS

The experiment was carried out at Sher-e-Bangla Agricultural University Farm, Dhaka-1207, Bangladesh which located at 90°22' E longitude and 23°41' N latitude at an altitude of 8.6 meters above the sea level under the agro-ecological zone of Modhupur Tract, AEZ-28 during December 2013 to April 2014 to examine the response to different planting time on morphology, yield and yield attributes of BARI Tomato-15. The experiment was laid out in single factors randomized complete block design with five replications. Treatments of the experiment was 10 December 2013 = First transplanting time (T₁), 20 December 2013 = Second transplanting time (T₂), 30 December 2013 = Third transplanting time (T₃). The total plot number was 3 x 5 = 15. The unit plot size was 1.8 m x 1.5 m = 2.7 m². The distance between blocks was 1m and distance between plots was 0.5 m and plant spacing was 50 cm x 60 cm. The land was ploughed with tractor and power tiller for four times. Then the ploughed soil was brought into desirable fine tilth and leveled by laddering. The weeds and stubbles were cleaned properly. The final ploughing and land preparation were done on 1 December, 2013. According to the lay out of the experiment the entire experimental area was divided into blocks and prepared the experimental plot for the transplanting of tomato seedling. In addition, irrigation and drainage channels were made around the plot.

III. RESULT AND DISCUSSION

Plant height (cm):

It is usual that the effect of transplanting time in relation to change of temperature of the environment is reflected primarily in plant height. Many previous authors stated that different days of transplanting-induced cold condition showed the reduction of length of plant axis or height (Chen *et al.*, 1999). In this experiment, the temperature was gradually declining trend during November 2013 to January 2014. The height of 25 day age seedling was also gradually decreasing with different days of sowing or late sowing (data not shown). In this study, late

transplanting of tomato showed a significant reduction in plant height (cm) of tomato (Table. 1). The highest plant height (70.28 cm) was observed from the T₁ which was statistically similar to T₂ (69.86 cm) and the lowest (58.24 cm) was observed from T₃ time of planting at 60 days after transplanting (DAT). The variation of height of tomato plant at different DAT is identical to seedling height of tomato plant. These results indicate that late sowing of tomato have to withstand cold environment. These results are consistent with the findings of Lawahori *et al.*, (1963) who stated that plant height decreased with decreasing trend of temperature. Recently, Srivastava and Srivastava (2007) reported that transplanting time had great effect on the regulation of plant architecture as well as plant height of tomato. Altogether, the present results suggest that plant height of tomato decreased with the late planting from optimum time of our environmental conditions.

Number of leaves plant⁻¹

The leaf number is a fundamental morphological character for plant growth and development as leaf is the main photosynthetic organ. To investigate the effect of different days of transplanting of tomato on changes in the number of leaves plant⁻¹ up to 60 DAT, the number of leaves were counted. Different days of transplanting showed a significant influenced on the formation of leaves plant⁻¹ in tomato (Table. 1). The highest number of leaves plant⁻¹ (71.76) was observed from the T₁ and the lowest (34.50) was observed from late transplanting, T₃ time. These results showed that the highest number of leaves plant⁻¹ found from early transplanting time and minimum number

of leaves was observed at late transplanting when the temperature was gradually declining that creates cold stress to the late planting plants. Hossain *et al.* (1986) reported that early sowing enhanced total number of leaves plant⁻¹. Therefore, altogether this experimental result indicates that the number of leaves plant⁻¹ of tomato will be decreased at late planting under our environmental conditions.

Number of branches plant⁻¹

Branches plant⁻¹ of tomato were significantly influenced by transplanting times (Table. 1). The highest number of branches plant⁻¹ (8.981) was observed from the T₁ which was statistically similar to T₂ (8.574) and the lowest (5.537) was observed from T₃. Among dates of planting, early planting recorded the highest vegetative growth Singh *et al.* (2005). Number of branches plant⁻¹ was found to be gradually decreased with the late transplanting dates (Mira *et al.*, 2011). Therefore, the presented results are consistent with many other previous findings published.

SPAD value

There was a clear effect of transplanting time on the SPAD value of tomato plant leaf for T₁, T₂ and T₃ (Table. 1). The SPAD value of tomato leaves higher in T₁ other than T₂ and T₃ decreased at late transplanting. The highest SPAD value was observed from the T₁ (59.83) and the lowest (54.30) was observed from T₃. From this experiment it was observed that the SPAD value decreased gradually when transplanting of tomato done at early December to late December.

Table: 1. Data on plant height, number of leaves, SPAD value and number of branches of tomato as influenced by different transplanting time.

Time	Plant Height	Leaf No.	Branch No.	SPAD value
T ₁	70.28 a	71.76 a	8.981 a	59.83 a
T ₂	69.86 a	44.61 b	8.574 a	56.39 b
T ₃	58.24 b	34.50 c	5.537 b	54.30 c
LSD _(0.05)	3.429	6.205	1.121	1.383
CV (%)	7.65	18.21	19.16	3.59

Number of flowers plant⁻¹

Planting time had significant effect on number of flowers plant⁻¹ of tomato (Table. 2). The highest number of flowers plant⁻¹ was observed from the T₁ (149.9) and the lowest (137.3) was observed from T₃ treatment which was statistically similar to T₂ (140.9). Hossain *et al.* (1986) reported that early sowing enhanced total number of flowers plant⁻¹. From these results, it was found that the early transplanted tomato seedlings produce more flower than lately transplanted tomato seedlings.

Number of fruits plant⁻¹

Number of fruits plant⁻¹ of tomato showed significant differences in response to transplanting time (Table. 2). The highest Fruits number plant⁻¹ (86.08) was observed from the T₁ which was statistically similar to T₂ (84.04) and the lowest (73.89) was observed from T₃. Maximum number of fruits plant⁻¹ from early and the minimum from late transplanting due to high temperature (BARI, 1989). Adelana (1976) and Drost and Price (1991) had also reported that late transplanting reduce fruits

number and early showed increasing trend. Jong *et al.* (2009) had reported that the initiation of tomato fruit growth, fruit set, is very sensitive to environmental conditions. So it can easily understand that environmental condition regulate the number fruits plant⁻¹ as when near optimum temperature was present produced the highest number of fruits and in unfavorable temperature condition decreased the number of fruits plant⁻¹.

Fruit diameter (cm)

In this study planting time showed significant variation in the fruit diameter (cm) of tomato (Table. 2). The highest fruit diameter (5.50) was observed from the T₁ which is statistically similar with T₂ (5.41) and the lowest (5.31) was observed from T₃ treatment. Madhumathi and Sadarunnisa (2013) reported that date of transplanting affected the fruit diameter of tomato. From the study of results it was found that early transplanting provide higher fruit diameter than the late transplanted tomato plant.

Fruit length (cm)

As consistent to fruit diameter planting time had significant influenced on fruit length (cm) of tomato (Table. 2). The highest fruit length (6.24) was observed from the T₁ which was statistically similar to T₂ (6.19) and the lowest (5.96) was observed from T₃. These data showed that early transplanting

time increased fruit length (cm) in contrast to late transplanting. Madhumathi and Sadarunnisa (2013) had reported that early transplanting showed the maximum fruit length of tomato fruit among different varieties.

Table: 2. Data on Flower number, Fruit Number, Fruit Diameter and Fruit length of tomato as influenced by different transplanting time.

Time	Flower No.	Fruit No.	Fruit Diameter	Fruit length
T ₁	149.9 a	86.08 a	5.503 a	6.237 a
T ₂	140.9 b	84.04 a	5.408 ab	6.195 a
T ₃	137.3 b	73.89 b	5.306 b	5.963 b
LSD (0.05)	7.555	4.912	0.1645	0.1560
CV (%)	7.82	8.91	4.49	3.74

Yield (kg plot⁻¹) and (t ha⁻¹)

As morphological characters the yield of tomato also significantly reduced by late transplanting-induced cold stress (Fig. 1, A and B). The highest yield plot⁻¹ (21.73 kg) and yield ha⁻¹ (80.46 t) were observed from the T₁ and the lowest yield plot⁻¹ (15.80 kg) and yield ha⁻¹ (58.53 t) were observed from T₃ or late planting. The results of both yield (kg plot⁻¹) and yield (t ha⁻¹) of tomato is gradually decreasing with the late transplanting, T₃. These results are consistent with the yield contributing characters which are analyzed in this experiment such as number of flowers plant⁻¹, fruit diameter and fruit length (Table. 2). These information are also dependable on growth measuring parameters of this study (Table. 1). In addition,

Sanjoy (1999) showed a declining trend in fruit yield and other yield attributing characters when planted lately. Tongova and Zhelev (1975) reported that early sowing or early planting of tomato gave increased yield. Previous authors reported as well that early transplanting of tomato gave increased fruit weight and yield of tomato (Adelana 1976). These results suggest that suitable transplanting time is more favorable to produce highest plant height, leaf number, branch number as a result higher flower produced which enhance the higher fruit set and development i.e. fruit diameter and length of tomato which contribute to maximum yield than late transplanting-induced cold injury.

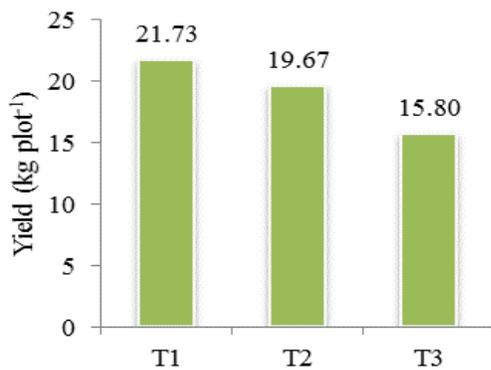


Fig. : 1. A

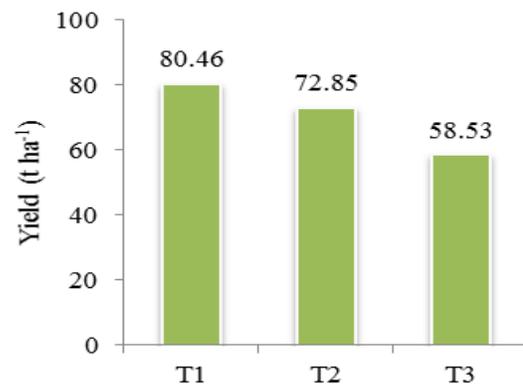


Fig. : 1. B

T₁ – First transplanting time, 10 December 2013
T₂ – Second transplanting time, 20 December 2013
T₃ – Third transplanting time, 30 December 2013

Fig. : 1. Effect of transplanting time on the yield plot⁻¹ in kg (A) and yield in t ha⁻¹ (B) of tomato (LSD_{0.05} = 1.150 and 4.259 for yield kg plot⁻¹ and t ha⁻¹ respectively).

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System using Multiple Encryption on Web Based Internet Voting System

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Abstract- In This Paper things is becoming online, so human tendency has changed, they try to do every things from home using Internet. Election is also becoming online Here an image based and biometric authentication is used. Use of homomorphic technique encrypts the casted vote stored securely in vote casting and recording server. Also the system is very user friendly.

Index Terms- web server, digital signature, internet voting.

I. INTRODUCTION

Election and voting are well known things in modern days of Democracy. Electronic online voting over the Internet would be much more profitable. Many voters would appreciate the possibility of voting from anywhere. A Electronic voting, as the name implies, is the voting process held over electronic media, i.e. computers. In general, such internet voting system should satisfy such requirements as Accuracy, Simplicity, Democrac., Privacy, Security. For such an internet voting system, security and privacy are main concerns. From that point of view, an implementation of secure Internet voting system appears to be another application of cryptography and network security. Pashine, ninave and kelapure proposed an android dais for online voting system. This request provide change of long procedure also offer security to the voter and its voter coziness system voter no need to go polling booth easily vote for candidate in hometown itself. And also provide the option of gesture recognition but authentication is the problem of android platform. On server side decryption of that vote is done before counting. We require two keys for this purpose one for encryption on voter system, which should be publicly known and second key for decryption of encrypted vote before counting on voting server, this key must be private. So for this purpose we need a pair of asymmetric keys. To provide security from active intruder who can alter or tamper the casted vote when vote is transferring from **voter** to voting server, we are using digital signature. When a voter cast his/her vote after that he/she will digitally sign on that by using his/her own private digital signature, and send this to voting server, on voting server side that signature is checked by digital signature verifier of that voter which is publicly known. For this purpose each voter should have a private digital signature and a public digital signature verifier, for this we are using a pair of asymmetric keys for each registered voter. In this application which is partitioned into three panels on the basis of its users as follows: Admin Panel: This panel will be specifically used by members of election commission to administer all the electoral processes including registrations of candidates & voters; and monitor all other actions

carried out by them. Candidate Panel: This panel will be specifically used by electoral candidates to interact with the election commission & voters which will help them to work efficiently not only before the election but also after the election if elected. Voter Panel: This panel will be specifically used by each individual voter who is eligible for casting his vote i. e. a person ageing 18 years or the above. These are the main users, for whom the application is developed. Online voting system security is main concern. In online voting process maintain the strict privacy and uprightness of the vote casted and authentication before voter is cast their votes. An online voting system authentication is the main problem, only approve someone can give their vote. Person can be authorizing by some methods that can be personal identification number (PIN), secret message user identity proof. All authenticated data can be collocated by user. All authentications are verified by main database then allow for that voter to vote for candidate. Authentication is verified by biometric identification process and steganography.

II. LITERATURE SURVEY

1] Ninave Pashine and kelapure proposed an android dais for online voting system. This request provide change of long procedure also offer security to the voter and its voter coziness system voter no need to go polling booth easily vote for candidate in hometown itself. And also provide the option of gesture recognition but authentication is the problem of android platform.

2] Pradhi and Jambhulakar, chakole proposed a novel security for online voting system by using multiple encryption schemes. Provide security for cast vote when it is submitted from voting polling station to voting stored server. Multiple encryptions to pass up DOS attack. Security provide obedient as well as lively interloper. This system is to take a decision of certain issues. This paper use cryptography concepts to take Advantages of digital signature. Encrypting the send forth vote to client server then send to server with the help of internet. After sending encrypted vote then server side decrypt the vote before counting. On server side decryption process of that vote is done before counting casted vote. We need two keys for this cause one for encryption on voter side system, which should be easily known and second key for decryption of encrypted vote before counting casted vote on voting server, this key must be confidential.

III. PROPOSED SYSTEM

In proposed system user does registration process first. Send all information to authentication server send password and ID Advantages of digital signa-ture. Encrypting the send forth vote to clientserver then send to server withthe help of internet. After sending encrypted vote then server side decrypt the vote before counting. On server side decryption process of that vote is done before counting casted vote. We need twokeys for this cause one for encryption on voter side system, which shouldbeeasily known and second key for decryption of en- crypted vote before counting casted vote on votingperson ageing 18 years or the above. These are the main users, for whom the application is developed. Online voting system security is main con- cern. In online voting process maintain the strict privacy and uprightness of the vote casted and authentication before voter is cast their votes. An online voting system authentic cation is the main problem, only approve someone can give their vote. Person can be authorizing by some methods that can be theform personalidentification number (PIN), secrete messageuser identity proof. All authenticated data canbe collocated data to voter

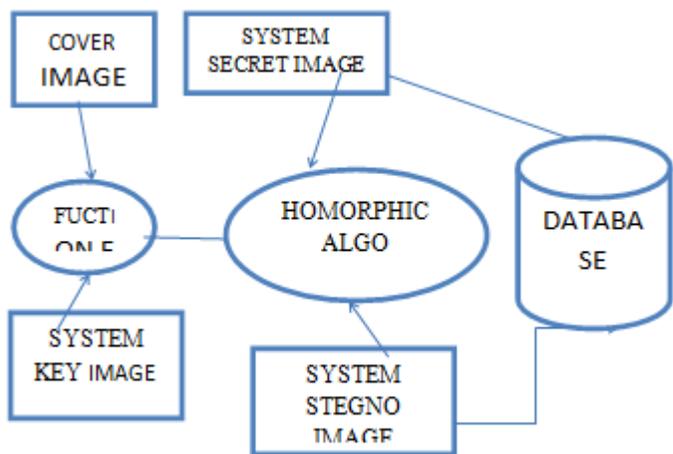


Fig 1: function stegno image for system

Online Voting System For Web based Purpose is shown in fig1.



Fig 2:Online first page for the system is shown in fig 2

IV. CONCLUSION

In this Paper biometric authentication with secure approach will be done In previous system cannot provide different online voting system is technique is studied based on homomorphic encryption casted vote is not stored securely or separately. We are providing security casted vote and only authenticated person is cast their vote .

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Studying the Relation between the Electron Temperature, Maximum Peak Height and Maximum Electron Density for F2 Region as a Function of Solar Activity

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Abstract- This research aims to study the effect of the solar activity on the correlation between the electron temperature T_e with both maximum peak height $hmF2$ and the maximum electron density $N_{e,max}$ for F2 region. The data used has been obtained using the International Reference Ionosphere IRI-2012 model which gives overall description of ionospheric parameters. The results show that the effect of high solar activity on the cross correlation coefficient (CCC) of (T_e with $hmF2$) has an intangible change at equator and no correlation will control it, while for other latitudes, the high solar activity try to shift the CCC from negative to no correlation especially at high latitudes. The second correlation (T_e with $N_{e,max}$), CCC at equator change from positive correlation to no correlation. For mid latitude, the process is opposite. Finally, for high latitude, the process is a typical for an equator.

Index Terms- Ionosphere, Electron Temperature, F2 region, Electron density, Solar Activity

I. INTRODUCTION

Solar soft x-ray and extreme ultra violet (EUV) photons ionize a fraction of the neutral atmosphere. Resulting photoelectrons and secondaries produced by electron impact ionization with energies in excess of their surroundings, referred to as the supra thermal electron population, ionize neutral species further or heat up the ambient plasma. Thermal electrons that are heated by the supra thermal electron population cool down through interactions with colder ions and neutrals.

Heat exchange between ions and other particles occurs through collisions. This fundamental heating process drives plasma temperature in ionosphere. Also, precipitating particles or solar wind interactions at the upper atmosphere can introduce additional heating source to the local plasma. The thermal structure of plasma can affect ion-chemistry and dynamics. Several chemical reactions rates have direct or inverse plasma temperature dependence [1]. The electron temperature can be studied using the theoretical models and observation. The theoretical model produces time-dependent, three dimensional distributions for the ion-temperature and the ion (NO^+ , N_2^+ , O_2^+ , N^+ , O^+ , He^+) and electron densities. The observations include the data aided by both satellite and ground based stations [2].

The main energy source responsible for space and time variations of meteorological parameters is the visible/infrared

solar radiation intercepted by the earth. Also, the upper atmosphere (ionosphere) arises from ionization of different constituent gaseous molecules by the atmospheric absorption of solar radiations of the wavelength less than 1026 Ao. It should be expected that the change in solar energy or in its distribution would produce changes in climate and also in the ionosphere. It has a periodicity of approximately 11 years, whose most obvious aspect is the sunspot number [3].

L.H. Brace et al developed an empirical model of the interrelationship of electron temperature and density in the daytime thermosphere at solar minimum [4]. T.L. Gulyaeva et al, have been used data from 23 ionospheric stations for September 1999 to produce the electron temperature, T_e , at the F2 layer peak height, $hmF2$, on the base of empirical relation between T_e and the electron density, N_e , at a given height for a given index of solar radio flux [5]. A. V. Pavlov develop a new theoretical model of the Earth's low and mid latitude ionosphere and plasmasphere. The new model uses a new method in ionospheric and plasmaspheric simulations which is a combination of the Eulerian and Lagrangian approaches in model simulations. The electron and ion continuity and energy equations are solved in a Lagrangian frame of reference which moves with an individual parcel of plasma with the local plasma drift perpendicular to the magnetic and electric fields [6].

Scope of the study

The aim of this study is to investigate the effect of the solar activity on the correlation between the electron temperature with both the maximum electron density $N_{e,max}$ and the maximum peak height $hmF2$ using the data presented by the International references Ionosphere (IRI)-2012 model <http://iri.gsfc.nasa.gov>.

II. DATA SELECTION AND ANALYSIS

The ionospheric electron temperature, maximum electron density and maximum peak height were obtained using the International Reference Ionosphere (IRI)-2012 model. The International Reference Ionosphere (IRI), a joint project of URSI and COSPAR, is the de facto international standard for the climatological specification of ionospheric parameters and as such it is currently undergoing registration as Technical Specification (TS) of the International Standardization Organization (ISO). IRI by charter and design is an empirical model based on a wide range of ground and space data. It describes monthly averages of ionospheric densities and

temperatures in the altitude range 50–1500 km in the non-auroral ionosphere. Since its inception in 1969 the IRI model has been steadily improved with newer data and with better mathematical descriptions of global and temporal variation patterns. A large number of independent studies have validated the IRI model in comparisons with direct and indirect ionospheric measurements not used in the model development [7].

III. RESULTS

To study the effect of the solar activity on the correlation between the electron temperature with both the maximum peak height (hmF2) and maximum electron density (N_{max}F2), data estimated by IRI-2012 model have been adopted for two levels of solar activity YSSN=9 and 119. Figures (1 -3) show the local time variations of T_e, hmF2 and N_{max}F2 for YSSN=9, 119, and for four different latitudes.

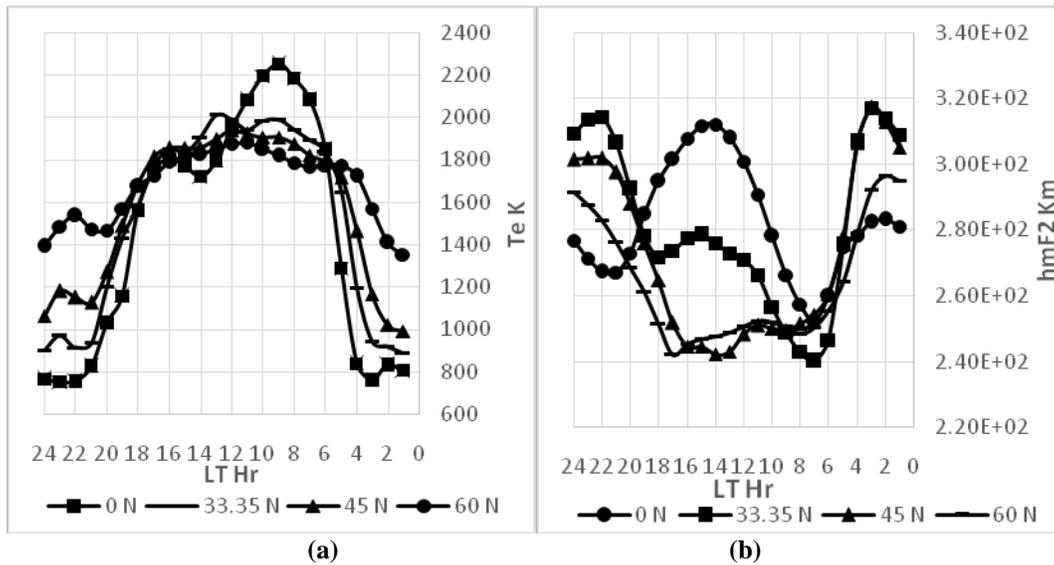


Figure (1): The local time variations for (a) electron temperature T_e, (b) maximum peak height hmF2 for YSSN=9

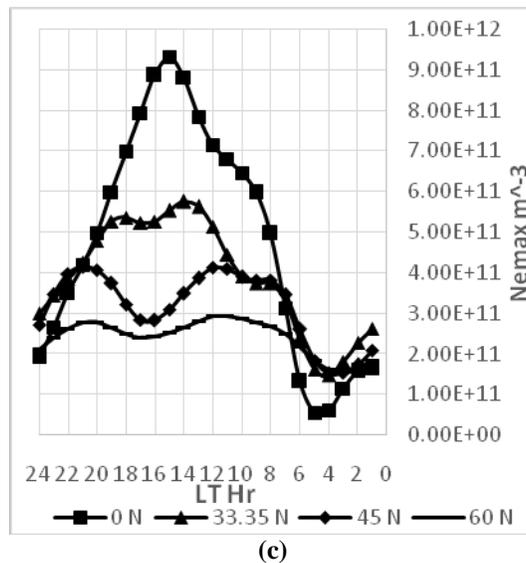


Figure (2): The local time variations for (c) maximum electron density N_{e,max} for YSSN=9

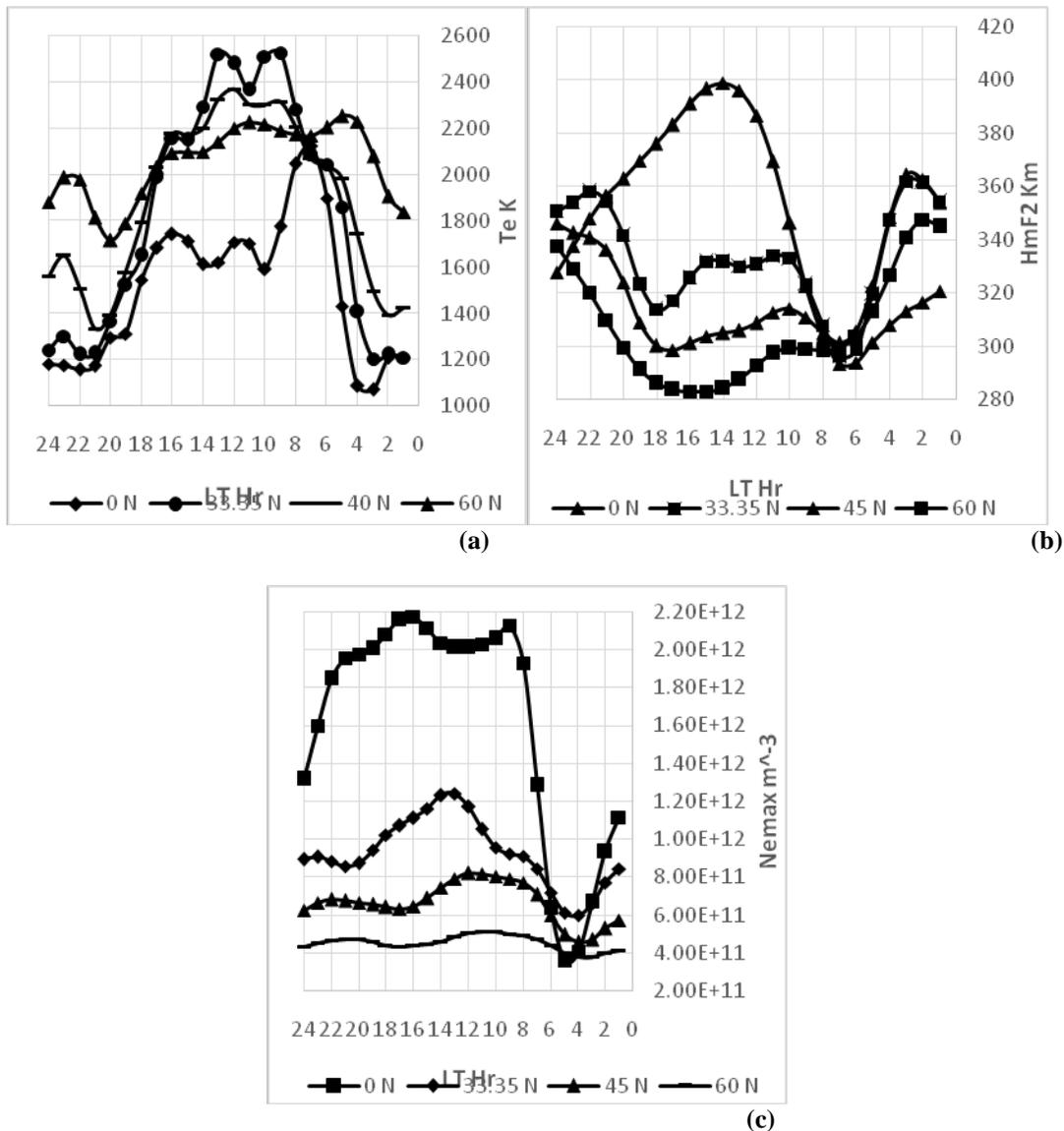


Figure (3): The local time variations for (a) Electron temperature T_e (b) maximum peak height $hmF2$ (c) $N_{e,max}$ for YSSN=119.

From figures (1-3) some important notices can be observed. Generally, it is seen that the T_e and $N_{e,max}$ and $hmF2$ have greater values for YSSN=119 than for YSSN=9. Also, the day values of both electron temperature T_e and electron density $N_{e,max}$ are greater than for night hours. While $hmF2$ has greater values at night and decreasing through day hours except for equator and low latitudes where there is a strong dependency of $hmF2$ on dynamic forces such as electric fields and neutral winds [8]. Results analysis according to latitude have a significant index because the $N_{e,max}$ has greater value at equator and low latitude than for other latitudes and for two solar activity levels. The differences between the day and night values of both the electron temperature and electron density are due to heating and

ionization respectively by solar emissions which increases at times of high solar activity, and higher ionization for equator and low latitude. The latitudinal distribution of $hmF2$ shows a maxima at the geomagnetic equator, gradually decreasing on both sides of the equator. Our investigation shows that the peak over the geomagnetic equator is prominent during daytime, but becomes weaker during nighttime [8]. Figures (4-10) show the correlation between the electron temperature with both the maximum electron density $N_{e,max}$ and maximum peak height $hmF2$ for YSSN=119 and YSSN=9 respectively and for four latitudes.

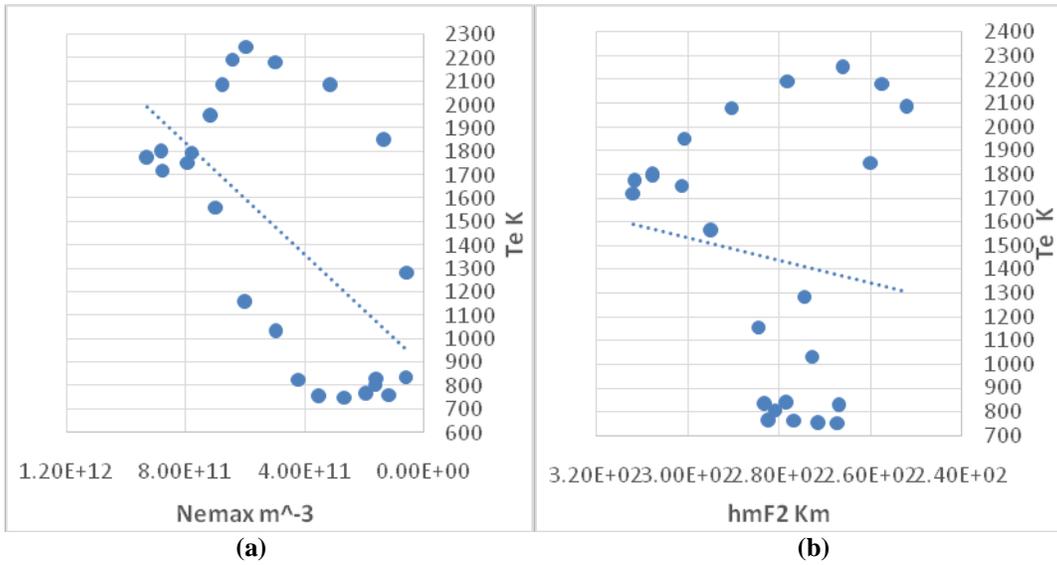


Figure (4) the correlation between T_e with both (a) N_{max} and (b) $hmF2$ for YSSN=9 for latitude=0 N

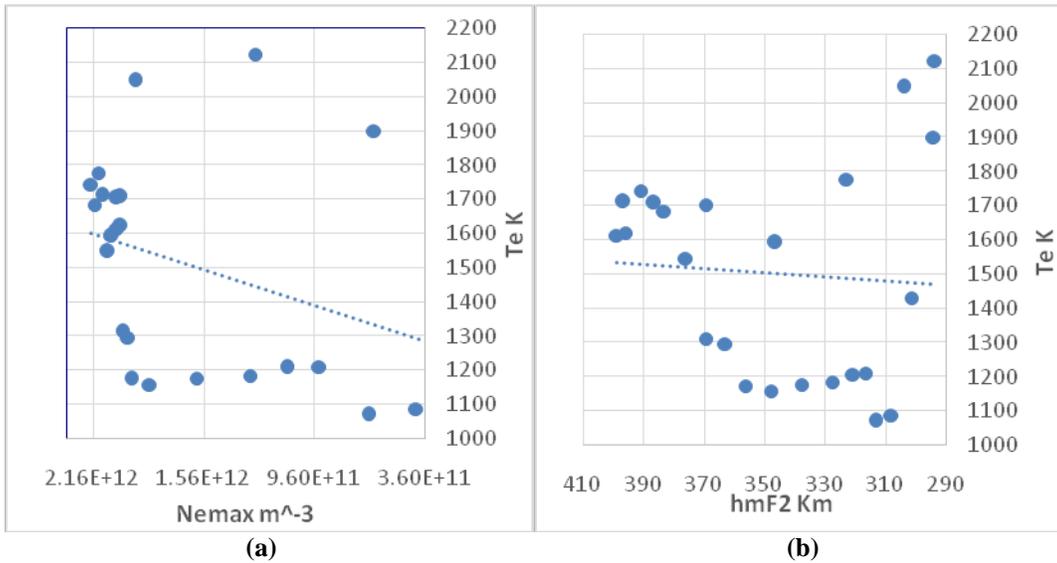


Figure (5) the correlation between T_e with both (a) N_e and (b) $hmF2$ for YSSN=119 for latitude= 0 N

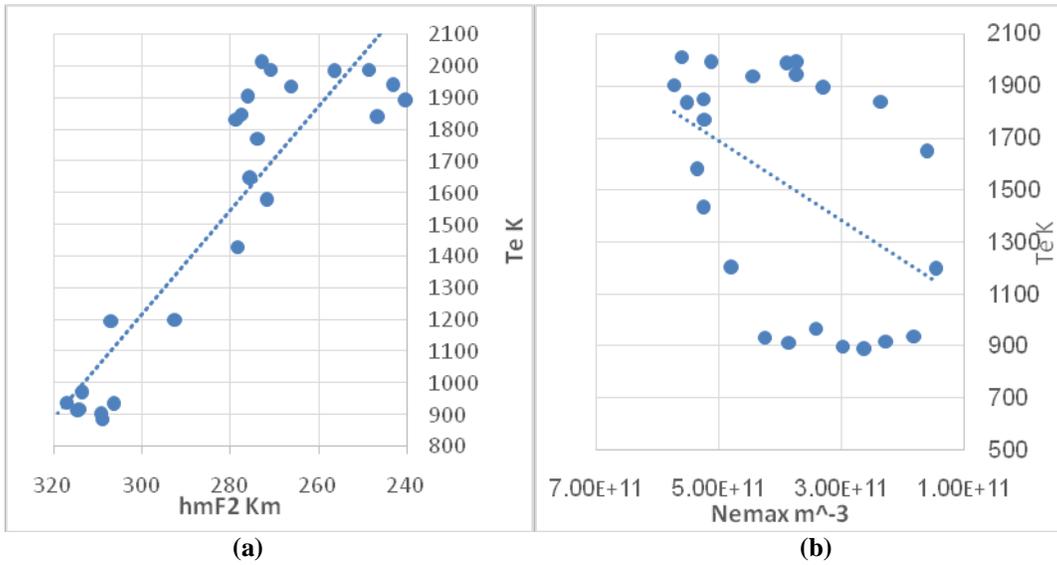


Figure (6) the correlation between T_e with both (a) N_e and (b) $hmF2$ for YSSN=9 for latitude=33.35 N

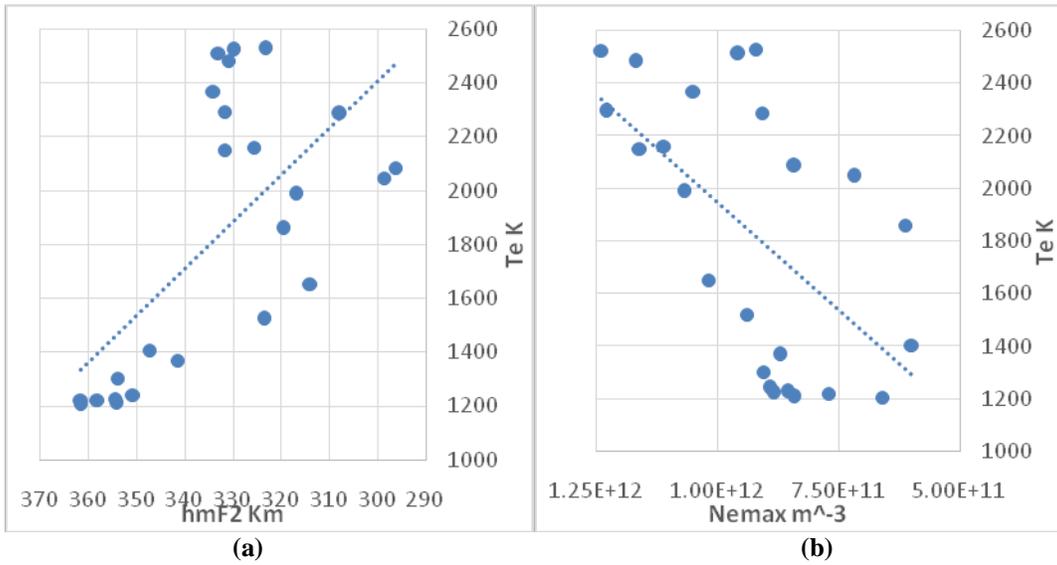


Figure (7) the correlation between T_e with both (a) N_{max} and (b) $hmF2$ for YSSN=119 for latitude= 33.35 N

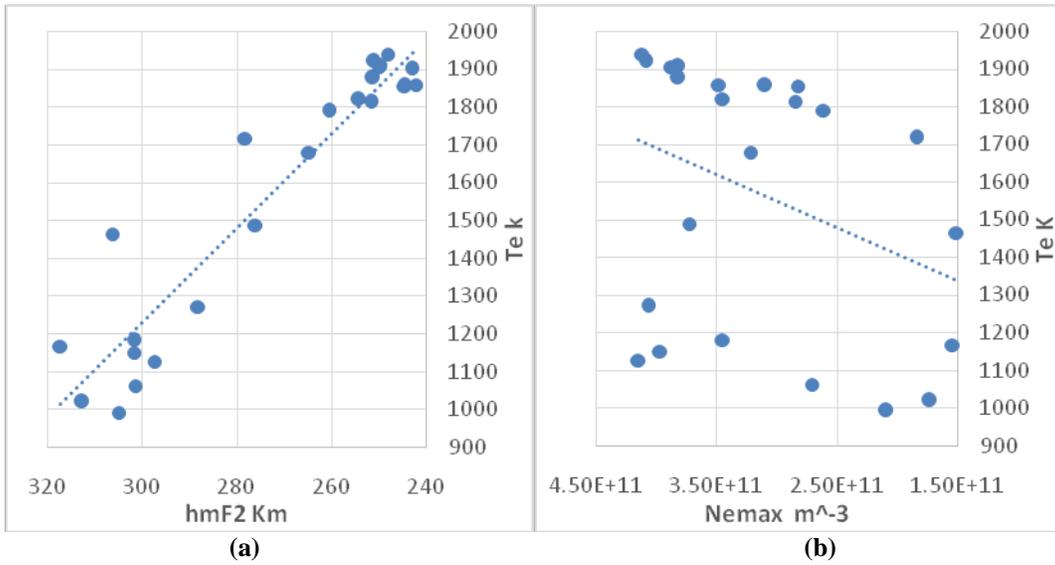


Figure (8) the correlation between T_e with both (a) Nmax and (b) hmF2 for YSSN=9 for latitude=45 N

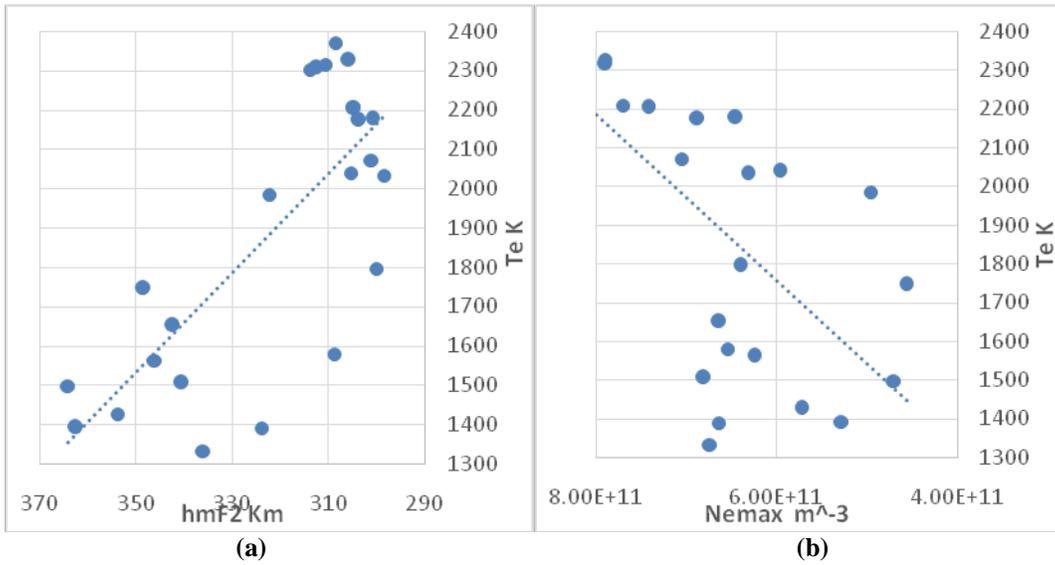


Figure (9) the correlation between T_e with both (a) Nmax and (b) hmF2 for YSSN=119 for latitude= 45 N

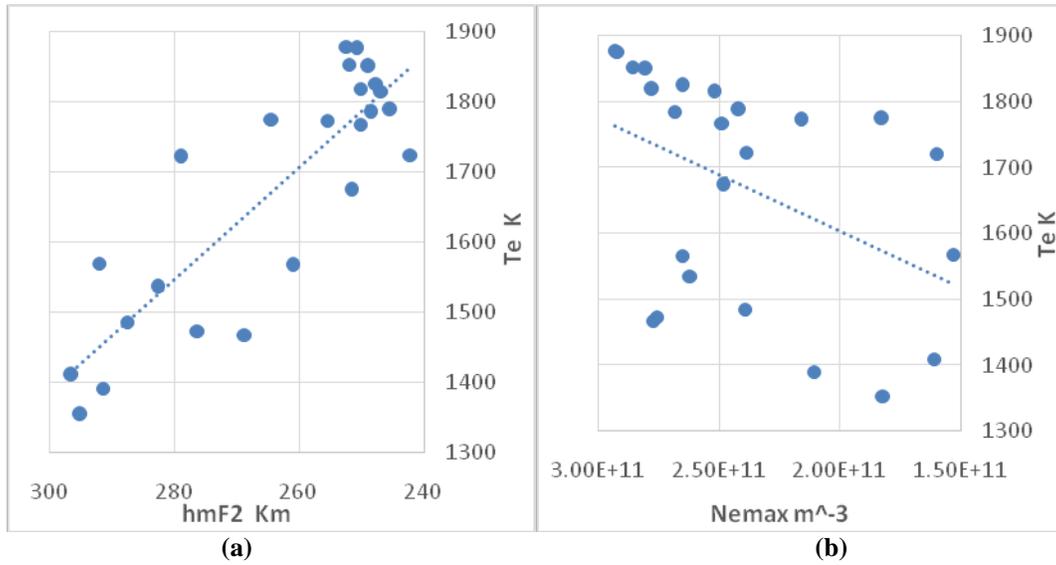


Figure (10) the correlation between T_e with both (a) N_{max} and (b) $hmF2$ for $YSSN=9$ for latitude= $60 N$

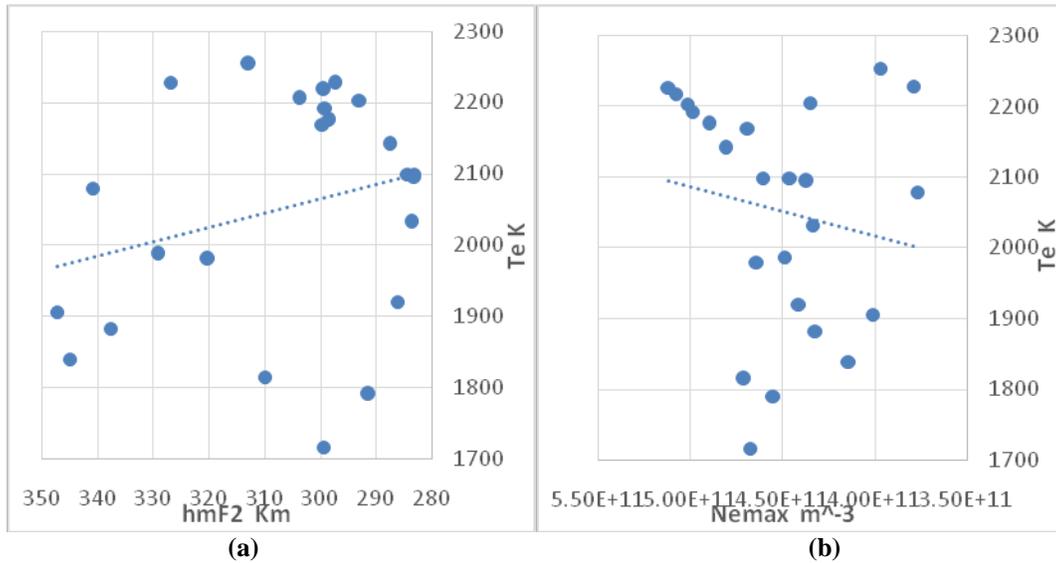


Figure (11) the correlation between T_e with both (a) N_{max} and (b) $hmF2$ for $YSSN=119$ for latitude= $60 N$

To reveal the degree of correlation between T_e with both $hmF2$ and N_{max} for different latitudes and two solar activity levels it is of interest to use more important statistical parameter called cross correlation coefficient (CCC) given by [8]

$$CCC = \frac{\sum_{i=1}^{24} (hmF2_i - \overline{hmF2})(T_e - \overline{T_e})}{\sqrt{\sum_{i=1}^{24} (hmF2_i - \overline{hmF2})^2 \sum_{i=1}^{24} (T_e - \overline{T_e})^2}}$$

The bound in CCC equation gives $-1 \geq CCC \geq +1$ which indicating maximum correlation and 0 indicating no-correlation. A high negative indicates a high correlation but inverse of the series. Equation above can be suited for another correlation. Applying this equation for four latitudes each two levels of solar activity resulted in table (1).

Table (1) the values of the Cross Correlation Coefficient (CCC) for different latitudes and solar activity

Latitude (N)	0		33.35		45		60	
YSSN	9	119	9	119	9	119	9	119

Te Vs. hmF2	0.148	0.068	-0.903	-0.653	-0.945	-0.754	-0.857	-0.26
Te Vs. N_{emax}	0.608	0.340	0.467	0.582	0.353	0.633	0.437	0.163

From table (1) and for latitude (0 N), the correlation between N_{emax} and hmF2 has roughly no correlation for both two solar activity levels, where CCC=0.1483 and 0.0688 for YSSN=9 and 119 respectively, while for mid latitudes (33.35 N and 45 N), the values of CCC for 33.35 N and 45 N are -0.9034 and -0.9452 for YSSN= 9 and 119 respectively, increasing to -0.6534 and -0.7543 for YSSN=9 and 119 respectively which all represent highly negative correlation. Finally for high latitude (60 N) the value of CCC changes from -0.8575 (high negative correlation) to -0.2067 (no correlation). The second correlation shows more accurate than the first correlation. The CCC for equator equal 0.6086 and 0.3402 for YSSN=9 and 119 respectively which shows the effect of increasing the solar activity for equatorial ionosphere. In the mid latitudes, 33.35 and 45 N, the increasing of solar activity rises up the degree of correlation where CCC for 33.35 N equal 0.467 and 0.5819 for YSSN =9 and 119 respectively, while for 45 N, the CCC ranges from 0.3529 to 0.6336 respectively. Finally, for high latitude 60 N, the CCC decreases from 0.4375 to 0.1636 for YSSN equals 9 and 119 respectively.

IV. CONCLUSION

From figures (1-3), some important conclusions will be show for this study. The local time variations of T_e, N_{emax} and hmF2 have a greater values for high solar activity than for low solar activity due to increasing the intensity of the solar emissions which leads to high ionization and heating which rises up. At equator, N_{emax} has the maximum value than other latitudes. The local time variation of the hmF2 has an important departest, it has an opposite behavior for equator than other latitudes which values rise up at day time and goes down at night hours. Also, from figures (4-11), firstly, two types of correlations between T_e with hmF2 have been observed, no correlation at equator and negative correlation at other latitudes. The solar

activity has no strongly effect on this correlation (Te vs. hmF2) at mid latitudes while has a marked effect at high latitudes. For second correlation (T_e vs. N_{emax}), the effect of the solar activity is to decreasing the correlation at equator and high latitude and vice versa for mid latitudes.

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Impact of Service Quality on Customer Satisfaction of Public Sector Commercial Banks: A Study on Rural Economic Context

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Abstract- The products and services offered by banks are very similar. The differentiator is the level of service quality. Many studies have been conducted to explore the impact of service quality on customer satisfaction in retail banking. However; it finds fewer studies conducted to identify the impact of Human Related and Non-Human Related Factors of perceived service quality on customer satisfaction with special reference to rural economic contexts. Alongside the research context briefed, the key purpose of this study was to examine how perceived service quality factors impact on Customer Satisfaction. Data was collected through a sample of 210 respondents from Puttlam District. A deductive approach was employed to construct the conceptual framework and accordingly hypotheses were formed. Survey method was followed for the data enumeration and SPSS 20 software packages has been used for data analysis. The hypotheses were tested using Co-relations and Regression analysis. Findings revealed that the Human Related Factors of perceived service quality have a greater impact on customer satisfaction whereas Reliability and Responsiveness are the most influential factors on customer satisfaction. Managerial implications and the research propositions were suggested for the service marketing sphere at the conclusion.

Index Terms- Customer Satisfaction, Perceived Service Quality, State Commercial Banks, Rural Economy, Sri Lanka

I. INTRODUCTION

Banking sector plays a significant structural role for any given case of industry or economic growth whereas rural economies extendedly demand such institutional and structural contribution. Moreover, service sector including commercial banking institutions obviously steers the nerve point of industrial growth of any economy. During the past two decades or so, regulatory, structural and technological factors have significantly changed the banking environment. This has led to an intense competition among banking service providers. Bank management must develop customer-oriented strategies in order to compete successfully in the competitive retail banking environment. In commercial banks, customer satisfaction is regarded as the primary criterion used to assess the relationships of banks with the market (Munari, Ielasi & Bajetta, 2013). Therefore, it is important for commercial banks to ensure maximum customer satisfaction. The products and services offered by banks are very similar in the industry, but the differentiator is the level of service quality and how the customers perceive it. Perceived

service quality is the customers' overall impression of the relative inferiority or superiority of the organization and its services. Customers in the present banking environment are knowledgeable and highly demanding, due to rapidly developing information technology and advanced communication channels. The present competitive business environment facilitates customers to switch banks easily seeking better options for higher levels of satisfaction. This is a major challenge to the banks. (Silva, 2009). With the above insights on customer satisfaction, the present study is focused on the perceived service quality and customer satisfaction of the state commercial banks in the rural economic context Sri Lanka.

II. PROBLEM STATEMENT

The Services sector accounts for 56.6% of GDP reporting 5.3% growth in value added terms in 2015, in comparison to the growth reported as 5.2% in the year 2014. The robust growth of 15.8% in financial service activities, largely contributed to the Services sector growth. (Annual Report, Central Bank of Sri Lanka 2015). Further it indicates that banking sector was found to be robust during 2014 and continued to expand its asset base maintaining its lead role in the financial sector. As at end of 2014, the total banking network of 34 banks included 25 Licensed Commercial Banks (LCB), of which 12 were branches of foreign banks, and 9 Licensed Specialized Banks with a branch and other banking outlet network of 6,554 and ATM network of 2,635, in last five years. (Performance Review 2015 IBSL). Therefore, banking could be recognized as a key industry in the service sector which demarcates one of the critical financial mechanisms of the economy. However, the context has not been properly studied in terms of performance, consumer behavioral responded and competitiveness. Customers of public sector banks experienced a higher service gap compared to the private sector banks. The process efficiency and interactive service marketing are comparatively poor in public sector banks (Dissanayake & Wanninayake, 2007). Amanfi and Benjamin, (2012) said that the public-sector banks have been seen as lethargic and non-responsive to the needs of the customers. Issues such as poor working conditions, poor work ethics, outdated systems, procedures and practices among others, conspire to impact adversely on service quality delivery by public sector organizations. Therefore, Service quality particularly in the public-sector banks has become ever more important in improving customer satisfaction.

Further, Dissanayake, Wasantha&Jinadasa (2016) said that the services sector including commercial banks need to focus on non –financial perspectives in terms of service performance, consumer behavioral responses and it is an area to be examined further.

Meanwhile, service quality aspects have been fragmented as: Human Related Factors of perceived service quality and Non-Human Related Factors of perceived service quality on customer satisfaction providing a new notion to be examined (Silva, 2009). Moreover, institutional service delivering excellence has been recognized as one of the key detriments to assist for the wholesome development where rural economies are considered as strategically a sensitive scope for the said matter (Wasantha, Ali &Goash, 2015). Further, Dissanayake, et.al. (2016) stated that the commercial banking sector need more consumer driven service improvements to enhance the overall performance including commercial banks as a postulated segment. Alongside, Sri Lankan Development Indexes show the insights of the growth of regional economies. Adding to this point, Puttlam district has been claimed as one of the less considered economic contexts in Sri Lanka (Central Bank Annual Report 2015). It has specifically referred the need of institutional and knowledge related inputs for such segments to accelerate the development phenomenon. Thus, studying how public sector commercial banks perform in such economic contexts could be an extendedly important matter to provide empirical knowledge for the needful development matters, for instance, consumer behavioral perspectives towards service related performance (Dissanayake et.al. 2016, Wasantha et.al. 2015, Dissanayake& Ismail, 2015). Therefore, examining consumer's perception towards the service quality delivered by public sector commercial bank could address to the empirical and practice-related knowledge gaps in Sri Lanka whereas special reference to rural economic sphere could provide a significant knowledge contribution in par with the notions specified in rural economic development potential (Wasantha, et.al., 2015). Accordingly, this paper has figured out its research problem as how far the perceived service quality of state commercial banks has influenced perceived customer satisfaction in the context of Puttlam district which represents critically important economic contexts in the rural segment of Sri Lanka.

Research Questions

1. How do Human-Related Factors of service quality (Reliability, Responsiveness, Assurance, and Empathy) influence on perceived customer satisfaction?
2. How do Non-Human-Related Factors (Tangibility) of service quality influence on perceived customer satisfaction?
3. How differently Human-Related Factors and Non-Human Related Factor influence on customer Satisfaction?

III. OBJECTIVES OF THE STUDY

1. To identify the impact of Human-Related service quality factors towards the perceived customer satisfaction in commercial banking sector.
2. To identify the impact of Non-Human Related service quality factors towards the perceived customer satisfaction in commercial banking sector

3. To evaluate the relationship between service quality and perceived customer satisfaction.
4. To propose recommendations to enhance perceived customer satisfaction in banking industry.

IV. LITERATURE REVIEW

Empirical studies indicated that service quality has been increasingly recognized as a critical factor in the success of any business (Parasuraman, 1988), and the banking industry in this case is not exceptional (Hossain & Leo, 2009). Service quality has been widely used to evaluate the performance of banking services (Cowling & Newman, 1995). The banks understand that customers will be loyal if they provide a greater service than their competitors (Dawes & Swailes, 1999), and on other hand, banks can only earn high profits if they are able to position themselves better than competitor within specific market (Davies, 1995). Consequently, banks need to focus on service quality as a core competitive strategy (Chaoprasert & Elsely, 2004).

V. SERVICE QUALITY

Parasuraman, Berry & Zeithaml, (1985, 1988) defines 'service quality' as the difference between customer perceptions of the current service being provided by a given organization and customer expectations of excellent service within that given industry. According to Gronroos (1982), perceived quality of a given service is the result of an evaluation process since consumers often make comparison between the services they expect with perceptions of the services that they receive. He points out; when it comes to service quality it is not the actual level of quality, but the level of quality the customer expects. Hence, service quality depends on the strategy of the organization, how it wants to be perceived. A customer's perceived service quality is very much impacted by how the customers are approached by, and treated by the banks front-line, and support-employees at different encounters with the organization. The same can be applied to the banking industry. Customers perceive services in terms of quality of the service and of the overall satisfaction with their experience. Thus, companies today recognize that they can compete more effectively by distinguishing themselves with respect to service quality and improved customer satisfaction.

VI. PERCEIVED SERVICE QUALITY MODEL

Gronroos (2000) presented the Perceived Service Quality Model. He identified three components of service quality, namely: technical quality; functional quality; and image. Technical quality (outcome) is the quality of "what" consumer actually receives as a result of his/her interaction with the service firm. Functional dimension is "how" the manner in which the product/service is delivered to the customer. Functional quality of the process is subjective as it is based on encounters with the service provider. The third step in the above model is the Image (Corporate and/or Local). This is how customers will see the organization and its methods of operation and is a major element

of quality perception. Image is very important to service firms and this can be expected to build up mainly by technical and functional quality of service including the other factors (tradition, ideology, word of mouth, pricing and public relations). Further, if the company has a good image, minor mistakes will not change customers' perception of the company, but if the company has a bad image, mistakes will yield that customers perceive quality as bad. He suggests a company must not focus merely on one strategy and forget the other. Company should strike a balance between the two dimensions, since one cannot disregard the other, in order to increase perceived service quality. However, according to Gronroos, (2000) it is very common to have slightly more focus on functional quality by most of organizations. The present study was focused on the above model and the functional dimension of the perceived service quality of the local banking sector in the rural economic context.

VII. HOW TO MEASURE SERVICE QUALITY IN THE BANKING INDUSTRY?

One of the most useful measurements of service quality is the dimensions stated in the from the SERVQUAL model developed by Parasuraman, Berry & Zeithaml, (1988).

1. Reliability: delivering on promises

Reliability is defined as the ability to perform the promised service dependably and accurate. In the broadest sense, reliability means that the company delivers on its promises- promises about delivery, service provision, problem resolution, and pricing. Customers want to do businesses with companies that keep their promises, particularly their promises about the service out come and core service attributes.

2. Tangibles: representing the service physically

Tangibles are defined as the appearance of physical facilities, equipment, personnel and communication materials. Tangibles provide physical representations or images if the service that customer, particular new customers will use to evaluate quality.

3. Responsiveness -being willing to help

Responsiveness is the willingness to help customers and provide prompt services. This dimension emphasizes attentiveness and promptness in dealing with customer requests, questions, complaints and problems, responsiveness is communicated to customers by the length of time they have to wait for assistance, answer to questions or attention to problems, responsiveness also captures the notion of flexibility and ability to customize the service to customer needs.

4. Assurance- inspiring trust and confidence

An assurance is defined as employees' knowledge and courtesy and the ability of the firm and its employees to inspire trust and confidence. This diminution is likely to be particularly important for services that customers perceive as high risk or for services of which they feel uncertain about their ability evaluate outcomes.

5. Empathy –treating customers as individuals

Empathy is defined as the caring, individualized attention that the firm provide its customers. The essence of empathy is conveying, though personalized or customized service, customers are unique and special and that their needs are understood. Customers want to feel understood by and important to firms that provide service to them. Personal at small service firms often know customers by name and build relationships that reflect their personal knowledge of customer requirements and preferences. when such a small firm compete with larger firms, the ability to be empathic may give the small firm a clear advantage.

VIII. CUSTOMER SATISFACTION

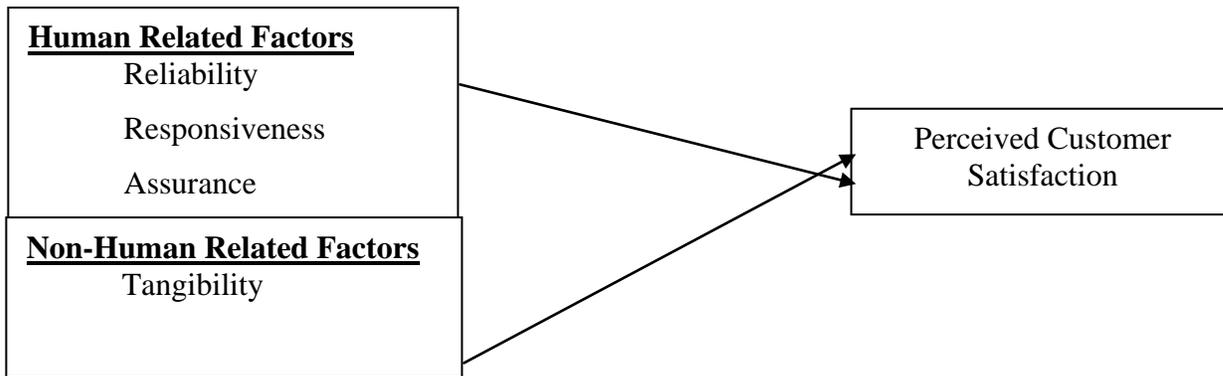
Customer satisfaction is the extent to which a product's perceived performance matches a buyer's expectations Kotler (2006). It further argues customer satisfaction depends on the product's perceived performance relative to a buyer's expectations. If the product's performance falls short of expectations, the customer is dissatisfied. If performance matches expectations, the customer is satisfied and if performance exceeds expectations, the customer is highly satisfied or delighted. (Kotler 2006) .

Oliver (1997) defines customer satisfaction as the customers' evaluation of a product in terms of whether that product has achieved their needs and expectations. If it fails to do so, dissatisfaction would occur. Satisfaction commonly has thresholds at a lower level (under fulfillment) and at an upper level (over-fulfillment). A consumer's satisfaction may drop if he "gets too much of a good thing". People focus upon the lower threshold and neglect the potential for an upper threshold. Outcomes of satisfaction feelings may involve intent to repurchase, word-of-mouth and complaints.

IX. RELATIONSHIP BETWEEN SERVICE QUALITY & CUSTOMER SATISFACTION

The relationship between service quality and customer satisfaction has received considerable academic attention in the past few years. Kirti Dutta & Anil Dutta, (2009) observed that Customer expectations are higher than perceptions and this gap varies across the banking sector with tangibility having the highest impact on overall customer satisfaction. Dharmalingam, Ramesh & Kannan, (2011) stated that all the service quality attributes are positively correlated with customer satisfaction. Prof Gopalkrishnan, et al, (2011) determined that Service quality and customer satisfaction had a direct positive effect on customer's retention intentions out of which customer satisfaction is a stronger predictor for retention. (Jackie & Tam, 2004) found that customer with higher perceptions of the value of the service results in turn with greater satisfaction. Montes, Mar & Fernandez, (2003) found that customers' perceptions, attitudes and intentions are being affected by employees' experiences and attitudes who are the internal customers of the organization. In line with the foresaid literature the following conceptual framework has been developed in association of the model developed by Zeithaml & Bitner 2003.

X. CONCEPTUAL FRAMEWORK



- H1: Human Related service quality factors & perceived customer satisfaction are significantly correlated.
- H2: Non- Human Related service quality& perceived customer satisfaction are significantly correlated.
- H3: Overall service quality and perceived customer satisfaction are significantly correlated.

XI. METHODOLOGY

DATA COLLECTION

Primary data was collected by distributing a detailed questionnaire for 210 respondents who are the customers of state commercial banks in Puttalam district. Personal interviews were used to fill the questionnaires. The questionnaire comprised of 32 close ended questions. All close ended constructs used in this study were measured by various items on five-point Likert-type scales ranging from 1 (strongly disagree) to 5 (strongly agree) to measure the relationship between service quality and customer satisfaction. Secondary data was collected from secondary sources such as previous researches, Journal articles and websites which are related to service quality and customer satisfaction.

were used as descriptive statistics whereas co-relations and coefficient techniques were used as inferential statistics. The researcher used SPSS-20 version software package to analyze data. As per the inferential statistical tools, the researcher used Pearson Correlation technique and Regression analysis in order to test the hypothesis and evaluate the relationships in between service quality and customer satisfaction. For the purpose of presentation of findings, researcher has used Histograms in order to provide a clear presentation of analyzed data.

RELIABILITY TESTING

A reliability test (Cronbach's alpha) was conducted to assess the internal consistency of each construct. According to the values in the table, all variables are adequate and reliable.

XII. DATA ANALYSIS PROCEDURE

Descriptive and Inferential statistical methods were utilized to analyze the data. Charts, percentages, Mean St. Deviation

Table 1 Reliability Testing

Variable	Cronbach's alpha	Number of items
Reliability	.792	5
Responsiveness	.799	5
Empathy	.746	5
Assurance	.886	5
Tangibility	.723	5
Perceived customer satisfaction	.731	5

(Source: Analyzed Research Data)

Analysis & Discussions
Correlation Analysis

The Pearson's Correlation Coefficient was computed for the purpose of determining the relationship between Service quality and customer satisfaction in state commercial banks of Puttalam District, Sri Lanka.

Table 2 Correlation of Independent variables and dependent variable

Variables	Pearson correlation	Significance (2-tailed)
Human Related Factors	.320**	.000
Non- Human	.282**	.000

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

(Source: Analyzed Research data)

The results indicate that the Human Related Factors correlates positively with customer satisfaction ($r = .320$, $p < 0.01$ positive figure) in state commercial banks of Puttalam District, Sri Lanka, since P value is 0.000 reporting less than 0.05, it could conclude that there is a statistical significance relationship between two variables. Therefore, the hypothesis (H_1) can be accepted. Non- Human Related Factors correlates positively with customer satisfaction ($r = .282$, $p < 0.01$ positive figure) in state commercial banks of Puttalam District, Sri Lanka. Further P value is less than 0.005 the relationship could be recognized as significant. Therefore, the hypothesis (H_2) can be accepted.

Table 3 Individual independent variables vs. dependent variable

Variables	Pearson correlation	Significance (2-tailed)
Reliability	.309**	.000
Responsiveness	.284**	.000
Assurance	.206*	.000

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

(Source: Analyzed Research data)

According to the above table it can be concluded that all the individual variables of Human Related Factors have a significant relationship ($P < 0.05$) towards customer satisfaction, whereas Reliability and Responsiveness have the greater impact on customer satisfaction than of Assurance.

Regression Analysis

The Regression Analysis was conducted for the purposes of further determining the relationship between service quality and customer satisfaction in state commercial banks in Puttalam District, Sri Lanka.

Table 4 Regression of Service Quality and Customer Satisfaction

R	R Square	Adjusted Square	R	Std. Error
.351 ^a	.123	.115		.65485

Predictors: (Constant), service quality

(Source: Analyzed Research data)

Table 5: Regression, B, and T- value of service quality and customer satisfaction

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.828	.587		3.112	.002
Service Quality	.613	.163	.351	3.772	.000

Dependent Variable: Customer Satisfaction

(Source: Research data)

The R is the correlation between two variables. However, the value of R square which indicates that the service quality only has 11.5% of variation in Customer satisfaction whilst rest of 88.5% of variation in customer satisfaction are explained by other factors which are not studied, because they are beyond the scope of study. According to coefficient table, constant value is 1.828 saying when service quality is zero, still Customer satisfaction has a value of 1.828 in statistical terms. In line with the said statistical results, when service quality increases by one unit, the customer satisfaction will increase by 0.351. According to B coefficient table, this is a sign of positive moderate relationship since it is between + 0.3 - + 0.7. Finally, since P value is 0.000 reporting less than 0.05, it could conclude that there is a statistical significance relationship between two variables and therefore hypothesis (H_3) is accepted.

XIII. CONCLUSION

The above study revealed that the human related factors of service quality (reliability, responsiveness, assurance and empathy), have a greater impact on customer satisfaction than that of the non-human related factors of perceived service quality (tangibles) on Customer Satisfaction. It was further established that Reliability and Responsiveness are the most influential determinants on customer satisfaction in retail banking. According to the Regression analysis, customer satisfaction is influenced by service quality by 35.1% (.351*100). Finally, service quality influences to customer satisfaction. So, finally it could conclude that service quality has an impact on customer satisfaction.

XIV. RECOMMENDATIONS

Based on above study, the following recommendations are made to the Banking Sector. To enhance customer satisfaction in retail banking high managerial attention should be focused on improving human related factors of perceived service quality.

Moreover, reliability & responsiveness variables foresaid, human related factors, should be focused as the most influential factor to determine customer satisfaction.

XV. SUGGESTIONS FOR FURTHER RESEARCHES

In addition to functional dimension, there are two other dimensions in service quality: (i) Technical and (ii) Image quality, which influence customer satisfaction. Therefore, banks should encourage further study to investigate the influence of Technical and Image dimensions on customer satisfaction in retail banking. Moreover, service sector of Sri Lanka needs more attention in researching consumer behavioral perspectives, perceived brand evaluations and brand relationship behaviors in relation to marketing stimulus (Dissanayake, 2015; Dissanayake & Ismail, 2015). In line with the said, research propositions are suggested to examine how service related innovations and value additions contribute to customer satisfactions and other forms of extended brand relationship behaviors. Further, human related service value additions resulted through brand citizenship behaviors (BCB) could be examined to investigate how BCB could influence to perceived customer satisfactions and brand evaluation perspectives including brand attitude, brand trust and brand love as some of the contexts within it.

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Perceptions on CPD Programs and Knowledge and Perception on Introducing a Process for Medical License Revalidation in Sri Lanka – A cross sectional study among medical professionals in Sri Lanka

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Abstract- CPD (CPD) is very important for medical professionals. It improves patient safety and other patient care outcomes. Revalidation is a process to ensure standard of practicing medical professionals. Sri Lanka currently does not have a proper CPD process or a revalidation system for medical professionals.

In this descriptive cross sectional study, medical professionals were surveyed on perception to introducing CPD program. In addition, it is also surveyed on knowledge of revalidation and perception to introducing a revalidation process. A self-administered questionnaire was given to 422 medical professionals from teaching hospital in central province and full time general practitioners in the province. In addition, in-depth interviews with key stakeholder (SLMC, SLMA, GMOA, Ministry of Health, Professional colleges) were also held.

On analysis, it was found that medical professional have very good perception on CPD program with average score of 85.95. Knowledge on revalidation programs were 64.24. However, perception to introducing a revalidation programs were comparatively low with a mean of 49.64.

Significant differences on average scores observed among different categories of medical professionals. However, there were no significant differences based on other demographic characteristics.

Based on the results, we recommend starting a formal CPD program in the country with collaboration of stakeholders. However, there is no place for revalidation at present context. Revalidation process should only be introduced only after establishment of sustainable CPD program in entire country.

Index Terms- CPD, Revalidation, Medical Professionals

I. INTRODUCTION

Introduction to Medical Systems

There are more than 100 different healing systems in the world (Leslie, 1980). Western medicine or allopathic system is also termed as conventional medicine and all others are termed as complementary and alternative medical (CAM) systems. Some complementary and alternative therapies such as Ayurveda and traditional Chinese medicine have non-western origin. They are entirely different from conventional system as they use

theoretical basis, diagnostic systems and therapeutic practices (Institute of Medicine, US National Academics, 2012).

Asia have more healing systems than any other continent. India, China and Middle East countries have number of different healing systems with merging boundaries of systems (Hsu & Barrett, 2008).

Sri Lanka also have different healing systems and includes western medicine, Ayurveda, Siddha, Unani. Western medical system remains as first choice among most Sri Lankans. However, there is significant utilization of alternative medical systems in the country (Weerasinghe & Fernando, 2010).

Introduction to Western Medical System

Before the 19th century, heroic medicine was dominant in Europe and North America. Heroic medicine comprises of dangerous and unproven practices. However, this system is almost replaced by western medicine (Singh & Ernst, 2008). Hippocrates is considered as father of western medicine and history is dated back to 460 BC (Grammaticos & Diamantis, 2008). Western medical system has now the most dominant healing system in the world.

Medical Education, Training & Registration

A typical medicine course at university is 5 – 6 years. At the completion of program Bachelor of Medicine and Bachelor of Surgery is awarded. There are regulatory bodies to regulate medical registration and medical education. For example, General Medical Council (GMC), is the statutory body responsible for medical registration in UK, needs further two years of foundation training before full registration as a medical professional (General Medical Council, 2009). Most countries around the world have similar programs and processes.

In Sri Lanka, medical undergraduate program takes about 5-6 years and one-year supervised internship is required before obtaining full registration as a medical practitioner. Foreign university graduates requires passing of EPRM test and one year supervised internship (Nonis & Herath, 2011).

Diversity and Dynamicity of Medical Profession

Medical professional are practiced in very diverse condition. Provision of medical care can be at primary, secondary or tertiary care levels. Further, some medical professionals are involved in public health, while majority in

curative health. In addition, there are number of specialities and subspecialties of medicine.

Current practice of western medicine is evidence based. It is defined as the careful, explicit and judicious use of current best evidence when making decisions about the care of individual patients (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996). Thus, updating knowledge and skills should be a continuous process and should not be stopped until the individual doctor is retired from practice.

Introduction to Revalidation

Revalidation is defined as the process by which licensed Medical Professionals demonstrate, on a regular basis, their knowledge is up to date and they are fit to practise. Medical revalidation improves confidence placed on them by patients knowing that their medical professional is regularly checked by their regulators (GMC, Revalidation, 2013).

United Kingdom, United States of America, Canada and Australia have made it a legal requirement to revalidate medical licenses from time to time. Asian countries such as Singapore and Thailand has also followed the same path.(Epa, 2003). In India, the proposals for revalidation system has already put forward (Mudur, 2005).

Justification

Allopathic health care system in Sri Lanka has been established and developed from during the British colonial period and is similar to that of United Kingdom. Although, a revalidation system is not available Sri Lanka at present.

In the United Kingdom, GMC started the revalidation process in December 2012 and they plan to revalidate most of the licensed medical professionals by March 2016 (GMC, GMP Framework for appraisal and revalidation, 2013). Revalidation process of GMC has three main aims (Cheshire, 2009).

1. To confirm that licensed medical professionals practice in accordance with the GMC's generic standards
2. To confirm that they meet the standards appropriate to their specialty
3. To identify, investigate, and remedy, poor practice

However, development of revalidation at GMC took more than 10 years, which included series of research studies and number of white papers(Cheshire, 2009). GMC also recognized the diversity of settings that medical professionals practice. Thus, they identified a number of key principles that are relevant (GMC, 2011).

The Sri Lanka Medical Council (SLMC) is the statutory body established for protecting health care seekers by ensuring the maintenance of academic and professional standards, discipline and ethical practice by health professionals. The Medical (Amendment) Act No. 40 of 1998 established the SLMC (SLMC, 2013).

There are clear rules and regulations guiding registration of medical practitioners in Sri Lanka. All medical practitioners need to renew their licences every five years.However, it does not scrutinize ability to practice by medical professionals.

In addition, there is no revalidation system or formal continuous professional development (CPD) program for medical

professionals in the country (Sri Lanka Medical Association, 2010). Since, medicine is changing rapidly with new knowledge added every day, there are serious concerns on knowledge and practices of Sri Lankan medical professionals. A medical professional qualified in his late 20's can practice medicine more than three decades later without updating his knowledge.

In addition, globally revalidation systems are being implemented which are consisting of CPD programs and performance appraisals. Therefore, Sri Lankan medical professionals who need to work overseas may have to provide revalidation status in the future (Epa, 2003). Therefore, revalidation will help in career development in addition to maintaining medical standards and patient safety.

SLMChas recognized the need of revalidation and CPD program and have obtained the support from Ministry of Health and professional colleges to develop such a system. In fact, they formed a revalidation committee in 2003. However, resistance from various groups have obstructed its establishment (Epa, 2003).

However, there has been no formal assessment carried out to measure knowledge of medical professionals and their perception with regard to revalidation and CPD programs in Sri Lanka. Thus, an assessment could provide an understanding of their views on CPD program and revalidation of medical licence. This could help to develop and implement a sustainable revalidation and CPD programs suitable to Sri Lanka.

Objectives

General Objective

To determine the perceptions on introducing a CPD program and to determine knowledge and perception on introducing a revalidation program for medical licensing in Sri Lanka

Specific Objectives

- To describe perception on CPD Programs among medical professionals
- To describe the knowledge on medical license revalidation program among medical professionals
- To describe their perception introducing a medical license revalidation process
- To determine differences in knowledge and perception on revalidation among different categories of medical professionals
- To recommend a method on developing and introducing a medical license revalidation process

II. REVIEW OF LITERATURE

All medical professionals who practices western medicine are usually takes Hippocrates oath or its derivatives as recommended by world medical association. The current medical declaration is adopted at the 173rd world medical assembly in 2006 in France (World Medical Association, 2006). However, there is a continuous debate on appropriateness of acts of individual doctors as well as professional organizations. The public is now increasingly question about competency of their doctors. Is study carried out in USA revealed that nearly 5% of

patients had complains of medical malpractices (Chandra, Durand, & Dickens, 2009). In addition, there are number of famous cases against unethical and illegal actions of doctors. In a study carried out in Birmingham, United Kingdom has revealed that the public wants the doctors to be charged with manslaughter in some case of malpractice (Kay, Green, McDowell, & Ferner, 2008 Oct).

Professor Carlo Fonseka has published an article on five medical errors that he has made during his career as a physician and in fact, there were no lawsuits against him (Fonseka, 1996 December). Professor Ravindra Fernando has discussed a famous medical negligence case in Sri Lanka describes how public and media perception on negligence by doctors (Fernando, 2002 Dec). Therefore, minimizing medical negligence and improved patient safety is very important in current medical practice.

Continuing medical education (CME) is a specific form of continuing education that helps professionals in the medical field to maintain competence and learn new developing areas of their field. CME activities take place in different formats, such as live events, written publications, online programs and electronic media. CME content is developed, reviewed, and delivered by experts in their individual clinical areas (Ahmed & Ashrafian, 2009). CPD is very similar to CME but encompass broader perspective. However, critics of CME complains that pharmaceutical firms often use financial aid to bias CME towards marketing their products (Lewis, Julie, & Taitsman, 2009).

A study conducted by World Health Organization (WHO) revealed that educational meetings alone could result in small to moderate increases in the adoption by health-care professionals of desired behaviors. WHO further concluded that there were only few studies on this topic from low- and middle-income countries and therefore, it is difficult to interpret the significance of the findings (Smith, Brown, & Khanna, 2013).

Problem based learning is a method of interactive learning, said to be more effective than traditional methods in terms learning skills, and is more pleasurable (Dolmans & Schmidt, 1996). However, Cochrane review concluded that there is limited evidence that problem based learning increased doctors' knowledge, performance, and patients' health more than no educational intervention at all (Smits, Verbeek, & Buissonjé, 2002).

Another Cochrane study shows that interactive CME activities shows evidence of performance improvement while traditional didactic lectures do not improve the performance (Davis, et al., 1999). Further, it is shown that broadly defined CME interventions using practice-enabling or reinforcing strategies consistently improve physician performance and health care outcomes (David, Davis, Thomson, Oxman, & Haynes, 1992).

CPD is becoming a popular mode of learning worldwide. Professional activity helps to maintain, develop or increase knowledge, problem solving, technical skills and professional performance standards with the aim that physicians can provide better healthcare. Research studies conducted in different settings have shown that locally designed pay for performance systems can have better results (Kristensen, McDonald, & Sutton, 2013).

In a study conducted in India has shown that CPD programs helps improve healthcare outcomes and patient safety. (Beshyah, Saadi, & Sherif, 2012).

Many professional organizations in Sri Lanka have started professional development programs for their members to uplift the standard of their profession. Institute of certified management accountants has published guideline on CPD program for their members (Institute of Certified Management Accountants, 2009). The Institute of Engineers Sri Lanka also formed a CPD committee and introduced an online CPD program for their members (IESL, 2013).

SLMChas recognized the need of CPD program and have obtained the support from Ministry of Health and professional colleges to develop such a system. In fact, they formed a revalidation committee in 2003 (Epa, 2003). However, due to many reasons the committee could not establish a sustainable CPD program in the country.

A study conducted among dental professional in Sri Lanka has revealed the need of CPD program and Sri Lanka dental association has taken initiatives to develop CPD program for dental doctors (Dissanayake, 2008). A study conducted in western, central and northern provinces of Sri Lanka has examined different type of factors affecting professional development of medical profession and the ways of their behavior in relation to development opportunities in government hospitals (Udugama, 2008).

Another study in Sri Lanka has examined the feasibility of introducing web based online CPD program and has identified web based CPD programs will fulfil the educational requirements of health professionals in the peripheral parts of Sri Lanka (Kulatunga, Marasingha, Karunathilake, & W, 2012).

Further, lack of career development and continuous education was identified as a reason for migration of medical professionals. A study carried out has revealed out of 1,915 post graduate trainees who left Sri Lanka for training, 215 (11%) have not returned or have left the country without completing the government specified bond period (De Silva, et al., 2013).

Revalidation is the process of regular assessing fitness to practice of licensed medical professionals. Revalidation expected to give extra confidence to patients on their doctor knowledge and skill. Licensed doctors in United Kingdom have to revalidate, usually every five years, by having regular appraisals with their employer. Patients can help medical professionals to improve by providing them with regular feedback about the service (GMC, Revalidation, 2013). There are six types of supporting information a medical professional is expected to provide and discuss at appraisal at least once in each five year cycle (GMC, 2011). They include

1. Continuing professional development
2. Quality improvement activity
3. Significant events
4. Feedback from colleagues
5. Feedback from patients
6. Review of complaints and compliments

Appraisal/ individual performance review (IPR) is frequently used in human resources management in the public and commercial sectors to evaluate the performance of an employee. It measures performance against agreed organizational expectations and objectives. The results are used in development

and effective management of employees. A study in UK has revealed that traditional IPR per se is not suitable for assessing hospital doctors (Trebble, et al., 2013).

Multisource feedback (MSF), or 360^o employee evaluation, is a questionnaire-based assessment in which rates are evaluated by peers, patients, and coworkers on key performance of an employee. This system is widely used in industrial settings to assess performance. MSF is gaining recognition as a quality improvement method in health systems. A research has identified the key aspects of MSF including program design. It also discusses limitations of MSF in health care (Lockyer, 2003). Another research carried out in similar setting have outlines tips for developing multisource feedback forms (Wood, Hassell, Whitehouse, Bullock, & Wall, 2006).

At present, there are multiple formats for assessment of different specialties in medicine. However, researches have shown that these forms do have drawbacks. In one study, participants appreciated multisource feedback as portion of formative assessment. However, some concerns about certain elements of multisource feedback methodology undermines its credibility for identifying poor performance (Hill, Asprey, Richards, & Campbell, 2012). Research on general practitioners in UK have shown that the general practitioner believe the revalidation is beneficial for patients as well as for themselves (Mugweni, Kibble, & Conlon, 2011). However, study conducted in West Lincolnshire Primary Care Trust have revealed a better understanding of knowledge, beliefs and attitudes towards appraisal is required to foster positive attitudes. Further, it emphasizes the need of clarification on relationship between appraisal and revalidation (Siriwardena & Middlemass, 2003).

In USA and Canada, the processes for ensuring that physicians maintain their competence depend on the independent and heterogeneous regulatory decisions of each provincial College of Physicians and Surgeons. The means is usually by attending mandatory CME activities. However, research have shown it lacks consistency (Levinson, 2008).

A qualitative study conducted In USA on perception on has revalidation shown the need for frequent changes and standardization. It identifies necessity of revalidation. However, concern was expressed on the reliability and validity of existing and proposed systems (Francis & Cuschieri, 2001).

A study has shown that Australasia (Australia, New Zealand and Singapore) is in the process of developing tools for revalidation. However, there is no uniform structure for revalidation in these countries. Responsibility of revalidation lies with professional colleges (Newble, N, & McLaren, 1999).

In a study conducted in South East Asia, it has identified that need for changes in present postgraduate medical education. It has suggested including performance appraisal system for the region (Mendis, Adkoli, Adhikari, Hug, & Qureshi, 2004). However, there are no published studies on knowledge on revalidation in South East Asian region.

Sri Lanka, there had being a debate on revalidation since 2003. An article on Ceylon Medical Journal discusses possibility of introducing a revalidation system in Sri Lanka. It was based on discussion by revalidation committee of SLMC. Further, it discusses how to face resistance from various groups including medical professionals and their trade unions (Epa, 2003).

However, knowledge and perception on revalidation was not assesses formally in Sri Lanka.

III. MATERIALS AND METHODS

Study Design

The study is a descriptive cross sectional study.

Study Setting

The study has focused on government hospital medical professionals as well as the general practitioners. The study on government hospital medical professionals will be carried out in the four teaching hospitals situated in Central Province namely General Hospital - Kandy, General Hospital - Peradeniya, SirimavoBandaranayake Specialized Hospital for Children and Base Hospital - Gampola. All full time general practitioners in central province, who are registered with Private Health Regulation Council (PHRC), were also included in the study.

In addition, a key informant survey was conducted to suggest a CPD program and revalidation program for the country.

Study Population

Study population consisted of all the medical professionals currently working in the four selected teaching hospitals in the central province. All the general practitioners in central province who were registered with PHRC.

Inclusion Criteria

1. Medical professionals with full SLMC registration and working in selected hospitals
2. All PHRC registered full time general practitioners in central province

Exclusion Criteria

1. Intern medical professionals
2. Administrative grade medical professionals
3. Medical professionals on maternity leave, foreign leave during the study period
4. Part time general practitioners

Study Period

Data collections was carried out during August to October 2013 at relevant hospitals and places of convenience among general practitioners.

Sample Size Calculation

The sample size was calculated using following formula.

$$n = \frac{Z^2 p(1-p)}{d^2}$$

n = Sample size

Z = 1.96 critical value

p = Probable estimate of proportion

d = 5% absolute error

$$\text{Sample Size} = \frac{1.96^2 * 0.5(1-0.5)}{0.05^2}$$

$$\text{Sample Size} = 384$$

Further 10% was added to calculated sample size to compensate non-respondents and it yielded total sample of 422 subjects.

Sampling Technique

Stratified random sampling technique was used and following procedure is adopted.

1. Names of medical professionals and their grades were obtained from the hospitals
2. Names of general practitioners were obtained from PHRC

3. Total population was calculated and respective percentage each category obtained
4. Number of required sample size was calculated proportionately for each hospital and each category
5. Samples of each category obtained using random number method

Postgraduate trainees were included in the category of postgraduate trainees despite his ministerial grade. There were 1396 eligible medical professionals in the population.

Table 1 summarizes the distribution of sample, which was selected proportionately from each category and each hospital.

Table 1: Distribution of Sample

Hospital	Consultants	Graded1	Graded 2	Preliminary grade	Postgraduate Trainees	General practitioners	Total
THK	27	16	190	32	22		287
THP	3	3	42	8	9		65
SBSCH	4	2	16	5	0		27
BH	4	1	13	9	0		27
GP						16	16
Total	38	22	261	54	31	16	422

Study Instrument

The study instrument was a self-administered questionnaire.

Questionnaire development

On extensive literature search, researcher has not found an existing scale to measure knowledge and perception on either CPD programs or revalidation. Therefore, the principle investigator chose to develop a new instrument. A new questionnaire was developed.

A panel consisting of experts that include a community physician, a sociologist, two medical administrators and a statistician scrutinized selected questions.

Final questionnaire comprises of 36 closed-ended question. Careful attention was paid in phrasing question to create clear, complete and concise statements. However, last questions was kept as open-ended questions to get suggestions on developing a CPD program and revalidation system. The questions were arranged in three logical parts. Modified Likert scale with six responses used in most occasion to avoid centralization of responses.

Basic socio-demographic data

There are twelve questions to collect socio-demographic information. The questions includes date of birth, sex, religion, ethnicity, marital status , number of children, year of graduation, place of graduation, country of graduation , place of work and current grade in profession. Age and service experience were calculated from collected data

Knowledge and perception on CPD

Researcher has prepared arating scale using basic principles from various sources (Jamieson, 2004). There are thirteen questions to assess the knowledge and perception on CPD program. Out of them, nine questions are on six-point Likert scale and directly assess the knowledge directly. A rating scale was prepared using nine questions mentioned above. Each question was assigned from 0 – 5 marks, 0 being negative perception towards CPD whereas 5 being strongly positive perception. Final marks were transformed to get out of 100. The domains used in preparation of rating scale are as follows

1. Medical Professionals perception on the importance of updating their knowledge in recent advances
2. View on requirement of formal CPD (CPD) program for Medical Professionals
3. View on important of assessing medical officers regular intervals
4. Areas that are need to assess, whether we should assess only the knowledge or should it be a multiple domain assessment
5. View on benefits to profession and their customers

In addition, data collected on their view on responsible government and non-governmental bodies who should take responsibility. Further, suggestion on frequency of assessment of medical professionals were obtained to propose a system of CPD.

Knowledge and perception on medical license revalidation

Part 3 of the questionnaire consists of twelve questions and assesse both knowledge and perception on medical revalidation. Last question was an open-ended question to collect

suggestion on developing a sustainable CPD program and a revalidation system.

Knowledge on revalidation was assessed by five questions comprising of whether the respondents aware of the presence of concept of revalidation of medical license. In addition, knowledge was assessed on countries with revalidation, legal need for revalidation. Further, two questions assess the methods of assessment and responsible bodies on revalidation. Questions are of different types including dichotomous, open ended and multiple choice. Arating scale was prepared allocating equal marks for each question. All correct answers were given five marks while wrong answers carry no marks. Then marks out of 100 was calculated.

Perception on revalidation was assessed using four 6-point Likert scale and marks allocated from zero to five for responses. A rating scale was prepared and marks were calculated out of 100.

Pretest

The questionnaire was pre tested at District hospital – Kadugannawa and at training center Kadugannawa. All the problems and difficulties arose during procedure were discussed and remedial actions were taken.

In-depth Interviews

The in-depth interview was comprises set of open-ended questions and brief outline. Questions and outline helps to keep focus on the subject., However, respondent were allow to be discursive on the issues within the guided framework.Data obtained from in-depth interviews were not formally analyzedbut used in suggesting a formal, sustainable CPD program and revalidation system.

Data Analysis

Data analysis was done using the IBM®SPSS® 22 statistical software.

Ethical and Administrative Consideration

Ethical clearance was obtained from the ethical review committee of Faculty of Medicine, University of Peradeniya. Consent forms were prepared in all three languages and informed written consent was obtained prior to administering the questionnaire.

Permission from Directors/ Medical Superintends of respective institutions were obtained prior to data collection.

Confidentiality of data

All the questionnaires were collected on the same day as distribution of questionnaires and only principal investigator was involved in collection of data. All completed questionnaires are at the custody of principal investigator. No personal data was collected.

IV. RESULTS

The sample of medical officers from teaching hospital of central province and from full time medical practitioners was obtained from stratified sampling techniques. There was 93% responded rate and final size of the sample was 396.

Socio-demographic Characteristics

Distribution by Age

Age of the sample ranges from 27 years to 67 years with mean of 36.57 years (Table 2).

Table 2: Age distribution of the sample

Age Statistics	
Mean	36.57
Median	34.50
Std. Deviation	7.143
Range	40
Minimum	27
Maximum	67

Once categorized into age groups, 30 – 40 age group dominates the sample with 68.9% of the sample (Table 3).

Table 3: Distribution of Sample by Age Categories

Age Categories	Frequency	Percent
21-30	47	11.9
31-40	273	68.9
41-50	54	13.6
51-60	12	3.0
61-70	10	2.5
Total	396	100.0

Distribution by Sex

Males dominates the sample with relative percentage of 59.1% and distribution by sex is illustrated in Table 4.

Table 4: Distribution by Sex

Sex	Frequency	Percent
Male	234	59.1
Female	162	40.9
Total	396	100.0

Distribution of Sample by Ethnicity & Religion

Sinhalese and Buddhist comprises bulk of the sample in line with provincial population statistics. However, proportion of Indian Tamils in the sample is lower than that of general population (Table 5&Table 6).

Table 5: Distribution by Ethnicity

Ethnicity	Frequency	Percent
Sinhala	350	88.4
SL Tamil	25	6.3
Indian Tamil	2	.5
SL Moor	19	4.8
Total	396	100.0

Table 6: Distribution by Religion

Religion	Frequency	Percent
Buddhist	339	85.6
Hindu	27	6.8
Islam	19	4.8
Christian	11	2.8
Total	396	100.0

Distribution of Sample by Marital Status

88% of the medical professionals included in the sample are married and only one widowed in status (Table 7).

Table 7: Distribution by Marital Status

Marital Status	Frequency	Percent
Single	45	11.4
Married	350	88.4
Widowed	1	.3
Total	396	100.0

Distribution of Sample by Place of Qualification

Only 15 medical professional were foreign qualified while others were from local universities (Table 8).

Table 8: Distribution by Place of Graduation

University	Frequency	Percent
Peradeniya	241	60.9
Colombo	50	12.6
Jafna	16	4.0
Ruhuna	23	5.8
Ragama	26	6.6
Jayawardanapura	25	6.3
Foreign	15	3.8
Total	396	100.0

Distribution of Sample by Service Experience

Most of the medical professionals in the study belongs to experience of 0 -10 years category and comprises 76% of the sample (Table 9&Figure 1).

Table 9: Distribution by Service Experience

Experience	Frequency	Percent
1 -5	163	41.2
6-10	138	34.8
11-15	44	11.1
16-20	18	4.5
21-25	12	3.0
26-30	11	2.8
31-35	7	1.8
36-40	3	.8
Total	396	100.0

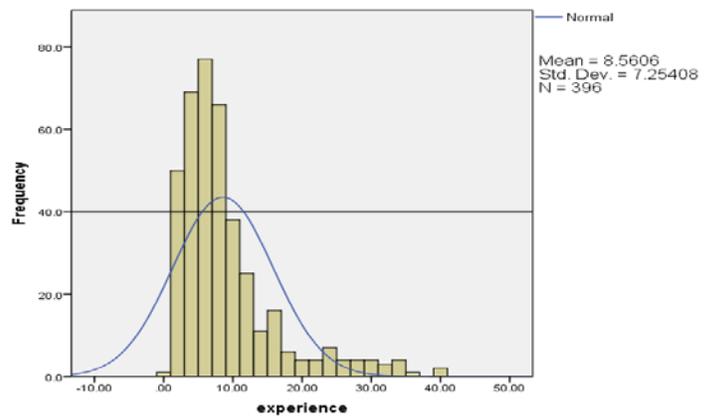


Figure 1: Service Experience

Distribution of Sample by Professional Grade

Grade 2 medical officers has the highest proportion of 70.7% of the sample while general practitioner proportion was 4.0% (table 10).

Table 10: Distribution by Grade

Present Grade	Frequency	Percent
Consultant	28	7.1
Grade 1	21	5.3
Grade 2	231	58.3
Preliminary	54	13.6
PG Trainee	46	11.6
P.Practitioner	16	4.0
Total	396	100.0

Perception on CPD Program

According to the perception scale on CPD, medical professionals have mean score of 85.95 with standard deviation of 7.39. Minimum score was 53.33 while the highest score was 100 (Table 11).

Table 11: Distribution of CPD Scores

CPD SCORE	
Mean	85.9540
Median	86.6667

Std. Deviation	7.39506
Range	46.67

One way ANNOVA test is performed to see any difference of CPD score based on grade of medical officers and Table 12 summarizes the results.

The CPD score distribution shows normal distribution (Figure 2).

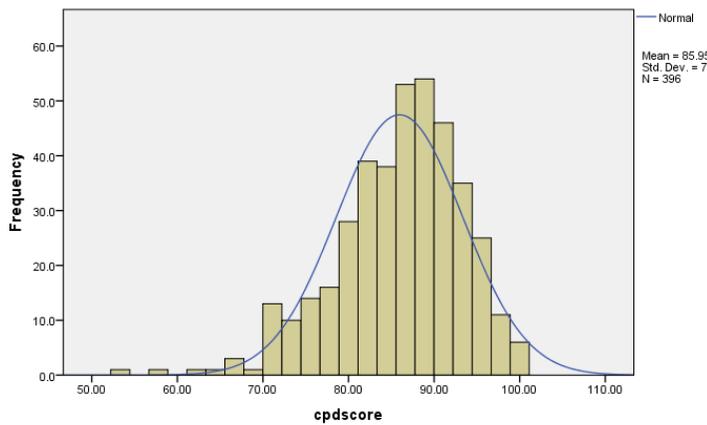


Figure 2: CPD score histogram

Table 12: Professional Grade vs CPD Score

ANOVA			
CPD score	Sum of Squares	df	Mean Square
Between Groups	1902.46	5	380.493
Within Groups	19698.86	390	50.510
Total	21601.33	395	

There was a statistically significant difference between groups as determined by one-way ANOVA ($F = 7.533, p = .000$). A Tukey post-hoc test revealed that the CPD score was statistically significantly higher among consultants compared to the others (Table 13). However, there were no statistically significant differences observed among other groups.

Table 13: Tukey's HSD for CPD Score Difference

CPD score - Tukey HSD			
Present Grade	N	Subset for alpha = 0.05	
		1	2
Grade 1	21	82.4339	
Grade 2	231	84.9062	
Preliminary	54	86.9959	
Private Practitioner	16	87.0833	
PG Trainee	46	87.1498	
Consultant	28		92.6190
Sig.		.092	1.000

There were no significant differences observed on CPD score based on other studied characteristics of the sample.

Most of the medical officers believe that implementing a CPD program is a responsibility of more than one organization (Table 14).

Table 14: Responsibility of CPD Program

Organization	Percentage
SLMC	41.7
SLMA	65.4
Ministry of Health	59.1
Professional Colleges	65.2
GMOA	16.4
Consultants	2.3

More than 50% medical professional believe that operationalization of formal CPD program is a responsibility of SLMA, Ministry of Health and Professional colleges. 16.4% medical professional believe that GMOA have a responsibility on implementing formal CPD program. 2.3% medical professional

in the study believe that respective consultant should look after CPD program on his subordinate officers.

In addition, nearly 77.8% medical professional believe that medical professionals' knowledge is not up to date (Table 15).

Table 15: Perception on Up To Date Knowledge

Knowledge up to date	Frequency	Percent
Strongly Agree	6	1.5
Agree	42	10.6
Slightly Agree	40	10.1
Slightly Disagree	71	17.9
Disagree	220	55.6
Strongly Disagree	17	4.3
Total	396	100.0

Knowledge on Revalidation Program

According to the knowledge-scale on revalidation programs, medical professionals have mean score of 64.24 with

standard deviation of 31.18 Minimum score was 0.0 while the highest score was 100 (Table 16).

Table 16: Knowledge on Revalidation

	Mean	N	Std. Deviation	Std. Error Mean
Knowledge on revalidation	64.2424	396	31.18230	1.56697

However, the knowledge on revalidation has not shown the normal distribution (Figure 3).

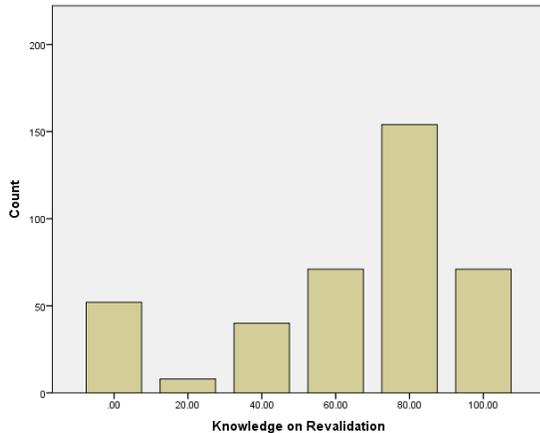


Figure 3: Distribution of Knowledge on Revalidation

Therefore, Kruskal-Wallis non-parametric ANOVA was performed to identify differences on knowledge on revalidation among different categories of medical officers (Table 17: Kruskal Wallis Test - Statistics).

Table 17: Kruskal Wallis Test – Statistics

Kruskal Wallis Test - Statistics	
	Knowledge on revalidation
Chi-Square	94.473
df	5
Asymp. Sig.(p value)	.000

Since our p value is less than 0.05 criterion of statistical significance, we can conclude that there are significant differences on knowledge on revalidation among different categories of medical professionals. When we analyse this further it is clear that 77.8% of study population accept that Sri Lankan medical professionals' knowledge is not up to date (Table 18).

Table 18: Stats on Medical Knowledge

Medical officers knowledge not up to date		
	Frequency	Percent
Yes	308	77.8
No	88	22.2
Total	396	100.0

Kruskal-Wallis test shows that there is significant difference on the perception on this matter depending on present grade of medical officers. However, due to non-parametric nature we did not analyze this further (Table 19&Table 20).

Table 19:Kruskal-Wallis Test1

Ranks		
	N	Mean Rank
Present Grade		
Consultant	28	154.50
Grade 1	21	220.50
Grade 2	231	190.50
Preliminary	54	257.17
PG Trainee	46	171.72
P.Practitioner	16	241.13
Total	396	

Table20:Kruskal-Wallis Test 2

Test Statistics	
	Up to Date Yes/NO
Chi-Square	48.148
df	5
Asymp. Sig.	.000

Perception on Revalidation Program

Scale on medical professionals' perception to introducing a revalidation program for Sri Lanka has shown a normal distribution (Figure 4: Distribution of Revalidation Score).

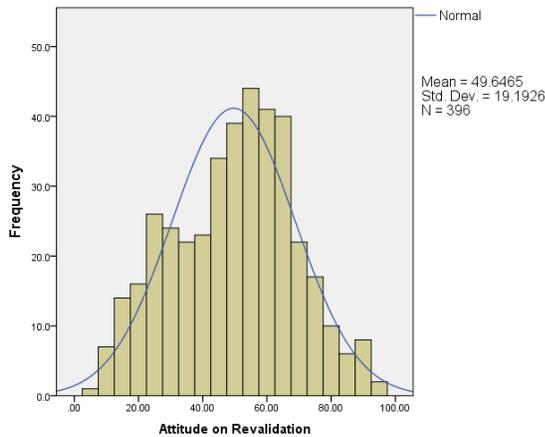


Figure 4: Distribution of Revalidation Score

Mean score on perception to revalidation was 49.64 with a standard deviation of 19.19, widely range from 5 -90 (Table 21).

Table 21: Descriptive statistics on perception to revalidation

Perception on Revalidation	
Mean	49.6465
Median	50.0000
Std. Deviation	19.19260
Range	90.00

Independent sample t test was employed to see difference of scores according to the sex shown that there is no significant difference as significance (2 tailed) is 0.91 which is higher than 0.05 (Table 22).

Table 22: Sex Difference on Perception to Revalidation

Independent Samples Test							
	t	df	Sig. (2-tailed)	Mean Diff	Std. Error Diff	95% Interval Difference Lower Upper	Confidence of the Upper
Equal variances assumed	1.696	394	.091	3.3190	1.9569	-.52834 7.1665	

One way ANOVA is employed to identify any difference on perception with regard to grade of medical professionals (Table 23).

Table 23: ANOVA Results on Perception Score vs. Grade

ANOVA	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	37652.19	5	7530.438	27.231	.000
Within Groups	107848.3	390	276.534		
Total	145500.5	395			

According to the ANOVA test as significance is 0.000 and is smaller than 0.05. Therefore, Tukey post-hoc test was employed and result is shown inTable 24.

Table 24: Tukey HSD for Revalidation vs Grade

Tukey HSD		
Present Grade	N	Subset for alpha = 0.05
Grade 1	21	38.0952
P.Practitioner	16	39.0625
Grade 2	231	45.4329
Preliminary	54	54.3519
PG Trainee	46	55.6522

Consultant	28		80.1786
Sig.	.499	.145	1.000

According to the test results, we can conclude that consultants are significantly different from all other groups on perception to revalidation. In addition, PG trainees and preliminary grade medical professionals have significantly better knowledge than grade 1 medical officers and private practitioners.

In the present study, 87.4% of medical officers believe that there will be resistance to introducing a medical license revalidation in Sri Lanka (Table 25).

Table 25: Resistance to Introduce a Revalidation Program in Sri Lanka

SL Resistance	Frequency	Percent
Strongly Agree	89	22.5
Agree	214	54.0
Slightly Agree	43	10.9
Slightly Disagree	15	3.8
Disagree	29	7.3
Strongly Disagree	6	1.5
Total	396	100.0

Almost all medical professional believe that resistance will come either from GMOA or from medical professionals.

V. DISCUSSION

The study subject is timely and required as there is increasing number of complaints against doctors as well as increase in number of court cases on medical negligence (Sri Lanka Medical Council, 2008). Negligence can result from not having up to date knowledge and skills, which may be a result of not having a proper coordinated professional development program. This is further worsened by not having regular assessment of medical professionals' fitness to work. In addition, most developed countries have established good CPD programs and revalidation systems (GMC, Revalidation, 2013). However, there were no studies carried out in Sri Lanka on medical license revalidation at present.

It was decided to carry out the study only in central province due to time and budget constraints. All full time general practitioners and teaching hospitals in central province were selected. The total population size was 1396. Sample size required was 422 and selected using stratified sampling technique. Self-administered questionnaires were selected as the tool because medical professionals are educated professionals and have a similar understanding ability.

Response rate at the present study was 93.8% (396/422) and was a very good response rate. A study conducted in India among medical professionals has shown response rate of 71.6% (Brogen, Rajkumari, Laishram, & Joy, 2009). Another study conducted in teaching hospitals in Kandy District, Sri Lanka has had response rate of 67% (Ranasinghe, 2010). The low response rate was due to non-returning of completed questionnaires.

Good response rate in this study can be attributed to simplicity of questionnaire, collection of the questionnaire on the same day, prior appointments with respondents, approach of respondents at free times. Lowest response rate by consultants, is about 73% (28/38), and may be due to their busy work schedules.

Characteristics of the sample

More than 80% sample was medical professionals younger than 40 years of age and is mainly due to all four teaching hospitals have similar proportion of medical professionals who are less than 40 years. This is also due to bulk of medical officers belong to grade 2 category. Sex distribution of sample slightly dominated by males. The sample is dominated by Sinhala, Buddhist.

About 88% of the medical professionals in the sample are married with 84% have at least one child. All the full time general practitioners were retired medical officers from government service except for one. Their ages range from 50 - 67 years.

Sample was representative of the study population as it was based on stratified random sampling. The results of the study can be generalized to entire country as

- medical professionals in the country have tight regulations on registration and have minimum requirements fulfilled
- being in all island service and transferable officers they are regularly transferred from one hospital to another, even for another province
- experience and categories of medical are same despite the institution and province

Perception on CPD Program

Most medical professionals in the study believe that knowledge of Sri Lankan medical professionals is not up to date. In addition, it is clear that there is significant difference on this among different categories of medical officers (X^2 : 48.14 and significance > 0.05).

Final score on perception on CPD shows that very good perception towards CPD program in general (mean: 85.95, SD: 7.39). Further, there was no difference based on socio-demographic characteristics except that consultants show better perception than others.

Therefore, it is prudent to develop a good CPD program suitable for Sri Lankan medical professionals. The responsibility should be given to national CPD council. This was highlighted as most medical professionals stated that responsibility should be shared among SLMA, Professional colleges and Ministry of Health (Table 14). Ministry of Health should allocate funds to national CPD program and for the CPD council. SLMA needs to take initiative as it has done in the past but needs better coordination with key stakeholders including ministry and GMOA. Professional colleges should help SLMA in developing curricula for CPD.

In addition, use of information technology including online web based learning must be employed in delivering CPD materials to medical professionals. This is a very prudent and

useful as most medical officers in peripheral hospital have problem of attending classes regularly. In addition, this will help to minimize disturbances to patient care services. Role of university in CPD program is limited in present situation. However, they can help in developing curricula and providing resource persons in CPD programs.

One of the main obstacle to implement a sustainable CPD program is that there is no benefits for medical professional participating in CPD. It was highlighted in an interview, payment of CPD allowance for participating medical professionals will improve participation. It is also suggested ministry of health to allocate funds in sustainable manner for CPD program.

On the other hand, CPD certificate/ credit scores can be used as assessment tool in ministerial promotions. However, this cannot implement in near future, as there is no equal opportunity for all medical professionals to access to CPD programs can trigger resistance from medical professional working in periphery. It involves amendment of service minutes and can violate existing hierarchy.

Knowledge and Perception on Revalidation

Knowledge on revalidating scale yield mean of 64.24 with standard deviation of 31.18 (Table 16). There were no difference on knowledge on revalidation based on socio-demographic characteristics except professional grade.

Perception on revalidation shows mean score of 49.64 with a standard deviation of 19.19, widely range from 5 -90. Descriptive statistics on perception to revalidation is shown on Table 21. Similarly, there were no difference on perception on revalidation based on socio-demographic characteristics except professional grade. Consultant had a better perception on introducing a revalidation program. PG trainees and preliminary grade doctors show significantly better perception than the grade I medical officers and full time general practitioners (Table 23&Table 24).

It was very clear that most medical professionals perceive CPD as a good move but not so for revalidation. There was a clear difference between perceptions on CPD vs perception on revalidation.

Introducing a revalidation program for medical license is far from the reality as almost all medical professional participated in the study agreed that there would be resistance for revalidation in Sri Lanka. In fact, in 2003 SLMA approach to formal CPD program may have failed as it is linked to revalidation.

As highlighted in an interview, GMOA accepts that revalidation may be needed in future to uplift the standard for patient care. However, they are against the introduction of revalidation program as the groundwork required for such system is not feasible now. SLMC shared the same idea and highlighted any form of revalidation requires establish CPD program in the country. Since the patient organization is not powerful in Sri Lanka, request for revalidation needs to come from the industry itself.

VI. CONCLUSIONS AND RECOMMENDATIONS

CPD is very important in medicine as it improves patient safety and other patient care outcomes. Process of revalidation

ensures medical professionals are reasonably up to date with their knowledge, skills and other important aspects. Therefore, it is very important to set up a well structured CPD program and suitable revalidation process.

Results of this study has shown that medical professional in central province have very good and favorable perception towards introduction of CPD program for them. Therefore, it is recommend starting a structured and sustainable CPD program.

It is recommended to set up a CPD council represented by Ministry of Health, SLMA, SLMC, GMOA and Professional colleges. Ministry of Health should allocate funds in sustainable manner for this program. GMOA should encourage its members on participating for CPD program and press authorities on allocating a CPD allowance for the doctors. SLMA and professional colleges can take the responsibility of developing contents and delivery of CPD program. It is SLMC's responsibility to act as the regulator in all steps.

Once we form a formal and equitable CPD program, the next step is to inclusion of CPD credits on grade promotions and annual increments. However, this should not be done initially as environment is not conducive as identified in the study.

Present study also revealed that perception on medical license revalidation is low. It was further highlighted during in-depth interviews. Therefore, introducing a revalidation process is not feasible in present context. Further, proposed CPD program should not linked revalidation in any way as it may lead to non-acceptance of CPD program.

Preparation of revalidation program should start only after implanting sustainable and accessible CPD program in entire country. At introduction, revalidation can be made compulsory to medical professionals joining the ministry of health as new recruits. For the present employees this needs to be coupled to a substantial financial benefit.

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Applying Multidimensional Three-Parameter Logistic Model (M3PL) In Validating a Multiple-Choice Test

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Abstract- This paper investigated the application of Multidimensional Three-Parameter Logistic model (M3PL) in assessing and evaluating an English multiple-choice test. Guessing parameter, when put in the picture, has been proved to strengthen the results of test validation. The data was gathered from 488 non-English majors taking an English final test at a university in Ho Chi Minh City, Vietnam. The findings, therefore, suggest how M3PL can be utilized in the test development process.

Index Terms- Factor analysis, M3PL model, Multidimensional Item Response Theory

I. INTRODUCTION

Item Response Theory (IRT) has long been utilized in test validation. The preliminary ideas of IRT model were presented by Thurston (1925), followed by Lord (1952) with a notion of Item Characteristic Curve (ICC). ICC describes the relationship between the probability of a correct response to item i and student j 's ability (referred to as θ_j). In 1968, Birnbaum applied logistic models for IRT, which were then built up by Lord and Novick (1968), and then Bock and Aitkin (1981). Meanwhile, they developed some approaches to parameter estimation. One of the salient features of IRT is how it relates each examinee's latent traits to item parameters through his/her response to each question in the test (Wright & Stone, 1979; Camilli & Shepard, 1994; Baker, 2001). Therefore, in IRT, ability parameters estimated are not test dependent and item parameters (i.e. item difficulty and item discrimination) are sample independent (Hambleton & Swaminathan, 1985). However, its two basic assumptions: unidimensionality and local item independence cannot be satisfied in most cases (Schedl et al., 1996; Wilson, 2000). Schedl et al. (1996) and Wilson (2000) also pointed out that in a language test, especially when it comes to reading comprehension section, multiple skills are required for the best performance.

In the late 1970s and early 1980s, a number of researchers got involved in promoting Multidimensional Item Response Theory (MIRT) (Reckase, 1972). In addition to work by Reckase (1972) on the multidimensional Rasch model, Mulaik (1972), Sympton (1978) and Whitely (1980a, b) proposed multidimensional models for the item/person interaction. According to Resckase (1985), some test items demand more than one ability to deal with (such as arithmetic and algebraic manipulations in a Mathematics test). A study by Kose and Demirtasli (2012) confirmed that these latent traits can be estimated more precisely by MIRT than IRT, i.e. MIRT standard

errors are smaller. Kose and Demirtasli added that the more items a test has, the smaller the standard errors of model parameters are, which is a great value to educators in test design. In Li et al.'s (2012) paper, an empirical K-12 science assessment was investigated for dimensionality validation using Multidimensional 2-Parameter Logistic (M2PL) approach. The unidimensional IRT and Testlet models were also included, which provides multiple-dimensional estimates for practitioners. Nevertheless, Li et al. (2012) have yet to group the questions in accordance with factor analysis. In another approach to MIRT, Do (2016) did the classification, but failed to estimate the model fitting level.

In fact, examinees have a tendency to guess answers in a multiple-choice test. Therefore, Birnbaum (1968) took into account the three-parameter model with guessing parameter $c_i \in (0,1)$ to evaluate students' guessing behavior. DeMars (2007) showed that fixing c parameter (guessing parameter) to zero may skew the interpretation of item difficulty. Li and Lissitz (2004) also discussed how poorly estimated c -parameters can lead to large standard errors in assessing the difficulty parameters in the unidimensional 3-parameter logistic model. As a result, the modification of Multidimensional 3-Parameter Logistic model (M3PL) has been a crucial extension of M2PL.

In Vietnam, IRT models have been of interest to recent research with Rasch model by Nguyen (2004), IRT 2PL model by Nguyen (2008) and Nguyen (2014), and IRT 3PL by Le et al. (2016). As MIRT and M3PL have not received proper attention, this paper aims at shedding more light on Multidimensional 3-Parameter Logistic model (M3PL) and its application in validating an English final test.

II. LITERATURE REVIEW

1. Test dimensionality

Validity has been taken into consideration in test development as it refers to how well the assessment instrument measures the objectives of the test (Henning, 1987). One type of validity evidence can be traced through the dimensional structure of a test (i.e. reflection of the intended traits). Many IRT models have been applied to analyze language tests and proved to provide construct validity evidence (McNamara, 1991; Embretson & Reise, 2000; Alderson & Banerjee, 2002; Walt & Steyn, 2008).

Multidimensionality does exist to a greater or lesser extent. Previous research has shown that there is high interrelation of skills associated with grammar, vocabulary and reading comprehension in a language test. Even a reading comprehension

section may include a number of noticeable subskills or abilities (Schedl et al., 1996; Wilson, 2000).

The number of dimensions for a multidimensional analysis of a test data has long been researchers' concern. Holzinger and Harman (1941) figured out the number of variables n needed to support the estimation of the factor loading for m independent factors in the following expression:

$$n \geq \frac{(2m+1) + \sqrt{8m+1}}{2\sqrt{m}} \quad (1)$$

This expression was deduced assuming no error in the estimation of correlation. Thurstone (1947) later recommended that the number of variables needed for a convincing analysis with m factors should be "two or three times greater" than this figure. Reise et al. (2000) in the research on selecting number of dimensions concluded that it is better to overestimate this figure and that scree plot, parallel analysis, and analysis of the residual correlation matrix can be employed to determine the dimensionality needed to model a matrix of test data.

2. Multidimensional 3-parameter logistic model (M3PL)

Multidimensional Item Response Theory (MIRT), as an extension of unidimensional IRT, allows for the analysis of multiple constructs simultaneously. In order to apply MIRT, the following assumptions need to be met:

- Monotonicity: the probability of each student's correct response will increase when one of his/her abilities increases.
- Local independence (Reckase, 2009): such possibility is not affected by other examinees as well as the student's response to other items.

When the test assesses more than one underlying ability, MIRT models such as exploratory and confirmatory (Embretson & Reise, 2000) are adopted. While exploratory procedures focus on discovering the best fitting model, confirmatory approaches evaluate some hypothesized test structure. Confirmatory MIRT models can be further classified into one of two groups: compensatory and noncompensatory. In compensatory MIRT models, a shortfall in one ability can be evened out by an increase in other abilities. On the contrary, in noncompensatory MIRT models, adequate levels of each measured ability are required, and nothing can make up for the deficiency of any ability. This study focused on the former model because of its popularity in theoretical research (Reckase, 2009).

As mentioned earlier, the addition of guessing parameter should result in improved estimation. Multidimensional 3-Parameter Logistic model (M3PL) was, therefore, implemented:

$$P(X_{ij} = 1 | \theta_j, a_i, c_i, d_i) = c_i + (1 - c_i) \cdot \frac{\exp(a_i \cdot \theta_j + d_i)}{1 + \exp(a_i \cdot \theta_j + d_i)} \quad (2)$$

in which $\exp(\cdot)$ is exponential function with base e ; $P(X_{ij} = 1 | \theta_j, a_i, c_i, d_i)$ is the probability of student j 's correct response to item i ; θ_j is vector of student j 's ability; a_i is vector of item i slope; $c_i \in (0,1)$ is guessing parameter; and d_i

is intercept parameter. Vectors a_i, θ_j have the same elements m , which is the number of dimensions.

The M3PL model was designed to account for observed empirical data such as that provided in Lord (1980) which shows that examinees with low capabilities still have a probability of correct response. As a result, this model contains a single lower asymptote or guessing parameter $c_i \in (0,1)$ to specify such probability for examinees with very low value in θ . Theoretically, the interval of c_i is between 0 and 1. In reality, since $c_i \geq 0,35$ is often omitted from the test bank (Baker, 2001), c_i ranges from 0 to 0.35.

Figure 1 (Reckase, 1985, p. 403) illustrates the graph of MIRT characteristic function when $m=2$, or in other words, Item Response Surface (IRS).

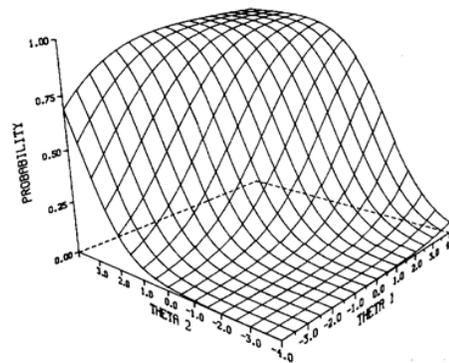


Figure 1. IRS of MIRT model with $a_{i1} = 0,75; a_{i2} = 1,2; c_i = 0; d_i = -1$

Discriminating power of item i for the most discriminating combinations of dimensions can be given as:

$$\eta_{MDISC} = \sqrt{\sum_{k=1}^m a_{ik}^2} \quad (3)$$

If the exponent in Formula (2) is set to some constant value, k , all θ vectors that satisfy the expression $k = a_i \theta_j + d_i$ fall along the straight line which is called contour line and they (θ) all yield the same probability of correct response for the model. The signed distance from the origin to the 0.5 probability contour line is called the difficulty of a multidimensional item (Reckase, 1985). Its difficulty was calculated as follows:

$$b_{MDIFF} = -\frac{d_i}{\sqrt{\sum_{k=1}^m a_{ik}^2}} \quad (4)$$

This formula helps identify the item threshold, i.e. the 0.5 probability of a positive answer. According to Baker (2001) and Hasmy (2014), the discriminating combination and item difficulty can be classified respectively as in Tables 1 and 2:

Table 1. Labels for item discrimination

Very High $\eta_{MDISC} \geq 1.7$

High	$1.35 \leq \eta_{MDISC} < 1.7$
Moderate	$0.65 \leq \eta_{MDISC} < 1.35$
Low	$0.35 \leq \eta_{MDISC} < 0.65$
Very Low	$\eta_{MDISC} < 0.35$

Table 2. Labels for item difficulty

Very Hard	$b_{MDIFF} \geq 2$
Hard	$0.5 \leq b_{MDIFF} < 2$
Medium	$-0.5 \leq b_{MDIFF} < 0.5$
Easy	$-2 \leq b_{MDIFF} < -0.5$
Very Easy	$b_{MDISC} < -2$

Figure 2 (Reckase, 2009, p. 119) demonstrates the interpretation of η_{MDISC} and b_{MDIFF} in MIRT models.

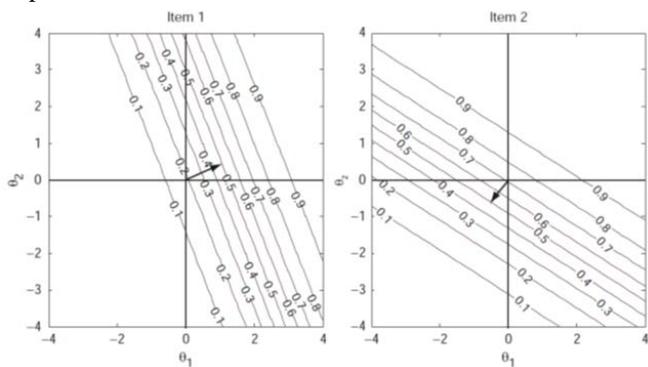


Figure 2. IRS contour lines of MIRT

The IRS contour lines of Items 1 and 2 infer that:

- Closer contour lines in Item 1 mean that the probability of correct response will vary more than that of Item 2 when a student's abilities change. To put it another way, Item 1 has greater discrimination than Item 2.
- Item difficulty was represented by a vector from the origin to 0.5 contour line at IRS steepest slope. If the vector points downward to the left side, the item is supposedly easy, otherwise, difficult. Therefore, it can be concluded from Figure 2 that Item 1 is more difficult than Item 2.

3. Factor analysis

The KMO Index and Bartlett's Sphericity Test

The KMO Index and Bartlett's Sphericity Test are often applied prior to factor analysis to ensure adequacy. Ranging from 0 to 1, the higher the KMO Index is, the more efficient factor analysis is. Further details about how to interpret this index can be retrieved from Kaiser (1974). For the same purpose, Bartlett's Test is concerned with verifying that variances are equal across groups or samples. If the correlation is perfect, only one factor is counted. Alternatively, the quantity of factors is equivalent to that of observed variables if they are orthogonal (null hypothesis). For factor analysis to be recommended suitable, p-value must be less than 0.05 (Barlett, 1951).

Factor analysis

In addition to establishing underlying dimensions, Principal Component Analysis (PCA) minimizes the number of observed variables to a smaller number of principal components that make up most of the variance of the observed variables. The number of factors can be determined by selecting those for which the eigenvalues are greater than 1 (Guttman, 1954; Kaiser, 1960). However, Gorsuch (1983) held that the Kaiser–Guttman rule might be subjective and merely applicable to a large sample with less than 40 factors. Cattell (1966) proposed the use of Scree Plot to make the factor selection more convincing. By drawing a straight line through smaller eigenvalues, the point where the factors curve above this line identifies the number of factors (Williams, Brown & Onsmann, 2012).

Another important aspect that needs mention is the Rotated Component Matrix. Rotation maximizes high item loadings and minimizes low item loadings, thereby producing a more interpretable and simplified solution (Thurstone, 1947; Cattell, 1978). There are two common rotation techniques - orthogonal rotation and oblique rotation. These days, the most popular rotation method is Varimax rotation developed by Kaiser (1958). With this method, each original variable tends to be associated with one (or a small number) of factors, and each factor represents only a small number of variables. In addition, the factors can often be interpreted from the opposition of few variables with positive loadings to few variables with negative loadings (Krabbe, 2016).

Taking the above-mentioned research as guidelines, the researcher adapted M3PL model for validating a multiple choice test for non-English majors, which so far has not been investigated statistically and appropriately.

III. OBJECTIVE AND METHODOLOGY

1. Research objective

The purpose of the study is to determine if the use of a multidimensional analysis is better suited than a unidimensional analysis for the English final test. Therefore, the following questions were examined for the test development:

- How many intended dimensions involve in the test?
- How can the difficulty, discrimination and guessing parameter of each item in the test be estimated?
- Of all the models IRT, M2PL and M3PL, which is the most suitable for the data? In that case, is the chosen model better-fit than the one suggested in the course learning outcomes?

2. Instruments

The data for this study was gathered randomly from 488 students taking the English final test at a university in Ho Chi Minh city, Vietnam. The test consists of three sections aiming at four learning outcomes: Vocabulary (Items 1-8, 25-30), Grammar (Items 9-19, 25-30), Functions of Speech (Items 20-24), and Reading Comprehension (Items 31-60). According to Wainer and Kiely (1987), items of Reading Comprehension (RC) section are better treated as testlet data to control the local dependence. When comparing Testlet 2PL with MIRT models, Min and He (2014) reached the same conclusion that Testlet models provide more appropriate analyses for RC tests. That justifies why in this study, only 30 multiple-choice items of the

two fill-in sections (Items 1-30) were investigated for students' intended abilities. Henceforth, these first 30 items will be referred to as the test for more convenience.

R is a free software used for statistical computing in recent research because of its flexibility (Kelley, Lai & Wu, 2008; Vance, 2009). The package distributed by R can be easily downloaded free of charge at <http://CRAN.R-project.org>. For factor analysis, FactorMineR, Psych and REdaS were utilized. The mirt package was applied when it came to M3PL and ANOVA.

3. Methodology

Previous research has confirmed the multidimensionality inherent in most tests. In this study, M3PL was adapted to investigate item difficulty, discrimination and guessing parameter of the first 30 questions as in Li et al. (2012). Firstly, Bartlett's Test and KMO Index were exploited to determine whether the data was indeed multidimensional. Then Principal Component Analysis (PCA) was conducted to bring out strong patterns in the dataset. With some idea about the underlying constructs, Varimax rotation was applied for identifying the most significant evidence. Parallel analysis played the role of Confirmatory Factor Analysis (CFA) to confirm the factor structure. In this analysis, actual eigenvalues are compared with random order eigenvalues. Factors are retained when actual eigenvalues surpass random ordered eigenvalues (Williams, Brown & Onsmann, 2012).

After that, to determine the appropriateness of MIRT models, ANOVA was carried out. The model with smaller AIC, BIC or $-\text{Loglikelihood}$ is supposed to be more suitable (Rijmen, 2010). The final stage is an illustration of how item difficulty and discrimination can be appraised by estimating MIRT parameters such as slope a_i , intercept d_i and guessing parameter c_i and applying Formulas (3) and (4).

IV. DATA ANALYSIS

1. Test dimensionality

The packages REdaS and psych were utilized for Bartlett's Test and KMO Index.

Table3.The results of Bartlett's Test and KMO Index

Keiser – Meyer – Olkin Statistics	KMO criterion: 0.786
Bartlett test	$\chi^2 = 1434.766$ $df = 435$ p-value < 0.0001

According to Kaiser (1974), with KMO = 0,786 and p-value smaller than 0,0001, it can be concluded that factor analysis is applicable to the data.

Then came Principal Component Analysis (PCA) with the use of FactoMineR. The number of factors can be determined by selecting those for which the Eigenvalue are greater than 1. This value means that these factors account for more than the mean of

the total variance in the items, which is known as the Kaiser-Guttman rule (Guttman, 1954; Kaiser, 1960).

Table4. Principal Component Analysis

	Eigenvalue	Percentage of VAR	Cumulative percentage of VAR
Component 1	4.0232774	13.410925	13.41092
Component 2	1.4190181	4.730060	18.14099
Component 3	1.3688881	4.562960	22.70395
Component 4	1.3006708	4.445569	27.03951
Component 5	1.2396500	4.132167	31.17168
Component 6	1.1893436	3.964479	35.13616
Component 7	1.1464178	3.821393	38.95755
Component 8	1.1132705	3.710902	42.66845
Component 9	1.0845349	3.615116	46.28357
Component 10	1.0379547	3.459849	49.74342
Component 11	1.0174491	3.391497	53.13492
Component 12	0.9876690	3.292230	56.42715
Component 13	0.9621180	3.207060	59.63421
...			

The eigenvalues are reported in Table 4. Among the 11 components (i.e. factors) meeting the rule, the first five components have eigenvalues much greater than 1 (i.e. 4.023, 1.419, 1.368, 1.300, 1.240), which strongly proves multidimensionality. The percentage of variance illustrates the variance proportion of observed variables. For example, 13.41% of variance of the first factor indicates that 13.41% of the variation can be explained. The cumulative percentage of variance of the 5 chosen factors accounts for 31.17%, which is equivalent to the results in Li et al. (2012). Moreover, the selection of these 5 factors satisfies the rule of Holzinger and Harman (1941). A corresponding Scree plot of the PCA is shown in Figure 3 for the pattern. Furthermore, Williams, Onsmann and Brown's (2012) rules when drawing a Scree Plot indicated that components 1, 2, 3, 4, 5 are meaningful to MIRT models.

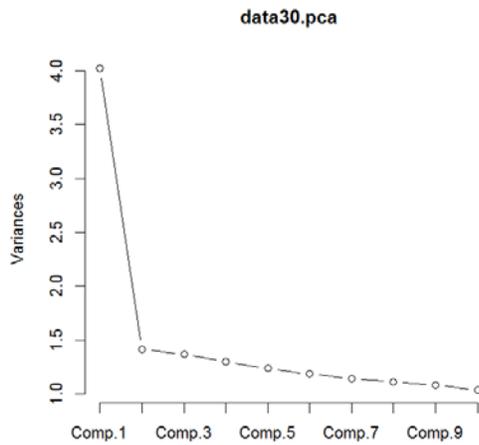


Figure 3. Scree plot của PCA

Parallel analysis acted as CFA shows the following results:

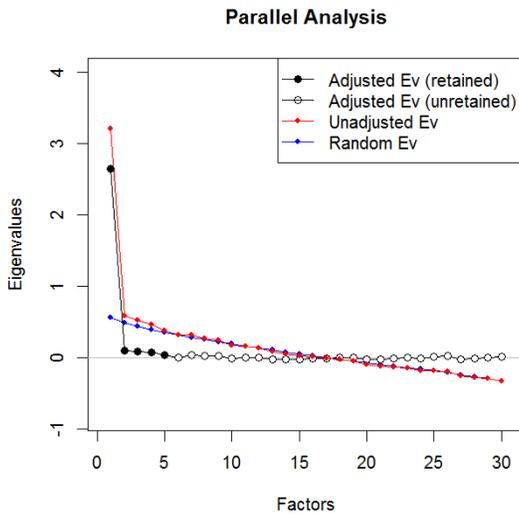


Figure 4. Parallel analysis

Subsequently, Varimax rotation once again proved that the 5 factors examined in PCA are eligible.

Table 5. Varimax rotation

Loadings:	Factor1	Factor2	Factor3	Factor4	Factor5
Item1	0.248	0.380	0.159	0.105	
Item2	0.262	0.107		0.359	0.132
Item3	0.177		0.213	0.187	0.106
Item4	0.190		0.138	0.279	
Item5	0.223	0.134		0.293	
Item6	0.269	0.278			
Item7	0.302	0.238	0.170		
Item8		0.308			
Item9	0.185	0.155			0.315
Item10	0.163	0.279	0.164	0.148	0.286
Item11		0.130		0.423	
Item12				0.126	

Item13	0.442		0.124		
Item14	0.161		0.770		
Item15	0.308	0.247			
Item16	0.153	0.350	0.122		0.112
Item17		0.247			
Item18	0.217	0.231			
Item19		0.112	0.399		-0.117
Item20	0.402	0.209		0.115	0.151
Item21	0.248	0.178			
Item22	0.486			0.157	
Item23		0.444	0.134	0.239	
Item24	0.139	0.327			
Item25	0.202		0.100	0.261	
Item26	0.111			0.258	0.659
Item27			-0.178	-0.161	
Item28					-0.148
Item29		0.159			0.185
Item30	0.191	0.255			

The values presented in columns Factor1, Factor2, etc. are item loadings for each factor. As Gorsuch (1983) put it, factors after orthogonal rotation are often uncorrelated. Therefore, χ^2 test was conducted for models with 2, 3, 4, 5 factors to investigate their correlation. The null hypothesis assumed no relationship among these variables. The results can be found in Table 6.

Table 6. χ^2 test

No. of factors	χ^2	Degree of freedom	p-value
2	$\chi^2 = 468.55$	$df = 376$	$p = 0.0008$
3	$\chi^2 = 405.50$	$df = 348$	$p = 0.0181$
4	$\chi^2 = 351.07$	$df = 321$	$p = 0.1190$
5	$\chi^2 = 308.33$	$df = 295$	$p = 0.285$

In this model, 4 factors are expected to account for the 4 content areas of the language assessment (i.e. Vocabulary, Grammar, Functions of Speech and Reading Comprehension, if any). However, Table 6 shows that the models may have more than 4 factors. As Riese et al. (2000) asserted the need for factor overestimation, 5 factors were chosen for M3PL model and classified as follows:

- Factor 1: Items 1,2,3,4,5,6,7,9,10,13,14,15,16,18,20,21,22,24,25,26,30.
- Factor 2: Items 1,2,5,6,7,8,9,10,11,15,16,17,18,19,20,21,23,24,29,30.
- Factor 3: Items 1,3,4,7,10,13,14,16,19,23,25,27.
- Factor 4: Items 1,2,3,4,5,10,11,12,20,22,23,24,25,26,27.
- Factor 5: Items 2,3,9,10,16,18,19,20,26,28,29.

2. Model suitability

7 models including IRT 2PL, IRT 3PL, M2PL (4 factors), M3PL (4 factors), M2PL (5 factors), M3PL (5 factors) and LO-3PL to evaluate data fit, in which LO-3PL represents MIRT

model with 3 factors designated for the first 30 questions (as Functions of Speech).
stated in the Learning Outcomes, i.e. Vocabulary, Grammar and

Table 7. Goodness of fit

	Estimation Model						
	IRT-2PL	IRT-3PL	M2PL4	M3PL4	M2PL5	M3PL5	LO-3PL
-loglikelihood	8793.661	8758.690	8718.171	8697.089	8718.774	8694.642	8944.445
AIC	17707.32	17697.38	17644.34	17662.18	17655.49	17667.28	18078.89
BIC	17958.74	18074.51	18080.14	18223.68	18112.23	18249.74	18476.97

Goodness of fit indices are reported in Table 7 for the four pairs of models. M3PL5 model with smaller AIC, BIC and -loglikelihood tends to fit significantly better than unidimensional models, models without guessing parameter and the LO model.

3. M3PL parameter estimation

The package mirt was then employed for M3PL model with 5 factors. The outcomes are summarized in Table 8.

Table 8. Parameter estimation of M3PL model with 5 factors

	a1	a2	a3	a4	a5	d	g	u
\$Item1	par 1.183	1.426	0.536	0.665	0		0.423	0.238
\$Item2	par 0.793	0.235	0	1.761	0.202		1.242	0
\$Item3	par 0.439	0	0.88	0.557	0.198		0.873	0.001
\$Item4	par 0.6	0	0.332	1.005	0		0.645	0.038
\$Item5	par 0.507	0.339	0	0.912	0		0.104	0

\$Item6	par 1.029	0.639	0	0	0		0.199	0
\$Item7	par 6.142	0.666	1.651	0	0		0.734	0.342
\$Item8	par 0	4.563	0	0	0		0.115	0.233
\$Item9	par 0.911	0.16	0	0	1.349		0.402	0.173
\$Item10	par 4.566	4.736	1.959	0.469	4.752		0.442	0.409
...								

The values in columns a_1, a_2, a_3, a_4, a_5 indicate the slopes of each item, d intercept and g guessing parameter. The discrimination of items is characterized by their slopes. The positive slopes show that the probability of a correct response of a good student is higher than that of a bad student, while the negative slopes depict the opposite trend. For further analysis, the discriminating combination and item difficulty mentioned in Formulas (3) and (4) were calculated.

Table 9. Discrimination and Difficulty

	a_1	a_2	a_3	a_4	a_5	d	g	η_{MDISC}	b_{MDIFF}
Item 1	1.183	1.426	0.536	0.665		0.423	0.238	2.04	-0.21
Item 2	0.793	0.235		1.761	0.202	1.242	0	1.96	-0.63
Item 3	0.439		0.880	0.557	0.198	0.873	0.001	1.15	-0.76
Item 4	0.600		0.332	1.005		0.645	0.038	1.22	-0.53
Item 5	0.507	0.339		0.912		0.104	0	1.1	-0.09
Item 6	1.029	0.639				0.199	0	1.21	-0.16
Item 7	6.142	0.666	1.651			-0.734	0.342	6.39	0.11
Item 8		4.563				-0.115	0.233	4.56	0.03
Item 9	0.911	0.160			1.349	0.402	0.173	1.64	-0.25
Item 10	4.566	4.736	1.959	0.469	4.752	0.442	0.409	8.36	-0.05
Item 11		0.645		0.854		1.637	0.002	1.07	-1.53
Item 12				3.993		-8.349	0.243	3.99	2.09
Item 13	1.916		0.461			0.307	0.08	1.97	-0.16
Item 14	0.546		4.897			-0.462	0	4.93	0.09
Item 15	1.904	0.695				-1.535	0.225	2.03	0.76
Item 16	0.647	0.902	0.091		0.198	1.381	0.002	1.13	-1.22
Item 17		1.079				-0.644	0.385	1.08	0.6
Item 18	1.101	0.567			0.714	-1.261	0.118	1.43	0.88

Item 19		0.276	2.782		-0.312	-0.801	0.003	2.81	0.28
Item 20	0.988	0.875		0.572	0.66	-0.079	0.194	1.58	0.05
Item 21	0.667	0.615				-0.939	0.13	0.91	1.03
Item 22	1.474			0.894		-0.856	0.1	1.72	0.5
Item 23		2.035	0.396	0.565		0.73	0.02	2.15	-0.34
Item 24	0.629	1.397		0.968		0.888	0.203	1.81	-0.49
Item 25	0.455		0.308	0.599		0.831	0.005	0.81	-1.02
Item 26	0.663			0.988	1.691	2.216	0	2.07	-1.07
Item 27			-2.048	-3.775		-8.591	0.135	4.29	2
Item 28					-3	-6.603	0.252	3	2.2
Item 29		0.401			0.567	0.166	0.002	0.69	-0.24
Item 30	0.543	0.543				0.371	0.001	0.77	-0.48

Based on Baker (2001) and Hasmy (2014)'s labels for item difficulty and discrimination (as shown in Tables 1 and 2), it can be deduced that:

- Item discrimination (η_{MDISC}): over 50% (16 items) have Very High discrimination. 3 items (10%) are at High level. About 35% (11 items) fits in Moderate level. There are no questions at Low and Very Low levels. With a majority of items (60%) at good discrimination levels, the test is supposed to differentiate well among students.

- Item difficulty (b_{MDIFF}): over 20% (7 items) are categorized as Easy; half of the items as Medium. 20% of the items are ranked as Hard and Very Hard. With 80% items at Medium and below levels, the test is not so challenging, but the distribution of item difficulties can be considered adequate for student level assessment.

Further analysis navigated our concern to some test items. Items 12, 27 and 28 can be regarded as well-designed with high levels of difficulty and discrimination. Having the highest discrimination among 30 items, Items 7, 8, 10, 14 are supposed to be reusably good. However, Items 17 and 21 need revision as they are at high difficulty level but moderate discrimination.

Most of the questions involve decent amount of guessing behavior, except for Items 7, 10, 17 (with guessing parameters of 0.409, 0.385 and 0.342, respectively). That these items are at fairly high difficulty level may lead to the fact that guessing behavior (rather than ability) can promote the possibility of positive answers. Furthermore, other factors rather than linguistic knowledge (General Belief, Contextual Knowledge or Logical Thinking) may influence a student's response. Taken Item 21 as an example, its intended ability of Speech Functions is inferior to Grammar knowledge, thereby causing students confusion over choices.

V. DISCUSSION AND IMPLICATION

This study investigated the application of factor analyses to validate test dimensionality. A 30-item excerpt of an English multiple-choice test was used as an example when M3PL is the best fitting model. The results reflect overlapping trait issues inherent in the test as in any kind of assessment, which reinforces Shedd et al. (1996) and Wilson (2000)'s idea of multidimensionality. Unlike Li et al. (2012), the above-mentioned selection of factors went beyond the 4 content areas of the language assessment for the following reasons:

- Besides the 4 intended abilities listed in the learning outcomes, a student's response may be manipulated by other non-linguistic factors such as General Belief (Item 8), Contextual Knowledge (Item 17) and Logical Thinking (Item 12).

- Factor analysis and ANOVA revealed that the model with more than 4 factors is better fitting than the Learning Outcome model. Moreover, according to Riese et al. (2000), it is better to overestimate the number of dimensions.

χ^2 test was employed to evaluate the goodness of fit of IRT, M2PL and M3PL models, which demonstrated that M3PL model with guessing parameter has the best data fit. This model with the emergent factors has been proved to measure students' real abilities. In addition, the right factor classification acts as a premise for the next steps of estimating item difficulty and discrimination.

More often than not, high-challenge questions tend to distinguish well among students. Nonetheless, there are cases in which difficult items have mediocre discrimination (for example, Item 17), which can be justified by guessing parameter. High values of guessing parameter acknowledge that students' guesswork, rather than knowledge, may engage in figuring out the answers.

All the 5 chosen factors turn out to involve a combination of different skills and abilities, which makes it hard to get them labeled. Especially, Grammar has emerged among the skills as a prerequisite for students' best performance. In addition, the knowledge of functions of speech is also an indispensable source for their comprehending the test questions.

VI. CONCLUSION

To sum up, more qualitative item analyses will be needed in future research to determine how well they meet the learning goals. Once the quality of each item (i.e. the discrimination and difficulty) and of the whole test is assessed, educators and stakeholders can decide what changes to make for a good test bank construction.

The procedures illustrated in this real example can be utilized to validate the test dimensionality as follows:

- First, one should identify the test's multiple dimensions using Bartlett's Test and KMO Index.

- Second, exploratory approaches (e.g., PCA) should be implemented to determine the potential latent dimension(s).

- Third, confirmatory analysis can then be conducted by Varimax rotation to simplify the interpretation and categorize the items.

- Then ANOVA is done to confirm the best fitting model.

- And finally, "mirt" package of the freeware R is employed to shed light on the multidimensional difficulty and discrimination of each item in the test.

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Grouping of Universities in Indonesia Based on Data Base of Higher Education

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Abstract- This study aims to group universities in Indonesia based on a various quality variables of universities that had been documented in the Data Base of Higher Education (PD Dikti) in order to develop the implementation of higher education in Indonesia. Variables that had been documented in PD Dikti among other is the quality variable of higher education, that are the number of students, the ratio of the average GPA to maximum GPA, the number of department, the average number of students per department, the ratio of lecturer to student, the ratio of tenured lecturer to total lecturer, the ratio of associate professor to professor, the ratio of certified lecturer, the ratio of lecturer titled master degree, the ratio of lecturer titled doctorate degree. These variables were obtained from data of higher education implementation that consist of institution data, department, student, and lecturer. By using a cluster analysis, this study showed that universities in Indonesia were formed into two groups. The first group consisted of universities with characteristics whose all factor values were above the average from the group formed that most members of this group were state universities and the second group consisted of universities with the characteristic factor where all factor values were low that some members of this group were private universities.

Index Terms- university, higher education, data base of higher education, cluster analysis

I. INTRODUCTION

Higher education has a strategic role in educating the intellectual life of the nation and bringing science and technology forward as well as the sustainable empowerment of the Indonesian nation. In attempting to realize this role, the implementation of the higher education in Indonesia faces challenges, in terms of policy, implementation, monitoring, and evaluation. These challenges include issues related to access, quality, budget and finance, relevance, governance of universities and other issues. These challenges that are related to higher education must be overcome immediately to make the future of nation development better. Higher education is expected to contribute in addressing the needs of national technology, creating jobs with technological base, creating qualified human resources, and developing economic. There is a positive causal relationship between higher education and economic growth, as well as between higher education and the level of employment (Morote, 2001). According to Keller (2010) and Shin (2012) in their research, it is stated that higher education plays an important

role in economic growth and regional development in a global context, particularly in developing countries. Therefore, serious efforts are needed to face the challenges in the implementation of the higher education.

The government, in implementing higher education, has an responsibility to organize, plan, supervise, monitor, and evaluate as well as to develop and organize the implementation of the program, level and type of higher education to achieve the goal of higher education. This charge is not effortless; for the reason that the number of university in Indonesia keeps growing.

Table 1 The development of number of university and department

Year	2012	2013	2014	2015
Universities	3.170	3.189	3.280	3.246
Departments	17.206	17.503	18.882	19.373

Source: Higher Education Database

Until 2015, there are 3,246 universities in Indonesia under the charge of the Ministry of Research, Technology and Higher Education. This number of universities will certainly continue to grow in the future, particularly as the public interest to participate in higher education is very high and the number of college-age population is growing. Based on data from academic year of 2014/2015, the number of department in the scope of Ministry of Research, Technology and Higher Education of the Republic of Indonesia is 19,373 managed by 3,246 higher educations. It consists of 6,101 (31.4%) departments managed by state universities and 13,272 (68.6%) managed by private universities. The data indicates that the ratio between departments and group of state universities is 1:45, while the group of private universities is 1:4. This means, on average, that a state university manages 45 departments while a private university manages 4 departments. Referring to some of the overview above, it will provide opportunities to the growth and development of higher education; in that case the quality of existing universities must be improved so that they have a competitive advantage (Rosalin, 2010).

Demands for quality and relevance of higher education, the availability and equal access to higher education is increasing. In order to implement excellent higher education, the government runs the Quality Assurance System of Higher Education (SPM Dikti). Law No. 12 of 2012 on Higher Education (UU Dikti) integrates Quality Assurance of Higher Education, which consists of Internal Quality Assurance System (SPMI), External Quality Assurance System (SPME) or accreditation, and

Database of Higher Education (PD Dikti), In Article 79 paragraph (2) of the Law of Higher Education stipulates that the government develop an information management system of higher education. With this rule, it is necessary to have a good management in Database of Higher Education so that data and information about higher education in Indonesia can always be provided as part of the implementation of excellent higher education. Database of Higher Education aims to provide information precise and accurate for decision making in higher education institutions on program development, planning, monitoring, evaluation and other management purposes.

Data and information of higher education by universities is an important part of the Database of Higher Education. Data and information reported can be used for the periodical evaluation of universities and departments (Muchlis, 2008). The implementation of higher education by the government requires data and information for making decision and projecting the development needs of higher education. This study aimed to group universities based on various quality variables of universities that had been documented in Database of Higher Education with the purpose of the development of the implementation higher education in Indonesia.

II. RESEARCH METHOD

The data used in this research was secondary data obtained from the data and information of higher education implementation, academic year of 2014/2015 that has been reported in the Data Base of Higher Education (PD Dikti). From the data report in the Data Base of Higher Education, data related to institutions, students and lecturers were collected from 2,993 universities in Indonesia that had reported their data. From the data it was obtained 10 quality variables of universities, that are the number of students, the average ratio of GPA to the maximum GPA, the number of department, the average number of students per department, the ratio of lecturer to student, the ratio of tenured lecturer to total lecturer, the ratio of associate professor and professor, the ratio of certified lecturer, the ratio of lecturer titled master degree, the ratio of lecturer titled doctorate degree.

Data processing was performed using factor analysis and cluster analysis. Factor analysis is an interdependence technique that aims to define the structure that exists between variables in an analysis, so that data reduction can be performed and these variables can be grouped into a few factors (Santoso, 2010). The process of factor analysis attempted to find an interrelationship between a number of variables that are mutually independent, so that one or fewer variables, than the initial number of variables, can be made.

Cluster analysis were used to classify objects or cases into relatively homogeneous groups called clusters. Objects or cases in each group tend to be similar each other and differ greatly (not the same) with the object of other clusters (Santoso, 2010). The procedure of cluster formation is divided into 2, that are hierarchy and non-hierarchy. The formation of hierarchy cluster has the quality as the development of a hierarchy or branched tree-like structure. Hierarchy method can be agglomerative or divisive. Agglomerative method consists of linkage method, variance methods, and the centroid method. Linkage method consists of a

single linkage, complete linkage and average linkage. Non-hierarchy method is often called K-means method. Cluster analysis used in this study was K-means with data processing done and supported by SPSS software.

III. RESULTS AND DISCUSSION

Factor analysis

Test tool of KMO and Bartlett's test of sphericity was used as an initial test whether the existing data can be parsed into a factor. The figure of KMO and Bartlett's test was above 0.5 with a significance of less than 0.5 indicating that the existing variables and samples could be analyzed by factor analysis. Here is the result of KMO and Bartlett's test of sphericity.

Table 2 KMO and Bartlett's test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0,6633
Bartlett's Test of Sphericity	Approx. Chi-Square	7966,680
	df	45
	Sig.	0,000

KMO / Kaiser-Meyer-Olkin Measure of Sampling Adequacy showed the adequacy of data used in the study, and how beneficial the data in the study. If the number is above 0.5, then the data is considered to be quite beneficial for use in the study. On the table, the value of KMO was sufficiently high at 0.663. This means the data was sufficiently effective to be used in the study. While Bartlett's Test of Sphericity showed the significance index of 0.000 or was under 0.05, so it can be said that the factor analysis was sufficiently effective to be used. As a result, the available variables and data could already be analyzed by factor analysis.

The next stage is to determine the number of factors. In determining the number of factors formed, one of them is determined by eigenvalue. The number of factors that are formed optimally is when eigenvalue was more than one. For more details, it can be seen in the table below.

Table 3 Value of Eigenvalue

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1	3,053	30,529	30,529
2	1,361	13,613	44,142
3	1,176	11,757	55,899
4	1,045	10,449	66,348
5	1,016	10,160	76,508
6	0,873	8,735	85,243
7	0,505	5,050	90,292
8	0,447	4,470	94,762
9	0,287	2,868	97,631
10	0,237	2,369	100,000

On the table, it is shown that Eigenvalues on quality variables of higher education was on the component / factor of 5, so that the factors that had been formed were 5. Cumulatively, the five factors formed can explain the variety of factors of

76.508% of the total variance. Based on the eigenvalue, it was obtained 5 factors that have the highest value. Then from 10 variables that were obtained, it was formed into five factors used to determine the factors that affect the quality of higher education.

After determining the number of factors that will be formed, the next step was to determine which variables that were included in these factors.

Table 4 The Value of Loading Faktor with Varimax Rotation

	Component				
	1	2	3	4	5
The number of student	0,367	0,830	0,024	0,075	0,070
The average ratio of GPA to the maximum GPA	0,000	-0,109	0,030	0,833	-0,156
The number of department	0,728	0,311	0,053	0,267	0,199
The average number of students per department	-0,066	0,846	0,094	-0,196	-0,177
The ratio of lecturer to student	-0,012	-0,094	-0,004	-0,150	0,891
The ratio of tenured lecturer to total lecturer	-0,020	0,128	0,835	0,235	0,169
The ratio of associate professor and professor	0,874	0,038	0,038	-0,065	-0,059
The ratio of certified lecturer	0,763	-0,091	0,080	-0,294	-0,212
The ratio of lecturer titled master degree	0,266	-0,015	0,752	-0,252	-0,231
The ratio of lecturer titled doctorate degree	0,784	0,151	0,114	0,097	0,062

Therefore the variables have been reduced to 5 factors with the following details:

Table 5 Grouping variables

Factors	Variables	Loading Value
Factor 1	The number of department	0,728
	The ratio of associate professor and professor	0,874
	The ratio of certified lecturer	0,763
	The ratio of lecturer titled doctorate degree	0,784
Factor 2	The number of student	0,830
	The average number of students per department	0,846
Factor 3	The ratio of tenured lecturer to total lecturer	0,835
	The ratio of lecturer titled master degree	0,752
Factor 4	The average ratio of GPA to the maximum GPA	0,833
Factor 5	The ratio of lecturer to student	0,891

Factor 1 consisted of 4 variables where the variable of ratio of associate professor and professor was the primary identifier because it had the largest loading value (0.874). Factor 2 consisted of 2 variables where the variable of average number of students per department was the primary identifier because it had the largest loading value (0.846). Factor 3 consisted of 2 variables where the variable of ratio of lecturer to total lecturer was the primary identifier because it had the largest

loading value (0.835). Factor 4 consisted of 1 variable, that was the ratio of the average GPA to the maximum GPA with loading value (0,833). Factor 5 consisted of 1 variable, that was the ratio of lecturer to student with loading value (0.891).

Cluster analysis

Clustering process is performed to classify universities based on characteristics similarity. The process begins by determining the number of clusters selected. This method is to classify by initially determining the desired number of clusters (two clusters, clusters or the others). After the number of cluster is determined, then the cluster process is performed without following hierarchy process (Santoso, 2010). This method is commonly called K-Means Cluster.

In this study, the number of clusters was determined, that was 2 clusters. After 2 stages of iteration, the final cluster results were obtained as the following table.

Table 5 Final Cluster Center

Factor	Cluster	
	1	2
Factor 1	4,25442	-,07522
Factor 2	2,22055	-,03926
Factor 3	,04419	-,00078
Factor 4	1,56770	-,02772
Factor 5	3,03952	-,05374

The universities grouping based on similar characteristics are as follows.

- Group 1 consisted of universities whose all value factors were above the average of the group formed. There were 52 universities in this cluster.
- Group 2 consisted of universities whose all value factors were low. There were 2,941 universities in this cluster.

From the results of university grouping, if cross-tabulation with the type of university is performed then it will produce the following table.

Table 7 Results of grouping based on type of university

		Cluster Number		Total
		1	2	
State Universities	Count	44	69	113
	% within Cluster Number of Case	84,6%	2,3%	3,8%
	% of Total	1,5%	2,3%	3,8%
Private Universities	Count	8	2872	2880
	% within Cluster Number of Case	15,4%	97,7%	96,2%
	% of Total	0,3%	96,0%	96,2%
Total	Count	52	2941	2993

From Table 7, it is shown that from the total universities, in the first group were mostly state universities, and in the second group were mostly private universities.

After that, the validity of the group was performed. The validation of the group formed was performed by using Analysis of Variance (ANOVA) to determine whether or not there was difference/ influence on clusters formed. ANOVA F-test showed

that the factors 1, 2, 4 and 5 had p-value <0.05, it means that each factor had a significant difference between cluster 1 and cluster 2, while on the factor 3, p-value was larger than 0.05 which means that both clusters were relatively the same or factor 3 between cluster 1 was not significantly different with factor 2 in the cluster 2.

Table 7 Final Cluster Center

Factor	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
Factor 1	957,848	1,000	0,680	2991,000	1408,412	0,000
Factor 2	260,937	1,000	0,913	2991,000	285,772	0,000
Factor 3	0,103	1,000	1,000	2991,000	0,103	0,748
Factor 4	130,059	1,000	0,957	2991,000	135,924	0,000
Factor 5	488,906	1,000	0,837	2991,000	584,205	0,000

IV. CONCLUSION

The grouping of universities in Indonesia based on the quality variable of higher educations that had been documented in the Data Base of Higher Education resulted 2 groups. The first group consisted of universities with characteristic whose all factor values were above the average of the group formed that some members of this group were state universities and the second group consisted of universities with factor characteristic whose all factor values were low that most members of this group were private universities.

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The Role of Banking Sector during the Global Financial Crisis of 2007 and 2008

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Abstract- This paper mainly focuses on the trends and bank behaviors during the global financial crisis. This paper criticizes banking sector during the financial crisis. Based on our deep analysis throughout the paper, funding and risk taking behaviour that can be found are the bank trends and behavior that had been practiced during the global crisis. This paper also focuses on the bank behavior and the financial market. The finding of the paper is the incongruity between the short-term funding and long-term funds had built up more liquidity risks. The study also finds the bank behavior that well-capitalized banks may react less to yield shocks and their profits could be less sensitive to the business fluctuations, as their portfolio decisions may vary from those taken by less promoted banks.

Index Terms- Crisis, Bank Behavior, Liquidity Risk

I. INTRODUCTION

The 2007-09 Global financial crisis led economies worldwide to a recession which is considered to be the highest after the one called "Great depression" in the 1930s. The panic of the banking sector caused by the credit crash which reached its peak in the mid-2007 followed up by the collapse of nonprime mortgages and many another type of securitized products are considered to be the most obvious catalyzer of the global financial crisis.

In any economy, banks are considered to be one of the most important players as they significantly contribute to the development of the economy through the facilitation of business activities of the economy (Temizsoy et al. 2015). Banks allow Business to invest beyond their ability to by providing credit in short and long term period. They also contribute to the affordability of household to purchase some of their needed asset, home for example, without saving the entire cost of the asset.

The effectiveness of the banking sector plays an important role in the growth sustainability of any nation. In result of that and as we mentioned earlier, banks contribute an essential role toward to progress of any modern economy, not only in terms of turnover but also as the primary financier of the national economy. However, as banks do significantly contribute to the development of the economy of any country, if not relatively regulated, they can also lead to recession of any economy into a severe recession as we experienced during 2007-09 Global Financial crisis.

The main goal of this study is to reveal the changes and trends in the banking system behavior during the recent global

financial crisis (2007-09). The work is organized as follows. The first part will highlight the key trends in banks' behavior during the 2007-09 global financial crisis. The second part will detail the funding and risk taking the behaviour of the banks during the period of recent crisis. The third part will focus on the type of banks which perform well during the global financial crisis and lastly the criticisms of banking sector behavior during the crisis.

Trends and Bank Behaviors during the Global Financial Crisis.

Following the great recession, US economy experienced 70 years of relative calm in a period which the economists described as the great moderation. It was not a period of free crisis, but losses were relatively very small, very moderate compared to the losses shown in the great depression. This is an important element because it led people to almost blindly believe that we were living in a calmer period with the less risky financial environment. People were having jobs, revenues and a huge amount of savings. In addition to that, people had the strong believe that home price will constantly continue to rise and so they can borrow a large amount relative to their income in order to invest in the real state. Similarly, issuers of home mortgage also had the same feeling that they could issue a large portion of mortgage loan because that was backed by what banks expected to be a rising value of that financial asset. This led banks to get into what is called "Moral Hazard" and in the result of that, the financial system experienced a huge boom in borrowing relative to income.

Banking sector and Global Financial Crisis: the Criticisms

During the global financial crisis, one of the bad side of the crisis was the imbalance between those profiting from excessive risk-taking in good times which are banks, and those who suffering the costs of that behavior in bad times (Corsetti et al. 2006). This phenomenon is called "The Moral Hazard". In this part of the assignment, we will explain in more details how the moral hazard contributed to the worldwide financial crisis.

Before the onset of the global financial crisis, one of the examples of moral hazard that contributes to the crisis was the financial institution's expectation that government will not let them fail due to the systematic risk that could spread to the rest of the economy. Through financial innovation instruments such as Mortgage back securities (MBS), Asset back securities (ABS), Collateralized debt obligation (CDOs), the bank got involved in a high-risk investment which was practically so complex, inherently non-transparent. These instruments were also not correctly priced, and not sold on markets and are not liquid. According to the Securities Industry and Financial Markets

Association (SIFMA), there was \$7.4 trillion worth of MBSs outstanding in the first quarter of 2008, more than double the amount outstanding in 2001 (Mishkin 1992). However, talking about moral hazard, even though banks were considered to be the ones who were taking the advantage of, the evidence saw that banks also relatively lost a huge amount of money. It does not really make a whole lot of sense to have the bad Behaviour by insiders and then to have the insiders get slammed as well. And that is exactly what we saw during the crash. Even before the collapses of Lehman Brothers, it appears to be the case that the insiders or banks, the ones who are supposed to be taking advantage of, and misleading these gullible homeowners, were, in fact, themselves losing a tremendous amount of money. Here is just some summary statistics on losses during the crisis. You can see that the institutions are losing multiples of billions of dollars. Citigroup losing 42.9 billion, UBS 38.2 billion, Merrill Lynch 37.1 billion. Here we see, in total, 20 institutions that lost, each one of them more than six billion dollars during the financial crisis (figure 1).

Bad behaviours evidences	
Institutions	Losses (Billion of dollards)
Citigroup	42.9
UBS	38.2
Merril Lynch	37.1
HSBC	19.5
IKB Deutsche	15.9
Roayl Bank of Scotland	15.2
Bank of America	15.1
Morgan Stanley	14.1
JPMorgan Chase	9.8
Credit Suisse	9.6
Washington Mutual	9.1
Credit Agricole	8.3
Lehman Brothers	8.2
Deutsche Bank	7.6
Wachovie	7.0
HBOS	7.0
Beyerische Landesbank	6.7
Fortis	6.6
Canadian Imperial	6.5
Barclays	6.3

Figure 1. Bank behavior evidences (Adopted from Foote et al. 2012)

Therefore, when the crash of the U.S nonprime mortgages spread across the financial markets in the summer of 2007, U.S banks were not the only financial institution the experience

losses. The French Bank BNP Paribas on August 9, 2007, announced that the bank is practically unable to value exactly what the nonprime securities are worth in their funds based on the fact that risk-averse investors stopped refinancing maturing ABCP.

According to (Temizsoy et al. 2015) during the crisis, the increase of unpredictability of credit risk led banks to reserve more liquidity rather than making them available in the interbank market. Because of the high level of risk in the financial system, banks prevent themselves from lending to business. Money market in many developed countries come a freeze and banks were forced also to borrow from central banks.

The loans to large borrowers dramatically dropped by 47% during the highest period of the 2007-09 of the crisis (fourth quarter of 2008) in direct comparison to the prior quarter, and by 79% compare to the peak of the crisis (second quarter of 2007). Lending to real investment sectors such as working capital and CAPEX fell by 14% in the last quarter of 2008. After the collapse of Lehman Brothers in September 2008, banks experienced a run by short-term bank creditors which made difficult for the bank to roll over their short-term debt (Coleman &Feler 2015).

It is found that low leverage and lower returns were almost settled by the well-performing banks before or beginning the crisis. There were some differences in banking principles all over the countries where it was generally uncorrelated with the banks' performance during the crisis and except those large banks from countries with lots of limitations on the actions of banks performed better and reduced their loans. They actually focus on how those banks that performed really good during the global crisis (Beltratti&Stulz 2012).

According to (Beltratti&Stulz 2012), the relation between some factors (lax rule, inadequate capital, unnecessary reliance on short-term financing) and the performance on stock return of large banks during the crisis was operated, where it was defined for the large banks with the assets of almost \$50 billion in 2006. Andrea Beltratti and Rene M. Stulz also found some solid evidence that banks that mostly relied on the deposits for their financing in 2006 managed better during the crisis. It is found that large banks which had lower leverage performed better at the end of 2006. During their study, it is expected that banks with better governance have performed better. It is commonly believed that insiders who have remarkable ownership strict their motivation with the interests of shareholders. Some limited evidence shows that shareholder controlling higher ownership of banks performed better. Andrea B. and M. Stulz also found that bank activities were more controlled in the large banks worldwide ached less from the disaster but no evidence exists that these kinds of restrictions made those banks less risky before the economic fall when risk measurement was used.

A study conducted by (Berger &Bouwman 2013) observed that there were pointedly high equity and low leverage in the well-performing banks at the end of 2006. The same research also highlighted that traditional banks actually performed better. Many theories suggest that the improvement of capital goes to the survival probability of banks.

First, a set of theories highlights the character of capital as a barrier to grip surprises to incomes while several theories advise that the capital structure of banks also influences its

portfolio, screening, and monitoring choices. If they are fixed, then this obstacle process instantly indicates that more capital may increase the existence of probability. Second, other theories focus on the incentive effects of capital. It contains some concepts related to monitoring and screening, and asset substitution ethical threat (Berger & Bouwman 2013).

It is broadly recognized that the development of the crisis may also depend on the limitations in the corporate governance of banks. There is also a real evidence on the positive impact of good governance on bank performance, they hypothesize that the power of corporate governance is replicated in bank performance during the financial crisis. Specifically, they got three mechanisms such as developed market valuations, greater profitability, and less negative stock returns by this time (Beltratti & Stulz 2009). The relationship between risk taking factors and corporate governance would suggest that having solid governance attributes in banks may take a high risk (Beltratti & Stulz 2009).

According to Beltratti & Stulz (2009), no evidence exists to those banks who had better governance and performed better when the measurement of governance was operated with the data used in the well-known Corporate Governance. Bank productivity and statement of financial position were significantly important factors of performance during the crisis than bank regulation and governance at the end of 2006. Banks with the advanced Tier 1 capital ratio in 2006 and huge deposits usually performed better during the crisis.

This analysis reveals that the substantial variation in the ability of banks to sustain lending remained during the financial crisis, and this ability is determined by the strength of their balance sheets. There are three main results in the research. First, the heavy reliance of banks on the funding from market caused liquidity shocks during the crisis and started reducing their supply of credit maximum than other banks. This effect may grip measuring exposure to the shock in the market based on funding and a difficult measure of essential liquidity.

Second, this effect was disposed of by bank capitalization in both the quantity and the quality of capital mattered. The disclosed banks to shocks with a good capital held more tangible common equity and decreased lending less as much as possible than other disclosed banks to shocks. Third, capital and structural liquidity are linked with some complementarities in the higher structural liquidity, in which there are benefits for lending only for well-capitalized banks (Kapan & Minoiu 2013).

Cull et al. (2013) also found that developing countries like China, Brazil, and India systemically recovered quickly from the crisis by generating interest in the potential modifying role that these banks could play during periods of financial suffering. From the Vienna, Initiative where

foreign banks joined together and which is called a public-private partnership among multinational banks, global financial institutions, and European governments, foreign banks were supposed to have financial support in return for commitments. They actually sustain their skills and preserve their subsidiaries effectively which is capitalized in affected host countries. Hence, they were stable lenders than those who did not have loan growth rates in domestic banks by the end of 2009.

Bank Behaviour during the 2007-09 Global Financial Crisis: Funding and Risk-taking

In this part, we will focus on the important changes in the bank behavior during the global financial crisis from the viewpoints of funding and risk taking the behavior of banks. Banks use a variety kinds of financial instruments, from both retail and wholesale sources of funding. Retail banks fund sources include primary customer deposits, mainly from household sectors while the wholesale banks source the funds from the private markets used in addition to customer deposits to finance the bank operations (IMF 2012) cited in (Adrian and Gabriele 2013).

Moreover, the main sources of wholesale funding include interbank loans, short-term debt instruments, reports, commercial paper (CP), and certificates of deposits which are in short-term in nature i.e. money market instruments. Also, sound deposit institutions like wholesale banks can issue long-term securities as well as access liquidity from the central bank, as the lender of the last resort (Adrian and Gabriele 2013).

To shape this section, the study discusses the funding Behavior of banks followed by the risk taking the behavior of banks during the recent global financial crisis.

A. Funding Behaviour of Banks during Global Financial Crisis

In the last two past decades, the structure of bank funding has changed due to numerous structural advances, in which these changes emerged as a result of changes to the supervisory and regulatory framework. These reasons include the strong interconnection of financial markets and banks, globalization of financial markets, rapid growth of investment banking activities in both investment banks and universal banks which commanded an increasing reliance (Borio 2009).

However, the recent global financial crisis showed the dark side the wholesale funding (Altunbas et al. 2011). In terms of the impact of funding structure on bank risk, past literature showed the swiftly of funding amount at a relatively at a low cost but the 2007-09 global financial crisis showed that the wholesale financiers have low interest to conduct costly monitoring on the basis of cheap and noisy signals (Huang & Ratnovski 2011). As the market sources of funding deeply reliant on market perceptions, this can initiate doubting to wholesale investors and could further lead to the experience of Northern Rock Bank in the United Kingdom.

The bank funding has gone through unprecedented dislocations, due to the structural changes, during the 2007-2009 global financial crisis which acted as promoter for the major adjustment in the operation of banks and funding models which lead and reinforced by the following euro area crises (Adrian and Gabriele 2013). Moreover, the authors identified that financial markets were severely hassled even the sound depository institutions (banks) which struggle to access wholesale funding from the raise secured financing.

The Euro crises which followed the financial crises that emerged in the United States and European banks resulted in key changes in the funding segments of euro banks. The analysis shows that a number of factors were the key notions of the trend causes. First, funding support from the governments both in direct and indirect funding for stabilizing the funding situations of the banks during at height of the crisis. Second, the euro banks reduced their interbank unsecured liabilities and securities and

stepped toward using long-term securities of wholesale funding, especially covered bonds (Adrian and Gabriele 2013).

Thus, how banking funding and financial crises interconnected? It is tough to find a simple answer to this question. Borio (2009) explained that bank funding and financial crises are powerfully interconnected as faintness on the asset side of banks' financial position statement incline to cause funding problems. These funding problems bare increasing difficulties in the value of the principal assets resulting drops in asset prices and further resulting funding liquidity crises and solvency concerns.

Moreover, from the viewpoint of bank funding, banking crises augmented as banks' over confidence on a limited number of sources of financing. Imbalances in the balance sheet may develop into banking crises as the increasing diversification and complexity of funding instruments. According to Adrian and Gabriele:

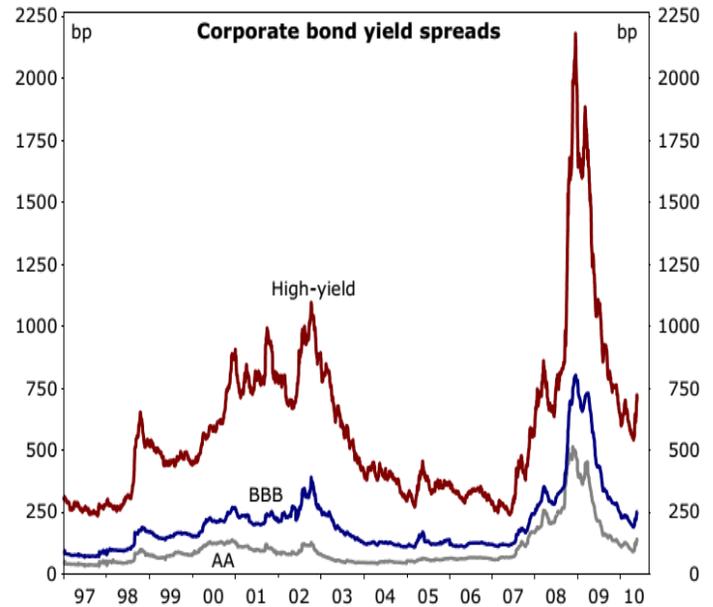
The 2007–09 global banking crisis showed the shortcomings of business models that depended disproportionately on short-term wholesale funding, such as those adopted by Northern Rock in the United Kingdom, Bear Stearns and Lehman Brothers in the United States (2013, p. 9).

B. Risk Taking Behaviour during Global Financial Crises

As the funding behavior of banks changes at the start of and during the period of the global financial crisis, the risk taking the behaviour of banks also changed significantly, particularly liquidity risks. There was a great mismatched between the increase in debt demand the and the increase of bank deposits which bring that banks try to find funds other sources of funds (Norgren 2010).

Also, there was a mismatch between the short-term funding and long-term funds which increasingly built up more liquidity risks. Huang & Ratnovski (2011, p. 259) concluded that "these funds can create significant risks in "modern" banks that hold mostly arm's length assets with readily available, but noisy, public signals on their values".

The changes in risk-taking behavior were not only limited to banks but also for other financial institutions like hedge funds and venture capitalist increase their leverage in order to increase the return on their capital (Norgren 2010). This was a result of a low-interest rate which made risk adverse investors uncomfortable. This latterly put investors to search for and invest high-risk investments or assets in order to get the higher return.



Source: Reuters Eco win. (Adopted from (Norgren 2010, p. 19))
Figure 2. Low risk premiums, 1997-2010.

Bank Behavior and Financial Market

The recent explanation of the "bank lending channel" focuses on the bank effects of reserve obligations on demand deposits, although no consideration is paid to bank equity, and the bank capital is inferred as an "irrelevant" balance-sheet. However, the link between bank behavior and financial market in these days has increased for the purpose of capital lending and it was newly that bank capital has been taken into account in the situation of the "bank lending channel" bank with weaker capital position greater depends on market founded and non-interest source of income restricted the loan supply.

Essentially, the cooperation between banks and financial market worsens the effect of money related to the economic situation on the incentive structure driving banks. In a precise, there should be stronger monitoring those financial factors that influence monetary transmission mechanism in particular in a period of crisis. The key finding of this strand of writing is that bank capital expands the ability to raise uninsured types of obligation and in this manner banks' capacity to limit the impact of a drop in the deposit on lending. However, bank capital can influence the impact of monetary changes on lending in two ways, both based on adverse selection problem that affects banks fundraising, the bank lending channel which relies on imperfection in the market for bank debt and the bank capital channel which concentrates on an imperfect market for bank equity.

Well-capitalized banks may react less to yield stuns furthermore their benefits could be less touchy to the business cycle, as their portfolio decisions may vary from those taken by less promoted banks. Gambacorta & Mistrulli (2004) stated that to assess the part of capital in bank lending had found that well-capitalized banks can better shield their lending from financial approach stuns. Lending choices of banks in connection to their capitalization are likewise addressed in others studies include (Jiménez et al. 2012), who watch that the worldwide money related emergency adversely influenced the lending action of

banks, particularly those with low capital and liquidity proportions.

Utilizing a disaggregate measure, Jiménez et al. (2012) affirmed that tier 1 bank capital (however not tier 2 bank capital) and retail or client stores decidedly influenced the consistent of lending during the financial crisis. In other words, interest fee cuts amid that the monetary emergency came about a gainful effect on the development of bank lending with no indication of pushing. This demonstrates that there is a nonstandard positive impact on bank lending, primarily through the impact of decreasing financing cost spread. In this regard, the literature indicates that the lending of low-capitalized banks experiences more money related fixing, however, their outcomes are not critical at routine qualities for the fundamental European nations. There is no convincing proof about the impacts of bank capital on the lending behavior in the financial crisis.

II. CONCLUSION

The key goalmouth of this study is to let slip the changes and tendencies of the banking sector behavior during the recent global financial crisis (2007-09). The study reveals that the behavior of banking sector had one of the primary ways and wherefores of recent global financial crisis. The study also revealed that the banking sector had gone through trends of changing behavior. At the center of heart for this study, the study identifies some the criticisms of banking sector since the start of the crisis.

Moreover, the study has identified that banks practice a different behavior in terms of funding and risk taking during the 2007-09 global financial crisis. In terms of bank funding, banking crises augmented as banks' over confidence on a limited number of sources of financing. Banks were only doing to source the fund from the wholesale trading. This brings imbalance in the balance sheet of the banks. In order words, banks were doing long term investments with short term sources of funds which create liquidity risks.

The study also identified that incongruity between the short-term funding and long-term funds had built up more liquidity risks. This brings that banks change their risk-taking behavior and invest high-risk investments to gain a higher return as a result of low-interest rates. Finally, the study looked the bank behavior and found that well-capitalized banks may react less to yield shocks and their profits could be less sensitive to the business fluctuations, as their portfolio decisions may vary from those taken by less promoted banks.

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Factors Influence Satisfaction and Loyalty towards Corporate Partner Program Garuda Indonesia

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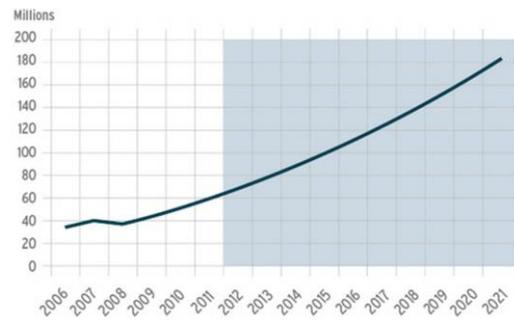
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Abstract- This study aimed to analyze the impact of product quality on satisfaction and user loyalty of Garuda Indonesia Corporate Partner Program, due to good product will drive user satisfaction so that loyalty to a product that will finally provide more benefits to the company and then to analyze competitive business in airline industry The data analysis techniques were Descriptive Statistic, Fishbein Model and Structural Equation Modelling (SEM). The results indicate that the strategic priority in airline industry for corporate partner. It is a strategy of providing all the attribute and factor that affect the selection of corporate partner in airline industry.

Index Terms- Airlines Industry, Model Fishbein, SEM, strategy corporate partner

I. INTRODUCTION

Economic growth in Indonesia has given impact for the society in choosing mode of transport. There are more people who shifted from using ship and land transport to aviation transport. This behavior changes are a good opportunity for aviation business such as airline companies. Based on the report from IATA in 2005, the number of airline passengers increase by 16%-20% each year. It is estimated that the number will continue to increase in 2021 where there will be 180 million people using aviation transportation.



Sumber: IATA, tahun 2005

Graph 1 Growth Projection of Aviation Passengers

The growth should have been a good opportunity for airplane companies to gain lot of profit. However, the profit of the airplane companies is not as high as the profit from other sectors such as banking or mining companies. The profit of airline companies is around 4%-7% each year, while other sectors could gain up to 25% of profit each year. In addition, the cost of operational from airplane transport has raised up to 15%. Little profit and high cost of typical airlines business should drive airplane companies to work harder and think creative in order to gain maximum profit.

Garuda Indonesia is one of the biggest airline companies in Indonesia who operates on domestic and international routes. Garuda Indonesia always try to improve their performance to keep its position to compete with other airlines. Garuda Indonesia try to increase their sales by manage their services and adjust it with consumer needs. Table 1 showed market share of airline companies in Indonesia.

Table 1. Market Share Airlines for Domestic and International Routes

Year	Domestic			International		
	Rank	Top 3 Airlines	Share	Rank	Top 3 Airlines	Share
2010	1	Lion Air	39.71%	1	Garuda Indonesia	13.41%
	2	Garuda Indonesia	26.18%	2	Air Asia Indonesia	13.08%
	3	Batavia Air	7.83%	3	Singapore Airlines	10.07%
2011	1	Lion Air	43.07%	1	Air Asia Indonesia	15.90%
	2	Garuda Indonesia	29.04%	2	Garuda Indonesia	14.19%
	3	Batavia Air	9.38%	3	Air Asia	9.17%
2012	1	Lion Air	46.66%	1	Air Asia Indonesia	15.56%
	2	Garuda Indonesia	25.27%	2	Garuda Indonesia	14.07%

	3	Batavia Air	7.04%	3	Air Asia	9.29%
2013	1	Lion Air	48.57%	1	Air Asia Indonesia	15.32%
	2	Garuda Indonesia	21.89%	2	Garuda Indonesia	13.58%
	3	Sriwijaya Air	7.72%	3	Air Asia	8.89%
2014	1	Lion Air	40.36%	1	Air Asia Indonesia	14.61%
	2	Garuda Indonesia	26.41%	2	Garuda Indonesia	13.13%
	3	Sriwijaya Air	8.29%	3	Air Asia	9.06%

Source : Pax-is, 2015

Based on Table 1, market shares of Garuda Indonesia from 2010 to 2014 were not high especially compare to other airlines who operate shorter in Indonesia than Garuda Indonesia.

Garuda Indonesia as a national full service airline has big operational cost as a main problem. The biggest sales

contribution is from the travel agent. Travel agent has contributed up to 70% from the total revenue, followed by corporate 20% and the rest are from web and ticketing offices. Garuda Indonesia has a corporate strategy to increase their sales that is explained from Picture 2.



Source : Garuda Indonesia Yearly Report in 2014
Picture 2. Corporate Strategy from 2015 – 2020

Picture 2 presented corporate strategy of Garuda Indonesia in order to win the market of airlines business. It is called *Quickwins Program*, consist of *Revenue Generator*, *Cost Drivers Restructuring*, *Refinancing*.

In line with *revenue generator* strategy, one of the programs to gain revenue from corporate market is *corporate partner* program. *Corporate partner* program is a partnership program between Garuda Indonesia with corporations, business to business. Corporate partner program was created in 2012, the

purpose of this program as a revenue generator and loyalty program for corporates. This program is expected to attach corporations to use Garuda Indonesia services by giving the benefits for employees and families who work in the corporations. However the achievement from this program has not been good. Sales achievement from 2012 to 2015 of corporate program is showed on Table 2

Table 2. Sales achievement for *CorporatePartner* program

Year	Total Sales	Target	Ach	Rev Cab Jakarta
2012	1,014,850,626,326	1,800,020,200,200	56%	20,199,360,511,000
2013	989,916,461,229	1,380,032,020,000	72%	23,138,506,204,000
2014	1,096,565,557,842	1,523,330,232,232	72%	24,870,852,853,000
2015	949,341,985,540	1,653,751,271,403	57%	26,127,576,079,000

Based on table 2, the number of sales from 2012 to 2014 was fluctuative and has never achived the target. This indicate that the corporate partner program has not met the corporate account needs. In order to improve the program, it is important to analyse the customer satisfaction factors and loyalty factors from the corporate partner program of Garuda Indonesia

This study was aimed to examine factors which influence customer satisfactions and loyalties towards *corporate partner* program of Garuda Indonesia. The respondents of this study were *corporate accounts* or corporates who have been worked with Garuda Indonesia in a *corporate partner* program. Intense competition in Indonesian airline business has put the curtomers in strong bargaining position in choosing airlines. Understanding customer's needs help airlines to formulate effective strategy and

by understanding factors affecting customers in choosing airlines so that Garuda Indonesia could developan optimal program.

Problem Formulation

Related to the conditions of airlines industry in Indonesia mentioned above, to increase of the satisfaction and loyalty. Therefore, it is important to thoroughly review factors related to the increase satisfaction and loyalty in airlines industry

Based on the background mentioned earlier, the research problem formulated is:

1. How does customers satisfaction influence the loyalty of Garuda Indonesia corporate partner program?
2. What are factors most affecting in selecting the program corporate partner of the airlines?

3.What strategies can be recommended to develop corporate partner program Garuda Indonesia ?

3.To formulate strategy for the program corporate partner of PT Garuda Indonesia

Research Purpose

Based on the problem formulation, this research is done with the purpose as follows:

1.To analyze the effect of customer satisfaction on consumer loyalty program corporate partner Garuda Indonesia

2.To identify the factors that most influence in selecting corporate cooperation partner of the airline

II. RESEARCH METHODOLOGY

The study was limited to selected corporate accounts of Garuda Indonesia on Jakarta branch. . Primary data was collected by questionnaires. The Questionnaires were spread to the corporate account by visiting them and make an interviews to get information

Table 3 Type and Data Sources

Variable	Variable Latent	Indicator	Scale	Symbol	Reference	
Variabel Independent	Price (X1)	Discount basic fare	Likert	X11	Park <i>et al.</i> (2005)	
		Tax refund	Likert	X12		
		Insentive / cash back	Likert	X13	Cento (2009), Belobaba (1987)	
	Product (X2)	Added baggage	Likert	X21	Park <i>et al.</i> (2005), De Jager & van Zyl (2013)	
		Payment	Likert	X22	Cento (2009), Belobaba (1987)	
	Service (X3)	Service PIC		Likert	X31	Chen (2008),Huang (2009), Pakdil & Aydin (2007), Park <i>et al.</i> (2005)
				Likert	X32	Chen (2008),Huang (2009), Pakdil & Aydin (2007), Park <i>et al.</i> (2005), De Jager & van Zyl (2013)
		Assistancy group booking		Likert	X33	Chen (2008), Gilbert & Wong (2002), Huang (2009), Pakdil & Aydin (2007), Park <i>et al.</i> (2005)
			Waiting list	Likert	X34	Cento (2009), Belobaba (1987)
			Frequent flyer for key person	Likert	X35	Chen (2008), Gilbert & Wong (2002), Park <i>et al.</i> (2005)
			Lounge access	Likert	X36	Gilbert & Wong (2002)
		Free inflight wifi	Likert	X37	Chen (2008), Huang (2009), Pakdil & Aydin (2007), De Jager & van Zyl (2013)	
		Flexibility (X4)	Flexibility reschedule	Likert	X41	Gilbert & Wong (2002), Pakdil & Aydin (2007)
			Flexibilityrefund	Likert	X42	Gilbert & Wong (2002), Pakdil & Aydin (2007)
		Emotional	Brand Image	Likert	X51	Chen (2008), Huang

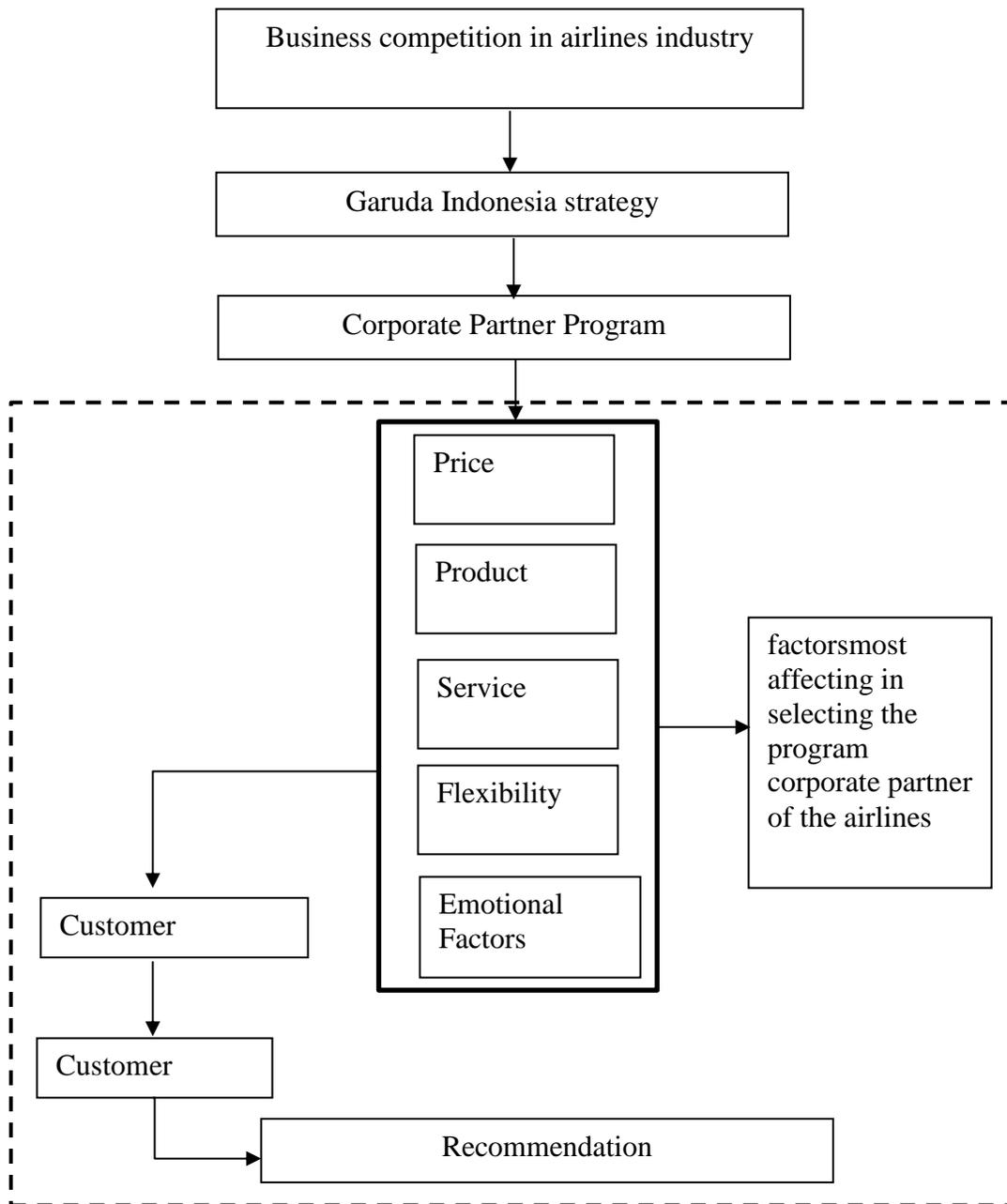
Factor(X5)		(2009), Pakdil & Aydin (2007)			
Variabel Dependent	<i>Safety and On TimePerformane</i>	Likert	X52	Chen (2008), Gilbert & Wong (2002), Huang (2009), Pakdil & Aydin (2007), Park et al. (2005), Belobaba (2009), De Jager & van Zyl (2013)	
	Customer Satisfaction (Y1)	Customer Satisfaction	Likert	Y11	Irawan (2002)
	Repeat purchase (Y2)	Repeat purchase	Likert	Y21	Khlaifa & Liu (2003)
	Customer Recommendation (Y2)	Customer Recommendation	Likert	Y22	Khlaifa & Liu (2003)
	Customer loyalty (Y4)	Customer loyalty	Likert		Khlaifa & Liu (2003)

Population of this study were all the corporations who have been the corporate accounts of Garuda Indonesia on Jakarta branch. Stratification sampling method was used to select 120 samples from all corporate accounts on Jakarta branch.

Data analysis of this study using descriptive analysis, Fishbein and SEM. The Fishbein model explain that customer attitude about an object is affected by their attitude to other attributes that is belong to the object, this model can also be used

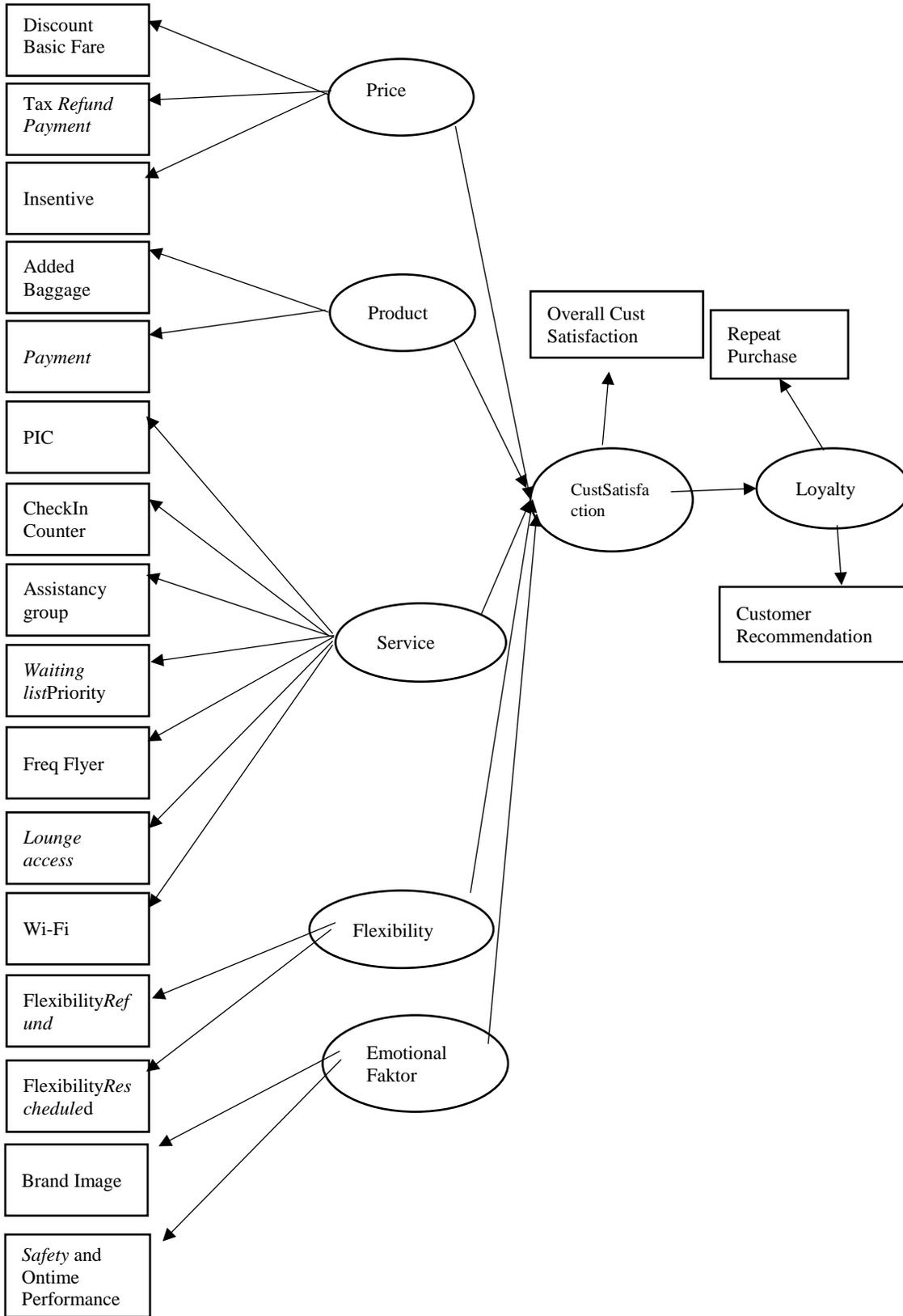
to assess customer attitude to specific program. SEM analysis in this study was used to assess attributes of corporate partner program that affect customer loyalty. Attributes divided into five latent variables are price, product, services, flexibility and brand. Loyalty is an endogenous variable that is affected by latent variable.

Based on the conceptual framework of this study and flow chart were created to understand the the problems.



Keterangan:
—— = Research Scope
- - - - - = Research flour

Picture 3. Conceptual Framework of Factors Influence Satisfaction and Loyalty Towards Corporate Partner Program Garuda Indonesia



Picture 4. Path Diagram SEM

III. RESULT AND DISCUSSION

Substantial Value Factors

Substantial Value Factors describe factors that are important in choosing airline from the corporate partner program. In this study, factors that were examined limited to basic fare discount, tax refund, insentive/cash back, additional bagage, variation of payment system, PIC services, corporate check in counter, group assistancy, waiting list priority, frequent flyer for key person, lounge access, free inflight wifi, flexibility in reschedule, refund flexibility, airlines brand, safety and on time performance.

Result of the substantial value factors analysis based on Fishbein model was presented on table 4. The main factors in choosing airlines from corporate partner program are safety and on time performance. Based on Fishbein model analysis, value from safety atribute and on time performance is 4.13. This means that safety, comfort and on time performance are needed to be

handled seriously when formulate corporate partner program. Safety and on time performance are the key factors for the customers of corporate partner program.

Second factor considered important in choosing airlines of the corporate partner program is corporate check in counter. Based on Fishbein model analysis, value of the corporate check in order is 4.09. Corporate check in counter is a service for the corporate account to have special access or line. This sevice is given to add value for customers in check in activities. This attribute is significant because regular checkin in Indonesian airports is long, particularly on holiday season. Corporate check in counter is a solution to save time in checking activities. Third factor in choosing airlines from the corporate partner program is additional bagage. Based on the Fishbein analysis, value from the corporate check in counter is 4.06. Table 4 below showed result from substantial factor analysis from the multiattribute Fisbein model.

Table 4Substantial Factor Analysis of Fishbein Model

Indicators	Evaluation of Atrributes (ei)
Discount basic fare	3.6
Fasilitas Tax refund	3.52
Insentive / cash back	3.31
Added Baggage	4.06
Payment Method	1.9
Service of PIC	3.96
Corporate check in counter	4.09
Assistancy Group	3.03
Waiting list priority	3.37
Frequent flyer for key person	2.26
lounge access	2.79
Free inflight WiFi	2.47
Flexibility reschedule	3.74
Flexibility refund	3.54
Brand Image	3.73
Safety and On Time Performance	4.13

Customer Satisfaction and Loyalty

Analisis structural equation modeling (SEM) explain association between satisfaction variable based on theoretical framework. In this model, customer satisfaction was analysed by develop a model using five exogenous latent variables, which consist of price (X1), product (X2), services (X3), convenient (X4) and emotional factor (X5) as well as two endogeneous latent variables, satisfaction and loyalty. Exogenous latent variables were developed by exogenous indicator while endogeneous latent variables were developed by endogenous indicator. five exogenous latent variables were connected by one endogenous variable which is satisfaction. Satisfaction latent variable was connected with loyalty latent variable.

Latent variables were not able to be measured directly so that several indicators were needed to predict it. Satisfaction latent variables were measured by satisfaction indicator thoroughly (Y1) and loyalty latent variables were measured by two indicators , willingness to repurchase (Y21) and willingness to recommend product (Y22). Exogenous latent variables were measured by discount basic fare (X11), tax refund (X12), insentive / cash back (X13), additional bagage (X21), variation payment system (X22), PIC services (X31), corporate check in counter (X32), assistency group (X33), waiting list priority (X34), frequent flyer for key person (X35), lounge access (X36), free inflight wifi (X37), reschedule flexibility (X41), refund flexibility (X42), airlines brand (X51), safety and on time performance (X52).

Table 5 Goodness of Fit SEM

Goodness-of-Fit	Cutt-off-Value	Result	conclusion
Chi square (<i>p-value</i>)	> 0.05	0.000	Not <i>good fit</i>
RMSEA	≤ 0.08	0.078	<i>good fit</i>
GFI	≥ 0.90	0.92	<i>good fit</i>
CFI	≥ 0.90	0.93	<i>good fit</i>
IFI	≥ 0.90	0.93	<i>good fit</i>

Result of Goodness of fit using chi-square testing showed that p-value $0.000 < 0.05$ so that H_0 was rejected and H_a was accepted which means that model has been created was not goodness of fit. One of the weaknesses of SEM model was sensitivity with number of samples. Big samples are tend to give high chi square that result model is not goodness of fit. Therefore SEM gives alternative of using other goodness of fit. RMSEA

criteria resulted value $0.078 \leq 0.08$ that means the model resulted was goodnes of fit. Using of the other goodness of fit criteria were GFI, CFI and IFI resulted > 0.90 , which means model that has been resulted was goodness of fit. Conclusion of several indicators resulted goodness of fit means that hypothesis testing could be done.

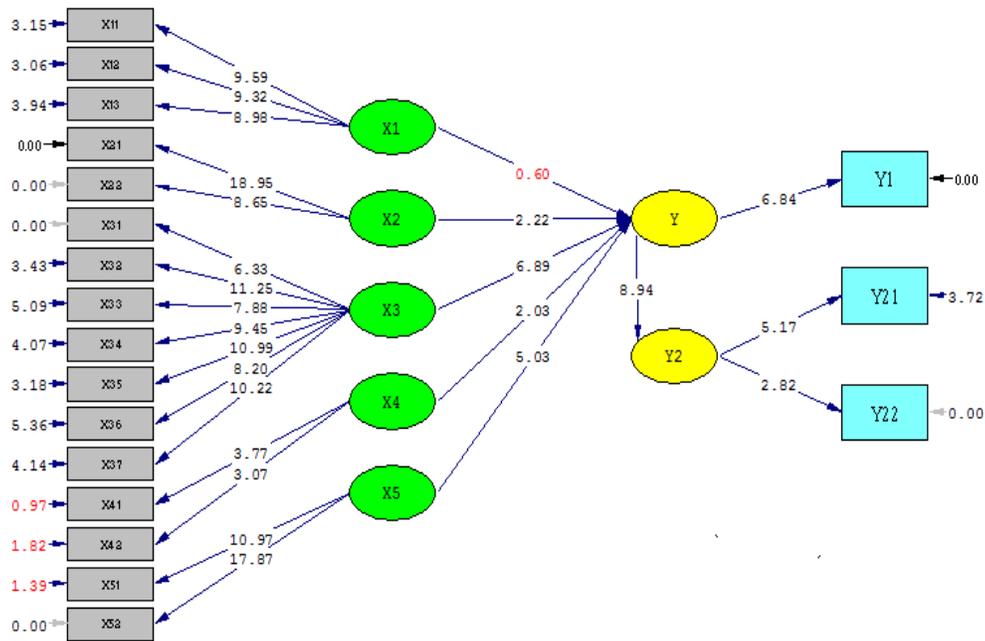
Table 6 The result of the influence of latent variables

Variable	Standardized loading faktor	t-hit	Conclusion
Price (X1)→ Satisfaction (Y1)	0.08	0.60	Not Significant
Product (X2)→ Satisfaction(Y1)	0.17	2.22	Significant
Service (X3) → Satisfaction(Y1)	0.41	6.89	Significant
Flexibility (X4)→Satisfaction(Y1)	0.25	2.03	Significant
Emotional Factor(X5)→ Satisfaction(Y1)	0.51	5.03	Significant
Satisfaction (Y1)→ Loyalty(Y2)	0.57	8.94	Significant

Remark: T Value > 1.96 = significant

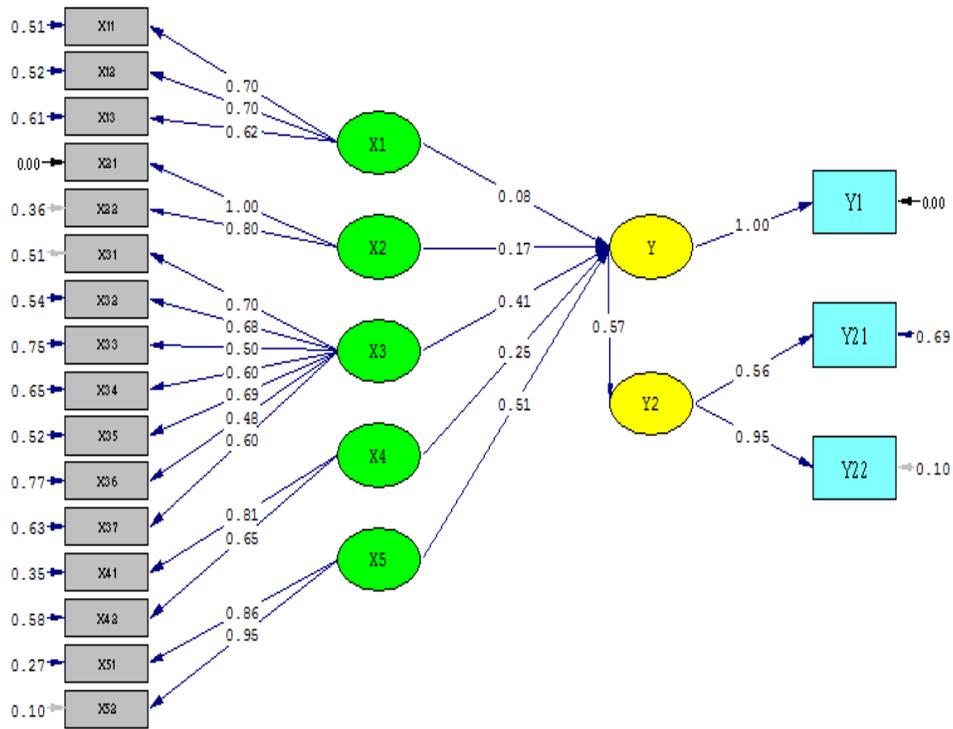
Hypothesis testing result showed that X2,X3,X4 and X5 have significantly positive effect on satisfaction with loading factor values are 0.17, 0.41, 0.25 and 0.51, which means that increase of X2,X3,X4 and X5 will increase the satisfaction value. Meanwhile X1 has no significant effect on satisfaction because of value $|t\text{-hit}| < 1.96$. Satisfaction was more affected by X5 compare to X2,X3 and X4 since X5 has higher factor loading value compare to X2, X3 and X4. Furthermore, satisfaction value has a significantly positive effect to loyalty (0.57) with t-hit $8.94 > t\text{-tabel } 1.96$, which means that the higher satisfaction value, the higher loyalty value.

Path diagram of satisfaction and loyalty model of the corporate account customer Garuda Indonesia with Lisrel 8.51 analysis presented on picture 5 and picture 6. Picture 6 showed that all exogenous variables give positive effects on endogenous variables. This showed that all variables have positive effect on customer's satisfaction. After the correlation inter model of *Standardized Solution* was analysed, there were analysis between one variable correlation and its significant and not significant effect on endogenous variable.



Chi-Square=208.76, df=121, P-value=0.00000, RMSEA=0.078

Picture 5 T-Values SEM



Chi-Square=208.76, df=121, P-value=0.00000, RMSEA=0.078

Picture 6 Result of path diagram

Each dimension has its own indicator variable that can be measured directly.

With significant level 5% and t-test > 1.96, picture 5 showed there are 4 variables that have significant association

with satisfaction; product 2.22, services 6.89, convenient 2.03 and emotional factor 5.03. One variable that does not have significant association was price 0.6.

Table 6 presented that the highest satisfaction was from emotional dimension factor (0.51), followed by service variable (0.41), service variable (0.25), product variable (0.17). Meanwhile satisfaction was not affected significantly by price (0.08). Variables that affect customer satisfaction were safety and on time performance (X52) at 0.4896, then safety and comfort variable (X51) at 0.4386, service variable from PIC (X31) at 0.2788, frequent flyer variable for key person (X35) at 0.2829

and corporate check in counter (X31) with contribution value 0.2788.

The extent of satisfaction dimension effect on loyalty has t-count lever 8.94 and estimation value 0.5. It showed that customer satisfaction will develop loyalty customers. Loyal customers will repeat the order and give recommendation to other people.

Table 7 SEM Result for variable latent

Sym	Atribut	Load Factor	Coef Construct	Contribution	Rank
X11	Discount basic fare	0.7	0.08	0.056	14
X12	Tax refund	0.7	0.08	0.056	14
X13	Inservice / cash back	0.62	0.08	0.0496	16
X21	Added Baggage	1	0.17	0.17	11
X22	Payment Method	0.8	0.17	0.136	13
X31	Service from PIC	0.7	0.41	0.287	3
X32	Corporate check in counter	0.68	0.41	0.2788	5
X33	Assistance group booking	0.5	0.41	0.205	8
X34	Waiting list priority	0.6	0.41	0.246	7
X35	Frequent flyer for key person	0.69	0.41	0.2829	4
X36	Lounge access	0.48	0.41	0.1968	10
X37	Free inflight WiFi	0.6	0.41	0.246	6
X41	Flexibility reschedule	0.81	0.25	0.2025	9
X42	Flexibility refund	0.65	0.25	0.1625	12
X51	Brand Image	0.86	0.51	0.4386	2
X52	Safety and On Time Performance	0.96	0.51	0.4896	1

Correlation between SEM Analysis and Fishbein

SEM Analysis was used to measure latent variable effect to construct variable of performance of corporate partner program Garuda Indonesia. Meanwhile, Fishbein model was used to analyse attitude and preference effect on decision making in choosing airlines and if it is compare to other airlines company. Both of those analysis tools give sustainable result that can help a study in choosing its managerial implication and it is not only limited to corporate partner program Garuda Indonesia, but also comparison with other competitors in airlines industry.

SEM Analysis showed that satisfaction and loyalty have a positive value and significant for the performance of corporate partner program Garuda Indonesia.

If the fact that the performance of the program has not been giving a good result, therefore a study is needed to compare the corporate partner program Garuda Indonesia with other airline's corporate partner programs by using a Fishbein Model. It aims to understand strengths and weaknesses of corporate partner program Garuda Indonesia, particularly compare with other airlines.

On Fishbein model, corporate partner program was analysed to recognize main factors in choosing corporate partner program in airlines industry. The object of Fishbein model are Lion Group and Singapore Airlines.

Based on the beliefs value (bi) on table 8, Garuda Indonesia overall point was better than Singapore airlines and Lion group. Meanwhile, respondents were believe that the main point from Garuda Indonesia compare to Lion group and Singapore airlines were on basic fare discount, tax refund facility, additional baggage for company, PIC services, corporate check in counter, lounge access facility. Those variables were the main point that can be used by Garuda Indonesia in promoting the corporate partner program to the customers.

The main point of Singapore airlines compare to other airlines based on the respondents were waiting list priority, frequent flyer for key person, lounge access facility, free inflight wi-fi, refund flexibility, reschedule flexibility, airlines brand in terms of safety, comfort and on time performance. Meanwhile for Lion air, the main point that are better compare to Garuda Indonesia and Singapore airlines were incentive model or cash back and variety of payment system. Those strength can be used

by company in order to create strategy of corporate partner program.

Table 8 Fishbein model result for attitudes

Attributes	Evaluation of Attributes (ei)	Garuda		Lion Group		SQ	
		bi	ei * bi	Bi	ei * bi	bi	ei * bi
Discount basic fare	3.60	3.43	12.33	3.37	12.12	3.88	13.98
Tax refund	3.52	4.23	14.89	1.94	6.83	1.63	5.71
Incentive / cash back	3.31	3.33	11.03	3.99	13.21	3.18	10.53
Added Baggage	4.06	3.65	14.81	3.42	13.87	2.93	11.87
Payment Method	1.90	3.24	6.16	4.17	7.92	2.93	5.57
Service from PIC	3.96	3.28	13.00	2.91	11.51	2.96	11.71
Corporate check in counter	4.09	3.33	13.64	2.81	11.49	2.88	11.80
Assistance group booking	3.03	3.02	9.13	2.93	8.87	3.22	9.73
Waiting list priority	3.37	3.01	10.13	2.94	9.90	4.54	15.29
Frequent flyer for key person	2.26	3.08	6.94	2.53	5.72	3.19	7.21
Lounge access	2.79	3.18	8.89	2.99	8.35	3.18	8.86
Free inflight WiFi	2.47	3.10	7.65	3.19	7.87	3.18	7.83
Flexibility reschedule	3.74	2.83	10.60	3.04	11.38	3.68	13.78
Flexibility refund	3.54	3.20	11.33	2.93	10.36	3.97	14.05
Brand Image	3.73	3.82	14.22	2.43	9.03	4.06	15.12
Safety and On Time Performance	4.13	3.92	16.19	2.48	10.26	4.09	16.91
Total			180.92		158.70		179.96

Managerial Implication

First priority that should be done by Garuda Indonesia is having lots of promotion activities by focus on their strengths which are safety and on time performance. Garuda Indonesia should create program or some kind of cooperation that could be adjusted based on the company needs.

IV. CONCLUSION AND SUGGESTION

Conclusion

The increasingly fierce competition is a challenge for airlines to win the market. Each airline has their own strategy in order to win the competition.

First priority that should be done by Garuda Indonesia is having lots of promotion activities by focus on their strengths which are safety and on time performance. Garuda Indonesia should create program or some kind of cooperation that could be adjusted based on the company needs.

Suggestion

Garuda Indonesia performances such as company strategy, products and human resources should be improved along with development and transformation of airlines industry. Management capability to understand industrial movements is needed to adopt and prioritize company strategy. Further study is needed to get comprehensive analysis.

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In vitro sun screening activity *Codiaeum variegatum* and its two varieties

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Abstract- This study was aimed at investigating the sun protective activities of leaves of three Sri Lankan croton plants, *Codiaeum variegatum*, *C. variegatum type 1* and *C. variegatum type 2* (family :Euphorbiaceae) in vitro using UV spectroscopic technique and Mansur equation. Sun Protection Factor (SPF) values were determined (which is an index of sun protection activity) using 0.2 mg/mL of methanolic crude extract of each plant. Dermatone® and Suncote® were used as reference agents. Phytochemical profile of *C. variegatum* was also investigated using standard protocols and TLC analysis. The results showed that crude extracts of leaves of *C. variegatum type 1* and *C. variegatum type 2* exhibit mild sun protective activity, (SPF values of 6.39 ± 0.08 and 8.48 ± 0.10 respectively) whilst *C. variegatum* has high SPF value (18.25 ± 0.22). And also reference agents Dermatone® and Suncote® had high SPF values (25.05 ± 0.33 and 27.54 ± 0.35 respectively). Flavonoid fraction of *C. variegatum* from TLC studies displayed a higher SPF value (25.92 ± 0.32) which is higher than the SPF value of its crude extract. Phytochemical screening of *C. variegatum* crude extract showed the presence of flavonoids, tannins, phenols, alkaloids and diterpenes. It is concluded that the sun protection activity of *C. variegatum* is mediated primarily by flavonoids via its antioxidant activity and this plant is a promising source to develop a cheap, consumer friendly and efficacious sunscreen formulation.

Index Terms- *Codiaeum variegatum*, Sun Protection Factor (SPF), Sun screen, UV-B rays, Thin Layer Chromatography (TLC)

I. INTRODUCTION

Sunlight, which is essential for life, consists of ultraviolet rays (UV-R) which are electromagnetic radiations, with wave lengths between 100 and 400nm (1, 2). Solar UV-R are of three types : UV-A (300 -400nm), UV-B (280 -320nm) and UV-C (200-280nm) (1,2). Short term exposure to small amount of UV light is beneficial to the well-being of humans since it is shown to facilitate skin cell regeneration, and stimulate hormone production, synthesis of vitamin D and melanin pigment (3,4). However, prolonged exposure to solar UV radiation, Particularly, UV-B radiation, commonly known as "burning rays", is detrimental to the health and well-being of both animals and humans (1, 2, 3, 4, 5). For example, in amphibians, over exposure to UV-B rays is shown to induce severe malformation and delay their metamorphosis (5) and also been claimed as a contributory factor for their global decline (5).

Erythema (sun burn), hyperpigmentation (tanning), hyperplasia, thinning of skin, inflammation, pain, development of brown and red spots, irritation and local immunosuppression are some acute effects of over exposure to UV rays (1,2,3,4,6,7,8). Fortunately, these acute effects are usually short lived and reversible (9,10). In contrast, chronic effects are much more serious and may be even life threatening (1,2,8,10). These include photo ageing/ premature ageing of the skin [rough texture, sagging, dry and leathery approach and wrinkling (both coarse and fine), degenerative change in the cells of skin, fibrous tissue and blood vessels], photo dermatoses, actinic keratoses, inflammatory reaction of eyes, cataracts and skin cancer (1, 2, 8, 10). Moreover, a growing body of evidence suggests that long term exposure of UV radiation could suppress cell mediated immunity and thereby enhance the risk of infectious diseases and also limit the efficacy of vaccinations (11). Sadly, globally, some 12-15 million people become blind by cataract annually, of which up to 20% may be caused and enhanced by sun exposure according to WHO estimates (11).

Most organizations (12) and dermatologists (12,13) now strongly recommend to liberally apply a topical sun screen formation having a sun protection factor (SPF) value between 15-20, probably, year round, to protect the human skin against harmful UV rays, especially, UV-B rays (8,12,13). However, sun screen use began in the early 20th century (14). And, now several sunscreen formulations are available in the market in the form of oil, ointments, creams, gels, balms, waxes, lotions (1,2,6,8,12). Some of these sun screen formulations act as physical sunscreens and (reflect UV rays) contains synthetic ingredients (such as zinc oxide, titanium dioxide, avobenzone) (12,13,15). These are fast acting, efficacious and provide broad spectrum protection of solar UV rays (8,12,13,15). However, overall, this type of sunscreens are relatively expensive and cosmetically unacceptable because of their opaque quality, occlusiveness, comedogenicity and tendency to stain cloths (6,8,12,16). Furthermore, their safety is doubted since they induce contact and/or irritant dermatitis, hypersensitivity, allergies, whitening, vitamin D deficiencies and skin cancers (6,8,12,16). Another point of concern is that some are found to be phototoxic (becoming toxic when exposure to UV rays) (4) and their uses are more likely to give birth to underweight babies if applied during pregnancy period (7). Alternatively, sunscreens containing natural herbal ingredients (such as flavonoids, phenols, tannins) are cheaper and affordable, safer, efficacious and appears to be more acceptable /consumer friendly (7,12,15,16). Clearly, there is a large demand and need, more than ever before, for development of novel sunscreens for herbal origin fulfilling these features.

Accordingly, we have initiated a programme of research to investigate the sun screen potential of selected Sri Lankan plants. So far, we have accessed the *in vitro* sun screen potential of Sri Lankan orthodox black tea made from *Camellia sinensis* leaves (17) and salt marshy plants (*Suaedamonica*, *Suaedamaritima*, *Halosarcia indica* and *Salicornia brachiata*) (18,19).

This study investigates the *in vitro* sunscreen potential of three selected ornamental plant types (Family ; Euphorbiaceae), namely *Codiaeum variegatum*, *C. variegatum variety 1*, *C. variegatum variety 2*. These are evergreen ornamental shrubs with a maximum height about 6 meters with large, simple thick leathery and shiny multi colored leaves 5-30 cm long and 0.5 – 8 cm broad which are alternatively arranged. The young leaves are usually green, yellow, red or brown in color and the color changes to gold, maroon, scarlet, purple, brown, cream or white as they mature (20). They are now wide spread in tropical regions of old and new world but were originally found in South Eastern Asian countries like Indonesia, Malaysia, Philippines, Thailand, India, and Sri Lanka (20,21). These plants only survive in outdoors in dry environments where the ambient temperature does not normally drop below 10⁰C (22). Cold temperatures cause loss of leaves (21,22).

Croton species not only have ornamental value but also used in the ethnomedicine of several countries. In African, Asian and South American countries they are used in the treatment of cancer, constipation, diabetes, gastric ulcers, digestive problems, dysentery, malaria, fever, intestinal worms, hypertension, hypercholesterolaemia, hyperlipidaemia, inflammation, pain (especially tooth), amoebiasis, gonorrhoea, wounds and weight loss (20,21,22,23). In addition, they are used as a wound healer, purgative and sedative (20). Moreover, interestingly, leaf extraction of *C. variegatum* is shown to possess strong molluscicidal activity (24).

II. MATERIALS AND METHODS

Collection and identification of *C. variegatum*, *C. variegatum type 1* and *C. variegatum type 2*.

Mature leaves of all the three plants types were collected from the garden of the Department of Chemistry, University of Ruhuna, Matara, Sri Lanka. (Geographical coordinates ; 5⁰56' 25.8" N, 80⁰34' 34.9" E). Plants were identified by Mr. N.P.T. Gunawardena, National Herbarium, Department of National Botanic Garden, Peradeniya, Sri Lanka and Dr. (Mrs) K. Fernando, Former Director of the Seed Certification and Plant Protection Center of the Agriculture Department, Peradeniya, Sri Lanka.

Voucher specimens of leaves of *C. variegatum variety 1* (ASD/chem/1), *C. variegatum variety 2* (ASD/chem/2) and *C. variegatum* (ASD/chem/3) were deposited in the Chemistry lab, Department of Chemistry, University of Ruhuna, Sri Lanka.

Preparation of extracts of *C. variegatum variety 1*, *C. variegatum variety 2* and *C. variegatum*

Mature leaves of each plant type were firstly washed in running tap water and secondly in distilled water. These leaves were then air dried at room temperature (28-30⁰C) for three days until a constant weight was reached. Each type of leaves were then cut into small pieces using razor blade. Five hundred grams

of cut pieces of each type of leaves was separately macerated in 500 mL of methanol (GPR grade, Merck Chemicals) for 4 days. The resulting extracts were filtered separately through cotton wool followed by Whatmann filter paper (No:1). The filtrates were evaporated to dryness using a rotary evaporator; yield (g/100g); *C. variegatum type 1* 6.0; *C. variegatum type 2* 24.0 and *C. variegatum* 4.5. In addition to methanolic extracts, with *C. variegatum type 1* water extract (yield: 5.0g /100g) and dilute HCl extract (yield: 7.5g/100g) and with *C. variegatum* acidified methanolic extract (5.5g/100g) were also made.

Phytochemical analysis

The methanolic extract of *C. variegatum* were initially subjected to qualitative analysis for alkaloids (using Meyer's test, Wagner's test and Dragendorff's test) tannins and phenols (FeCl₃ test), flavonoids (HCl and magnesium turnings test), glycosides (Keller – Killiani test) and diterpenes (Cu (CH₃COO)₂ test), sterols (Lieberman - Bruchard test) and diterpens (Salkowski test) (25).

In vitro evaluation of sun protection factor (SPF).

Five milligrams of the dried extracts of the three croton plants were separately redissolved in 25 mL of methanol to prepare solution of 0.2 mg/mL. In addition, 0.2 mg/mL methanolic solutions of two reference sun protective agents, namely Dermatone® and Suncote® were also made. Absorbance of UV radiation by the methanolic extracts of three croton types, water and dilute HCl extract of *C. variegatum type 1*, and acidified methanolic extract of *C. variegatum* were determined in triplicate (at 23⁰C with an equilibrium time of 1hr) in 1cm quartz cells, using a UH 53000 Hitachi Spectrophotometer from 290 to 320nm, at 5 min. intervals timing, methanol as the blank. Sun protection factor (SPF) value was determined using Mansur equation (10,17,25) given below.

$$SPF = CF \times \sum_{290}^{320} EE(\lambda) \times I(\lambda) \times Abs(\lambda)$$

Where EE – erythral effect spectrum; I – Solar intensity spectrum; Abs – Absorbance of sunscreen product; CF – correction factor (=10). The value of EE × I is a constant and predetermined.

Following TCL analysis, the absorption spectra for the phytochemicals obtained from the characteristics 5 bands: Band 1 (diterpenes), Band 2 (flavonoids), Band 3 (alkaloids), Band 4 (tannins) and Band 5 (phenols) were obtained and SPF values were determined using Mansur equation (10,17,25).

Statistical Analysis

The results are given as mean ± SEM. Statistical comparisons were made using X² test. Significance was set at P < 0.05.

III. RESULTS

Absorption spectrum profile of *C. variegatum* methanolic extract is shown in Figure 1. As shown absorbance peaks were evident in all three regions of the UV spectrum: UVC (2.9); UVB (2.1);

UVA(2.4).

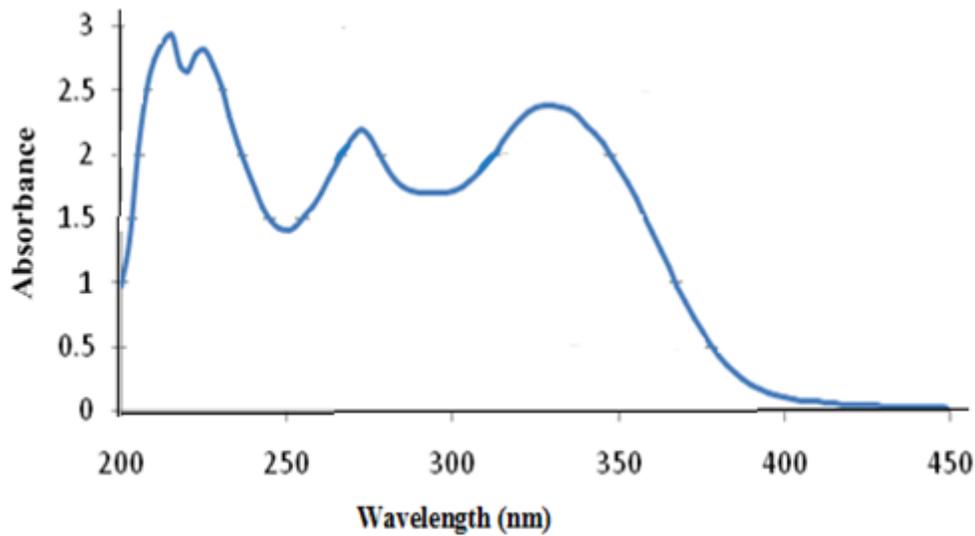


Figure 1. Absorption spectrum of methanolic extract of *Codiaemvariegatum*

The results of the SPF evaluations of the crude extracts are given in Table 1. As shown, the two reference agents exhibited high SPF values. Further, these two SPF values of the reference agent were comparable and not significantly ($P > 0.05$) different. The lowest SPF value was shown in dilute HCl extract of *C.variegatum type 1*, whilst its water extract and methanolic extracts had moderately high SPF values. However, these SPF values were significantly ($P < 0.05$) lower than the two reference agents. In contrast, methanolic extract of *C.variegatum* showed a high SPF value, although, significantly lower ($P < 0.05$) than the two reference agents. Furthermore, methanolic extract of *C.variegatum* extract showed high absorbance values ranging from 1.7 to 2.2 between the wave lengths tested (290-320nm). Acidified extract of *C.variegatum*, on the other hand, exhibited a mild SPF value.

Table 1. Sun protection factor (SPF) values of 0.2 mg/mL of *Codiaemvariegatum* extracts, and reference agents Dermatone® and Suncote® (Mean ± SEM).

The SPF values obtained with different phytochemical fractions of the methanolic extract of *C.variegatum* are shown in Table 2. As shown, flavonoid fraction had the highest SPF value which was almost identical to the SPF values of the two reference agents and the lowest SPF values were evident with diterpene and phenol fractions.

Type of plant	Nature of extract / and reference agent	Sun protection factor (SPF) value
<i>C.variegatum</i>	Methanolic	18.25 ± 0.22
<i>C.variegatum</i>	Acidified methanolic	7.34 ± 0.09
<i>C.variegatum type 1</i>	Methanolic	6.39 ± 0.08
<i>C.variegatum type 1</i>	Aqueous	7.11 ± 0.09
<i>C.variegatum type 1</i>	Acidic (Dilute HCl)	3.80 ± 0.05
Dermatone®	Methanolic	25.05 ± 0.33
Suncote®	Methanolic	27.54 ± 0.35

Class of phytochemical	Sun protection factor (SPF) value
Diterpenes (Band 1)	2.41 ± 0.03
Flevonoids (Band 2)	25.92 ± 0.32
Alkaloids (Band 3)	7.00 ± 0.09
Tannins (Band 4)	4.87 ± 0.06
Phenols (Band 5)	2.40 ± 0.03

Table 2. Sun protection factor (SPF) value of different phytochemical fractions of methanolic extracts of *Codiaemvariegatum* (mean ± SEM).

As shown in Table 3, initial phytochemical analysis of methanolic extract of *C.variegatum* showed the presence of alkaloids, tannins and phenols, flavonoids or diterpenes. The thin layer chromatography (TLC) conducted with butanol ; acetic

acid ;water (3.5:1.4) solvent system (after trying several solvents of solvent system) revealed 5 spots (major compounds) ($R_f = 0.42$; $R_f = 0.62$; $R_f = 0.79$; $R_f = 0.81$ and $R_f = 0.95$) when visualized under UV light (254 nm). Compound/s from each band was then extracted in methanol and a second TLC was carried out using the previous solvent system. The results showed 5 distinctive band with single spots indicating that there are no contaminations (Band 1, $R_f = 0.81$;Band 2 , $R_f = 0.75$;Band 3, $R_f = 0.70$;Band 4, $R_f = 0.68$ and Band 5, $R_f = 0.46$).

Phytochemical analysis showed that the Band 1 contains: diterpenes; Band 2 flavonoids; Band 3 alkaloids; Band 4 tannins and Band 5 phenols.

Phytochemical class	Presence /absence
Alkaloids	+++
Tannins and phenols	+++
Flavonoids	+++
Diterpenes	+++

+ = small amount; ++ = moderate amount; +++ = large amount

Table3. Phytochemical screening of methanolic extract of *Codiaeum variegatum*.

IV. DISCUSSION

This study assessed the *in vitro* sunscreen activities (in term of SPF) of three varieties of Sri Lankan croton plants, namely, *C.variegatum*, *C.variegatum* type 1 and *C.variegatum* type 2. The efficiency of a sunscreen is generally expressed by its SPF value (8,26,27).The higher SPF value ,the more effective the agent as a sun screen (8,26,27).The SPF value of the synthetic and natural products /formulations can be investigated by using both *in vivo* and *in vitro* techniques (8,17,26,27).

In vivo techniques are cumbersome, expensive, time consuming, produce variable results (depending on the subjects used) and also involves ethical issues (27). On the other hand,*in vitro* techniques are simple, quick, inexpensive, validated, more reliable and well established (2,6,10,16,17,25). Hence, we employed an *in vitro* technique using UV absorption spectroscopy (290-320nm) and Mansur equation (10,17,25),which is widely used in evaluating sun protecting potential of natural products (2,4,6,7,10,17). Since, sun protective value is known to vary with several factors such as the nature of the solvent, concentration of the tested material, duration and the temperature equilibration ,type of cuvette used and the quality of the spectrophotometer (6,17,27), methanolic extracts of croton varieties having a concentration of 0.2 mg/mL , an equilibrate time of 1hr, an ambient temperature of 23⁰C , and high quality 1cm quartz cells and well calibrated spectrophotometer were used as done previously by us (17,18,19)

and other investigators (6,7,27). Hence, the results obtained are valid, reliable and meaningfully compared and interpreted with all of other workers.

The results clearly demonstrated that at 0.2 mg/mL concentration (a low concentration) of methanolic extracts of *C.variegatum* variety 1 and *C.variegatum* variety 2 have mild sun protective activity whilst *C.variegatum* has profound sun protective activity *in vitro*. In contrast, water extract, HCl extract or acidified methanolic extracts had poor sun protection activity. This is a novel finding for any croton species worldwide. Further, the results indicate the high potential of developing cheap and a promising herbal sun protective formulation based on *C.variegatum*; in SPF ranking, SPF values 2-12, 12-30 and >30 are regarded as having mild, medium and maximum sun protective activity (8), and the SPF value of 18.25 suggest that this extract is capable of protecting the skin against 93% of normal solar UV-B rays (28). Nevertheless, SPF value of *C.variegatum* was 27-33% lower than the two reference agents tested ,yet ,it passes the threshold SPF value of a good sunscreen : most organizations and dermatologists recommended to liberally apply topical sunscreen formulations having SPF values 15 or more 15-30min before exposure to sun to minimize normal effects of suns UV.B rays (12,13). Another plus point for *C.variegatum* to be developed as a potential sunscreen is its high absorbance values (1.6 to 2.2) exhibited over a wide range of absorbance (between 290-320) : it is claimed that wider the range of absorbance of a photoprotective formulation higher would be its effectiveness in preventing sunburns resulting from solar UV B rays (27).

Large number of studies have shown that UV-B rays trigger the production of free radicals such as $\cdot O_2$, $\cdot HOO$, $\cdot OH$ in the human skin (1, 2, 10, 16). Free radicals are now implicated with UV-induced photodamage in the skin (1, 2). Further, sunscreen activity of many effective herbal formulations are attributed mainly to their antioxidant activity (ability to quench free radicals) (1,2,10) and nowadays, many commercially available sunscreens are enriched with antioxidants like vitamin E (2,15,28). Powerful antioxidant activity has been shown in *C.variegatum* extracts (29), and, thus, a strong possibility exist that sun protective activity evident in this study, particularly, with the methanolic extract of *C.variegatum* is mediated through its antioxidant activity. Qualitative photochemical analysis and TLC studies revealed the presence of phenols, tannins, flavonoids, diterpenes and alkaloids. Of these, it is well established that flavonoids (mainly), phenolics and tannins are strong antioxidants (26, 29, 30). Further, the SPF value obtained with flavonoid fraction of *C.variegatum* was significantly increased (upto 25.92 ± 0.32) from the SPF value (18.25 ± 0.22) of its crude methanolic extract whilst the SPF value obtained for diterpenes (2.41 ± 0.03), alkaloids (7.0 ± 0.09), tannins (4.87 ± 0.06) and phenols (2.40 ± 0.03) were significantly lowered. These observations clearly indicate that the sun protective activity of *C.variegatum* is mediated via its flavonoids. Interestingly, UV absorbing other constituents are also reported in plants growing in arid environments (31). In addition, an increase in UV absorbing constituents has been demonstrated when leaves are artificially exposed to UV rays (31). Possibility exists that these phytoconstituents are also present in croton species as well and contribute, at least partly, to the sun

protective activity of the plants examined in this study. Further studies are wanted to confirm these notions.

In toto the present study established methanolic extract of the *C.variegatum*, *C.variegatum type 1* and

C. variegatum type 2 possesses marked sun protective activity *in vitro* which is mediated, primarily by flavonoids via their antioxidant actions. A strong possibility exists to develop a safe, cheap, consumer friendly and readily available sun protective topical formation from *C.variegatum* leaves.

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The Factors Effecting on Bank Profitability

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Abstract- This study examines the effect of bank specific factors of profitability in Sri Lankan domestic commercial banks. This study conducted with a complete panel data and utilized the sample frame annual reports of the domestic commercial banks in Sri Lanka. A regression analysis is built on a strongly balanced panel data set including 60 observations of 12 Sri Lankan domestic commercial banks over the period 2011-2015. Bank size, Capital, Deposits, and Liquidity have been identified as independent variables and Profitability as the dependent variable. This research used Return on assets to identify the profitability, logarithm of total assets - size, equity ratio- capital, deposit ratio- deposit, liquidity ratio- liquidity. Regression model were analyzed by using STATA Statistical Software Package. Regression findings reveal that size (0.001), capital ratio (0.000) and deposit ratio (0.027) are significant bank specific determinants of bank profitability in Sri Lanka. There is a positive relationship between those factors and bank profitability. Liquidity (0.188) is an insignificant determinant and it has a negative relationship. In view of these findings, some recommendations may be functional for bank regulatory authorities to sustain strength and stability of the banking sector. The results provide the effect of bank specific factors on Sri Lankan domestic commercial banks. This paper intends to fill a gap in the existing literature by improving an understanding of bank profitability in Sri Lanka.

Index Terms- Bank Profitability, Capital, Deposits, Liquidity, Profitability, Size

I. INTRODUCTION

The Banking sector is one of the major sectors in Sri Lanka and it plays a central role in the operation of the economy. The concept of profitability is more important for financial institutions and banks are the part of them. Competition, concentration, efficiency, productivity, and profitability are the various terms of expressed by the performance of banks. Firms with better performance help to continue the stability of the financial system. (Athanasoglou, et al., 2008). In the financial environment, the profitability of the banking system is one of the hot issues. The banking sector fulfills an important economic function in providing financial intermediation by converting deposits into productive investments. Banks are the providers of funds needed for investment. Stability is of most important to the financial system. Therefore profitability of the banking sector is most important the economy of the country. High profits in banking sector always leads to financial stability.

There are many factors affect to the profitability of the banking sector. Generally, these factors are categorized as bank specific factors, industry specific factors and macroeconomic factors. Bank specific factors such as bank size, capital ratio, deposits ratio, Liquidity ratio and Overhead expense management. These are internal determinants of bank profitability. Macroeconomic factors such as inflation, GDP and Market Capitalization. Many researchers in different countries have investigated determinants of bank profitability. They have found different factors affecting bank profitability. But they don't give a clear picture.

In Sri Lanka, commercial banks play the important role of the operation on the economy. Therefore study the determinants of bank profitability is more important to the economy. Bank specific determinants are more important to among these factors. This research examines the effects of bank-specific determinants to the profitability of domestic commercial banks in Sri Lanka during the period from 2011-2015.

II. LITERATURE REVIEW

Bank Size

Bank Size is important bank specific determinant of bank profitability. In this investigation bank size is measured by the logarithm of total assets. Bank size is generally found to relate positively to bank profitability. (Kosmidou, 2008). In the literature, one of the important question is whether bank size maximizes bank profitability. In the literature most of the relationships investigated to bank size and bank profitability. Most of the previous studies have many evidences of which bank size is one of the main determinants of bank profitability.

Capital Ratio

Capital Ratio examines the relationship between bank profitability and bank capitalization. One of the basic measure of capital strength by Equity to total assets ratio (Capital ratio). Generally assumed well-capitalized banks have high profitability and lower probable cost of financial distress. According to Bourke (1989), Demirguc-Kunt & Huizinga (1999), Pasiouras & Kosmidou, (2007), Ben & Goaid (2008), Kosmidou (2008), banks with higher capital are more protected from insolvency. This means higher capital banks can get the high profitability. And also some empirical evidence by A & Huizinga (1999), Ben & Goaid (2008), Kosmidou (2008), revealed that high profitable banks have high level of equity relative to their assets. Bourke (1989), stated a significant positive relationship between capital adequacy and bank profitability. Similarly, the studies of Berger, (1995b), and Angbazo (1997), concluded that

the US banks, those which are well-capitalized, are more profitable than the others.

Customer Deposit

Customer Deposit is a liability to the bank. It is the main source of funding for banks. Banks have more deposits, the bank can provide more loan opportunities to customers. Then it will be able to create profits in future. Generally supposed that customer deposits positively related to bank profitability, if there is a satisfactory demand for loan opportunities in the market. Additional deposits can generate more profits and lower level of deposits negatively impact on bank profitability. By the way, banks have additional deposits bank can get more loan opportunities. Hence bank can generate higher profits. Therefore customer deposits are positively related to bank profitability. (Lee & Hsieh, 2013).

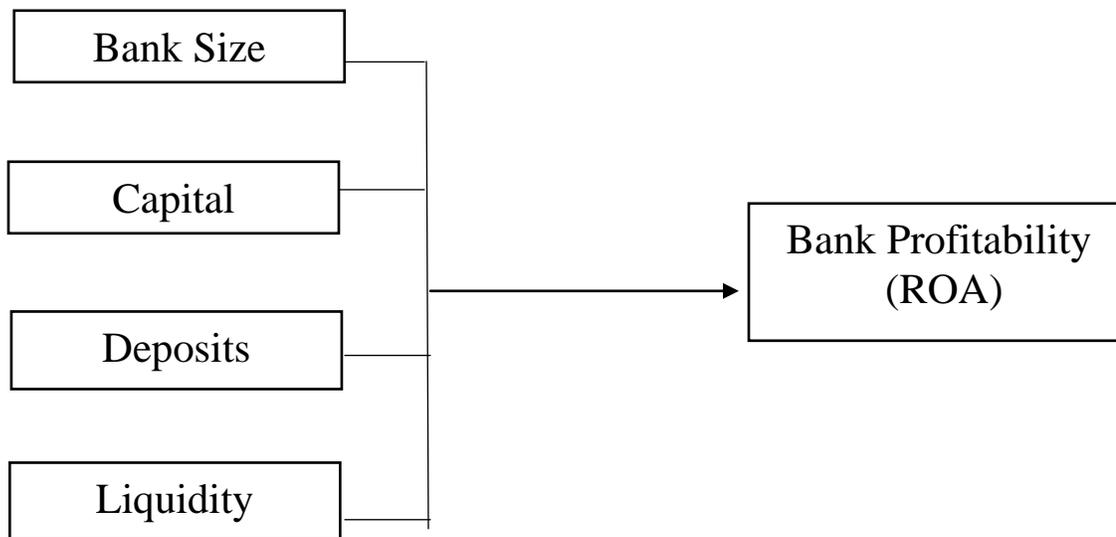
Liquidity

According to Shim & Siegel (2000), accounting Liquidity is the company's capacity to liquidate maturing short-term debt

(within one year). Maintaining adequate liquidity is much more than a corporate goal is a condition without which it could not be reached the continuity of a business. This ratio measures the ratio of liquid assets by total assets. Liquid assets include cash & equivalent and cash reserve at the central bank, short-term deposits in banks and other government and non-government guaranteed securities as a percentage of total bank assets. Liquidity ratio can be calculated by dividing the acid liquid ratio to total assets. Liquidity risk is one of the types of risk for banks; when banks hold a lower amount of liquid assets they are more vulnerable to large deposit withdrawals. Pasiouras & Kosmidou (2007) have found that there is a negative relationship between liquidity ratio and profitability. And also Molyneux & G (1992) and Guru (2002) have found a negative relationship between liquidity and bank profitability.

Thus, the conceptual framework of the study is shown in Figure 1.

Figure 1: Proposed Conceptual Model



Thus, the following hypothesis are derived based on the conceptual framework.

- H1: There is a Positive Relationship between Bank Size and Bank Profitability
- H2: There is a Positive Relationship between Capital Ratio and Bank Profitability
- H3: There is a Positive Relationship between Deposits and Bank Profitability
- H4: There is a Negative Relationship between Liquidity and Bank Profitability

III. RESEARCH METHODOLOGY

This study used the quantitative approach to analyze the data. The population of this study was banks in Sri Lanka. The desired sample size is 60 commercial banks in Sri Lanka during 2011-2015. The study investigate the significant determinants of bank profitability in commercial banks in Sri Lanka. To measure

determinants of bank profitability, Bank Size (BSIZE), Capital Ratio (CAP), Deposits Ratio (DEP) and Liquidity Ratio (LIQ) are used as independent variables. Return on Assets. (ROA) is used as dependent variable.

Model

$$ROA = \beta_0 + \ln_BSIZEx_1 + CAPx_2 + DEPx_3 + LIQx_4 + e$$

Where,

ROA= Return on Assets

β_0 is Constant

BSIZE= Bank Size

CAP= Capital Ratio

DEP= Deposits Ratio

LIQ= Liquidity Ratio

E=Error Term/Residual Term

Table 1: Operationalization of Variables

Concept	Variable	Indicator	Measurement
Profit	Return on Asset Ratio	Ratio	Net income/Average Total assets
	Bank Size	Number	Logarithm of Total assets
Determinants of Bank Profitability	Capital Ratio	Ratio	Equity/Total assets
	Deposits Ratio	Ratio	Total deposits/Total assets
	Liquidity Ratio	Ratio	Cash and cash equivalent/Total assets

Source: Research Data

IV. DATA ANALYSIS

Table 2: Descriptive Statistics of Variables

	Variable	N	Mean	St. deviation	Minimum	Maximum
DV	ROA	60	.0153983	.0171234	-.0204	.1227
IV	BSIZE	60	19.14215	1.218613	16.4942	21.1733
	CAP	60	.1217033	.0933836	.0334	.3847
	DEP	60	.69283	.1547201	.1535	.8544
	LIQ	60	.0372833	.0340393	.001	.2325

Source: Research Data

As stated in the above table, (Table 2), the profitability measurements (ROA) indicates that the Sri Lankan domestic commercial banks have an average positive profit over the last five years. From the total of 60 observations, the mean of ROA equals .0153983 percent with a minimum of -.0204 and a maximum of .1227 percent respectively. The mean of Bank size equals to 19.14215 present with a minimum of 16.4942 and a maximum of 21.1733 present respectively.

Continuing to the explanatory variables of the model, there are some interesting statistics to mention. Like the large dispersion in the minimum and maximum observation of ROA, there could be seen high variation in the CAP. On average, CAP equals of .1217033 percent. In the industry, there is the high variation of CA with the maximum of .3847percent and a minimum of .0334percent. Deposits also saw high variation. On average, DEP equals of .69283 percent. In the industry there is high variation of DEP with the maximum of .8544 percent and a minimum of .1535 Percent respectively. The descriptive statistics for liquidity indicated that the availability of cash and cash equivalent assets are averagely .0372833 percent. The maximum and minimum value of LIQ is .2325 and .001 respectively.

The Size of the bank which represented by the total assets represents a larger standard deviation with 1.218613 compared

with other variables. It revealed that the size of the bank has more significant variance than other variables. The regression analysis was carried out to test the hypothesis derived. The model summary shows in Table 3.

Table 3: Model Summary

Model	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.334	.286	.0144736	1.629

Source: Research Data

According to the model summary the bank profitability can be explained by Bank Size (BSIZE), Capital (CAP), Deposits (DEP) and Liquidity (LIQ). Since R² is 0.334, it can be conclude that 33.4% of variations in bank profitability can be explained by Bank Size (BSIZE), Capital (CAP), Deposits (DEP) and Liquidity (LIQ).

The regression analysis shows that bank size (0.001, p<0.05), capital (0.000, p<0.05) and deposits (0.027, p<0.05) have a significant impact on bank profitability. Therefore the hypotheses 1, 2 and 3 are supported and accepted. The regression results are shown in Table 4.

Table 4: Regression Analysis

Variable	Coefficient	Std. Error	T	Sig
C	-.1758454	.0514489	-3.45	-0.001
BFSIZE	.0071263	.0021391	3.37	0.001
CAP	.1789504	.0423862	4.23	0.000
DEP	.0526832	.0238243	2.23	0.027
LIQ	-.0924886	.0703103	-1.29	0.188

Source: Research Data

V. DISCUSSION

The Researcher intends to give a clear conclusion regarding the view point of determinants of bank profitability. The practical validity of this research also contributed major recommendation for the future researches.

The banking system is an important area for the economic development of all nations. This study has examined how bank-specific variables affect the profitability of domestic commercial banks in Sri Lanka over the time period from 2011 to 2015.

According to the observations derived from (Table 3: Model summary) the explanatory power of the bank-specific determinants in terms of R² for ROA model is 33.40%. Turning to the explanatory variables, the coefficient of the Bank size (BFSIZE) is positive and it is statistically highly significant determinants of profitability for ROA models at 5% significance level, supporting the argument that large banks have taken advantage of economies of scale. This result is in line with the previous studies carried out by Flamini, et al. (2009), for the profitability of banks in 41 Sub-Saharan African Countries and short (1979). However, there is no consensus in the literature on whether there is an escalation in size provides, economies of scale to banks. For example, some researches including Athanasoglou, et al. (2005), claim that there is no significant relationship between profitability and size.

This study confirms a positive and highly significant relationship between capital ratio and profitability in Domestic commercial bank ROA model at 5% significance level. These empirical results are consistent with previous studies of, Berger (1995), Demircuc-Kunt & Huizinga (1999), Pasiouras & Kosmidou (2007), and Kosmidou (2008).

There are positive and highly significant relationship between deposit ratio and profitability in Domestic commercial bank ROA model at 5% significance level. This result is in line with similar studies that have focused on banks' profitability such as Lee & Hsieh (2013) Ben & Goaid (2008).

Liquidity has no statistically significant impact on Sri Lankan domestic commercial bank profitability even though it represented the expected negative relationship. In the previous studies Pasiouras & Kosmidou (2007), Molyneux & Thornton (1992), and Guru (2002) have found a significant negative relationship between liquidity ratio and profitability. But this investigation has found liquidity is insignificant factor for bank profitability.

VI. CONCLUSION

A healthy banking system is one of the basics of sustainable economic growth. Overall these empirical results provide

evidence that, the profitability of Sri Lankan domestic commercial banks are formed by bank-specific factors (internal determinants). The findings provide interesting insights characteristics of bank profitability. In view of these findings, some suggestions may be useful for banks' management, policymakers and shareholders. To increase their profitability, Sri Lankan domestic commercial banks should attempt to emphasize the firm size, represented by total assets because Firm Size is the main determinant of Sri Lankan commercial banks' profits. The findings also showed that capital strength, measured by equity to total assets, which is a significant determinant of bank profitability in Sri Lanka. Well-capitalized banks face lower costs of external financing and that advantage can be translated into higher profitability. According to the results, Deposits is also considered as a significant determinant of Bank profitability. According to the regression result, the domestic commercial banks have little liquid assets. Based on this, the researcher can conclude that, the domestic commercial banks are more utilized idle cash and cash equivalent assets effectively. However liquidity ratio has insignificant effect on profitability of the commercial banks of Sri Lanka. As the above explanation, the profitability of the banks can be increased by increasing the asset base of the banks, increasing the size of the banks, and the deposits.

These bank-specific factors are controlled by the banks themselves, banks are in a better position to increase their profitability by concentrating on these factors and to promote the financial stability in the country which is paramount essential for economic development in Sri Lanka. Profitability of the banking sector is imperative for all countries, since it is an important source of equity which leads to rise in assets base. High profits in the banking sector always leads to financial stability of all countries.

According to the research the researcher investigates only bank-specific determinants (internal determinants) apart from other external determinants. There are some more external variables can include to obtain the better results.

For the study, researcher have taken only domestic commercial banks in Sri Lanka, as well as for the future researches they can consider all the commercial banks.

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Height, Weight, Body Mass Index (BMI) and Academic Performance (AP) of University Students in Sri Lanka: With Special Reference to the University of Kelaniya.

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Abstract- This study will ease the unscientific belief that most parents and teachers have the overweight persons are sluggish, lazy and sleepy; therefore would not do well in academic programme at the university. This cross-sectional study investigated the relationship between academic achievement and body mass index (BMI) of undergraduate students at the University of Kelaniya, Sri Lanka. Researcher hypothesized that H1 -There is a relationship between BMI and Academic Performance. Actabit BMI calculator and Grade Point Average (GPA) scores were used to collect data. Researcher has collected responses from undergraduate students in faculty of social sciences and humanities. BMI was calculated from each student's height and weight recordings. Academic performance was determined by each student's cumulative university Grade Point Average. Researcher used cross-tabulation analysis, to identify the relationship between both categories. Chi-square test revealed significant differences in BMI and GPA. There is lower significant association between BMI and academic performance. Students in the normal BMI category had significantly GPA scores than students in the overweight category. Results from such studies could potentially change the way university administrators view nutrition and physical education. Therefore no basis to judge a student generally by body mass profile rather conducive learning environment and genetic endowments would continue to influence academic performance.

Index Terms- BMI, GPA, Academic Performance, Overweight.

I. INTRODUCTION

Modern world is rapidly developing at present. It seems a huge difference in economic, social, political, cultural aspects. People are adapted to various life styles with this huge change of the world. So many people seem to take their health for granted globally, many are afflicted with array of diseases and disorders arising from multifaceted causes. Modern man doesn't care about his health because of the busy life pattern. Various Organizations among the world have paid their attention to find out this matter. With this change of the word, overweight, underweight, and obesity have emerged as burning problems in the world. Obesity has become a serious

body mass profile problem today (WHO 2004). Obesity means having too much body fats and adipocytes. It is not exactly the same as being overweight. Scientists have become interested in measuring body fats percentages directly or by estimation using facilities and methods to evaluate body mass, especially on the sedentary individuals. One of these methods is the use of Body Mass Index (BMI). BMI is simply a numeric measure of a person's body "thinness" or "thickness", allowing health professionals to discuss underweight and overweight problems more objectively with their patients (sited by Flegal, Graubard, William & Gail, 2005) (U & Nkangude, 2014). Hendry and Gillies (1977) found obese students to be both socially and educationally disadvantaged. It has been reported that obese children and adolescents are also more likely to do less well academically, have poor job prospects and be socially isolated (Levine, 1987). The obesity has also proven to lead to mental and emotional problems, such as anxiety and depression (MD, 2006). The social (anti-fat bias) (Hendry and Gillies 1977) and psychological (Low self - Concept) consequences may lead to poor academic performance among obese adolescents.

They are studies on children that report no negative association between obesity and academic achievement (Freeman, 1990). There is some uncertainty regarding the effect of obesity on academic performance. The findings from earlier studies thus indicate that it is reasonable to expect that obesity impacts student's academic performance negatively, especially for adolescents. However, the results from previous studies are based on small sized samples and focused more on children and therefore, the inferences drawn by these studies may not be applicable to adolescents. Thus there is a need to conduct empirical studies to further examine the issue of obese and academic performance, as obesity among adolescents has become too visible to be ignored. Students, who are adapted to this competitive educational pattern from childhood, work hard with a great devotion and dedication to achieve higher education in universities. So many children were there childhood because of chasing after this dream and it is a tragedy in Sri Lanka now. We focus on undergraduates because it is easy to have an objective assessment of academic performance through the cumulative grade point system. Moreover, students at this age are less concern about their weight and may not likely take drastic decisions affecting their

weight. The use of BMI on the students was relevant as they have all the characteristics needed for its use which included homogeneity in environment, Food, Racial disposition and daily physical engagement. It is possible to think that weight may be endogenous to academic attainment.

II. RESEARCH METHODOLOGY

The type of research is to find answers to problems that are taken and in harmony with the purpose of this study, the types of research that are considered convenient survey research that will be used in this study is quantitative method that the survey studies or exploratory research for the purpose of exploration and clarification of a BMI and academic performance. There was to explain a number of variables relating to the problem and until examined with questioning building relationship between variables that exist. Therefore in a deductive approach was done hypothesis testing to establish and develop the study.

Sampling.

Primary data were gathered. Primary data were collected through a survey conducted in Faculty of Social sciences and Humanities, university of Kelaniya from Sri Lanka university field. All respondents in the sample will as bring full time university students. Data were collected from 449 undergraduate students in above faculty. The data sample will selected by systematic random method. Height (cm) and Weight (Kg) of each selected subject were measured using standard method as given by Jelliffe 1966 and BMI (Body Mass Index) was calculated for each one. Primary data is data obtained directly at the time we did the research, data sources obtained directly from the people or informants were intentionally selected to obtain data or relevant information with research problems. As for the primary data in the study are Data Collection Techniques Data collection techniques used in this study were Questionnaires.

Design and Procedure

This study is an experimental design. Participants were from a purposive sample of 449 students, ages 20 – 24, with 251 females and 198 males. All of them are university students from the Sri Lanka country with same hostel and dietary conditions. The A-very weighing scale was used for the measurement of the body weight of each subject, while standard meters was also used to measure the height of each subject. . The grade point average (GPA) for each students was collected from the academic branch report, official publications and web sites in university of Kelaniya .The template converts every examination score entered into GPA, based on which final classification of degree are based... The reliability coefficient of the instrument is .743 respectively. The data collected were arranged in line with WHO (2016)

body mass classification chart, while the students' academic performance as represented by GPA were ranked as follows.

Grade Point Average (GPA)

3.70 - 4.00 -	First class Honour
3.30 - 3.70-	Second class Honour -Upper
3.00 - 3.30-	Second class Honour-Lower
2.00 –3.00-	Pass

Body Mass Index

Below 18.5-	Underweight
18.5 – 25.00 -	Normal weight
25.00 - 30.00-	Over weight
30 Above-	Obese

The data was analyzed with descriptive statistics, chi square, and Cramer's V test analysis at .05 alpha levels.

III. RESULTS AND DISCUSSIONS

This study aimed To Explore the relationship between BMI and student Academic performance in the higher Educational sector, to understand BMI Levels in the Students and to understand Academic Performance in the University Students. There is no known comparative study from other Faculties in our University. The analysis of the data showed that BMI level and GPA of the Sample. 75 students were underweight(16.7%), 348 has normal weight(77.5%), 26 overweight(5.8%).On academic performance,69 students were in 1st class (15.4%) 254 in 2nd class upper(56.6%), 107 in 2nd class lower(23.8%), and 19 had pass(4.2%).The result also showed that there are significant difference in the BMI and AP of the students as the calculated chi square value of 29.06 was significant as $P.00 < .05$ at 6 degree of freedom. Also, the result revealed that there are significant difference in the students as the calculated Cramer's V value of .180 was significant as $P.00 < .05$ at 6 degree of freedom.

The findings of this Study that focused on Body weight and academic performance also report conflicting findings. While it conflicts with Sabia(2007) findings that weight lowers test scores, though only for girls, it supports Fletcher & Lehrer, (2008) and Kaestner& Grossman, (2009).who found no significant differences or effects of BMI on academic performance or productivity of workers.

IV. CONCLUSION

Therefore, we conclude that BMI is not related to academic performance, so there was a positive relationship between BMI and Academic performances of the university student's .It is there were more normal weight students in the university. And 2nd upper was the highest Academic Performance. Academic Performance were also indicated a nominal BMI range. Also that the study be continued longitudinally for subsequent sessions to compare trends in future in other parts of the world Based on the findings, most of university Students are in normal range but considerable quantities in underweight underscoring the need to intensify interventions focused on reducing and preventing obesity among university population

Table 1: Chi-Square Test

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.068 ^a	6	.000
Likelihood Ratio	36.536	6	.000
Linear-by-Linear Association	.167	1	.683
N of Valid Cases	449		

a. 3 cells (25.0%) have expected count less than 5. The minimum expected count is 1.10.

Symmetric Measures

	Value	Approx. Sig.
Nominal by Nominal Phi	.254	.000
Cramer's V	.180	.000
N of Valid Cases	449	

The study was for the conducted on 449 regular students of the Faculty of Social sciences and Humanities, university of Kelaniya. There are no comparative studies in the past years or in other Faculties to compare and contrast body mass profile findings obtained. BMI did not determine body fat %, but it places individuals in the BMI chart as to the degree of fatness, over fatness, thinness and extreme thinness. But Hensley, Erort and Stillwater (1982) found that girls had more BMI as from 12 years as they get into the pubertal stage before the boys and later found that by 14 to 16 years the boys' BMI became closer to the girls' BMI. Since this study did compare age by sex interaction, it could neither support nor contrast the findings of these authors these except that in males and females in this study had no significant BMI difference and they were not of the same age group.

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The Knowledge and Attitude of Autism among Community in Mukim Dengkil, Sepang, Selangor

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Abstract- Autism is a complex disorder of brain development characterized by a variable mixture of compared capacity for reciprocal socio-communicative interaction. A study in Malaysia shows that the community has bad perception towards autism. This study aims to assess the knowledge and attitude of community in Dengkil towards autism. A cross sectional study was done by using universal sampling. Respondents that fulfill the inclusion & exclusion criteria were interviewed with validated questionnaires and data were analyze using SPSS. Only 47.4% of the respondents have good knowledge on autism, however 94.9% have positive attitude towards autism. A long-term health intervention program (HIP) should be implemented so that the community could increase the knowledge of autism and spread their understandings to their family and friends.

IndexTerms- Autism, Perspective, Knowledge, Attitude, ASD, Malaysia.

I. INTRODUCTION

The umbrella term 'autism spectrum disorders' (ASD) covers conditions such as autism, childhood disintegrative disorder and Asperger syndrome. It is a complex disorder of brain development characterized by a variable mixture of impaired capacity for reciprocal socio-communicative interaction and a restricted, stereotyped repetitive repertoire of interests and activities [1]. In 2014, Centre for Disease Control and Prevention [2] in United States reports about 1% of the world population has autism spectrum disorder with estimated at 1 in 68 births in the United States and the prevalence shows an increasing trend over the years. There is no local epidemiological study on ASD prevalence in Malaysia, however, a feasibility study done at child health clinics by Ministry of Health Malaysia, shows the ASD in Malaysia was approximately 1.6 in 1000 [3].

Suhaily & Siti Syuhada [4] report only 24.5% knew about autism and this gives bad perception towards autism. This is supported by Isabelle et al. [5] in which 22% of the respondents considered individual with autism as a threat to them. The report also mention that when asked to provide descriptors of autism, 61% respondents reported pejorative

labels (e.g. used the words mad or lunatic), whereas compassionate descriptors, (e.g. sad or sorrowful), were used by 29% respondents.

Isabelle et al. [5] also report that although 100% of the respondents recognized the name of autism, however the value plummeted drastically to 67% when the respondents were asked about the characteristics of autism. A preliminary study conducted in Malaysia shows that a higher number of respondents knew about autism (33.1%) compared to the respondents who don't know (28.1%) and the respondents that were unsure (38.8%) [4].

Cathryn [6], in her study conducted among the community in United States shows that 10.3% of the respondents prefer not to have contact with an autistic child, whereas another study shows 6% of the respondents refused to work with an autistic person, 3% of the respondents would not want their child to be in the same class with an autistic child and 6% would not agree to live with an autistic relative [5].

Regarding knowledge, attitudes and behaviours towards autism among adults, majority (50%) of respondents who have heard of autism do not worry if their neighbour were an autistic individual, 22.6% do worry, 22.6% partially worry and 4.8% do not know [7]. However, statistically there is no significant association between respondents' knowledge status and attitude ($p > 0.05$).

Thus, this study was designed to determine the knowledge and attitude of autism among the community in Mukim Dengkil, Sepang, Selangor. Therefore findings can then be used to improve or strengthening the general knowledge on autism in the community.

II. RESEARCH METHODOLOGY

A cross sectional study was conducted within two weeks in a residential area in Mukim Dengkil, Sepang, Selangor. The area has only Malay community with 59 houses and 140 residents. As the estimated sample size was 95 and due to limited number of houses and residents, universal sampling was done. All Malaysian who are above 18 years old, not mentally retarded, deaf and mute were selected as respondents.

Data was collected through assisted interview using a validated questionnaire, which consists of knowledge (10 items, $\alpha=0.926$) [8] and attitude (5 items, $\alpha=0.904$) [9].

The data analysed for the components of knowledge and attitude, were scored as 1 mark for correct or positive answer and 0 mark for wrong or negative answer, respectively. Based on median, a score of more than 5 is categorized as good knowledge, whereas 5 marks and less means poor knowledge. Similarly a score of 3 and more is considered as positive attitude and less than that means negative attitude. Data was analysed using "Statistical Package for Social Sciences (SPSS) version 20. Fishers' Exact Test analyses the association between knowledge status (independent variable) and attitude status (dependent variable) towards autism.

III. RESEARCH FINDINGS

A total of 99 participants participated in this study, giving an overall response rate of 100%.

Table 1. Awareness status of Autism in Dengkil, Sepang

Awareness status	Frequency	Percentage
Yes	78	78.8
No	21	21.2
Total	99	100.0

Among the respondents, 78.8% were aware of Autism (Table 1).

Table 2. Knowledge status among those who were aware of Autism

Knowledge status	Frequency	Percentage
Good	37	47.4
Poor	41	52.6
Total	78	100.0

However, among the respondents who were aware of autism, majority (52.6%) have poor knowledge on autism.

Table 3. Knowledge items on autism (N=78)

	Items for knowledge	Correct answer n (%)	Wrong answer n (%)
1	Autism is a neurological disorder that affect the functioning of the limbs.	9 (11.5)	69 (88.5)
2	Most children with Autism have an intellectual disability.	49 (62.8)	29 (37.2)
3	Children must exhibit impaired interaction and language communication to be diagnosed with Autism.	66 (84.6)	12 (15.4)
4	Autism is a development disorder.	57 (73.1)	21 (26.9)
5	With proper intervention, most children with Autism disorder will eventually "outgrow" the disorder.	52 (66.7)	26 (33.3)
6	Most autistic children talk a lot	40 (51.3)	38 (48.7)
7	The majority of children with Autism are female.	25(32.1)	53 (67.9)
8	Children with autism do not make any visual communication during conversation with others.	38 (48.7)	40 (51.3)
9	Most children with Autism have a problem with imaginary playing.	35 (44.9)	43 (55.1)
10	We can diagnose Autism disorder depending on physical features.	30 (38.4)	48 (61.6)

Majority (84.6%) of the respondents who were aware of autism correctly answered that children must exhibit impaired interaction and language communication to be diagnosed with autism, autism is a developmental disorder (73.1%), most children with autism has intellectual disability (62.8%) and with proper intervention most children with autism disorder will eventually 'outgrow' the disorder (66.7%).

Only 11.5% correctly answered that autism is a neurological disorder that does not affect the functioning of the limbs, majority of children with autism are female (32.1%) and autism disorder can't be diagnosed depending on physical features alone (38.4%).

Forty nine percent of the respondents knew that children with autism do not make any visual communication during

conversation with others, whereas 44.9% knew that most children with autism have a problem with imaginary playing

However, 48.7% of the respondents thought that most autistic children talk a lot (Table 3).

Among respondents who have negative attitude, 100% of them have poor knowledge on autism. However it was not statistically significant ($p > 0.05$) (Table 7). Therefore there was no association between knowledge and attitude among respondents in Mukim Dengkil, Sepang, Selangor.

Table 4. Attitude status among those who were aware of Autism

Attitude status	Frequency	Percentage
Positive	74	94.9
Negative	4	5.1
Total	78	100

Among the respondents who were aware of autism, majority (94.9%) have positive attitude status towards autism (Table 4).

Table 5. Attitudes items on autism (N=78)

	Items	Positive n (%)	Negative n (%)
1	Care to know about autism.	56 (71.8)	22 (28.2)
2	Think that people with autism are dangerous.	67 (85.9)	11 (14.1)
3	Feel sympathy towards people with autism.	72 (92.3)	6 (7.7)
4	Open to the thought of getting to know someone with autism.	71 (91.0)	7 (9)
5	Willing to work with someone with autism.	49 (62.9)	29 (37.1)

Table 5 showed that majority of the respondents (92.3%) feel sympathy towards people with autism and followed by open to the thought of getting to know someone with autism and care to know about autism, with the percentage of 91% and 71.8%, respectively. Only 14.1% of the respondents think that people with autism are dangerous.

Table 6 showed that the good knowledge status was the highest among female (73%), married (78.4%), government staffs (54.1%) and those who earn more than RM 5000.00 (59.5%). While within the age 30-39 has the highest prevalence (43.3%) of poor knowledge. Respondents with tertiary education also showed high prevalence (92.7%) of poor knowledge on autism in this study.

Female, married, government staffs and those who earn more than RM 5000.00 were also among the respondents who showed positive attitude towards autism (60.8%, 70.3%, 48.6% and 47.3% respectively). While among the respondents with tertiary education, 94% have positive attitude towards autism (Table 6).

Table 6. Knowledge and attitude status towards Autism by socio-demographic data (N= 78)

Sociodemographic data	Knowledge status		Attitude status	
	Good n (%)	Poor n (%)	Positive n (%)	Negative n (%)
Gender				
Male	10 (27)	23 (56.1)	29 (39.2)	4 (100)
Female	27 (73)	18 (43.9)	45 (60.8)	0 (0)
Age				
18-19	2 (5.4)	1 (2.4)	3 (4.1)	0 (0)
20-29	6 (16.2)	11 (26.8)	15 (20.3)	2 (50.0)
30-39	16 (43.3)	18 (43.9)	32 (43.2)	2 (50.0)
40-49	11 (29.7)	5 (12.3)	16 (21.6)	0 (0)
50-59	1 (2.7)	3 (7.3)	4 (5.4)	0 (0)
>60	1 (2.7)	3 (7.3)	4 (5.4)	0 (0)
Education				
Primary	1 (2.7)	2 (4.9)	3 (4.1)	0 (0)
Secondary	6 (16.2)	1 (2.4)	7 (9.5)	0 (0)
Tertiary	30 (81.1)	38 (92.7)	64 (86.4)	4 (100)
Marital status				
Never married	8 (21.6)	14 (34.1)	20 (27)	2 (50.0)
Divorced/widow	0 (0)	2 (4.9)	2 (2.7)	0 (0)
Married	29 (78.4)	25 (61)	52 (70.3)	2 (50.0)
Occupation				
Government	20 (54.1)	18 (43.9)	36 (48.6)	2 (50.0)
Pensioner	2 (5.4)	4 (9.8)	6 (8.1)	0 (0)
Student	2 (5.4)	6 (14.6)	6 (8.1)	2 (50.0)
Private	9 (24.3)	5 (12.2)	14 (18.9)	0 (0)
Housewife	1 (2.7)	1 (2.4)	2 (2.8)	0 (0)
Self-employed	3 (8.1)	7 (17.1)	10 (13.5)	0 (0)
Income				
<RM 1000	6 (16.2)	10 (24.4)	14 (18.9)	2 (50)
RM 1000-4999	9 (24.3)	18 (43.9)	25 (33.8)	2 (50)
>RM 5000	22 (59.5)	13 (31.7)	35 (47.3)	0(0)
Total	37 (100)	41 (100)	74 (100)	4 (100)

Table 7. Association between knowledge and attitude status towards Autism

Knowledge status	Attitude status		P value
	Positive n (%)	Negative n (%)	
Good	37 (50.0)	0 (0)	0.117
Poor	37 (50.0)	4 (100)	
Total	74 (100)	4 (100)	

IV. DISCUSSIONS

Dourish define awareness as “an understanding of the activities of others, which provides a context for your own activity” [10]. The awareness might be influenced mainly by sources of information such as health professionals, personal experiences, electronic media or literatures, which for any given source of information, there was often a big difference in awareness status [11]. As example, health professionals were source of information for many people ranging from 0% to 51% [12], whereas literature, including books, magazines, pamphlets and newspapers, provided information for between 3% and 82% of participants [13]. This reflects the difference between our finding and others, where the awareness of respondents in Mukim Dengkil, Sepang, Selangor on autism were lower than a study conducted in France [5] which is 100% but higher than a study done in Malaysia [4] (76.7%).

However, studies done in France [5] and China [14], show only 33.1% and 57.8% of the respondents have good knowledge on autism, respectively. These are consistent with our finding where majority (52.6%) of the respondents who were aware on autism, have poor knowledge. The awareness does not accompanied by knowledge about the characteristics of particular disorders as it was found that only 25.2% of respondents are able to recognize children with autism and only 33.1% know the characteristics of autistic children despite of 96% saying that they are aware of the term autism [5]. Therefore, awareness does not necessarily correspond to entirely accurate knowledge [15, 13]. Again it probably due to the sources of information as most of the awareness on autism came from television (28.5%), newspaper (16.9%) and conference (2.5%) [4]. Thus, it is suggested that the lack of awareness among people could be solved by using ICT or multimedia learning [16].

Low-income and rural households were much less likely to be connected than their more affluent and urban counterparts. In aggregate, seven out of ten households and about two out of three persons ages 16 and older used broadband at home by 2011. However, they use computer skills towards submitting resumes and filling out employment applications through online sources [17]. This might explained the lower knowledge status on autism among respondents with tertiary education and at the age 30-39 in our study.

A study done in Ireland reports that majority (69%) of female respondents have had contact with autistic children and therefore have more tendencies to know more about autism [18]. This is consistent with our finding and Suhaily & Siti Syuhada [5], where majority of female have good knowledge on autism.

This is very much important as absence of knowledge means that women cannot make or are not in a position to make informed and correct choices [19].

Other than women, our study also showed that married couple have good knowledge on autism, as parents are often the first to notice difficulties as they encounter other children with more advanced speech-language skills and thus often wonder if their child is behind [20]. Nazish et al. [21] and our study showed that autism is a communication disorder (46.7%) and could be diagnosed through impaired interaction and language (84.6%), respectively. Parental concerns about speech and language are associated with developmental disabilities [22], as among children enrolled in early intervention programs, 46% have communication impairments while 26% have developmental delays in multiple areas [23]. These were also consistent with our study, which 73.1% and 62.8% of respondents mentioned that autism is a development disorder and most of them have an intellectual disability, respectively.

Speech-language deficits are the most common of childhood disabilities and affect about 1 in 12 children or 5% to 8% of preschool children [24]. The consequences of untreated speech-language problems are significant and lead to behavioral challenges, mental health problems, reading difficulties [25]. Family members also have reported that their children avoid activities in their communities due to perceived hostility and therefore choose activities in their own home, the homes of friends, or day centers organized by friends [26]. This might be due to children who experienced loss of words also lost some social skills [27].

As 48.7% of our respondents agreed that children with autism do not make any visual communication during conversation with others, therefore majority knew that autistic children are not females, which was similar with finding from a study done in the Middle East, where 63.4% of the respondents disagree that most autistic children are female [8]. This is might be due to female has higher verbal communication skills and social empathy which may help girls with autism to more easily camouflage their social deficits. In turn, in boys the same social communication issues may readily be more salient and thus reinforce male identification [28].

Abdulhade et al. [8] in their study to assess the knowledge towards autism, report 54.2% of the individuals thought that autistic children had problem with imaginary playing which is slightly higher than our study (44.9%). Actually autistic children do have difficulties in imaginary play and rarely produce pretend play by transforming objects, activating dolls as agents, or inventing imaginary objects, roles or event [29].

Majority of our respondents have positive attitude towards autism, which was similar with a study conducted in Istanbul [7], France [5] and United States [6]. Those with positive attitude towards autism, in this study, also have good knowledge. However, although respondents with tertiary level of education have less knowledge on autism but they also have positive attitude. There is a direct relationship between one's positive training experiences and attitudes, where 86.8% of those

who had updated training had the most positive attitudes [30]. This shows that education level might greatly impacts the attitude status, as it increases level of consciousness towards all diseases, therefore there might be less prejudiced towards autism [7].

There is also a significant differences between men and women with respect to overall positive training attitudes. Women, significantly more often than men, indicated positive attitudes [30], which is similar with our study. However, it was contradictory with a study done in Istanbul [7], which showed that females have a lower prevalence (37%) of good attitude compared to males. This might be due to the difference in educational level of female gender as majority (42.5%) of the female respondents in Istanbul only have secondary level of education whereas in our study the majority (81.1%) of our respondent have tertiary level of education. Therefore the thought of autistic people are dangerous could possibly arise due to lack of personal experience, awareness or knowledge as having adequate training is related to positive attitudes [30].

However, Erica [31] reports there is no relationship between knowledge and attitude status towards experiencing people with autism, which is similar with our study. Collective memory, characterized by shared beliefs and experiences within a community, may also contribute to mistrust [32]. Therefore, positive attitude towards autistic child does not depend on their knowledge level on autism alone but it actually depends on their personal experiences, which shows that a person's encounter with an autistic person effects the way the person perceives autism [31].

Small sample size and with one ethnicity is our limitation to this study as it might not give a good representative of the community. Thus, it is better to have ample sample size with wide diverse of community which could provide more interesting results in the future study.

V. CONCLUSION AND RECOMMENDATION

Majority of the respondents in Mukim Dengkil, Sepang, Selangor have poor knowledge but good attitude towards autism and among those with good knowledge and positive attitude were female, married and government staffs.

Intervention program on awareness towards autism should be carried out for the residents, especially among housewife who most of the time take care of their children and at the same time could spread their good understandings regarding autism to their family and friends. Intervention targets should consider the family's desired outcomes for their child's communication and targets should be developmentally appropriate and meaningful to the child. Special program also should be initiated from government to empower their staff to give health education on autism and be a role model.

Further research is necessary to assess the effect of early intervention on language skills among autistic children as language skills can improve social interaction.

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The Analysis of Employee Quantity Needs in PT Best Logistic Service Indonesia

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Abstract- Building an organization or institution, both public and private institutions, in addition to the necessary funds also mature strategy when developing human resources. Thus, organizations or institutions will be a body that tactical and efficient. HR planning is an important element in the development strategy of the institution. The availability of qualified human resources in the right quantities is absolutely necessary in every institution. The exact number of employees who can be known through the analysis of the workload and workforce needs. Workload becomes important to note because the institution is fundamental to the identification of how well an employee doing the job. The exact numbers of employees who will assist institutions to further improve its effectiveness. Through systematic HR planning program can be estimated that the number and type of labor required. One method to measure the employee needs to see the work load is a Work Indicator of Staffing Need (WISN) method, even this method has been standardized by the United Nations (UN) through the World Health Organization (WHO).

Index Terms- employee quantity, human resource, organization, WISN, work load

I. INTRODUCTION

PT. Best Logistic Service Indonesia (PT. BLSI) is a foreign company in the field of logistics service providers, which is one part of a group of companies Honda Logistics Inc. In conducting its business PT BLSI become a vendor of PT Honda Precision Parts Manufacturing (PT HPPM) engaged in manufacturing critical components to the automotive brand Honda located in the city of Karachi Indoteisei. In this case PT BLSI is party to three of PT HPPM the entire activity depends on the needs of the customer, namely PT HPPM.

Availability of third-party human resources tailored to the needs of logistics control department PT HPPM by receiving, supply, packaging, and prepare shipping. For the availability of human resources at PT BLSI must be the concern of the leadership of the Department of Logistic Control PT HPPM as the first party since the activity will determine the logistics costs, effectiveness, and efficiency of the Department of Logistic Control PT HPPM. One important effort should be made Manager Logistic is planning HR needs appropriately in accordance with the functions of each area of work, parts and logistical needs PT HPPM. In the implementation of production activities and operations require appropriate human resources in terms of executive employees and line managers to help meet the goals of the organization. That requires the proper management of human resources management in terms of effective and efficient, in order to improve the competitiveness and value of the company.

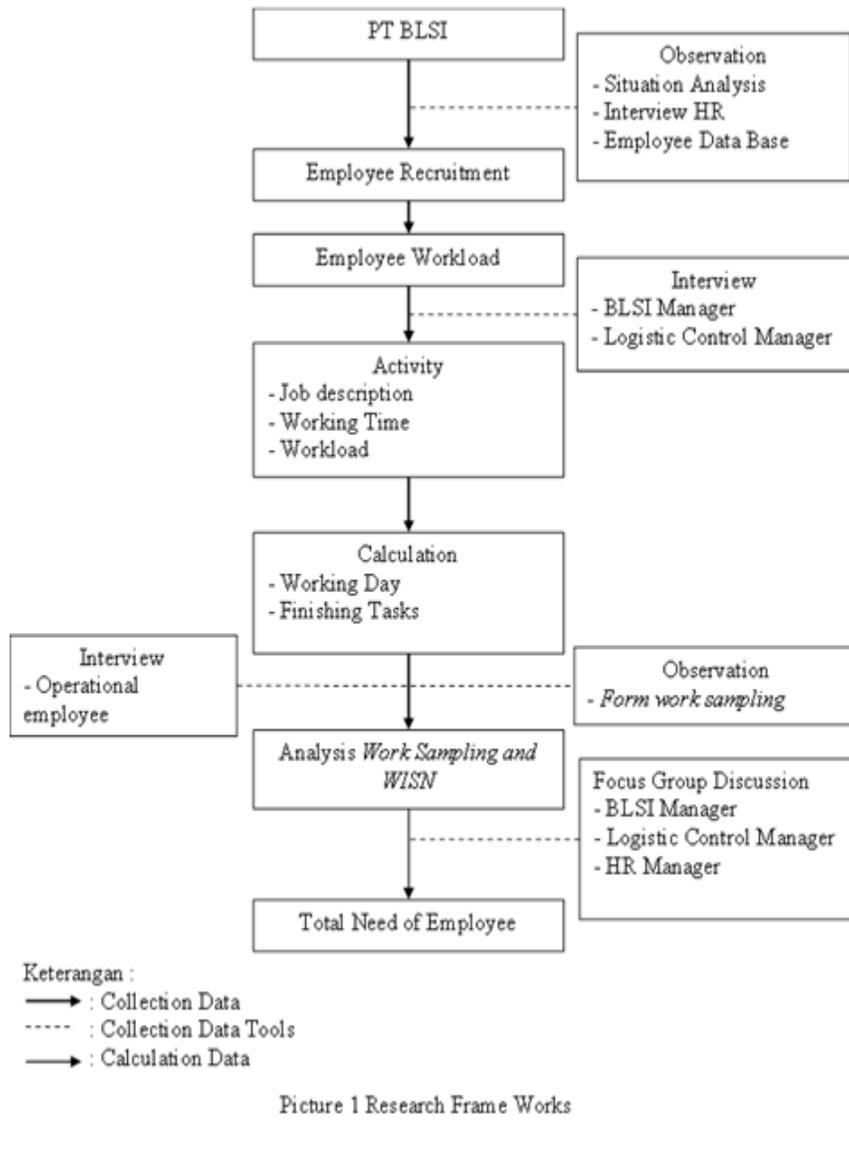
From observations made, when this happens the problem of determining the labor force in a third party. In the recruitment activities of PT BLSI determine for themselves the needs of employees and treat the contract system on a new employee, so that in addition to the number of employees becomes excessive, job rotation is very often the case resulted in many problems and the value of the bill for operating costs of PT BLSI PT HPPM be great.

In detail, the purpose of this study was (1). Analyzing the availability of manpower at PT BLSI. (2) To analyze the labor needs PT BLSI. (3) To analyze the amount of labor that is effective and efficient for PT BLSI. To determine and analyze the amount of labor, the method used is Work Indicator of Staffing Needs (WISN) preceded by work sampling, time and motion study, daily log, and job description.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

This study is limited to the formulation of the strategy is based on a case study on PT BLSI involving the top management of the company as an internal party. The study was conducted at PT BSLI, which is located at the headquarters of Karawang. Selection PT BLSI done by intentionally of course based on the formulation of the problem. The consideration is the availability of data and willingness of the management company to study its strategic assessment. Data were collected in May 2016 until July, 2016.

2.1 Frame Works



The experiment was conducted on: (1) Focus on needs analysis based on the workload of employees at PT HPPM a third party (PT BLSI), Karawang, West Java, which consists of several office staff, and operators. (2) The work area is used as research material is a logistic area where this area is the doorway and spearheads the flow of goods from PT HPPM consisting of Material Service and Export area. (3) The study was conducted with two design studies; the design of qualitative and quantitative studies (4) Qualitative study design was applied using the Workload Indicator of Staffing Need (WISN), observation, interviews, focus group discussion and review documents. (5) Quantitative study design was applied by using a calculation of working time by observing the cycle time is the best. A measurement tools used is interview, study guidance document, and the process table (form work sampling) to take note of the activities carried out and implementation time employees. (6) Prepare estimates and recommendations based on the Employee Needs tasks and job function, job title, and position levels.

Methods of collecting primary data on employee obtained through methods WISN work sampling approach, is observation and

recording of employee activities conducted during working hours, with a distance of observation time every ten minutes. Activity observed in studies using work sampling is grouped by category of production activities, unproductive and personal. The primary data collection capability in the form of standard average completion time and the quantity of the load from the main tasks of work. The data collection for the purpose of identifying the main tasks to be performed by the method of work combined interviews and observations. The types and sources of data used can be seen in the following table:

Table 1 the Types and Resources Data

No	Type Data	Resource Data
A	<u>Data Primer</u>	
	- Questioner	Sample Responden all operational unit at PT BLSI
	- In Deep Interview	
	- Observation	
B	<u>Data Sekunder</u>	
	1. Vision Mission and organization structure	1. Company Document
	2. Employee Data (workload, Total Labor, <i>job description</i>)	2. Literature review
	3. Thesis/book/literature	3. Library and internet

The population in this study was employees of PT BLSI holds a position as an operator. Selection of sample size conducted with non-probability sampling method in which each member of the population has the same chances to be elected as members of the sample. The sampling technique was by purposive sampling where samples were taken based on availability and ease to get it.

III. STUDIES AND FINDINGS

Data processing, carried out two stages, the first examination of the data has been obtained on the observation sheet work sampling. Examination of the terms of the completeness, if there are errors or inconsistencies in the observational data. The activities are grouped by category of productive activities, unproductive and each individual then calculated the amount. Furthermore, the data derived from observation sheet was transferred into the computer for processing. The second step, enter data regarding the ability of the average standard completion time of the main tasks of work for a year in the formula for calculating labor requirements based on workload. The calculation process will be supported by Microsoft Excel.

a. Setting a working time

The working time in question is effective working time, which means that working time is effectively used to work for one year. Effective working time consists of effective working days and working hours effectively. Effective working days are the number of days in the calendar minus holidays and leave. The following detailed calculation:

$$\text{Effective working day} = (A - (B + C + D)) \dots \dots \dots (1)$$

Information:

A = Total day in a year, B = Total Saturday and Sunday in a year, C = Total holiday in a year, D = Total Annual Leave

Holidays can be a national holiday and a regional day off, therefore for each area calculate your own holiday. Effective working hours is the number of formal working hours reduced by lost work time because they do not work (allowance) such as waste water, unwind, meal breaks, and so on.

b. Setting finishing completion Job

Task completion time is the product of the amount of loads standard basic tasks with the ability of the average completion time of the task. Task completion time calculation formula is shown in Table 2. The product of the burden of the task to standard time averaging capabilities completion of tasks performed per basic tasks. The result of the multiplication of all the main tasks that exist then summed, resulting in a total time of completion of the task.

Table 2 Time Calculation Finishing Job

No	Description of The Main Tasks	BT	SKR	WPT (BTxSKR)
1				
2				

Ext.

$$\sum WPT$$

Description: BT = Total workload in a certain time, SKR = Standard Capability average task completion time, WPT = Completion Time of Tasks

c. Calculations the needs of employee

Needs of employees could be calculated if the specified task is done. The formula for computing the number of employees needs is:

$$KP = \frac{\sum WPT}{\sum WKE} \times \text{1orang}$$

Description: KP (Employee Needs), WKE (Effective working time), (Completion time tasks)

WISN is method can be used for all units, the calculation is more real because base on a real job. From the data analysis may propose additional labor / put power based on competence. This method is also obtained from WISN ratio, the smaller the ratio WISN it will be increasingly heavy workload in comparison with power availability. The downside of this method include requiring service standards for each category of workers, require job descriptions are detailed, requiring a standard time to carry out tasks and require the data (attendance, number of visits, the quantity of activity) in previous years so it's hard when will count labor requirements for the new unit. This method can be used to calculate the level of the institution.

The method of calculating HR needs based on workload (WISN) is a method of calculation HR needs based on real work load carried by each category of human resources in each work unit. The advantages of this method are easy to operate, easy to use, technically easy to implement, a comprehensive and realistic. The calculation step SDM based WISN includes 5 steps: (1) Establish working time available (2) Establish working units and categories of HR (3) Develop a standard workload (4) Developing standard clearances (5) Calculation of energy per unit workWISN (Workload Indicator Staffing Needs).

Based on these data is then performed calculations to determine the time available with the following formula:

$$\text{Available Working Time} = \{A - (B+C+D+E)\} \times F$$

Description:

- A = Working Day
- B = Annual Leave
- C = Education and Training
- D = National Holiday
- E = Absent
- F = Working hour

IV. CONCLUSION

Currently the formation of employees based on six areas studied had a formation that does not agree with the calculated optimum needs of employees based on the method WISN. Based on Table 21, it can be seen that the admin and operator control material as a whole had excess staff of about seven people, and operator safety QC and development experience as well excess of 5 people. As for shipping operators experiencing a shortage of 7 people, and then staging operator experiencing a shortage of 14 people. As for the carrier supply shortage packing 19 people and experiencing a shortage of 15 people. Research conducted on six areas of work PT BLSI PT HPPM to perform the method WISN get the average result indicating that there is a shortage and excess employees in this case. If the company does not recruit in the near future rotation some operators may provide for the optimum current.

Table 21 Calculation of Employee needs base on WISN Method

No	Category SDM	Total Shift	Availabl e	Optimum Needs (per- shift)	Total Section	Total Optimum Needs	Over Minus
1	Admin & Material Control	1	14	7	1	7	(+) 7 orang
2	Safety QC & Development	1	11	6	1	6	(+) 5 orang

3	<i>shipping</i>	3	20	9	1	27	(-) 7 orang
4	<i>Staging</i>	3	122	9	4	108	(+) 14 orang
5	<i>Supply</i>	3	62	9	3	81	(-) 19 orang
6	<i>Packing</i>	3	69	7	4	84	(-) 15 orang

Ratio Labor PT BLSI

From the results of counting the amount of energy that should be 7 to admin operator and material control, 6 to operator safety QC and development, 27 shipping operator, 108 operator staging, 81 to supply operators, and 84 people for packing operator. While the current state of the workforce today, namely, 14 for admin and material control, 11 people to safety QC and development, 20 people for the operator of shipping, 122 for operator staging, 62 for operator supply, and 69 people for the operator packing.

Table 22 Ratio Calculation of Employee Needs base on WISN Method

No.	Category SDM	Available	Total Optimum Needs	Over Minus	Ratio WISN
1	<i>Admin & Material Control</i>	14	7	(+) 7 orang	2,00
2	<i>Safety QC & Development</i>	11	6	(+) 5 orang	1,83
3	<i>shipping</i>	20	27	(-) 7 orang	0,74
4	<i>Staging</i>	122	108	(+) 14 orang	1,13
5	<i>Supply</i>	62	81	(-) 19 orang	0,77
6	<i>Packing</i>	69	84	(-) 15 orang	0,82

Comparison between the labors provided by labor optimum operator can know the ratio of 2.00 admin and material control, operator safety and development QC 1.83, 0.74 shipping operator, operator staging 1.13, 0.77 supply operators, and the operator packing 0.82. In the book User Manual WISN (WHO 2010) explained that if the power ratio value is one, meaning that the number of personnel in accordance with the demands of the workload (the amount is sufficient), while the value ratio of less than one indicates that the amount of labor is not in accordance with the workload (shortages labor). The smaller ratio is greater the workload. Based on this indicates that the amount of labor for the operator admin & material control, safety QC & development, and not in accordance with the staging operator workload is too light because the workload is smaller than the number of employees. While the shipping operators, supply, and the packing is not in accordance with the workload as the workload is greater than the number of employees available.

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Implication Managerial

This research is expected to have implications for the companies to pay attention to the workload and the optimum number of employees who have to give maximum results in line with targets set by the company. This is because this study gives an overview and results that excessive workloads or less and the number of employees who are not optimum can affect the outcome of the work. The following managerial implications that can be input to the admin area and material control, safety QC and development, shipping, staging, supply, and packing achieve maximum results.

1. The number of employees in the admin area and material control is still a little bit due to the condition where the first PT HPPM have a production CVT, MCVT, ATM, 4WD, and BELT phenomenon occurs due to over production, the model did CVT start

production and begin to decrease due to ATM at the end of 2017 will be discontinued so that the resulting excess employees in these areas. Excess employees resulted in a loss of time in that area. It is strongly opposed to the policy of PT HPPM that values efficiency in every area. However it is very beneficial for the PT BLSI and be detrimental to the PT HPPM, therefore, the need for reduction of employees in the area, and the excess can be directed employee gets more demanding. If employees in these areas are still a contract employee, it can be reduced while still wait until the employee contract runs out. This condition will continue to run until the contract runs out on the status of contract employees. This can be done by them and work efficiency will be achieved when the number of employees is in accordance with the needs of the workload that exists today.

2. Activity is on safety area QC and development is still felt to be too much, especially in the area of logistic BLSI because these activities can be done by 6 people. Seen from the high idle time on the field because the system is running in this area is already more neat and better than ever before. Skill up is done in this area was considered quite successful because the area is pretty much doing routine activities, so that more experienced employees in the area, the more the employee is able to be faster in completing the job.
3. He made zero overtime policy to minimize non efficient job so we encourage employees to complete the work in accordance with a predetermined target or a target refers to the production plan.
4. Need for reduction of employees in the admin area and material control, quality safety and development, as well as the staging with the number of 26 people. In employee attrition is not necessarily immediately decided to dismissal of employees, but with the condition of the large number of permanent employees, then this condition must be adjusted by means of a mutation treatment to areas that have excess employees.
5. In the area of supply, packing, and shipping it should be done immediately because of the addition of the load of work that are arguably high plus another abnormal conditions occur so it needs to pursue reach production targets. The addition of the three areas amounted to 41 people.
6. In addition to the reduction and additional personnel for the future need for changes to the layout whose function is as a deduction from the cycle time in each work area.

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Literature Search for Scientific Processes in Medical Devices: Challenges, Errors, and Mitigation Strategies

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Abstract - Literature search is a commonly used strategy or a method of collecting evidence on a given research question, specifically for a Clinical Evaluation Report. A precise literature search not only provides accurate evidence but also saves time and efforts during collation of such data. However, unless implemented correctly, literature search can be misleading, time-consuming, or useless. Focusing the literature search on a precise topic and obtaining relevant evidence in a stipulated time requires high skill levels. Despite several guidance documents and papers, the process of literature search has various types of errors. These are errors of inclusion, exclusion, inclusive exclusion, exclusive inclusion, and limited relevance (exclusive exclusions). In order to obtain optimal outcomes in a literature search, the analysis of these errors is important. These errors pertain to the volume of evidence, relevance of the data, tone of evidence, and its value to the research topic. Analyzing these challenges and devising an accurate strategy to overcome these errors would certainly improve literature search outcomes. Combinations and permutations of these challenges (volume and relevance) present various practical challenges, namely, too high data; too low data; high volume, low relevance data; low volume, low relevance data; high value, high relevance data but repetitive outcomes (monotonous); and high value, high relevance data, but missing trends and threads. In this article, we discuss the above-mentioned errors and challenges and mitigation strategies along with literature search automation.

Index Terms- Literature search, challenges, errors, mitigation strategies

I. BACKGROUND AND PROBLEM STATEMENT

Clinical evaluation report (CER) is a widely accepted document for the approval of medical devices by various regulatory bodies, and literature search plays a pivotal role in drafting a CER. In fact, recent modifications of the MedDEV 2.7.1 guidelines (June 2016) focused more on the role of literature search as a tool for medical device clinical evaluation and on establishing state-of-the-art treatment of diseases in which the device is used. Hence, in the present article, we discussed errors and challenges in literature search while identifying and appraising evidence (references) and strategies to mitigate them. Clinical evaluation of medical devices is a process similar to synthesizing a systematic review or a research article. Data documentation and publication are the most important aspects of any research,¹ regardless of whether the outcomes of the research are accepted or challenged. When a documented research is cited as a reference, it assures readers of the quality of the research and

presents previous knowledge on the topic under investigation. A reference is important in providing information on the past efforts, methods, and strategies used; method or strategy alternatives; intellectual property information; and the current status of the selected research topic. Addition of contemporary and historical research data confirms the validity and feasibility of the research project and also reduces the chances of failure, thereby saving cost and resources.¹For a medical device industry, such addition helps in reducing failures and thus, reduces the cost of development.

Literature search is a commonly used strategy or a method of collecting evidence on a given research question.ⁱⁱA precise literature search not only provides accurate evidence but also saves time and efforts required in collecting evidence. However, unless implemented correctly, literature search can be misleading, time consuming, or useless. Focusing literature search on a precise topic and obtaining relevant evidence within a stipulated time often demands high skill levels. Despite several guidance documents and papers on its methodology, the literature search process still has various errors. In order to obtain optimum outcomes with literature search, the analysis of these errors is a high priority study. These errors are related to the volume of evidence, relevance of the data, tone of evidence, and its value to the research topic. Analyzing these challenges and devising an accurate strategy to overcome these would certainly improve literature search outcomes.

The present article defines errors due to the incorrect use of key elements during literature search, such as keywords, database, and Boolean logic. We briefly explain how these errors may manifest into either inclusion of noise or exclusion of relevant information. We also explain how these errors can lead to challenges in literature search. Although prima facie, this white paper is focused on literature search for CER and medical devices, it is generally applicable to all types of literature search.

Errors and challenges in literature search

Errors and challenges in literature search are the main reasons why outcomes deviate. Errors have their origin in incorrect use of primary attributes of literature search, viz., keywords, Boolean, and database. The attributes of these errors are stated below:

- a. Errors in setting eligibility criteria (type of literature and databases)
- b. Errors in selecting keywords and Boolean logics
- c. Errors in setting up the search phrases for database

Often, these attributes concur and can form five types of errors:

1. Error of inclusion
2. Error of exclusion
3. Error of inclusive exclusion

4. Error of exclusive inclusion
5. Error of limited relevance (error of exclusive exclusions)

Error 1 – Error of inclusion

The error of inclusion means including more information than required (Figure 1). This error may occur in case of inadequate exclusion criteria, use of broad keywords, non-specific databases, or Boolean logic misuse. In addition, use of improperly formed long search strings, such as several synonyms joined by the “OR” Boolean logic, may result in the error of inclusion. An error of inclusion may occur even in a topic-specific database if a search phrase contains broad keywords, improper Booleans, or many words with truncations or wildcards.

When an error of inclusion occurs, the overall completion of the task may be delayed because a longtime is required to appraise the literature, while keeping topic relevancy as a prime objective. Furthermore, an error of inclusion leads to high volumes of low value literature, as it returns many irrelevant results and often fetches duplicates. Therefore, the effort required in a literature search is disproportionate to the actual usable data obtained and the time taken in the process. However, in case of rare diseases or treatments, the error of exclusion is preferred over the error of exclusion because the target literature remains in the literature pool.

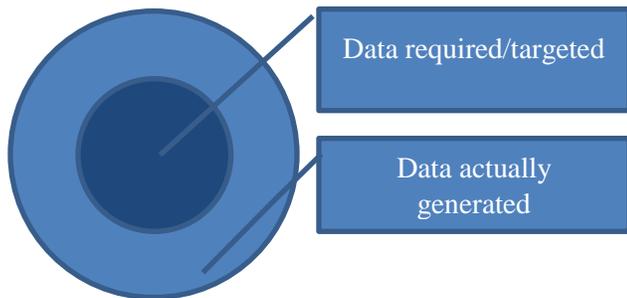


Figure 1. Error of inclusion

Error 2 – Error of exclusion

In an error of exclusion, relevant data are not included in the search because of an extreme exclusion-driven strategy. This error occurs in three scenarios:

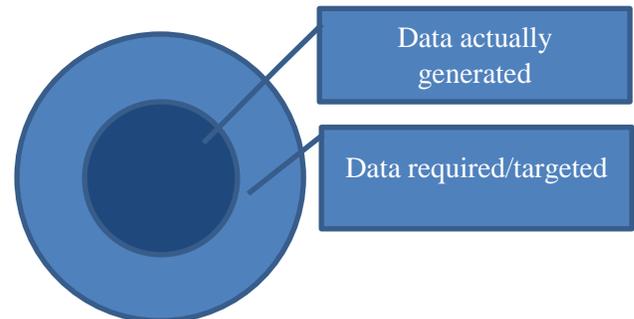
1. When eligibility criteria fails to set correct inclusions
2. Stringent or too specific keywords
3. Use of excluding Boolean logic “AND” or “NAND” to form search strings

Exclusions in the literature can be influenced by literature type, keywords, synonyms, similar words, or phrases, etc. When an error of exclusion occurs, relevant and useful literature may be excluded (Figure 2) from the literature. This error can occur even during appraisal owing to stringent appraisal criteria. An error of exclusion may lead to specific literature outputs that often lead to less information and thus may cause bias.

Error 3 – Error of inclusive exclusions

Errors of inclusive exclusions are due to bias by literature search professionals. Typically, the protocol in this type of error has an appropriate set of exclusion and inclusion criteria; however, because of selection bias, the key terms used in the search may be linked to a specific or desired (leading) outcome, and hence, monotonous data may be returned. MeSH terms or controlled vocabulary are highly recommended for key terms as these words fetch related information. The bias can range from inclusion of only positive results of a particular treatment for a particular disease to the inclusion of only specific brand names and event types. Owing to the use of several synonyms and inclusive Boolean logic such as OR, the search appears to be inclusive or correct search. However, bias in selection and combinations of keywords (inclusive their synonyms and wild cards) leads to errors, and returns one-sided outputs and relevant data may be missed (Figure 3). In some cases, the error of inclusive exclusion also occurs when exclusion criteria are not set to exclude sponsored or promotional literature. This bias tends to shift the data trends in favor of the sponsor. However, some of the bias can be recognized and addressed in the appraisal process.

For example, the search phrase, “Diabetes Mellitus” AND (“Pioglitazone” AND “Normoglycemia”) or “Diabetes”, AND (“Pioglitazone” AND “Normal blood sugar”) or Pioglitazone AND (Normal Blood Sugar OR Normoglycemia OR Normal HbA1c OR HbA1c Less than 7, OR Blood sugar Less than 140), etc., is less likely to generate literature data on adverse events



related to Pioglitazone. Mostly, metabolic adverse events such as hypoglycemia caused by the drug can be anticipated in this search outcome.

Figure 2. Error of exclusion

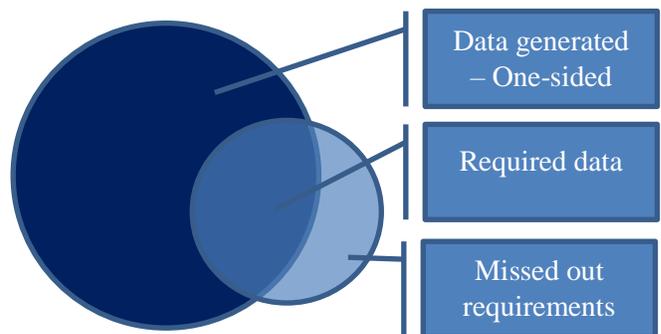


Figure 3. Error of inclusive exclusion

Error 4 – Error of exclusive inclusions

As the term suggests, the error of exclusive inclusions is related to exclusivity (Figure 4). Use of an exclusively specific

term or a Boolean is the principle component of this error. Some other minor contributors to this error can be the use of exclusively specific dialect of language, geography, or exclusively specific exclusion criteria. An error of exclusive inclusion occurs because of extreme caution or critic, and is commonly associated with highly specific key terms used with inadequate Booleans. The search may also exclude synonyms for key terms. In this case, logically, the search phrases are correct and unbiased. Hence, the outcome will have unbiased data that will include positive and negative aspects for all types of possible therapies. However, because of their specificity and exclusion or limited connector's logic, only exact matches are included in the output. Therefore, in some cases, where an antonym of a term consists of the term itself (for example, ST-elevation MI and non-ST-Elevation MI or oriented and non-oriented) may also be excluded. This strategy is useful when the data available are too large, and a very specific search is desired. In other cases, this error has effects similar to that in the error of exclusion.

For example, when searching for non-ST elevation myocardial infarction, a combination of "Coronary Artery Disease" AND ("ECG changes" XOR "ST Elevation") is a specific combination, which will return all coronary artery disease-related literature with electrocardiography (ECG) changes, and will exclude ST-elevation in those ECG changes. However, this search will not return a good literature source because this is most likely to exclude the non-STEMI cases.

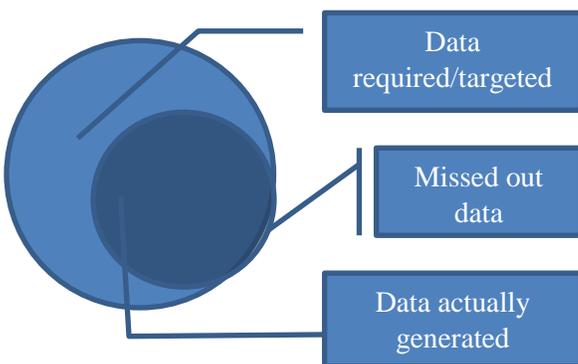


Figure 4. Error of exclusive inclusions

Error 5 – Error of exclusive exclusions (error of limited relevance)

An error of exclusive exclusions is also called the error of limited relevance. This error is a combination of bias and specific exclusiveness. Hence, the search phrases constructed will be biased to only one-sided data trends, and the terms selected will be too exclusive to return sufficient information. Therefore, the output will have a very small relevance to the requirements, and both these sets will actually miss extensive information from the actual available data (Figure 5).

Features of output in this error are linked with relevance. Most of the data generated in this literature search will have limited relevance with the key terms, search phrases, or the purpose of the literature search. Relevant data in the output will be less than one-fifth of the entire output.

Example: "Pacemaker implant" NAND ("Atrial defibrillation" AND "Atrial flutter") taken as a search term for cardiac resynchronization therapy.

Challenges in literature search

On the basis of the type of literature search, two types of challenges exist:

1. Volume-related challenges
2. Relevance-related challenges

Several combinations and permutations of these two challenges can be expressed as practical challenges, namely:

1. Too high data
2. Too low data
3. High volume, low relevance data: Data irrelevant, non-specific, and high on noise
4. Low volume, low relevance data: Non-conclusive search or data; data are specific, but not sufficient to help inferences
5. High value, high relevance data but repetitive outcomes: Monotonous outcomes – no value addition
6. High value, high relevance data, but missing trends and threads: Circular references, cascade of references, or hydra-headed or contradictory results

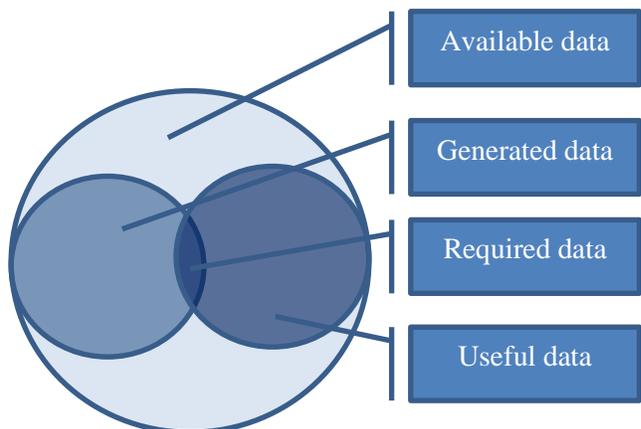


Figure 5. Error of exclusive exclusions

These challenges are discussed in details below.

Challenge 1 – Too high data

This is the most commonly observed challenge in a literature search, especially when the scientist is a novice. The common problem underlying this type of output is an error of inclusion caused by vague, common, general and use of a general database such as Academia, Researchgate, or Google Scholar. In short, this challenge relates to a broad search. For example, the use of the phrase "Event-free Survival" AND "Norfloxacin" returns 4,120 results on Google Scholar; most of the data from the literature search is related to antibiotics in general or similar drugs other than Norfloxacin.

This challenge will increase the quantity of data, and will result in extensive noise and duplication. High volume data makes processing, tabulation, and presentation difficult. In most cases, three-fourth data of this volume is excluded during appraisal. Depending upon further filers of relevance and value addition, about 20% of these data are used in the final documentation for citation and reference purposes.

Challenge 2 – Too low data

This is the second common challenge in the literature search process, when the scientist is too specific and/or has mid-level expertise. The problems with these data extend to two extremes, either the entire data are appraised at once, and the literature search is completed within a short time and with little effort, or the entire process needs to be repeated owing to difficulty in appraisal of the available data.

The common problem with this challenge is the error of exclusion or the use of incorrect logic or an incorrect combination of terms, Boolean, database, or search engine, etc. Depending on further filters of relevance and value addition, the use of data in the final documentation, citation, and reference purposes is unpredictable at the start. In most cases, even if all the data points are appraised from this type of search, their reliability and unbiased nature are uncertain.

Challenge 3 – Irrelevant, non-specific data, and noise

Mostly, data noise is a challenge caused by apprehension of experienced people, who work on a new subject, therapeutic area, or treatment. Especially if a key term has multiple meanings or spelling variation or use in more than one disciplines, its use usually leads to this problem. Replacing specific key terms with non-specific key terms often returns irrelevant or non-specific data. For example, NexGen™ is the name of a stent as well as a knee replacement device. The use of search phrases such as “Nexgen clinical data” may be a medium strength search phrase *prima facie*; however, when we actually search this in a general database such as Google Scholar, 2300 results are obtained, which include results on knee, stent, and hemophilia studies, constituting a large amount of irrelevant data for a stent.

Challenge 4 – Non-conclusive search of data; data is specific but not sufficient for inferences

When very specific terms are used, we mostly receive information related to the term, but the amount or nature of information is too small to support claims or draw inferences. For example, if we search “Widal test titre 1:80” AND “Antibiotic therapy in low titre enteric pyrexia”, no results are returned on Google Scholar, Helios, PubMed, Medscape, and Medline. However, if any word of the phrase or the phrases above are altered, the search returns a large amount of vague data. When the query is split into three parts “Low titre” AND “Antibiotic therapy” AND “Widal test”, only 2 articles are returned in the search. Here, the data are too specific but not sufficient to draw inferences or support claims. Rephrasing the search query as “Low titre” AND (“Widal test” AND “Antibiotic”) returns 20 articles with specific information on antibiotic therapy, low widal titre, and enteric fever. However, the obtained data cannot be used to obtain conclusions beyond epidemiology and clinical guidelines. When the query is reframed, the search results include extensive noise with no specific information.

Challenge 5 – Monotonous outcomes – no value addition

This challenge is often faced when searching for well-established facts and highly tested treatments or common diseases. For example, the phrase “Aspirin” AND (“Angioplasty” AND “Prophylaxis”) return about 8,200 articles, most of which establish the fact that one-year dual antiplatelet

therapy and the indefinite use of aspirin are required to prevent stent thrombosis in post-angioplasty care. Even if some well-established and widely accepted trials are obtained from this search, most data will have the same information, usually repetition of the same studies in different contexts such as different timeframes, subsets, and resource. This type of data lacks value addition. Citation of these data is taken only once for its best presentation and source.

Challenge 6 – Circular references, cascade of references, hydra-headed, or contradictory results

Circular references are usually found when two or more contemporary studies are alternately published more than once in different contexts. These studies have two outcome modalities. If all such studies have similar outcomes, the same group is used as a reference to the current claim or statement. However, in certain cases, data from such studies cannot be substantiated, and an expert literature search scientist will refrain from using circular reference studies. The second modality is that these studies have different or contradicting outcomes, the hydra-headed presentation. In such cases, such circular references are better avoided or only the current and best-supported ones should be chosen.

Hydra-headed outcomes are also obtained when terms are used incorrectly and when large research is performed on a condition with the same endpoint and probably different outcomes. Those with minimum experience in literature search on interventional cardiology can easily connect to this situation with the dilemma of choice between coronary artery bypass graft and coronary angioplasty on which various studies are published, and each has different or rather contradictory outcomes. A similar situation was also seen with sympathetic denervation and neuromodulation comparison. A matrix for assessment of causality is presented in Table 1.

Possible corrective and preventive actions and solutions for better literature search.

Preparation of an unbiased literature search protocol

A protocol is among the mandatory requirements of literature search for the clinical evaluation of medical device regulatory activities.ⁱⁱⁱ In addition to the regulatory requirements, a literature search protocol should be considered for other types of literature search exercises to maintain a clear and unbiased methodology. A literature search when conducted with the correct protocol is expected to produce the same outputs every time the search is repeated using the same phrases in the same database. Appraisal criteria are other important aspects of the literature search protocol, which need to be correctly set to justify the inclusion, exclusion, and use or rejection of the data points in outputs.

Quality check for search phrases

Quality check at the level of key term, phrase construction, and search engine selection is a critical but often excluded part of the search process. The quality check at these three levels can reduce errors at the root and can save effort. The motive behind a quality check of terms is to avoid bias and ensure appropriate Booleans usage, correct database selection, and optimal use of alternatives.

Automation of literature search

The IT companies with leadership in life-sciences technologies have developed automation of tools that drastically reduce time for literature search and summarization. The use of Summarization, and reporting can be best handled by automation. Algorithm of automation decides its utility and dependability. A good literature search tool provides options for various combinations of key terms. Such a tool provides options of combined access of various databases and provides information on the quality and quantity of output with each key term, search phrase, and database, with a list of unique records. Allows reusability of algorithms and allows ease of customization in different contexts. This reduces the time taken to reach the end-result by avoiding multiple searches. An automated search could provide researchers the desired results based on their pre-specified set criteria, and should significantly decrease the time taken for manual search and filtering appropriate content. This automation will be useful in time-consuming literature search that involves the major task of selecting and extracting desired data. This will reduce the possible bias of inclusive exclusions or exclusive inclusions. Another aspect of automation will be to translate articles from non-English to English and include them in the final selection. This automation of the literature search will eventually reduce the time spent on manual search and would be beneficial in cases in which time is critical in decision making.

Healthcare providers, regulatory agencies, researchers, etc., at times, depend on the latest information in the field to take valuable decisions that could impact public health and/or have large-scale financial implications. Early access to information can ease the decision-making process. Cost saving would be another aspect in automated literature search. Early availability of key information would reduce costs, and less time would be needed for the same task that could lead to better management of resources, including better manpower management. Thus, automation will eventually reduce cost, time, and resource in the whole process. The combination of a good literature search tool and a trained literature search professional can be the best solution to avoid errors and limitation of literature search. Overall literature search strategy is presented in Figure 6.

Acknowledgements

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artificial intelligence and natural language processing based tools with cognitive capabilities provide a near-perfect solution for literature search. For performing literature search for aCER, the tedious job of literature search, appraisal, tabulation,

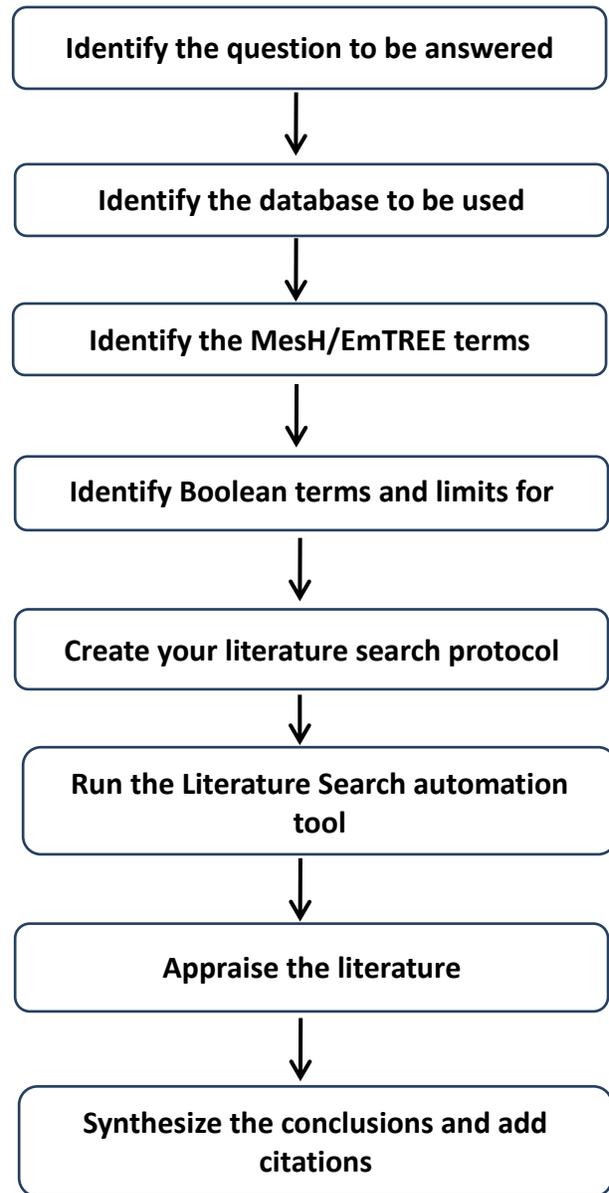


Figure 6. Process flow of literature search

Table 1: Matrix for assessment of causality

Data quantity	Data specificity	Relevance	Inference value	Problem (source of issue)	Possible error	Strategy	
High	Specific	Relevant	Conclusive	No problem in most cases Repeating literature or concept	No error Error of inclusion	Handled in appraisal; remove duplicates; refine, if required	
			Hydra-headed or self-contradictory	Poor specification of the search criteria Past research has different methods	Error of inclusion	Redefine and recheck the logic	
		Irrelevant	Conclusive	Key terms specific, but irrelevant to objective Search logic not correctly set	Error of exclusive inclusion	Rephrase/redefine	
			Hydra-headed or contradictory	Use of common synonyms and relevant terms when specific terms are available and use of disease-specific terms Common terms used with a general search engine	Error of inclusion	Use exclusion; refine terms and revise Boolean logic	
	Non-Specific	Relevant	Conclusive	Key terms specific but broad, search engine, Obtained results have low scientific value	Error of inclusive exclusion	Redefine, revise logic, rephrase, and change search engine	
			Hydra-headed or contradictory	Filters or refining error, incorrect dataset used, too many terms used for the search	Error of inclusion	Redefine, revise logic, rephrase, and refine	
		Irrelevant	Conclusive	Vague terms, incorrect terms and phrases Incorrect database choice, and obtained results are usually biased	Error of inclusion	Refine and redefine	
			Hydra-headed or contradictory	Vague terms, incorrect terms and phrases Incorrect database choice	Error of inclusion	Discard and re-search	
	Low	Specific	Relevant	Conclusive	Usually no problem Focused data Biased data must be ruled out	Error of exclusion	Reassign the terms and check for bias
				Hydra-headed or contradictory	Terms and database correct and logic or phrases are incorrect	Error of exclusive inclusion	Redefine
irrelevant			Conclusive	Incorrect synonyms or logic used Incorrect Boolean used	Error of exclusion	Discard and re-search	
			Hydra-headed or contradictory	Too specific terms or phrases and incorrect database	Error of inclusive exclusion	Discard and re-search	
Non-Specific		Relevant	Conclusive	Vague terms or phrases, correct database Wrong Boolean used Use of general terms	Error of exclusive inclusion	Change database	

			Hydra-headed or contradictory	Vague terms or phrases, correct database, incorrect Boolean used Use of disease-specific terms instead of treatment-specific terms	Error of exclusive inclusion	Redefine, revise logic, and rephrase
		Irrelevant	Conclusive	Too many filters and multiple logics Use of an incorrect logic for a database	Error of exclusion	Discard and re-search
			Hydra-headed or contradictory	Use of incorrect Boolean logic with too specific terms Use of incorrect logic on database	Error of exclusion	Discard and re-search

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Consonant Cluster and Syllable Structure in Mehri language

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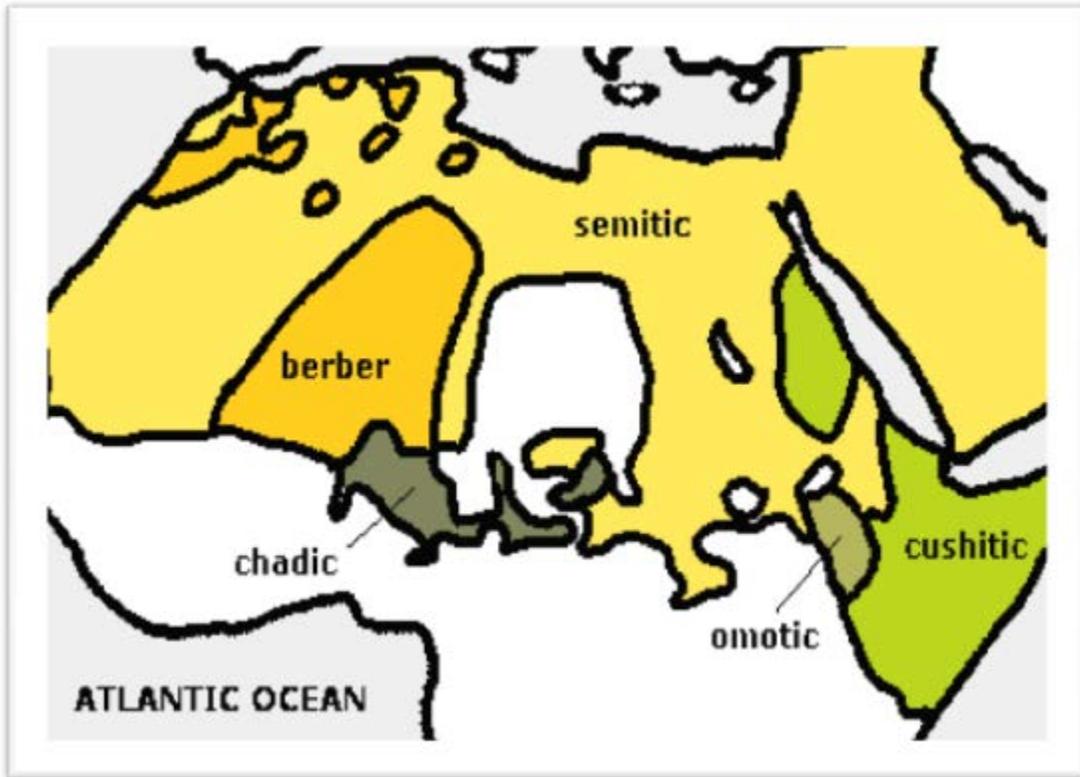
Abstract- This paper is a discussion on the consonant clusters and syllable structure found in Mehri language, spoken in the south of the Arabian Peninsula, in the Republic of Yemen, by the Mahrainhabitants in the desert steppe of Yemen, and in Oman particularly in the mountains of Dhofar and in the Omani desert plateau in Sultanate of Oman. Mehri language is a Modern South Arabian language (MSALs) that descended from the Semitic languages of the Afro-Asiatic language family. This paper gives concise study of consonant clusters in Mehri language. There are two types of consonant clusters in the language; initial and final clusters. Initial clusters in Mehri are formed by combining voiced bilabial nasal /m/ with voiced alveolar stop /d/ or voiced alveolar approximant /l/. Also by combining voiced alveolar nasal /n/ with voiceless uvular fricative /χ/ or voiceless labio-dental fricative /f/. And final cluster by combining voiced bilabial glide /w/ and voiced palatal glide /j/ with /b/, /k/, /t/, /f/, /b/, /t/, /n/ and /l/. Only two consonant is permitted to form cluster in initial and final. Mehri has two kinds of syllables: open syllables (CV), (CV:) and closed syllables (CVC), (CV: C), (CVCC). Mehri has three patterns of syllables: Monosyllabic forms, Disyllabic forms, Trisyllabic forms.

Index Terms- Consonant Clusters, Syllable Structure, Mehri Language.

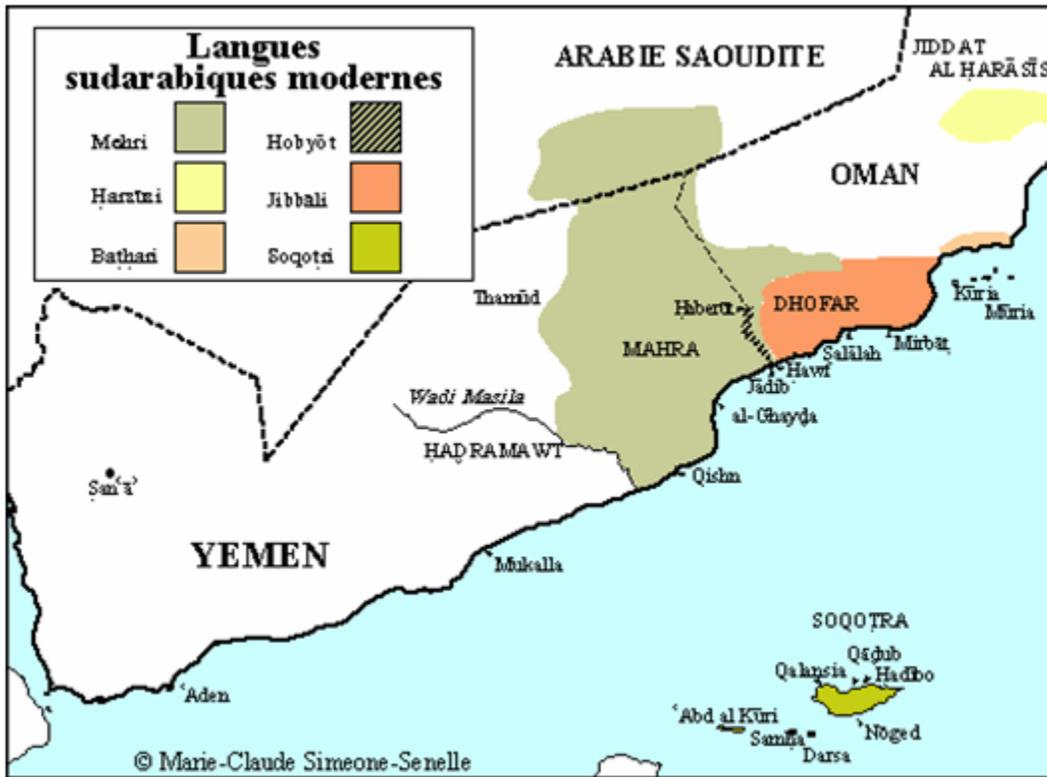
I. INTRODUCTION

Mehri language belongs to Semitic group of language. Mehri is a language in the south of the Arabian Peninsula, in the Republic of Yemen, and the Mahrainhabitants in the desert steppe of Yemen, and in Oman particularly in the mountains of Dhofar and in the Omani desert plateau in Sultanate of Oman. Mehri language is a Modern South Arabian language (MSALs) that descended from the Semitic languages of the Afro-Asiatic language family. Mehri is spoken by about more than 200,000 people in the Republic of Yemen, in the eastern governorate (Almahrah), Sultanate of Oman particularly in Dhofar and Saudi Arabia in the desert of AL-Rua AL-Khali.

Mehri language is in the endangered list of languages, because the influence and dominance of Arabic language and most of Mehri speakers are shifting to the dominant language Arabic. Mehri language named, (mehriyyet) spoken by thousands of speakers. Mehri is widespread language spoken by three Mahra tribes, and some in the mountains of Dhofar in Oman. The majority of speakers live in Yemen in the eastern governorate of Mahra, whereas the others live in Oman in the mountains of Dhofar. Watson (2012) describes in her book Mehri Structure the consonant and vowels in two dialects Mehriyyet and Mehriyo:t.



Map of Afro-Asiatic family



Map of the Geographic Locations of MSA (Simeone-Senelle, 1997)

Hackett (1955) who define the syllable “as the smallest unit in structure of an utterance”. Daniel Jones (1918; 1972:55) said that “each sound which constitutes a peak of prominence is said to be syllabic and the word or phrase is said to contain as many syllables as there are peaks of prominence”. Crystal David

(2008) defines it “a unit of pronunciation typically larger than a single sound and smaller than a word”.

In Mehri language, there are 31 consonants including eight plosives, two nasals, fifteenfricatives, three laterals, two glides and one rhotic. The tablepresented below shows the consonants ofMehri language withexemplification:

Sound	Word	Gloss
b	/ bi:r/	“ well”
t	/tu:k/	“ate”
d	/dri:g/	“staircase”
k	/ktu:b/	“ book”
g	/gi:d/	“good”
ʔ	/ʔalu:t/	“high”
tʰ	/ χle:tʰ /	“ mix”
kʰ	/kʰabi:n/	“ crawling animal”
m	/mdi:t/	“sea winds”
n	/nfu:χ/	“swell”
f	/Fo:s/	“axe”
θ	/θawma/	“thirst”
ð	/ðe/	“the”
S	/shi:l/	“easy”
Z	/zbu:n/	“expensive”
ʃ	/ʃi:ba/	“seven”
χ	/xajer/	“good”
ʕ	/beʕe:li/	“herder, owner
κ	/κsu:m/	“ went”
ðʰ	/ðʰajer/	“on”
ʃ	/ʃba:t/	“finger”
ħ	/ħu:z/	“goat”
h	/hi:t/	“ you”
sʰ	/sʰanwi:t/	“deaf (f) ”
ʒ	/ʒambjet/	“dagger”
ʒ	/ʒa:r/	“detrimental”
ʔ	/ʔi:wo:tʰ/	“fire”
L	/ltu:κ/	“ killed”
r	/rahmit/	“ rain”
w	/warx/	“month”
j	/jikis/	“ he gets”

Table 1:Consonants ofMehriLanguage

Furthermore, with respect to vowels,Mehri has 10 vowels, five short and five long vowels.

The following table shows the vowels ofMehri language with examples:

Sound	Word	Gloss
e	/ðehb/	“gold”
e:	/he:t/	“you”
i	/dinχiru:r/	“ snoring”
i:	/shi:l/	“easy”
u	/ʃu:kuf/	“slept”
u:	/zbu:n/	“ expensive”
o	/je:noka/	“come”
o:	/lo:m/	“last year”
a	/ kal/	“all”

a:	/ka:l/	“every”
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Table 2: Vowels of Mehri Language

II. OBJECTIVES

The main objectives of this paper are as follows:

- To investigate the occurrence of consonant clusters in Mehri language.
- To identify the most important concepts about consonant clusters and the syllable structure.
- To find out the patterns and types of a syllables and their structure in Mehri language.
- To identify the phonemic inventory of Mehri language.
- To evaluate the importance of Mehri language.

III. METHODOLOGY

Data collection for the present study was based mainly on qualitative criteria. The researchers applied several systematic techniques which included primary collection of data from the native speakers of Mehri. Secondary sources like books, journals, articles, etc. We also used further help in data collection. The data collected was then analyzed to reach to certain conclusions regarding Mehri language.

IV. CONSONANT CLUSTERS

A consonant cluster stands for a blend of two, three or more consonants in a sequence. Unlike many languages, consonant clusters in Mehri are very limited. It is interesting to note that three consonant clusters do not exist in Mehri. Only two consonant clusters is found in the language in both position, initial and final. Crystal (1994:74) claimed that consonants “are those units of sounds which function at margins of syllables, either singly or in cluster”. Knowles (1993:68) says that some consonant clusters occur marginally in the syllable structure of English language with clusters as complex as (C) V (C) (C)(C)(C), as in the word “texts” /teksts/. In Mehri there are two types of consonant cluster: Initial and final clusters.

4.1. Initial Clusters

Initial clusters are formed when two or more consonants come together at the beginning of a syllable. In Mehri, only two consonant clusters come together in the initial position.

4.1.1. Nasal Consonant Sequences

Initial cluster in Mehri language are formed by combining voiced bilabial nasal /m/ with voiced alveolar stop/d/ or voiced alveolar lateral /l/.

For example: /mdi:t/ “sea winds” /mduh/ “praise” /mdrat/ “slot shirt”
/mla:jkət/ “angels” /mlayl/ “dull”
/mle:ss/ “smooth”

From the examples above, it is observed that (md-), (ml-) can occur word-initially in the language. Moreover, some more consonant clusters are formed by combining voiced alveolar

nasal /n/ with voiceless uvular fricative/χ/ or voiceless labio-dental fricative /f/.

For example: /nχiru:r/ “he snorted” /nχarah/ “dig”
/nχal/ “under”
/nfu:χ/ “swell” /nfaiχ/ “harness” /nfe:s/ “wide”

4.1.2. Consonant Stop Sequences

Mehri language has the following consonant stop sequences /t/, /dt/, /kt/.

Consonant plus/t/

For example: /ltu:β/ “killed”
/dthora/ “blood”
/ktu:b/ “book”

4.2. Final Clusters

Clusters which appear at the end of a syllable constitute final clusters. Mehri has only two consonant clusters at the end of a syllable.

3.2.1. Glide Consonant Sequences

Final cluster in Mehri language is formed by combining voiced bilabial glide /w/ or voiced palate glide /j/ with consonants. Mehri has the following glide consonant sequences /wb/, /wk/, /wł/, /wf/, /jb/, /jt/, /jn/, /jl/.

Some examples of /w/ plus consonant are presented below:

/kawb/ “the wolf”
/sowk/ “market”
/hawł/ “pound”
/gawf/ “chest”
/j/ plus consonant
For example: /hajb/ “crowbar”
/jisajt/ “nine”
/ferhajn/ “horse”
/χajl/ “maternal uncle”

V. SYLLABLE STRUCTURE

In Mehri language, a syllable consists of a vowel with one or two consonants in initial position (onset) and one or two consonants in final position (coda). In Mehri, a syllable cannot exist without an onset but, a syllable can exist without coda. Ladefoged (1993:248) defines a syllable as “the smallest possible unit of speech”, while George Yule (2006) calls it “a unit of sound consisting of vowel and optional consonants before or after the vowel”. Syllables in Mehri language are divided into open and close.

5.1. Open Syllable

An open syllable may be constituted when the syllable ends with vowel and the syllable consists of consonant (onset) and vowel. A few examples are cited below:

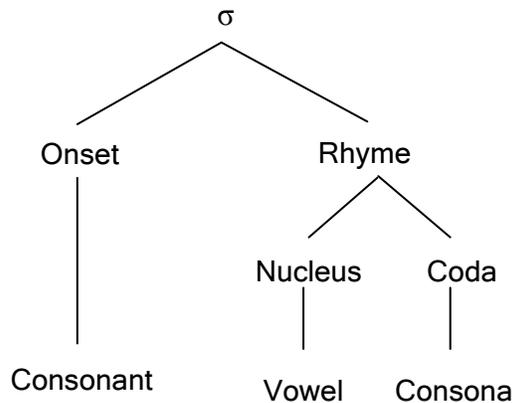
cv	/ðe/	“the”	/wa/
		“and”	
cv:	/ta:/	“till”	/ho:/
		“I”	
cv.cv:	/ha.bu:/	“people”	/hero:/
		“head”	

5.2. Close Syllable

A close syllable is formed when the word ends with consonant and the syllable consists of consonant (onset), vowel and consonant (coda). To prove the point a few examples are presented below:

cvc	/ham/	“name	/harb/
		“war”	
cv:c	/Fo:s/	“axe”	/he:t/
		“you”	
cvcc	/teth/	“a woman”	/warx/“month”

There are three parts in a syllable: Onset, Rhyme (Nucleus) and Coda. The following diagram shows the occurrence of onset, nucleus and coda.



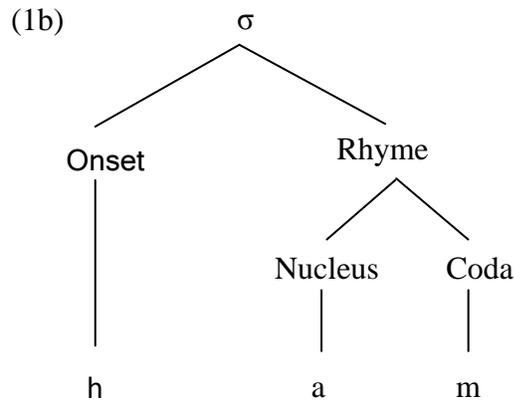
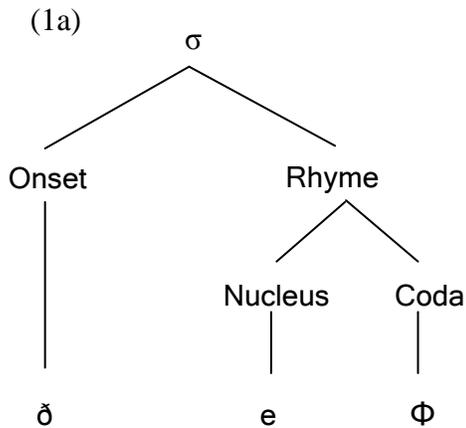
(Structure of the Syllable, April McMahon (2002))

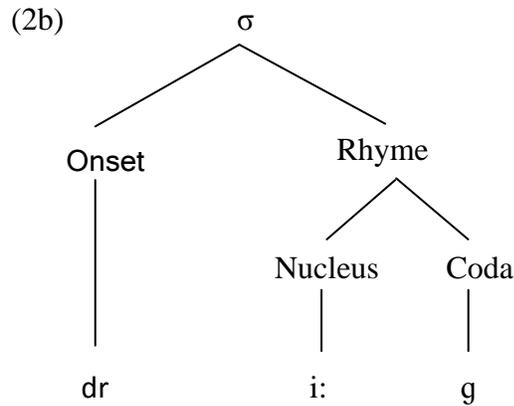
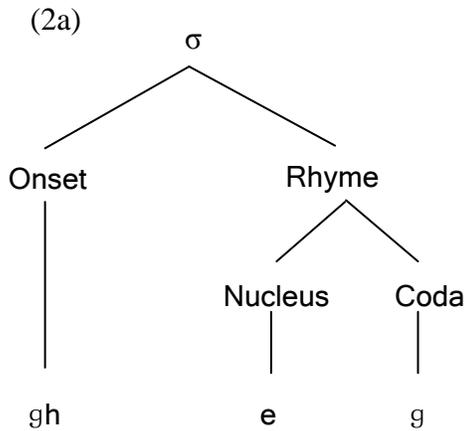
5.3. Onset

In Mehri, all the consonant phonemes can occur in the beginning of the syllable. One or two consonants only can occur as an onset in Mehri language. There are two types of onset:

5.3.1. Simple Onset: a) /ðe/ “the” b) /ham/ “name”

5.3.2. Complex Onset: a) /gheg/ “a man” b) /dri:g/ “staircase”





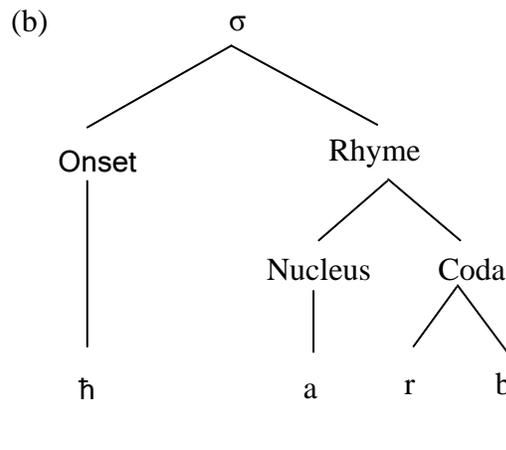
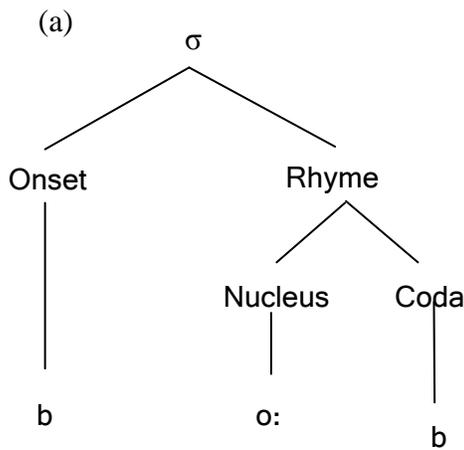
5.4.Rhyme

Nucleus, is the most prominent part of the syllable. Nucleus is preceded by onset and followed by coda. In Mehri, it is observed that only one or two consonants occur before or after the nucleus. Kenstowicz (1994:252) discusses this unit in the following terms: “the syllable is believed to consist of an

obligatory nucleus preceded by an optional consonantal onset and followed by an optional consonantal coda”.

5.5.Coda

A consonant which comes after the vowel is called coda. In Mehri, only one or two consonants can occur as a coda. For example: a) /bo:b/ “door” b) /harb/ “war”



5.6.Syllabic Pattern

There are three Syllabic patterns in Mehri language.

5.6.1.Monosyllabic

cv	/ðe/	“the”	cvc	/ham/
“name”				
cv:c	/bo:b/	“door”	cv:	/ta:/
cevc	/bkoh/	“cried”	“till”	
cvcc	/gawf/	“chest”	cevc:c	/lbo:n/
			“whit”	
			cvcc	/ʃanx/
			“rest”	

3.6.2 Disyllabic

cvc.cv	/θaw.ma/	“thirst”	cvc.cvc
/kub.kob/	“stars”		

cv.cvc	/hu.did/	“iron”	cv:c.cvc	/ha.r.wan/
“goats”				
cv.cv:	/ha.bu:	“people”	cv.cv	
/qa.qa/	“sister”			
cv.cvc	/ji.sajt/	“nine”	cvccv:c	
/rah.mi:t/	“rain”			
5.6.3.Trisyllabic				
cvc.cv.cv:c	/din.xi.ru:r/	“snoring”	cv.cv.cvc/	
/ʃa.fa.jem/	“grew”			
cv.cv.cv:c	/xe.tʰe.ra:t/	“once”	cv.cv:.cv	
/te.lo:.mi/	“then”			

VI. CONCLUSION

This paper discusses the consonant clusters and syllabic structure found in Mehri language. As far as consonant clusters are concerned, it is found that they can occur both as initial and final clusters. With regards to the syllabic structure of Mehri, it is observed that the language has monosyllabic, disyllabic, and trisyllabic forms.

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Effect of H.E.C. effluent on morphological development of *Vicia faba*

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Abstract- Wastewater commonly use in irrigation for several crop plants growth. The reason is because it contains various important micro and macro-nutrients which are useful for crop development. However the content of nutrients in wastewater completely depends on their origin of source. Moreover such variations in nutrients availability greatly influence the particular crop growth. In the present study we addressed the effect of heavy metal industry, Heavy Engineering Corporation (H.E.C.) wastewater on growth of *Vicia faba* (Broad bean). Different concentrations of H.E.C. effluent (0% - 100%) were used to examine their effect on development of *Vicia faba* morphologies. We found that 20% effluent concentration is most suitable for development of different morphologies of *Vicia faba*, indeed support the maximum growth. At higher concentrations (40% - 100%) development of crop is significantly compromised suggesting certain constituents in effluent are present excess than their tolerance limit. Nonetheless, 20% effluent concentration contains optimum micro and macro-nutrients as well as other components which are useful for better growth of *Vicia faba*.

Index Terms- Development, Effluent, Heavy Engineering Corporation (H.E.C.), Morphology, *Vicia faba*, Wastewater.

I. INTRODUCTION

Commonly synthetic fertilizers are being used to provide the requirement of various nutrients to get the best productivity of crop (Liu et al., 2014; Liu et al., 2011). Excess utilization of synthetic fertilizers often leads to deteriorate the soil which ultimately decrease the crop growth (Savci, 2012a, b). Moreover, their production and utilization in irrigation is often associated with high cost (Hussain et al., 2002; Khaleel et al., 2013). Nowadays wastewater is frequently use in irrigation to overcome the cost associated problem as well as their recycling (Hussain et al., 2002; Khaleel et al., 2013). One of the most advantageous factor behind the use of wastewater in irrigation is the presence of desirable nutrients (Hussain et al., 2002). However, types of nutrients and their requirement substantially differ for specific crop developmental growth. One of the major source of wastewater is industry which almost prevalent around world (Hanchang, 2009; Rana et al., 2014). Industrial wastewater contains important micro- and macro-nutrients, though their concentration varies with characteristic of industry (Gatta et al., 2015; Hussain et al., 2002; Rana Ibrahim Al-Dulaimi, 2012). Moreover, type of effluent which depends on the strategies used while treatment of wastewater such as untreated or partially treated, also affect the concentration of nutrients (Chauhan, 2016). Despite important nutrients, wastewater also contains several

undesirable components which often toxic for plant growth. It has been reported that certain micro and macro-nutrients at lower concentration is beneficial however their higher concentration is lethal for crop growth (Barakat, 2011; Chibuike and Obiora, 2014; Yadav, 2010; Yu et al., 2014). Thus, it is worthwhile to examine the systematic analysis of suitable concentration of effluent which can be use in irrigation for better growth of specific crop. H.E.C effluent is commonly using in irrigation for several crop plants growth. In this study we have investigated the effect of heavy metal industry (H.E.C.) effluent on different morphological development of *Vicia faba*. We examined their different concentrations (0% - 100%) effect on various developmental stages of *Vicia faba*. We found that development of different morphologies of *Vicia faba* was higher at 20% concentration effluent and gradually decreased at higher tested concentrations (40% - 100%).

II. MATERIALS AND METHODS

Wastewater was collected at regular interval of six months from the H.E.C. plant Ranchi, Jharkhand, India. Different concentrations of effluent were prepared with distilled water. The prepared effluent concentrations were 0%, 20%, 40%, 60%, 80% and 100%. The control was 0% (distilled water) and the crude was 100% effluent concentration. Pot study experiment was performed to examine the effect of H.E.C. effluent concentrations on development of different morphologies of *Vicia faba*. After post flowering stage different morphologies such as length of root, shoot, leaf and total number of nodule, stem, branch, leaf and flower were analyzed. Length and width of respective morphologies were measured by meter scale and the number was scored. All the experiments were performed in quadruplicate. All data were expressed as mean values with the corresponding standard deviations (SD).

III. RESULTS

Vicia faba was grown in the presence of different concentrations of H.E.C. effluent. To understand the specific response of different concentrations of effluent we systematically examined the several morphological development of plant. We investigated the influence of different effluent concentrations (0%, 20%, 40%, 60%, 80% and 100%) on the length of root, shoot, leaf and total number of nodule, stem, branch, leaf and flower. All the above mentioned morphologies were analyzed after post flowering stage.

Root length: Results show that length of root varies with respect to different concentrations of effluent. The maximum length of

Table 1. Effect of different concentrations of H.E.C. effluent on morphological development of *Vicia faba*.

H.E.C. effluent concentration	Root length (cm)	Shoot length (cm)	Leaf length (cm)	Leaf width (cm)
0%	17.5 ± 1.29	84.25 ± 1.26	5.5 ± 0.43	4.3 ± 0.32
20%	22.25 ± 1.26	91.25 ± 1.5	6.1 ± 0.52	5.2 ± 0.29
40%	20.25 ± 1.5	87.75 ± 0.96	6.0 ± 0.34	5.1 ± 0.31
60%	18.25 ± 1.71	85.0 ± 0.82	5.8 ± 0.45	5.1 ± 0.28
80%	17.0 ± 1.63	82.75 ± 0.5	5.5 ± 0.39	4.5 ± 0.41
100%	14.25 ± 0.96	80.5 ± 1.0	5.4 ± 0.41	5.1 ± 0.35

root (22.25 cm) was found to be at 20% concentration of effluent (table 1). Moreover, the length of root was decreased at higher tested concentrations as compared to 20% effluent concentration. The length of root was 20.25, 18.25, 17.0 and 14.25 cm at 40%, 60%, 80% and 100% effluent concentrations respectively. Root length was found to be 17.5 cm in control (0% effluent concentration) which was used to prepare the different dilution of effluent concentrations. These results indicate that 20% - 60% effluent concentrations are suitable for root development as compared to control. However higher concentrations (80% - 100%) of effluent decreased the root development as compared to control.

Shoot length: Similar to root length the shoot length was found maximum at 20% effluent concentration as compared to control and the other tested effluent concentrations (table 1). Shoot length was found to be 91.25 cm at 20% concentration however it was 84.25 cm at control. Moreover, shoot length was higher at 40% - 60% and decreased at 80% - 100% effluent concentrations as compared to control. The length of shoot was 87.75, 85.0, 82.75 and 80.5 cm at 40%, 60%, 80% and 100% effluent concentrations respectively. The pattern of shoot development at various effluent concentrations suggesting that 20% to 60% effluent concentrations are optimum, however 80% to 100% concentrations can decrease the shoot development.

Leaf length and width: Effect of effluent on leaf elongation (length and width) was minor as compared to root and shoot development. Nevertheless, maximum length and width of leaves were found to be at 20% as compared to control and other tested effluent concentrations (table 1). The length and width of leaves at 20% effluent concentration were 6.1 cm and 5.2 cm respectively. However, the length and width of leaves were 5.5 cm and 4.3 cm at control. Though the development of leaves was increased at 20%, it almost remains or comparable to the control at higher tested effluent concentrations (40% - 100%). The length at 40%, 60%, 80% and 100% effluent concentrations were 6.0, 5.8, 5.5, and 5.4 respectively. Likewise the width was 5.1, 5.1, 4.5 and 5.1 cm respectively.

Total number of nodules: Results show that nodules number increased at 20% effluent concentration as compared to the control (table 2). The total number of nodules was 43 at 20% effluent

concentration and 36 at control. However nodule number decreased with increased in effluent concentration, nevertheless it remain higher up to 60% as compared to control. Total number of nodules was 40 and 38 at 40% and 60% effluent concentrations respectively. At 80% effluent concentration number of nodules was same as control however it was decreased to 35 at 100% effluent concentration.

Total number stem: Effect of effluent on the number of stem followed the same trends like number of nodules. At 20% total number of stem was two-fold higher than the control and higher among other tested effluent concentrations (table 2). Total number of stem was 4 at 20% effluent concentration, however total number of stem was 2 at control. Further increased in effluent concentration decreased the number of nodule as compared to 20% concentration. Nevertheless number of nodule was higher at 40% to 60% as compared to control, however further decreased at 80% - 100% effluent concentrations.

Total number of branch: Results show that number of branch was higher at 20% and 40% effluent concentrations as compared to control (table 2). Total number of branch was 5 at both 20% and 40% however it was 4 at control. However the number of branch was similar to control at 60% effluent concentration. Moreover, their number further decreased with increased in effluent concentration. The total number of branch was 3 and 2 at 80% and 100% effluent concentrations respectively.

Total number of leaf: Effect of effluent was most predominant on development of leaf among all examined morphologies of *Vicia faba*. Results show that the maximum number of leaves was at 20% effluent concentration (table 2). The total number of leaves was 99 at 20% effluent concentration however it was 75 at control. We found that number of leaf decreased gradually with increased in the effluent concentrations. The total number of leaf was 98, 93, 62 and 52 at 40%, 60%, 80% and 100% effluent concentrations respectively. These results indicate that 20% to 60% effluent concentrations are suitable for leaf development as compared to control. However use of higher effluent concentrations such as 80% to 100% can inhibit the leaf development.

Total number of flower: Development of flower was found maximum at 20% effluent concentration (table 2). At 20%

Table 2. Effect of different concentrations of H.E.C. effluent on nodule, stem, branch, leaf and flower of *Vicia faba*.

H.E.C. effluent concentration	Total number of nodule	Total number of stem	Total number of branch	Total number of leaf	Total number of flower
0%	36	2	4	75	2
20%	43	4	5	99	5
40%	40	3	5	98	4
60%	38	3	4	93	3
80%	36	1	3	62	2
100%	35	1	2	52	1

effluent concentration total 5 flowers was developed however total number of flowers was 2 at control. We found that number 100% effluent concentration. The obtained result suggesting that 20% to 80% effluent concentrations are more beneficial for flower development as compared to control.

IV. DISCUSSION

H.E.C. effluent is utilizing in irrigation for several crops near their flow regions in Jharkhand, India. The reasons for their use in irrigation are to get nutrients for crop growth to overcome the cost associated with fertilizers. Though, this strategy is beneficial for certain crop it remains to investigate their optimum concentration which can be used in irrigation for specific plant such as *Vicia faba*. Moreover, analysis of suitable H.E.C. effluent concentration for better crop growth could economize the agriculture practice. In the present study we have examined the effect of H.E.C. effluent on different morphological development of *Vicia faba* growth as well as investigated the suitable concentration which can be used in irrigation for their growth. We tested the effect of different concentrations of effluent to better understand their response towards specific morphological development of *Vicia faba*. We grow the plant in the presence of different concentrations of effluent (0% - 100%) and examined their different morphologies after post flowering stage. We analyzed the effect of effluent on length of root, shoot, leaf and total number of nodule, stem, branch, leaf and flower. We found that development of all these morphologies were increased at 20% effluent concentration as compared to control. Moreover, we found that their development decreased with increased in effluent concentrations. Among all tested dilution the optimum concentrations of effluent were found to be 20% to 60% for root, shoot and leaf. For nodule and flower the optimum concentrations of effluent were 20% to 80%, for stem, branch and leaf the optimum concentrations were 20% to 60%. These results indicating that highest concentration contain excess nutrients or heavy metals which possibly affect the proper development of different morphologies of *Vicia faba*. Several studies have reported the toxic effects of excess nutrients and heavy metals on plant growth (Barakat, 2011; Chibuike and Obiora, 2014; Yadav, 2010; Yu et al., 2014). Though, their lower

concentrations are beneficial and important, higher concentrations can lead to abrogation in the plant growth. Thus, it will be insightful to analyze the physico-chemical properties to uncover the presence of specific nutrients and heavy metals in H.E.C. effluent. Moreover their quantitative analysis and investigation of individual response towards different morphological development will be useful to select the particular concentration of H.E.C. effluent in irrigation for specific plant growth.

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Theorizing the Concept of Core Competencies: An Integrative Model beyond Identification

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Abstract- The multi-dimensional view of Core Competence is addressed differently by different scholars (Barney, 1991; Javidan, 1998; Collins, Smith and Clark, 2005). However, theoretical basis in this regard is still fragmented. Thus, we conceptualize the notion of core competencies. Core competence, resources and competence have been identified as the main constructs of the study. Subsequently, two propositions were developed and model was constructed based on the literature reviewed. We postulate, Capabilities, competencies and resources are the dimensions of core competencies and identical core competencies lead to gain a competitive advantage for a firm. Furthermore, competitive advantages usually proceeds to grow a firm.

I. INTRODUCTION

Unlike in the past, the current business competition is well informed and the battle is fierce. Hence, Henry Ford's concept of "You can have any colour as long as it's black" is no longer a viable option to addressing the customer needs. Companies now require something special in order to fight the fierce battle among the competitors. This is termed as "**Core Competencies**". This is notion is contemporary and topical in the field of strategic management (Selznick, 1957; McLagan, 1983; Thornston, 1992; Spencer, 1993; Prahalad, 1990; Lahti, 1999; Barney & Wright, 1998; Mueller, 1996; Porter, 1985; Zhang, et al., 2002; Wright, et al., 2001; Wernerfelt, 1984; Ulrich, 1998; Schuler, 1992).

The definitions of these scholars will be referenced throughout the core of the study and will explain the concept of core competencies in a broader manner. Therefore, it is vital that any company differentiates itself from the rest of the competition through a unique set of skills, commonly referred to as "core competencies". With today's competition, knowledge is power and having knowledge others do not possess would most certainly give power to one over the rest. Therefore, core competence is considered as one of the main assets an organization could possess. However, although it is considered to be one of the most important things, scholars in the field have not reached to a consensus in relation to the definition of core competence. Thus, this integrative model development paper intends to make a contribution to the existing body of knowledge by means of defining what core competency is & introducing a new model by amalgamating previous models through reference to past document and using a practical approach.

II. LITERATURE REVIEW

Most importantly, this section will elaborate the core constructs addressed in this paper. Simply said, within the domain of core competencies; competencies, resources and capabilities are viewed as topical and indeed the subject domain exists in a fragmented literature base. Given this, this section reviews the seminal works pertaining to the construct of core competencies.

Core competencies

A **Core Competency** is a concept in management theory originally advocated by two business authors, (Prahalad & Hamel, 1990). In their view a core competency is a specific factor that a [business](#) sees as central to the way the company or its employees work. It fulfills three key criteria:

1. It is not easy for competitors to imitate.
2. It can be reused widely for many products and markets.
3. It must contribute to the end consumer's experienced benefits and the value of the product or service to its customers.

A core competency can take various forms, including technical/subject matter know-how, a reliable process and/or close relationships with customers and suppliers. It may also include product development or culture, such as employee dedication, best Human Resource Management (HRM), good market coverage, or [kaizen](#) or continuous improvement over time.

Core competencies are particular strengths relative to other organizations in the industry, which provide the fundamental basis for the provision of added value. Core competencies reflect the collective learning of an organization and involve coordinating diverse production skills and integrating multiple streams of technologies. It includes communication, involvement, and a deep commitment to working across organizational boundaries, such as improving [cross-functional teams](#) within an organization to address boundaries and to overcome them. Few companies are likely to build world leadership in more than five or six fundamental competencies.

A core competency results from a specific set of skills or production techniques that deliver additional value to the customer. These enable an organization to access a wide variety of markets.

In an article from 1990 titled "The Core Competence of the Corporation", (Prahalad & Hamel, 1990) illustrate that core competencies lead to the development of core products which further can be used to build many products for end users. Core

competencies are developed through the process of continuous improvements over the period of time rather than a single large change. To succeed in an emerging global market, it is more important and required to build core competencies rather than [vertical integration](#). NEC utilized its portfolio of core competencies to dominate the semiconductor, telecommunications and consumer electronics market. It is important to identify core competencies because it is difficult to retain those competencies in a price war and cost-cutting environment. The author used the example of how to integrate core competences using strategic architecture in view of changing market requirements and evolving technologies. Management must realize that stakeholders to core competences are an asset which can be utilized to integrate and build the competencies. Competence building is an outcome of strategic architecture which must be enforced by top management in order to exploit its full capacity

Please note: according to Prahalad & Hamel (1990) definition, core competencies are the "collective learning across the corporation". They can therefore not be applied to the SBU and represent resource combination steered from the corporate level. Because the term "core competence" is often confused with "something a company is particularly good at", some caution should be taken not to dilute the original meaning.

In *competing for the Future*, the authors Prahalad (1990) show how executives can develop the industry foresight necessary to adapt to industry changes and discover ways of controlling resources that will enable the company to attain goals despite any constraints. Executives should develop a point of view on which core competencies can be built for the future to revitalize the process of new business creation. Developing an independent point of view of tomorrow's opportunities and building capabilities that exploit them is the key to future industry leadership.

For an organization to be competitive, it needs not only tangible resources but intangible resources like core competences that are difficult and challenging to achieve. It is critical to manage and enhance the competences in response to industry changes in the future. For example, Microsoft has expertise in many [IT](#) based innovations where, for a variety of reasons, it is difficult for competitors to replicate or compete with Microsoft's core competences.

In a race to achieve cost cutting, quality and productivity, most executives do not spend their time developing a corporate view of the future because this exercise demands high intellectual energy and commitment. The difficult questions may challenge their own ability to view the future opportunities but an attempt to find their answers will lead towards organizational benefits.

Resources

An economic or productive factor required to accomplish an activity or as means to undertake an enterprise and achieve desired outcome. Three most basic resources are land, labor, and capital & other resources include energy, entrepreneurship, information, expertise, management and time. Resource is defined as an input to the value process, found in the basic activities and processes within a company in which core competencies often form a major part.

Resources are inputs to a company's value process and they are the 'basic units of analysis' (Grant, 1991). According to (Barney, 1991), Resources are categorized in numerous ways: E.g.: Organizational (culture and reputation) Physical (asset, equipment, location, and plant)

Human (manpower, management team, training, and experience). According to (Peteraf, 1993), resources are categorized as tangible and intangible other than above categorization. Resources are also identified as sources for sustainable competitive advantage if they are valuable, rare, inimitable, and organization-able (Barney, 1991). Resources are among the most basic elements in a company, and they are natural objects to study since they are input to a company's value process (Grant, 1991).

Competence

Competence is an assembly of related abilities, commitments, knowledge, and skills that enable a person or an organization to act effectively in a job or a situation. Competence indicates sufficiency of knowledge and skills that enable someone to act in a wide variety of situations. Because each level of responsibility has its own requirements, competence can occur in any period of a person's life or at any stage of his or her career.

In other words the capacity of a person to understand a situation and to act reasonably. Disputes regarding the competence of an individual are settled by a judge and not by a professional, although the judge may seek expert opinion before delivering at a judgment.

According to (Henderson & Cockburn, 1994), Competencies are generally separated into 2 categories. They are namely, Functional competencies and Integrative competencies. The former are used in daily activities, and the latter to integrate and develop new competence components.

From a technology perspective, (Danneels, 2002) suggest that product innovation, facilitated and improved by competencies, is a driving force of firm renewal. Further, he suggests three categories of competencies:

- First order - comprise customer and technological competencies
- Integrative - relate to the ability to combine first-order competencies
- Second order - relate to the ability to build first-order competencies.

According to (Javidan, 1998), Competencies are crucial in general too, since they play a major part in organizational developments. He has suggested a "Competence Hierarchy", in which the competence concept is of greater value to a company than (in decreasing value order) the capability concept and the resource concept.

Capabilities

In strategic management, capabilities are perceived as a critical resource of firm performance and at present every firm strive to be perceived as being capable of doing something than other firms. However, the exact meaning of defining the notion of capabilities has roots to different conceptual definitions. Collis (1994) stated that the conception of has left been vague in relation to firm capabilities. Schreyögg & Kliesch-Eberl, (2007)

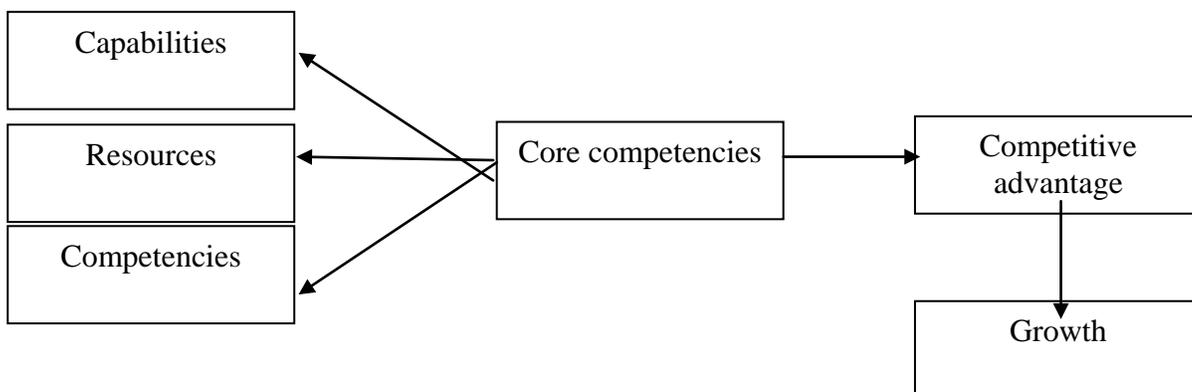
asserted that defining the notion of capability is very important due to the above mentioned differences of conceptualizing capabilities. Therefore, they view capability as not a mere firm resource that enhances the performance of other resources such as financial, manpower or technology, but rather firm capability is superior means of allocating resources. Furthermore, capabilities addresses complex process of firm such as customer relationship, product development, or supply chain management (Schreyögg & Kliesch-Eberl, 2007). At the outset, it is important to recognize that the distinction between capabilities and assets is not a simple task (Andersen & Kheam, 1998). However, firm capabilities are argued to be the most important factor in determining firm success Srivastava, et al., (1998) and Bontis & Fitz-enz, (2002). Confirming this Grant, (1996) postulated that success of a firm depends on knowledge or know-how of employees. Similarly Lado, et al., (1992) firm performance have a link to expertise, know-how and skills of managers. Meanwhile suggesting the importance of capabilities to a firm McEvily & Chakravarthy (2002) suggested that know-how of employees generates more durable returns than any other resource due to the complexity and tacit nature of the notion. Brush & Chaganti, (1999) asserted that variation in performance is explained by capabilities of the firm. Furthermore, Galbreath (2005) write since capabilities are embedded to firm experience and learning it is considered that capabilities are difficult to copy or duplicate due to the 'highest level of causal ambiguity' (p. 982).

Reviewing the above constructs identified, following summaries can be developed with seminal works in the domain of strategic management.

III. CONCLUSION MODEL CONSTRUCTION AND PROPOSITION DEVELOPMENT

Above table depicts the highly cited works in the domain of core competencies. Importantly, Javidan, (1998) postulated that Prahalad & Hamel (1990) conceptualizations of competences, capability and core competencies have used as synonymous. Also, Javidan (1998) suggested that, Prahalad & Hamel (1990) used these terms as a combination of technological and production skills. Javidan, (1998) opinioned that there are major problems in Prahalad & Hamel, (1990) conceptualizations of core competencies. Javidan (1998) affirmed that the terms are two narrow and it defines only about the manufacturing

Accordingly, following model is constructed.



capabilities of a firm. Also the term brings the confusion to the relationship between capabilities and competencies (Javidan, 1998). As a remedy, Javidan (1998) postulated a 'competence hierarchy' as a remedy to address the called issues of Prahalad & Hamel (1990). They asserted that resources lie at the bottom of the hierarchy which acts as a building blocks to firm's competencies. Adding to this resources definition, Barney (1991) postulated three categories of resources for a typical firm. They are namely; physical resources, human resources and organizational resources. Moving along in the competence hierarchy, Javidan (1998) opinioned that capabilities refer to the firm's ability to exploit its resources. He further proposed that firm capabilities typically includes business processes and routines that acts as the basis to manage the interaction among the firm's resources. He further defined that a process typically transforms input to an output. Also, capabilities are functionally based (Javidan, 1998). Competencies lies in the third level of the hierarchy. Precisely, competencies includes co-ordination and cross functional integration of capabilities of the firm (Javidan, 1998). He further opinioned that in multi-business corporations, competencies can be viewed as a set of capabilities vested in a Strategic Business Unit (SBU). Finally, core competence, (Javidan, 1998) affirmed that it lies at the higher level of the competence hierarchy. Core competence results from the interaction of specific SBU competencies.

Given this detail conceptual definitions of core competence, capabilities, competence and resources proposed by Javidan, (1998), the researchers bring another recent highly cited conceptualizations of the concepts proposed by Ljungquist (2007). However, Ljungquist (2007) criticize Javidan (1998) competence hierarchy and emphasized that, competence hierarchy apparently reasonable, but definitions of the associated concepts are not explicitly defined (Ljungquist, 2007). As a remedy, Ljungquist (2007) proposed the core competence model with empirical and conceptual applications to practitioners. Overall, accepting the conceptualizations of Ljungquist (2007) we intend to develop a proposition as follows.

Proposition one: Capabilities, competencies and resources are the dimensions of core competencies and identical core competencies lead to gain a competitive advantage for a firm.

Proposition two: Competitive advantages usually proceeds to grow a firm.

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Add-on security using Weak Magic squares in Public Key Cryptosystem, Modified with Dummy Letters

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Abstract- The efficiency of a cryptographic algorithm is based on the time taken for encryption/decryption and the way it produces different cipher-text from a clear-text [1]. An alternative approach was suggested for handling ASCII characters in the cryptosystem, a magic square implementation to enhance the efficiency by providing add-on security to the cryptosystem. The encryption/decryption is based on numerals generated by magic square rather than ASCII values and expected to provide another layer of security to any public key algorithms such as RSA, EL Gamal etc.

In this paper a modified cryptosystem is considered with the introduction of 5 dummy letters {Au, Ea, Ee, Oo, Ou} in the existing 26 English letters. The proposed dummy letters are used in the theoretical developments focusing on its merit and advantages of using magic squares or any type of matrices in encryption and decryption processes. In fact, the introduction of dummy letters will affect the ASCII characteristics thereby inviting troubles in other uses. The technique will provide another layer of security to the modified cryptosystem. If implemented, it will give a new direction to the information scientists, computer operators and specifically to the crypt-analyzers.

Index Terms- Basic Latin Square, magic Square, pivot element, add-on security, public key cryptosystem
 AMS classification No. A-05 and A-22

I. INTRODUCTION

Tomba [2-6] developed simple techniques for constructing normal magic squares using basic Latin squares for any n (odd, doubly-even and singly-even). The method needs 3 steps for construction of odd order and doubly-even magic squares but 6 steps for construction of singly-even magic squares. Depending upon the choice of the central block and assignment of pair-numbers satisfying T, different weak magic squares are generated that can produce different cipher text as far as possible from plaintext.

II. METHODOLOGY

We [13] suggested the introduction of 5 dummy letters as AU, EA, EE, OO, OU, expressed as A_u, E_a, E_e, O_o, O_u in the existing 26 English letters. The merits and demerits of introducing the selected dummy letters were also discussed. Suppose the plaintext and cipher text of these letters are:

PT	A	B	C	D	E	F	G	H	I
CT	0	1	2	3	4	5	6	7	8
PT	Q	R	S	T	U	V	W	X	Y
CT	16	17	18	19	20	21	22	23	24

J	K	L	M	N	O	P
9	10	11	12	13	14	15
Z	A _u	E _a	E _e	O _o	O _u	
2	26	27	28	29	30	
5						

(i) Encryption/decryption with a weak magic square

Encryption: Let the message to be encrypted be M comprising a block of m letters. Encryption is considered as a vector of m dimensions and multiplied by a m*m weak magic square, mod 31. If the weak magic square, A is invertible i.e. !A! ≠ 0, decryption is ensured.

Now, cipher text = {(m *m) weak magic square} * plaintext mod 31.

Decryption: M = {(m *m) weak magic square}⁻¹ Cipher text mod 31 giving the original plaintext of the message.

(ii) Application of weak magic square as add-on security in public key cryptosystem

Consider a public-key cryptosystem, RSA is taken. The private key of a user consists of two prime p and q and an exponent (decryption key) d. The public-key consists of the modulus n = p*q, and an exponent e such that d = e⁻¹ mod (p-1)(q-1). To encrypt a plaintext, M the user computes C = M^e mod n and decryption is done by calculating M = C^d mod n.

Encryption The encrypted cipher text using the m*m matrix or weak magic square (i) is done by using Cipher text⁽ⁱ⁾ = {(m *m) weak magic square} * M mod 31: denoted as CT⁽ⁱ⁾.

The encrypted cipher text, CT⁽ⁱ⁾ is then applied to RSA algorithm given above C⁽¹⁾ = {CT⁽ⁱ⁾}^e mod n. In fact, C⁽ⁱ⁾ represents the doubly encrypted cipher text (first using a weak magic square and secondly using RSA algorithm) of a message.

Decryption To decrypt M⁽¹⁾ = C⁽¹⁾^d mod n. The decrypted cipher text using RSA algorithm gives CT⁽ⁱ⁾ = {C⁽ⁱ⁾}^d mod n.. Once again, the doubly decrypted plaintext is calculated using Cipher text⁽ⁱ⁾ = {(m *m) weak magic square}⁻¹ CT⁽ⁱ⁾ mod 31

Example 1: For any singly-even n (6 * 6) magic square

Step-1

34	9	22	15	27	4	111
2	29	17	14	11	32	105
36	25	13	19	12	6	111
1	7	18	24	30	31	111
5	26	20	23	8	35	117
33	10	21	16	28	3	111
111	106	111	111	116	111	111

WMS-1

1	2	3	4	5	6
8	9	10	11	12	7
15	16	17	18	13	14
22	23	24	19	20	21
29	30	25	26	27	28
36	31	32	33	34	35

Step-2

31	25	19	13	7	1
32	26	20	14	8	2
33	27	21	15	9	3
34	28	22	16	10	4
35	29	23	17	11	5
36	30	24	18	12	6

WMS-2

34	9	16	21	27	4	111
2	29	17	20	11	32	111
31	30	18	13	12	1	105
6	7	24	19	25	36	117
5	26	14	23	8	35	111
33	10	22	15	28	3	111
111	111	111	111	111	111	111

Step 3 and step-4: not shown

Step-5

6	12	13	24	30	1
5	11	14	23	8	35
34	28	16	15	10	4
3	9	22	21	27	33
2	29	17	20	26	32
36	7	18	19	25	31

WMS-3

34	9	16	21	27	4	111
2	29	17	20	11	32	111
31	30	18	13	12	7	111
6	1	24	19	25	36	111
5	26	14	23	8	35	111
33	10	22	15	28	3	111
111	117	111	111	111	105	111

Step-6

6	32	3	34	35	1	111
7	11	27	28	8	30	111
19	14	16	15	23	24	111
18	20	22	21	17	13	111
25	29	10	9	26	12	111
36	5	33	4	2	31	111
111	111	111	111	111	111	111

WMS-4

34	9	16	31	37	4	111
2	29	23	14	11	32	111
31	30	24	18	7	1	111
6	12	19	13	25	36	111
5	26	20	17	8	35	105
33	10	15	22	28	3	111
111	116	117	105	106	111	111

Note: In the construction of singly-even magic squares using basic Latin squares, selecting a suitable central block, assigning the pair-numbers satisfying T in selective positions is normally complicated. In many cases, it will generate weak magic squares

Example 2: For singly-even, $n = 6$, and $n=10$, pair numbers satisfying T are 18:and24 respectively. For $n = 6$, different weak magic squares can be constructed. Assuming central block comprise of the pair-numbers [13, 24] and [18, 19], then six types of weak magic squares can be generated as follows:

WMS-5

34	9	22	15	27	4	111
2	29	23	14	11	32	111
36	25	13	19	12	6	111
1	7	18	24	30	31	111
5	26	20	17	8	35	111
33	10	21	16	28	3	111
111	106	117	105	116	111	111

WMS-6

34	9	16	21	27	4	111
2	29	17	14	11	32	105
31	30	24	18	7	1	111
6	12	19	13	25	36	111
5	26	20	23	8	35	117
33	10	15	22	28	3	111
111	116	111	111	106	111	111

The above illustrations (6*6) shows that six different forms of weak magic squares can be generated, depending upon the choice of two pair-numbers [13, 24] and [18, 19] satisfying T,

Altogether ${}^{18}C_2 \cdot 6 = 918$ weak magic squares can be generated taking the central block and assignment of pair-numbers satisfying T in different positions.

8. Illustrations

Illustration 1: Using 5 selected dummy letters, the message SEA \Rightarrow SE_a corresponds to the plaintext, [18 27]

Let A = $\begin{bmatrix} 3 & 7 \\ 5 & 12 \end{bmatrix}$

Encryption $\begin{bmatrix} 3 & 7 \\ 5 & 12 \end{bmatrix} * \begin{bmatrix} 18 \\ 27 \end{bmatrix} \pmod{31} \Rightarrow \begin{bmatrix} 243 \\ 414 \end{bmatrix} \pmod{31} \Rightarrow \begin{bmatrix} 26 \\ 11 \end{bmatrix}$
 cipher text [A_o L]

Decryption: $\begin{bmatrix} 12 & -7 \\ -5 & 3 \end{bmatrix} * \begin{bmatrix} 26 \\ 11 \end{bmatrix} \pmod{31}$

$\Rightarrow \begin{bmatrix} 235 \\ -97 \end{bmatrix} \pmod{31} \Rightarrow \begin{bmatrix} 18 \\ 27 \end{bmatrix} \Rightarrow$ SE_a or SEA

Illustration 2: Consider a message HOUR represented as HO_uR \Rightarrow corresponds to [7 30 17]

Let A = $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 7 \\ -2 & -4 & -5 \end{bmatrix}$

Encryption $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 7 \\ -2 & -4 & -5 \end{bmatrix} * \begin{bmatrix} 7 \\ 30 \\ 17 \end{bmatrix} \pmod{31}$
 $\Rightarrow \begin{bmatrix} 118 \\ 283 \\ -219 \end{bmatrix} \pmod{31} \Rightarrow \begin{bmatrix} 25 \\ 4 \\ 29 \end{bmatrix} \Rightarrow$ [Z E O_o]

Decryption: $\begin{bmatrix} 3 & -2 & -1 \\ -4 & 1 & -1 \\ 2 & 0 & 1 \end{bmatrix} * \begin{bmatrix} 25 \\ 4 \\ 29 \end{bmatrix} \pmod{31}$

$\Rightarrow \begin{bmatrix} 38 \\ -125 \\ 79 \end{bmatrix} \pmod{31} \Rightarrow \begin{bmatrix} 7 \\ 30 \\ 17 \end{bmatrix} \Rightarrow$ HO_uR or HOUR

Illustration 3: Let the message be HOUR \Rightarrow HO_uR \Rightarrow the plaintext: [7 30 17]

Let A = $\begin{bmatrix} 8 & 1 & 6 \\ 3 & 5 & 7 \\ 4 & 9 & 2 \end{bmatrix}$

Encryption $\begin{bmatrix} 8 & 1 & 6 \\ 3 & 5 & 7 \\ 4 & 9 & 2 \end{bmatrix} * \begin{bmatrix} 7 \\ 30 \\ 17 \end{bmatrix} \pmod{31}$

$\Rightarrow \begin{bmatrix} 188 \\ 290 \\ 332 \end{bmatrix} \pmod{31} \Rightarrow \begin{bmatrix} 2 \\ 11 \\ 22 \end{bmatrix} : [C L W]$

Decryption: $\begin{bmatrix} 24 & 25 & 11 \\ 7 & 20 & 2 \\ 29 & 15 & 16 \end{bmatrix} * \begin{bmatrix} 2 \\ 11 \\ 22 \end{bmatrix} \pmod{31}$

$\Rightarrow \begin{bmatrix} 565 \\ 278 \\ 575 \end{bmatrix} \pmod{31} \Rightarrow \begin{bmatrix} 7 \\ 30 \\ 17 \end{bmatrix} \Rightarrow$

HO_uR or HOUR

Illustration 4: Consider the message COE that corresponds to the plaintext: [2 14 4]

Let A = $\begin{bmatrix} 0 & 13 & 14 \\ 19 & 6 & 4 \\ 12 & 1 & 25 \end{bmatrix}$

Encryption: $\begin{bmatrix} 0 & 13 & 14 \\ 19 & 6 & 4 \\ 12 & 1 & 25 \end{bmatrix} * \begin{bmatrix} 2 \\ 14 \\ 4 \end{bmatrix} \pmod{31}$

$\Rightarrow \begin{bmatrix} 238 \\ 138 \\ 148 \end{bmatrix} \pmod{31}$

$31 \Rightarrow \begin{bmatrix} 21 \\ 14 \\ 24 \end{bmatrix} \Rightarrow$ [V O Y]

Decryption, Here, A⁻¹ = $\frac{1}{6453} \begin{bmatrix} -146 & 311 & 32 \\ 407 & 238 & -266 \\ 83 & -221 & 247 \end{bmatrix}$

Using the multiplicative inverse $\Rightarrow 5 \pmod{31}$ as $25 \pmod{31}$, A⁻¹

$= \begin{bmatrix} 8 & 25 & 25 \\ 7 & 29 & 15 \\ 29 & 24 & 6 \end{bmatrix}$

Now, $\begin{bmatrix} 8 & 25 & 25 \\ 7 & 29 & 15 \\ 29 & 24 & 6 \end{bmatrix} * \begin{bmatrix} 21 \\ 14 \\ 24 \end{bmatrix} \pmod{31}$

$\Rightarrow \begin{bmatrix} 1118 \\ 913 \\ 1089 \end{bmatrix} \pmod{31} \Rightarrow \begin{bmatrix} 2 \\ 14 \\ 4 \end{bmatrix} \Rightarrow$ Corresponds to

COE

The involvement of the factors of 2 or 13 in any matrix is not affecting the encryption and decryption process if the matrix or magic square is non singular.

Illustration 5: (Encryption and decryption based on weak magic squares)

Taking A = 0, B = 1, C = 2 ... Z = 25, A_u = 26, E_a = 27, E_e = 28, O_o = 29, O_u = 30, the message **FLOWER** gives the plaintext [05 11 14 22 04 17]

We may consider two weak magic squares generated for n = 6 (singly-even) as:

34	9	22	15	27	4
2	29	23	14	11	32
36	25	13	19	12	6
1	7	18	24	30	31
5	26	20	17	8	35
33	10	21	16	28	3

WMS-A

34	9	16	31	37	4
2	29	17	14	11	32
31	30	24	18	7	1
6	12	19	13	25	36
5	26	20	23	8	35
33	10	15	22	28	3

WMS-B

FLOWER \Rightarrow plaintext [05 11 14 22 04 17]

Encryption: Cipher text = $\{[(6*6) \text{ weak magic square}] * \text{plaintext}\} \text{ mod } 31$.

Let CT = Encrypted cipher text of the message, using 6*6 weak magic squares given above.

$$CT^{(1)} = [WMS-A] * [05\ 11\ 14\ 22\ 04\ 17] \text{ mod } 31 \Rightarrow [15\ 06\ 22\ 0\ 19\ 16] \Rightarrow \text{PGWATQ}$$

$$CT^{(2)} = [WMS-B] * [05\ 11\ 14\ 22\ 04\ 17] \text{ mod } 31 \Rightarrow [29\ 28\ 27\ 21\ 11\ 30] \Rightarrow O_o E_e E_a V L O_u$$

Decryption $M^{(1)} = (WMS-A)^{-1} * CT^{(1)} \text{ mod } 31$
and $M^{(2)} = (WMS-B)^{-1} * CT^{(2)} \text{ mod } 31$

Here, $[WMS, Fig A] = 2308920$, using the multiplicative inverse of $2308920 \text{ mod } 31 \Rightarrow 9 \text{ mod } 31$ as $7 \text{ mod } 31$, {Inverse of **WMS-A**} mod 31 =

$$\begin{bmatrix} 19 & 5 & 23 & 3 & 29 & 25 \\ 24 & 19 & 28 & 28 & 6 & 1 \\ 23 & 25 & 0 & 19 & 5 & 26 \\ 23 & 18 & 0 & 0 & 13 & 8 \\ 21 & 10 & 3 & 0 & 1 & 18 \\ 27 & 17 & 8 & 6 & 17 & 6 \end{bmatrix} \text{ mod } 31$$

Here, $[WMS - B] = 66600$, using the multiplicative inverse of $66600 \text{ mod } 31 \Rightarrow 12 \text{ mod } 31$ as $13 \text{ mod } 31$: {Inverse of **WMS-B**} mod 31 =

$$\begin{bmatrix} 28 & 27 & 6 & 8 & 6 & 6 \\ 16 & 9 & 1 & 3 & 13 & 8 \\ 15 & 26 & 4 & 0 & 30 & 6 \\ 30 & 0 & 4 & 0 & 25 & 22 \\ 14 & 0 & 26 & 28 & 28 & 16 \\ 18 & 18 & 2 & 23 & 9 & 2 \end{bmatrix} \text{ mod } 31$$

$$M^{(1)} = (WMS-A)^{-1} * CT^{(1)} \text{ mod } 31 \Rightarrow [05\ 11\ 14\ 22\ 04\ 17] \Rightarrow \text{Original plaintext } \mathbf{FLOWER}$$

$$M^{(2)} = (WMS-B)^{-1} * CT^{(2)} \text{ mod } 31 \Rightarrow [05\ 11\ 14\ 22\ 04\ 17] \Rightarrow \text{Original plaintext } \mathbf{FLOWER}$$

Illustration 6: (Encryption and decryption based on weak magic squares)

Suppose the message be: A PROVERB IS THE CHILD OF EXPERIENCE

Arranging in blocks of 6: APROVE RBISTH ECHILD OFEXPE RIENCE

Encryption (WMS-A): ARWNFO_o YCUXNO_u YO_oO_oPOA LMVHBB LIMVGJ

Encryption (WMS-B): NIVVE_aL WQESE_eE_e O_uSSRAG BTZPPW DPO_uRWB

On decryption using multiplicative inverse of the WMS-A and WMS-B give: A PROVERB IS THE CHILD OF EXPERIENCE

Illustration 7: (Encryption and decryption based on weak magic squares)

Suppose the message be: BEAUTY IS ONLY SKIN DEEP \Rightarrow BE_aUTYI SONLYS KINDEP

Encryption (WMS-A): IQZVLS SO_uFBSS JRDDQK
Encryption (WMS-B): CUKQBM GOAXWG LBLIDM

On decryption using multiplicative inverse of the WMS-A and WMS-B give: BEAUTY IS ONLY SKIN DEEP

Illustration 8: Add-on security in the cryptosystem using weak magic square implementation

To show the relevance of this work to the security of public-key encryption schemes, a public-key cryptosystem RSA is taken. For convenience, let us consider a RSA cryptosystem,

Let $p = 11$, $q = 17$ and $e = 7$, then $n = 11(17) = 187$, $(p-1)(q-1) = 10(16) = 160$. Now $d = 23$. To encrypt, $C = M^7 \text{ mod } 187$ and to decrypt, $M = C^{23} \text{ mod } 187$.

Encryption: First the message FLOWER, encrypted using two different weak magic squares : WMS-Fig-A and WMS-Fig-B using the plaintext represents [05 11 14 22 04 17]

The encrypted cipher text using WMS-Fig-A and WMS-Fig-B are:

$$CT^{(1)} = [15\ 06\ 22\ 0\ 19\ 16]$$

$$CT^{(2)} = [29\ 28\ 27\ 21\ 11\ 30]$$

The encrypted cipher text using $C = M^7 \text{ mod } 187$ are:

$$C^{(1)} = \{CT^{(1)}\}^7 \text{ mod } 187 \Rightarrow [93\ 184\ 44\ 0\ 145\ 135]$$

$$C^{(2)} = \{CT^{(2)}\}^7 \text{ mod } 187 \Rightarrow [160\ 173\ 124\ 98\ 88\ 123]$$

Decryption: $M = C^{23} \text{ mod } 187$ for the two Cipher text $C^{(1)}$ and $C^{(2)}$. It gives the decrypted cipher text $CT^{(1)}$ and $CT^{(2)}$

$$CT^{(1)} = [C_{(1)}]^{23} \text{ mod } 187 \Rightarrow [15 \ 06 \ 22 \ 0 \ 19 \ 16]$$
$$CT^{(2)} = [C_{(2)}]^{23} \text{ mod } 187 \Rightarrow [29 \ 28 \ 27 \ 21 \ 11 \ 30]$$

These decrypted cipher text in two forms are again decrypted to get the original message.

$$(WMS-A)^{-1} * CT^{(1)} \text{ mod } 31 \Rightarrow [05 \ 11 \ 14 \ 22 \ 04 \ 17] \Rightarrow \text{original plaintext, FLOWER}$$

$$(WMS-B)^{-1} * CT^{(2)} \text{ mod } 31 \Rightarrow [05 \ 11 \ 14 \ 22 \ 04 \ 17] \Rightarrow \text{original plaintext, FLOWER}$$

III. CONCLUSION

It indicates that any non singular matrix or magic square or weak magic squares can be comfortably used as add-on device to this modified cryptosystem. The technique will provide another layer of security to the cryptosystem. The proposed dummy letters are the theoretical developments focusing on its merit and advantages in using magic squares or any type of matrices in encryption and decryption processes. In facts, the introduction of 5 dummy letters will affect the ASCII structure thereby inviting troubles in other uses. If implemented, it will give a new direction to the Computer operators and specifically a new direction to the crypt analyzers.

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Job Mobility in Big Cities, Southern Sumatera

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Abstract- This study discusses job mobility Major cities in South Sumatera, namely Palembang, Bandar Lampung and Jambi. In this study, the occupational mobility divided into two (2) categories: (1) to move jobs, and (2) do not change jobs. The data used is the cross section data obtained through field surveys. By using binary logistic regression equation, the estimation results show that the variables of work experience, and age variables significantly affect job mobility.

Index Terms- Job Mobility, binary logistic, probability, odds ratio

I. INTRODUCTION

Genesis moved from one job to another in the economic sector (sector primary, secondary, and tertiary) a lot going on lately. One of the factors that influence the incidence of this is that many companies are using the contract system on employees. Displacement can work because it is the desire of its own workers to improve the well-being, income received unsatisfactory, or dismissed from the company because of downsizing or due to expiration of the employment contract.

Job mobility is a change of jobs to different jobs or types of work into different types of jobs or job status to the status of different jobs (Alatas and Trisilo, 1990). Job mobility can be seen from two sides. First, the views of the status of job mobility which includes workers who've moved jobs and workers who have never been. Second, job mobility is seen from a shift in the type of work from one sector to another.

The move from one job to another has an important role in the economy, because it involves an increase in the welfare of workers. In addition to the displacement of jobs, there is a concordance between the company and labor, which the company wants a quality workforce while at the workers expect higher wages. In taking the decision to move jobs or stay on the job long usually influenced by several factors, but usually the most dominant factor is the wish to obtain greater revenue. Pack and Paxson (1999), suggests that through the mobility of the work will earn a better income from a previous job. To obtain a better income, workers tend to change jobs more promising is the work that relatif high level of productivity.

II. LITERATURE REVIEW

Workers with low quality or lacked the skills at a more mobile work among existing industries than workers who have high skills and quality. While Pack and Paxson (1999), Mincer

and Jovanovic (1981), Akkemik (2005) revealed that workers are more likely to move to other industries that provide wage increases, meaning that workers prefer a sector or industry whose productivity is better than the economic sectors more. The main objective of the mobility of the work to earn a better income than from his previous work, it also reinforced the findings Susilowati (2001) that labor mobility a positive impact on increasing household income and economic development of rural areas

Rationality workers to move from one job to another job or jobs with low productivity to higher productivity to gain a better wage rate than his previous work. The wage rate is usually measured by labor productivity, while productivity can be recorded from education and employment experience. The wage rate is far below the given labor productivity has the potential to encourage workers to move or quit the job. McConnell (1999) revealed that the mobility of workers emerged as a response to the difference in wages as the market moves towards balance. In addition to the wages, there are several other factors that also may be the originator. Many factors cause someone to do a job change. According Suriastini (2006), one can do the job on his own mobility or voluntary or involuntary occurring or not voluntary because it was not his desire.

Ehrenberg and Smith (2012), mentions that there are three schemes undertaken by the company to withhold labor to not exit or quit. First, give wage rate that is higher than the level of wages in the labor market. Second, wage rates with higher acceleration, especially to workers who are already experienced. Third, by providing opportunities for workers to participate in training or education and the labor required to serve and apply the knowledge gained in the company within a certain time.

Longhi and Taylor (2011) analyzed changes in the type of work, and found that about 30 percent of job seekers find new kinds of work in the same job with the previous work. Job seekers who work much easier than the job seekers who have been unemployed for vertical mobility.

III. RESEARCH METHOD

This study discusses the job mobility in major cities in South Sumatera, namely Palembang, Bandar Lampung and Jambi. All three cities are in the group of big city because it has a population of more than 500,000 people.

In this study, the unit of analysis is all the workers doing the job mobility. The variable unit the unit of analysis is labor income, work experience, education workers, age, number of dependents, and the worker's location. The data used is the cross section data obtained through field surveys using a questionnaire. Other necessary supporting data from various surveys the Central

Bureau of Statistics (BPS) is Palembang in Figures 2014, Bandar Lampung in Figures 2014, and Jambi in Figures 2014. Data is taken from data on the number of workers by the main business field where the number of workers in Palembang as many as 600 408 people, Bandar Lampung as many as 361 957 people, and Jambi is 230 243 people, bringing the total number of residents in three (3) of the city is 1,192,608 people

In order for samples taken in this study may represent the population, the sample in this study was determined by using a formula Slovin (Sangadji and Sopiah, 2010). By using a precision level of 10 percent, the number of samples were obtained as many as 100 people, then the number of samples for each city are determined by proportional random sampling, which obtained results (1) for Palembang as many as 51 respondents; (2) to Bandar Lampung as many as 30 respondents; and (3) Jambi were 19 respondents. Determination of workers who perform that job mobility sampled using simple random sampling (Singarimbun and Effendi, 1995).

Model and Technical Analysis

Analysis of the probability of workers to do the job mobility is based on two categories: (1) changing jobs; and (2) do not change jobs., which analyzed using binary logistic regression model. Factors affecting the mobility of workers to do the job (MP), namely income (INC), work experience (EXP), education (EDU), the number of dependents (ND), age (AGE), and the location of the respondent (LR). Then the function of job mobility is

$$MP_i = f(INC, EXP, EDU, ND, AGE, LR) \quad (1)$$

According to Hosmer, Lemeshow, and Studirvant (2013), and Agresti (2007), binary logit model of equation is:

$$g(x) = \ln \left(\frac{\pi(x)}{1-\pi(x)} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p$$

From equation 1, then the equation model in this study are as follows:

$$MP = \ln \left(\frac{P}{1-P} \right) = \beta_0 + \beta_1 INC + \beta_2 EXP + \beta_3 EDU + \beta_4 ND + \beta_5 AGE + \beta_6 D_1 LR_1 + \beta_7 D_2 LR_2$$

Where:

- MP = Job Mobility (1 = Moving jobs; 0 = No change jobs)
- INC = Respondent income every month (in Indonesian Rupiah)
- EXP = Work experience of respondents (in terms of years)
- EDU = Education formally respondents (in terms of years)
- ND = Number of dependents of respondents (in person)
- AGE = Age of respondents (in terms of years)
- LR = Location Respondents
- D1 = Dummy location of respondents, 1 = Palembang; 0 = more

- D2 = Dummy location of respondents, 1 = Bandar Lampung; 0 = more

IV. RESULTS

In this study, the dependent variable consists of 2 categories with coding Y = 0, to move jobs, and Y = 1 not to move jobs, therefore the regression model appropriate to be used with the dependent variable nominal scale two categories is the equation of logistic binary (Hosmer and Lemeshow, 2013).

Based on estimates, with $\alpha = 0.05$ and a degree of freedom (df) = k = 6, obtained χ^2 value (p) of the chi-square distribution table at 12.592. Subsequently obtained value -2 (LO-LI) (Iteration History) amounted to 18.595 > 12.592 or -2 (LO-LI) > $\chi^2(p)$, it can be concluded that together (simultaneously), the 6 (six) independent variables significantly influence variable job mobility.

Hosmer and Lemeshow Test used to test the suitability of the model (goodness of fit), or in other words to test whether the model that we use, by using the 6 (six) independent variables (INC, EXP, EDU, ND, AGE, and LR) are in accordance with the data empirical or not. The null hypothesis in this test is a "model has been adequately explain the data (fit)" with the test criteria reject the null hypothesis (Ho) if the probability value less than or equal to a predetermined level of significance ($p \leq 0.05$). Based on the results of data processing obtained Chi-square value of 9.855 with a probability value of 0.275. Thus the null hypothesis is accepted ($0.275 > 0.05$), meaning that models have been adequately explain the data (fit).

Through the Model Summary table of the results if the data obtained value Nagelkerke's R Square of 0.231. This indicates that the variability of the dependent variable (MP) which can be explained by the variability of independent variables (INC, EXP, EDU, ND, AGE, and LR) simultaneously is of 23.1 percent, while the remaining 76.9 percent is explained by the variability other variables outside the 6 (six) independent variables were studied.

By using binary logistic regression, obtained the test results shown in Table 1 below.

Table 1 Results of Testing Individual Independent Variables

Independent variables	B	Wald	Sig.	Exp (B)
intercept	2,004	1,021	0,312	7.416
income	-	.538	.463	0.878
work experience	0.131	9.593	0,002	1,175
education	0.161	0,030	0,862	0,986
age	-	5,847	0,016	.914
number of dependents	0.014	1,784	.182	1,282
location Palembang	-	0,003	0,959	1,033
location Bandar Lampung	0.090	0,315	.574	.663
	.248			
	0,033			
	-			
	0,412			

Source: results of data processing, 2017

From Table 1 it obtained a logistic regression model as follows.

$$MP = \ln\left(\frac{P}{1-P}\right) = 2,004 - 0,131/INC + 0,161EXP - 0,014EDU + 0,248ND - 0,090AGE + 0,033D,LR_1 - 0,412D,LR_2$$

The Effect of Income (INC) on Job Mobility

In this case, the variable income of workers did not significantly affect job mobility. In this logit model, the coefficient of labor income obtained yield was -0.131, while the odds value of workers' income is exponential (-0.131) of 0.878. This value explains that the income of workers who perform the job mobility decreased by 0.878 times than the income of workers who do not change jobs.

Someone who did move the work would start again from the beginning and still not much experience. Revenue given by the company to be readjusted with the expertise and experience possessed by the worker.

The Effect of Work Experience (EXP) on Job Mobility

In this study, work experience is calculated by a long time or employment either at the old job and the new jobs that have been taken by the workers in terms of years. Results of the estimation model (Table 1) shows that significant work experience variables at $\alpha = 0.05$ with a value of 0.002. From the results of the statistical calculation, the coefficient is positive work experience that is 0.161, meaning that each additional year of work, the job mobility increasing by 16.1 percent. Nuse values odds of work experience is exponential (0.161) of 1.175. This value is clear that respondents have a longer work experience, will have a tendency to do the job mobility increases by 1,175 times.

In this study suggest that individuals who have had work experience longer then the opportunity to move jobs is growing. It is clear that workers who are in Palembang, Bandar Lampung and Jambi has considerable opportunities to change jobs when each worker has had a long working experience. The experience of the control of any type of work is a resource for those workers to earn a better income from a previous job.

The Effect of Education (EDU) on Job Mobility

Based on Table 1, the education variable is not significant p-value 0.862 which is greater than $\alpha = 0.05$. If seen from the coefficient of education variable negatively affected by the value of -0.014, meaning that the higher the education level the lower the chances of workers to do the job mobility. Nuse values odds of education is exponential (-0.014) of 0.986. This value explains that the high education level of workers, the tendency to do the job mobility decreased by 0.986 time than workers who have low education levels but do not change jobs.

The higher the level of education will be the higher the level of income, therefore, when a person has a higher education, hence the desire to do the job mobility decreases. This is because the revenue earned is directly proportional to the level of education that can be achieved by anyone.

The Effect of Age (AGE) on Job Mobility

In this study indicate that the respondent's age significantly affect job mobility. When a person still has the ability to perform mobility for various reasons, such as to obtain a better income,

then do the job mobility choice. The estimation results explain that the respondent's age a significant negative effect, where the value of the coefficient is -0.090 to mean that the increasing age of the diminishing opportunities for job mobility. If viewed from the odds of 0.914, which means that the opportunity to move jobs decreased by 0914 times compared to workers who do not change jobs.

The Effect of Number of Dependents (ND) on Job Mobility

In this study, the number of dependents is defined as the sum of all family members to be borne in one family. Variable number of dependents and no significant positive effect on job mobility opportunities. The coefficient of the variable number of dependents obtained yield was 0.248, meaning that the more the number of dependents, the increasing mobility of the work amounted to 24.8 percent. The odds of the number of dependents of workers is exponential (0.248) of 1.282. This value explains that workers have a number of dependents more the tendency to do the job mobility increased by 1,282 times compared to the number of dependents workers who have little and do not change jobs.

Variable number of dependents is positive, which means the addition of one of the family members are borne increase the chances of workers to do the job mobility. This is done to obtain a better income from previous work to meet the needs of family life. While an increasing number of family dependents, the necessities of life is also increasing, therefore the worker who is also the head of the family has a great responsibility to provide for the welfare of his family.

The Effect of Location Respondent (LR) on Job Mobility

In this study, the location of the respondent is three (3) major cities are located in South Sumatera, namely Palembang, Bandar Lampung and Jambi. Jambi as the basic category or the reference category. From the estimation results shown in Table 1, the results obtained Palembang locations is positive but not significant. Palembang locations coefficient of 0,033 with a value odds ratio of 1.033, this value gives the meaning of job mobility is greater than 0,033 times in Jambi. As for the location of Bandar Lampung leave a negative value and the value of the odds ratio of 0.663. This explains the value of that job mobility in Bandar Lampung 0.663 times lower than in the city of Jambi.

V. CONCLUSION

The aim of the workers doing the job mobility because they want to earn better than a previous job. From the estimation explains that the only variable work experience, and age variables that significantly. Worker who already have work experience longer then the opportunity to move job growing. Of the three major cities of Palembang, Bandar Lampung and Jambi, the probability of workers doing the job mobility, as work experience increases, increasing by 1,175 times than workers with little work experience and do not move the sector. Furthermore, the variable age where increasing age the lower the chances of workers to do the job mobility of 0.914 times than workers who do not change jobs. In addition a person of child bearing age will be more motivated to work in order to meet the needs of families, meaning that at the time of the person's ability

to move jobs is quite high, but after increasing age and increasing work experience then a lower desire to change jobs. Another variable that is not significant is the income variable, because when a worker has obtained sufficient income to meet the needs of family life then there is the unwillingness to change jobs. These conditions explain that earned income is directly proportional to the level of education that can be achieved by someone, it means that the higher the education level, the greater the revenue that could be earned workers. Therefore, the education variable is also not significant to job mobility. Furthermore, a variable number of dependents not significantly affect job mobility. This indicates that regardless of the number of dependents is not strong enough influence workers to switch to another job. This condition describes the help of other family members to meet the needs of family life. Besides the location of respondents also did not significantly affect whether or not to move to another job.

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AN ALGORITHMIC APPROACH TO SOLVE TRANSPORTATION PROBLEMS WITH THE AVERAGE TOTAL OPPORTUNITY COST METHOD

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Abstract: The current new algorithmic approach to solve the Transportation Problem (TP) is based upon the Total Opportunity Cost (TOC) of a Transportation Table (TT). Opportunity cost in each cell along each row of a TT is the difference of the corresponding cell value from the lowest cell value of the corresponding row. Similarly, opportunity cost in each cell along each column of a TT is the difference of the corresponding cell value from the lowest cell value of the corresponding column. Total Opportunity Cost Table (TOCT) is formed by adding the opportunity cost in each cell along each row and the opportunity cost in each cell along each column and putting the summation value in the corresponding cell. The current algorithm considers the average of total opportunity costs of cells along each row identified as Row Average Total Opportunity Cost (RATOC) and the average of total opportunity costs of cells along each column identified as Column Average Total Opportunity Cost (CATOC). Allocations of costs are started in the cell along the row or column which has the highest RATOCs or CATOCs. The Initial Basic Feasible Solution (IBFS) obtained by the current method is better than some other familiar methods which is discussed in this article.

Keywords: TP, TOC, TT, TOCT, RATOC, CATOC

I. INTRODUCTION

Transportation cost has significant impact on the cost and the pricing of raw materials and goods. Supplier and producer try to control the cost of transportation. The way how the desirable transportation cost can be obtained is the subject matter of transportation problems in linear programming. Some conventional methods to find the minimum transportation cost are North West Corner (NWC) method, Matrix Minima method/ Least Cost method, Row Minima method, Column Minima method, and Vogel's Approximation Method (VAM). Matrix Minima method and VAM are considered to provide the better IBFS. Besides the conventional methods many researchers have provided many methods to find a better IBFS of a TP. Some of the important related works the current research has dealt with are: 'A New Approach for Solving Transportation Problems with Mixed Constraints' [1] by P. Pandian and G.Natarajan; N. M. Deshmukh's 'An Innovative Method for Solving Transportation Problem' [2]; 'Modified Vogel's Approximation Method for Unbalance Transportation Problem' [3] by N. Balakrishnan; Serder Korukoglu and Serkan Balli's 'An Improved Vogel's Approximation Method (IVAM) for the Transportation Problem' [4]; Harvey H. Shore's 'The Transportation Problem and the Vogel's Approximation Method' [5]; 'A modification of Vogel's Approximation Method through the use of Heuristics' [6] by D.G. Shimshak, J.A. Kaslik and T.D. Barelay; A. R. Khan's 'A Re-resolution of the Transportation Problem: An Algorithmic Approach' [7]; 'A new approach for finding an Optimal Solution for Transportation Problems' by V.J. Sudhakar, N. Arunnsankar, and T. Karpagam [8]. Md. Amirul Islam *et al.* [9] calculate the Difference Indicators by taking the difference of the largest and the next largest cell value of each row and each column of the TOCT for the allocation of units of the TT. The cited algorithms in this article are beneficial to find the IBFS to solve transportation problems. Also, the current research presents a useful algorithm which gives a better IBFS in this connection.

II. ALGORITHM

The developed algorithm in the current research involves two parts:

- ❖ Algorithm for Total Opportunity Cost Table (TOCT)
- ❖ Algorithm for transportation allocation

Algorithm for TOCT

- Step 1 Subtract the smallest entry from each of the elements of every row of the TT and place them on the right-top of corresponding elements.
- Step 2 Apply the same operation on each of the columns and place them on the right-bottom of the corresponding elements.
- Step 3 Form the TOCT whose entries are the summation of right-top and right-bottom elements of Steps 1 and 2.

Algorithm for Allocation

- Step 1 Place the average of total opportunity costs of cells along each row identified as Row Average Total Opportunity Cost (RATOC) and the average of total opportunity costs of cells along each column identified as Column Average Total Opportunity Cost (CATOC) just after and below the supply and demand amount respectively within first brackets.
- Step 2 Identify the highest element among the RATOCs and CATOCs, if there are two or more highest elements; choose the highest element along which the smallest cost element is present. If there are two or more smallest elements, choose any one of them arbitrarily.
- Step 3 Allocate $x_{ij} = \min(a_i, b_j)$ on the left top of the smallest entry in the (i, j) th of the TT.
- Step 4 If $a_i < b_j$, leave the i th row and readjust b_j as $b'_j = b_j - a_i$.
 If $a_i > b_j$, leave the j th column and readjust a_i as $a'_i = a_i - b_j$.
 If $a_i = b_j$, leave either i th row or j -th column but not both.
- Step 5 Repeat Steps 1 to 4 until the rim requirement satisfied.
- Step 6 Calculate $z = \sum_{i=1}^m \sum_{j=1}^n c_{ij}x_{ij}$, z being the minimum transportation cost and c_{ij} are the cost elements of the TT.

III. NUMERICAL ILLUSTRATIONS

Illustration 01

The per unit transportation cost (in thousand dollar) and the supply and demand (in number) of motor bikes of different factories and showrooms are given in the following transportation table.

Factories	Showrooms				Supply (a_i)
	D ₁	D ₂	D ₃	D ₄	
W ₁	9	8	5	7	12
W ₂	4	6	8	7	14
W ₃	5	8	9	5	16
Demand (b_j)	8	18	13	3	42

Table: 1.1

We want to solve the transportation problem by the current algorithm.

Solution

The row differences and column differences are:

Factories	Showrooms				Supply
	D ₁	D ₂	D ₃	D ₄	
W ₁	9 ₅ ⁴	8 ₂ ³	5 ₀ ⁰	7 ₂ ²	12
W ₂	4 ₀ ⁰	6 ₀ ²	8 ₃ ⁴	7 ₂ ³	14
W ₃	5 ₁ ⁰	8 ₂ ³	9 ₄ ⁴	5 ₀ ⁰	16
Demand	8	18	13	3	42

Table: 1.2

Therefore, the TOCT is:

Factories	Showrooms				Supply
	D ₁	D ₂	D ₃	D ₄	
W ₁	9	5	0	4	12

W ₂	0	2	7	5	14
W ₃	1	5	8	0	16
Demand	8	18	13	3	42

Table: 1.3

The allocations with the help of RATOCs and CATOCs are:

Factories	Showrooms				Supply	RATOC			
	D ₁	D ₂	D ₃	D ₄					
W ₁	9	5	¹² 0	4	12	(4.5)	-	-	-
W ₂	0	¹³ 2	¹⁷ 7	5	14	(3.5)	(3.5)	(2.3)	-
W ₃	⁸ 1	⁵ 5	8	³ 0	16	(3.5)	(3.5)	(2)	(2)
Demand	8	18	13	3	42				
CATOC	(3.3)	(4)	(5)	(3)					
	(0.5)	(3.5)	(7.5)	(2.5)					
	(0.5)	(3.5)	-	(2.5)					
	-	-	-	-					

Table: 1.4

Therefore, the allocations in the original TT are:

Factories	Showrooms				Supply
	D ₁	D ₂	D ₃	D ₄	
W ₁	9	8	¹² 5	7	12
W ₂	4	¹³ 6	¹⁸ 8	7	14
W ₃	⁸ 5	⁵ 8	9	³ 5	16
Demand	8	18	13	3	42

Table: 1.5

The transportation cost is $z = \sum_{i=1}^m \sum_{j=1}^n c_{ij} x_{ij}$

$$z = 5 \times 12 + 6 \times 13 + 8 \times 1 + 5 \times 8 + 8 \times 5 + 5 \times 3 = 241 \$$$

Illustration 02

A company manufactures toilet tissues and it has three factories S₁, S₂ and S₃ whose weekly production capacities are 9, 8 and 10 thousand pieces of toilet tissues respectively. The company supplies tissues to its three showrooms located at D₁, D₂ and D₃ whose weekly demands are 7, 12 and 8 thousand pieces respectively. The transportation costs per thousand pieces are given in the next Transportation Table:

Factories	Showrooms			Supply(a _i)
	D ₁	D ₂	D ₃	
S ₁	3	3	5	9
S ₂	6	5	4	8
S ₃	6	10	7	10
Demand(b _j)	7	12	8	27

Table: 2.1

Solution:

The row differences and column differences are:

Factories	Showrooms			Supply
	D ₁	D ₂	D ₃	
S ₁	3 ₀ ⁰	3 ₀ ⁰	5 ₁ ²	9
S ₂	6 ₃ ²	5 ₂ ¹	4 ₀ ⁰	8
S ₃	6 ₃ ⁰	10 ₇ ⁴	7 ₃ ¹	10
Demand	7	12	8	27

Table: 2.2

Therefore, the TOCT is:

Factories	Showrooms			Supply
	D ₁	D ₂	D ₃	
S ₁	0	0	3	9
S ₂	5	3	0	8
S ₃	3	11	4	10
Demand	7	12	8	27

Table: 2.3

The allocations with the help of RATOCs and CATOCs are:

Factories	Showrooms			Supply	RATOC		
	D ₁	D ₂	D ₃				
S ₁	0	⁹ 0	3	9	(1)	(1.5)	(1.5)
S ₂	5	³ 3	⁵ 0	8	(2.6)	(1.5)	(1.5)
S ₃	⁷ 3	11	³ 4	10	(6)	(7.5)	-
Demand	7	12	8	27			
CATO C	(2.6)	(4.6)	(2.3)				
	-	(4.6)	(2.3)				
	-	(1.5)	(1.5)				

Table: 2.4

Therefore, the allocations in the original TT are:

Factories	Showrooms			Supply
	D ₁	D ₂	D ₃	
S ₁	3	⁹ 3	5	9
S ₂	6	³ 5	⁵ 4	8
S ₃	⁷ 6	10	³ 7	10
Demand	7	12	8	27

Table: 2.5

The transportation cost is
$$z = \sum_{i=1}^m \sum_{j=1}^n c_{ij} x_{ij}$$

$$z = 3 \times 9 + 5 \times 3 + 4 \times 5 + 6 \times 7 + 7 \times 3$$

$$= 125 \text{ units}$$

IV. COMPARISON OF RESULTS

The current method yields a better IBFS of a TP than other conventional methods. To show this, a comparison is presented in the following table:

Methods	Solutions
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	Illustration – 1	Illustration – 2
Current Method	241	125
North-West Corner Method	320	143
Matrix Minima Method	248	159
VAM	248	143
Optimal Solution	240	125

Table: 3

V. CONCLUSION

The current method considers averages of total cost along each row and each column which is totally new concept. The solution obtained by the current method is near optimal or optimal. The developed method is effective for both the large and small size TP.

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Ownership and Profitability: Evidence from Ethiopian Banking Sector

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Abstract- The study conducted to examine the effect of state and private Ownership on the Profitability of the Commercial Banking Sector in Ethiopia initiated following the emergence of researches, in different economic set ups, with varied results on the effect of Ownership structure on the performance of banks. The research used panel data set of 8 banks operating in the sector for more than 10 years in Ethiopia, where the financial sector is at its infant stage and closed for foreign investors, for the period covering 2005 to 2014. The mean Profitability of the commercial Banks under study were described, compared, and then tested for the relationship between Banks' Profitability and Ownership Structure using pooled OLS Regression model with Dummy Ownership Variable. After performing some statistical tests, Return on Equity (ROE) has been used as a measure of Profitability. The result shows that there is a significant outperformance of state owned commercial banks than private competitors during the period. Of the control variables used, bank size, liquidity, loans and advances, and bank capitalization have been found to have significant effect on profitability of the commercial banking.

Index Terms- Bank Profitability, Ethiopian Banking, Private Ownership, State Ownership

I. INTRODUCTION

Banks play a major role in the mobilization, allocation and investment of savings of the different economic agents in an economy. Accordingly, the performance of the banking sector has a significant impact on the allocation of capital, industrialization and economic growth. Therefore, efficiency and profitability of the banking sector is of importance at macroeconomic level in a given nation.

During the past some decades, new movement of private ownership in the banking industry has significantly changed the banking ownership structure in many countries around the world (Janeth P. and Cosmas S. 2014). While the ownership stake of foreigners and domestic companies & individuals witnessed to increase, the involvement of government ownership has been reduced. As a result, the banking sector has experienced major changes in its operating environment. The transformation of the banking sector from government to private and foreign company's ownership has increased competition amongst the banks, and played a great role improving efficiency of the sector. And hence, an efficient banking sector is better able to endure undesirable shocks of the sector and helps to the strength of the financial system of a given nation.

In Ethiopia, following change in the government, a new Proclamation No. 84/1994 has been prepared and approved. Allowing the private sector to invest in the financial business of the nation was of the objectives of the new proclamation, which marks the beginning of a new era in in the financial sector of the country. Following this, formation and increment in the number of the private banking companies have been witnessed. Currently, there are 16 private banks and 3 government owned banks operating in the country. In spite of the fact that the financial proclamation of the country allows involvement of private investors, the sector is still closed for foreign investors. And hence, there is no foreign investment in the financial sector, which makes the country unique in regulating the sector.

Experiences of various countries have shown that profitability of banks may vary across nations and among the banks with different ownership structure (Zhao Shi-Feng, 2013; Mohammad Alipour, 2013; Peter W. et al, 2010; Toni Aburime, 2008; Eric G. and Daniel M, 2002; MuhammetMercan, et al, 2003) of the same country. Variation in ownership Structure of banks has been studied to be one factor of the difference in the profitability of banks (Sukhdey S, et al, 2016; Faizul H. &Rehnuma S., 2016; Xiaotian T. & Zhang Y., 2014; GiulianoIannotta, 2007; Alejandro Micco, 2007; MuhammetMercan, et al, 2003).

In literatures, studies have been conducted to examine the effect of ownership variation on the financial and economic growth of banks (Sukhdey S, et al, 2016; Maria T. et al, 2016; Peter W. et al, 2010;La port et al., 2002). Others also examined the difference in lending behavior of state owned and private owned banks (Khwaja&Mian, 2005 and Sapienza, 2004), and the change in the lending decision of government owned banks during election (Dinc., 2005). Moreover, Faizu H. &Rehnuma S. (2016) andCornett et al., (2010) studied a comparison on the impact of state ownership on performance differences in privately owned and state-owned banks of different regions. Almost all of the previous researches examined at a country level have been done in either developed economies or developing ones where the financial sector is open for foreign investment.

Various studies (Samuel, 2015;Amdemikael, 2012; Birhanu, 2012; Habtamu, 2012;K.Rama M. &Tekeste B., 2012;Demena, 2011; Belayneh, 2011) have also been conducted to investigate the different bank specific, industry specific & macroeconomic factors affecting the profitability of the commercial banking sector in Ethiopia, and to review literatures of the same topic (Fentaw, 2015). None of the literatures consulted above included the ownership variable as a factor affecting profitability in Ethiopian banking industry.

And hence, examining the impact of ownership on the profitability of the banking sector in Ethiopia, where the financial system is at its infant stage & closed for foreign investors, has a paramount importance in policy directions, and as an addition to the existing literature in the area.

Research Objective and Significance

The Objective of this study is to examine the impact of ownership on the profitability of Commercial Banks, controlling the size difference and other variables having an influence on the profitability of the banks, in Ethiopia.

This study will have a significant importance in extending existing literature in the impact of ownership on performance. And the finding will also be useful for the different policy making bodies in Ethiopia as the expansion of domestic private involvement in the financial sector of the country is in progress.

Review of Related Literatures, Gap and Hypothesis

It has been studied and documented in many research outputs that there exists lower profitability and poor quality of assets, of government owned banks as compared to their privately owned ones (Berger et al., 2005; Micco et al., 2004). There are many theoretical bases in favor of private ownership than state ownership of firms. The extensively studied Agency Theory, states that ownership difference in any kind of organization affects its performance level and it assumes privately owned firms to be more profitable than government owned competitors.

In a study with Chinese banks, Xiaotian T. & Zhang Y., (2014) found that private banks are more efficient than state owned ones, state ownership of the banks is related to the low productivity of the bank. Sukhdey S, et al, (2016) also conducted study on the performance of Indian banks, and concluded that Private sector banks perform better than public owned banks. Several other research results (Allen N. et al, 2009; Alejandro M. et al, 2007; MuhammetMercon et al, 2003; Barth et al., 2004; Micco, Berger, Clarke, Cull, Klapper and Udell, 2005; Mian, 2006; Micco, et al., 2004; La Porta et al., 2002; Sapienza, 2004; Berger et al., 2005; Giuliano Iannotta. Et al, 2007) have been documented that; State ownership of banks negatively affects financial development and economic growth, and hence efficiency and profitability.

Faizul H. & Rehnuma S., (2016) also found that government ownership of banks is positively related to default risk, and negatively associated with bank profitability in a study conducted on Indian banks.

On the other hand, Zhao Shi-Feng, (2013); Mohammad Alipour, (2013); Peter W. et al, (2010); and Toni Aburime, (2008), have found in their study and concluded that state and private ownership structure has no significant impact on the profitability of commercial banks.

Empirical Literatures from Ethiopia and the Gap

Various literatures have been conducted to the different determinants of Ethiopian Banking business. Demena (2011) conducted an empirical study to investigate the influence of internal and external determinants of Ethiopian banks profitability using the Ordinary Least Squares (OLS) Technique. In the same year, another researcher, Belayneh (2011) also

examined the bank specific and macroeconomic factors determining profitability of the commercial banks in Ethiopia using the OLS technique. Amdemikael (2012) and Birhanu (2012) made two different empirical investigations as to the effect of bank specific, industry specific and macroeconomic factors affecting the profitability of the commercial banks in the country. Habtamu (2012) conducted a study to investigate determinants of profitability of Ethiopian private commercial banks using panel data of the period 2002 to 2011, applying the fixed effects regression model. Moreover, K.Rama M. & Tekeste B., (2012) published an article on the determinants of profitability of commercial banks in developing country: Ethiopia. The researchers used unbalanced panel data, applying the fixed effects regression model, and concluded that internal factor, under the control of the management, are the most determinants. Recently, Samuel, (2015) also conducted a study to investigate the determinants of the profitability of the commercial banking sector of Ethiopia using panel data for the period from 2002 to 2013. The researcher used the fixed effects regression model to investigate the impact of bank specific and macroeconomic determinants.

Moreover, Fentaw, (2015) reviewed various literatures on the determinants of banking profitability in Ethiopia, and suggested to include the missed ownership variable in the basket of determinants.

And hence, examining the impact of ownership on the profitability of banking sector in Ethiopia, where the financial system is at its infant stage & closed for foreign investors, is of a fertile research gap, which has significant importance in policy directions and also to the addition of the existing literature in the area.

Research Hypothesis

Agency theory is one of the most widely used theories in the profession of Finance & Management (Daily, Dalton and Rajagopalan, 2003; Wasserman, 2006). Agency theory is all about the relationship among two parties in a firm, the principal called owner and the agent called manager (Eisenhardt, 1989; Jensen and Meckling, 1976; Ross, 1973).

In this theory, managers, or agent, in both private and government owned firms are presumed to act in the maximization of their own utility as opposed to that of the organization and its owners, the principal.

Considering the agency theory as a basis, we have developed and tested the hypothesis that states that the *Profitability of Privately Owned Banks is greater than the Profitability of the State Owned Banks in Ethiopia.*

Research Design and Methodology

Population and Sample

The overall objective of the study is to examine the impact of state and private ownership on the profitability of the commercial banking sector in Ethiopia. Currently, there are 19 banks operating banking business in Ethiopia, of which 3 (Commercial Bank of Ethiopia, Development Bank of Ethiopia, and Construction & business bank of Ethiopia) are government owned and the remaining 16 are privately owned (www.nbe.gov.et). The Development Bank of Ethiopia is the one financing long term development projects of the government,

doesn't engage in commercial activities, and hence it has been excluded from this study. In this study, 8 commercial banks have been included in the sample purposely taking the duration in the business in to account.

Data Type and Source

To test the hypothesis developed above, profitability indicator quantitative data have been collected from the audited annual financial statements of the banks. The researchers have used a panel data set of 8 banks for the years from June 30, 2005 to June 30 2014 (the fiscal year runs from July 1 to June 30). We used panel data due to the availability of consistent financial data of the banks over the period under study. Moreover, as indicated by Peter W. et al (2010), panel data usually contain more degrees of freedom, less multicollinearity problem than simple cross sectional data, and provides greater capacity of capturing firms characteristics than time series or cross sectional data. The ownership data of the banks have been collected from the National Bank of Ethiopia, which is responsible in the licensing and supervision of the financial sector in the country.

Variables Description and Measurement

The Dependent Variable

Profitability is the dependent variable that we are going to explain. Based on previous studies, we identified the two common accounting measures of profitability; Return on Asset (Flaminiet al., 2009; Oladele et al., 2012; Zhao S. & Zhao S., 2013; Sukhdey S, et al 2016), and Return on Equity (Mohamed O., 2007 ; Zhao S. & Zhao S., 2013; Saona, 2011).

Considering the previous literatures of measuring profitability, we regressed the pooled OLS regression using both return on assets and return on equity as dependent variables and see the fitted model. The adjusted R-square of the fitted model was found to be 0.5551 and 0.3331 using dependent variables of return on equity and return on assets respectively, controlling the effect of other explanatory variables indicated below. This shows that the dummy ownership and other controlling variables explain more of the variation of return on equity than that of return on assets. And hence, we used the Return on equity as dependent variable, and run pooled OLS regression model.

Variable	Proxy	Measurement	Source
Dependent Variables	Profitability	Measured by the Return on Equity Capital of the bank	Mohamed O., 2007 ; Zhao S. & Zhao S., 2013; Saona, 2011
Independent Variable	Ownership	A dummy variable which takes a value of 1 if it is Privately Owned, and 0 if state owned	Sukhdey S, et al, 2016; Xiaotian T. & Zhang Y., 2014; GiulianoIannotta, 2007; Alejandro Micco, 2007
Control Variables	Liquidity	Measured as a percentage of liquid assets of the bank to that of the total amount assets	Giuliano I. et al, 2007
	Loans and advances	Measured as the percentage of total loans and advances to the total amount of assets	Giuliano I. et al, 2007
	Size	Measured by the natural logarithm of total amount of assets owned by the bank.	Zhao S. & Zhao S., 2013; Micco et al, 2007; Janeth P. et al., 2014; Athanasoglou et al, 2008
	Credit Risk	Measured as the percentage of Loan Loss Provision to Total Loans and Advances	Andreas D. & Gabrielle W., 2014; Giuliano I. et al, 2007
	Capital Equity	Measured as the percentage of Equity Capital to Total amount of Assets	Zhao S. & Zhao S., 2013; Giuliano I. et al, 2007; Andreas D. & Gabrielle W., 2014

Table 1. Summary of the variables used and the respective proxies.

Model Specification

According to Gujarati (2012), there are three estimation procedures used in panel data sets: fixed effects (FE), random effects (RE) and pooled OLS regression model. The dummy ownership variable in our study doesn't change over time, and as fixed effects model cannot be used to investigate time invariant causes of the dependent variable, it was not appropriate. Using the fixed effects model will eliminate the time invariant ownership dummy variable. Additionally, the Hausman specification test was conducted and suggested that the random effects was appropriate. Moreover, we have also performed the random effects (Breusch-Pagan Lagrange multiplier, LM) test to decide between the random effect and the pooled OLS

estimation. The result was in favor of using pooled OLS than that of the random effects, and we run pooled OLS regression model. Based on the Hypothesis developed, and the diagnostic tests performed above, the following model was used;

Profitability = f(Ownership and Other Control Variables)

Therefore, the specific model used in testing the effect of Ownership on profitability is:

$$Prof_{it} = \alpha + \beta_{1it}Own + \beta_{2it}LiquaTa + \beta_{3it}LoadTa + \beta_{4it}LnTa + \beta_{5it}LlpTload + \beta_{6it}TcaTa + Err.$$

Where,

- Prof. is Profitability (Return on Equity, Measured as the percentage of net income to book value of total equity)

- *Own* is Ownership (Dummy variable 1 for Private owned banks and 0 otherwise)
- *LiqTa* is liquidity (Measured by percentage of Liquid Assets to total assets).
- *LoadTa* is Loans and advances (Measured as the percentage of total loans and advances to the total amount of assets).
- *LnTa* is size (Measured by the natural logarithm of total assets)
- *LlpTload* is credit risk (Measured as the percentage of Loan Loss Provision to Total Loans and Advances).
- *TcaTa* is equity capital (measured by the percentage of total equity capital to total assets).
- β_1 to β_6 are coefficients for the independent and control variables
- α is the intercept, and *Err.* is the error term

Results and Discussion
Descriptive Statistics

Descriptive statistics have been used in presenting results. This section presents the profitability and related descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
roe	80	29.30525	11.77054	1.76	77.71
liqata	80	36.1175	10.25789	15.8	56.96
loadta	80	49.24625	12.21958	22.46	72.77
lnta	80	22.73763	1.144351	20.79	26.22
llptload	80	4.9415	3.970679	1.46	21.17
tcapta	80	11.60987	3.607254	4.23	19.22

Table 2. Descriptive statistics

It is indicated from the above table 2 that the Ethiopian commercial banking sector has reported on average 29.3% of Return on Equity for the years covering from beginning of July 2005 to end of June 2014. The variation on the percentage of the return on equity (standard deviation) was found to be 11.77, and 1.76% & 77.71% of minimum & maximum return on the equity capital of the banking sector respectively.

The above table also shows the descriptive summary of the control variable, with liquid assets to total assets (st.dv 10.3) and loans and advances to total assets (12.3%) having higher variability as compared to other control variables.

Diagnostic Tests

A. Multicollinearity Test

Correlation analysis was done to detect multicollinearity in the data, and also to determine the association among the dependent variable and other variables.

	roeliqata	loadta	lnta	llptload	tcapta	
roe	1.0000					
liqata	-0.2655	1.0000				
loadta	-0.1254	-0.2967	1.0000			
lnta	0.5141	-0.2323	-0.7115	1.0000		
llptload	0.0093	0.3434	-0.0882	-0.1463	1.0000	
tcapta	-0.5587	0.0542	0.2153	-0.3791	-0.3671	1.0000

Table 3. Correlation Matrix

From the correlation coefficients presented in the Table above, there is no serious multicollinearity among the variables used in the model.

B. Heteroskedasticity Test

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity was performed, and found that the problem does not prevail in the model used.

Regression Result and Analysis

In this sub section, the descriptive statistics summarized above have been presented further, and the impact of the ownership difference (state & private) on the mean profitability of the banks (as measured by return on equity) have been tested using the pooled OLS.

Source	SS	df	MS	Number of obs =	
				80	
Model	6075.95773	6	1012.65962	F(6, 73) = 15.18	
Residual	4869.15287	73	66.7007242	Prob> F = 0.0000	
Total	10945.1106	79	138.545704	R-squared = 0.5551	
				Adj R-squared = 0.5186	
				Root MSE = 8.1671	
roe	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
own	-9.104165	3.752248	-2.43	0.018	-16.58238 - 1.625945
liqata	.2437185	.1397428	1.74	0.085	-.0347885 .5222256
loadta	.6493438	.1604935	4.05	0.000	.3294807 .969207
lnta	7.962239	1.68907	4.71	0.000	4.595928 11.32855
llptload	-.5725984	.3638298	-1.57	0.120	-1.29771 .1525133
tcapta	-.9463507	.3486872	-2.71	0.008	-1.641283 -.2514181
_cons	-171.8728	49.73508	-3.46	0.001	-270.9947 - 72.7509

Table 4. Regression output

As shown in the table above, the coefficient of the dummy private if negative (-9.1) with a p-value of 0.018, which is significant (5%) enough to affect the profitability of the banks as measured by Return on Equity (ROE). The negative coefficient reveals that on average the private banks have reported return on equity of 9.1% lower than their respective state owned banks during the period under study, *ceteris paribus*.

The coefficient of determination (R²) was found to be 0.5551, showing the model can explain 55.51% of the variation in the return on equity is due to the ownership dummy and other control variables used. Moreover, the F-value shows that the overall coefficients of the explanatory variables used are

statistically significant enough to explain the explained variable in the model.

Based on the result, we reject the hypothesis developed, stating that private owned banks perform better than state owned banks. The result reveals that there is a significant outperformance of state owned banks during the period considering the return on equity as a measure of profitability.

The finding is not consistent with the agency theory, which states that state owned firms are less profitable than those owned privately (Eisenhardt, 1989; Jensen and Meckling, 1976; Ross, 1973; Daily et al, 2003; Wasserman, 2006).

The result is not consistent with most of the research outputs conducted in the area, (Sukhdey S, et al, 2016; Faizu H. and Rehnuma S., 2016; Xiaotian T. and Zhang Yong W., 2014; GiulianoIannotta, 2007; Alejandro Micco et al, 2007; Berger et al., 2005; Mian, 2006; and MuhammetMercan et al, 2003), concluding the better performance of the private owned banks as compared to the state owned competitors. The result refutes the notion that state owned banks have tendency of keeping more non-earning assets as compared to that of the private banks that can result in lower profitability.

The result is found to be somehow consistent with the research result of (Zhao Shi-Yong and Zhao Shi-Feng, 2013; Peter W. et al, 2010; and Mohammad Alipour, 2013), concluding the better performance of the state owned firms, though the findings were not statistically significant.

Examining the above table also shows that the impact of most of the control variables on the profitability is highly statistically significant. Size of the banks, measured by natural logarithm of total assets, and percentage of loans and advances to total assets have positive coefficients of 7.96 & 0.65 respectively with statistically strong significant at 1%. The result also shows bank capitalization measured by book value of total capital to total assets percentage has negative & significant impact on the Return on Equity of the banks at 1% significant level. The liquidity of the banks, measured by the percentage of the liquid assets to total assets, found to have a statistically significant impact on the return on equity of the banks at 10% significant level. It is also found that credit risk as measured by the percentage of loan loss provisions to total loans and advances has a negative impact on the profitability of the banks though statistically insignificant.

Conclusion and Suggestion for Future Research

The study was designed to examine the effect of state and private ownership on the profitability of the commercial banking sector in Ethiopia taking 10 years panel data set of 8 banks for the period from 2005 to 2014.

Considering the previous literatures of measuring profitability, we regressed the pooled OLS regression using both return on assets and return on equity as dependent variables and examined the fitted model. The fitted model shows that the dummy ownership and other control variables explain more of the variation of Return on Equity than that of Return on Assets. And hence, we used the return on equity as a measure of profitability for our study.

The Summary Descriptive Statistics shows that Ethiopian commercial banking sector has reported mean profitability of 29.3% Return on Equity for the years covered in the study with a

standard deviation of 11.77. The descriptive statistics also reveals that the overall mean return on equity of privately owned banks is lower than the mean return on equity of the state owned banks during the period under study.

The impact of the ownership difference on the profitability of the banks have been tested using the pooled OLS by regressing the return on equity, dependent variable, with the dummy independent variable (ownership) and other control variables.

The regression result shows that there is a statistically significant difference on the performance of state and privately owned commercial banks, in which state owned ones perform better than private ones. The finding contradicts with the agency theory, and not consistent with most of the research outputs conducted in the area, concluding the better performance of the private owned banks as compared to the state owned competitors. The result also refutes the notion that state owned banks have tendency of keeping more non-earning assets as compared to that of the private banks that can result in lower profitability.

The regression result also shows that the impact of most of the control variables on the profitability is highly statistically significant. Size of the banks and loans and advances have strong statistical positive effect on return on equity at 1% significant level. Bank capitalization is found to have negative & significant impact on the Return on Equity of the banks at 1% significant level. The result also reveals that the liquidity of the banks have a statistically significant impact on the return on equity of the banks at 10% significant level. At last, credit risk is found to have negative impact on the profitability of the banks though statistically insignificant.

As a subject for future research, we have investigated that, considering the adjusted R-square of the fitted model, the ownership and other control variables explain more of the variation in the return on equity than that of the return on assets as a measure of profitability. This has come to our attention that in a country like Ethiopia, where there is no stock exchange in which equity shares can be traded freely, which measure of profitability needs to get emphasized (the return on equity or return on assets). And hence, we came to conclude that this is a subject for further research.

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Polarographic methods for the determination of Copper (II) and Cadmium (II) using Schiff base as chromogenic reagent

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Abstract- Schiff base, 1-[2,4-dihydroxy phenyl] ethanone [RPT] Ligand is a new chromogenic reagent have not been used so far for the determination of copper and cadmium in trace quantities. Effect of pH on wave height for Cu-[RPT] and Cd-[RPT] systems have been studied at pH 6.5-11.0 in 0.1 M NaNO₃, and 0.002 % Triton -X-100 which increases the stability of the complex. Effects of Ligand concentrations, height of mercury column, metal ion concentrations on Copper and Cadmium on wave height at pH 10.0 have been studied. The author also investigates metal-ligand ratio and stability constants of cadmium-RPT by reversible system.

Index Terms- polarographic, Schiff base, copper, cadmium, NMR, IR and Lingane method.

I. INTRODUCTION

Many number of Schiff bases were synthesized from Tris (Hydroxymethyl) methylamine with different aldehydes and were tested as pharmaceutical intermediates [1,2], bactericides, fungicides [3] and pesticides [4]. Schiff bases prepared by Inoyatov [5] act as effective polymers. Spectrophotometric work [6] on the azomethine of pyridoxal-5'-phosphate-Tris was carried out and determined the formation constant (*pKa*) values. Vyas *et al.*, [7] published work on polarographic determination of ligand-proton stability constants for Salicylaldehyde-Tris (ST) Schiff base in 50% DMF. Effect of pH, amine concentration and solution composition of pyridoxal-5'-phosphate-Tris was reported by Blazquex *et al.*, [8] employing polarographic technique, [9] reported the effect of pH, supporting electrolytes, solvents and acid concentration on the polarographic reduction of ST. Characterization of seven new

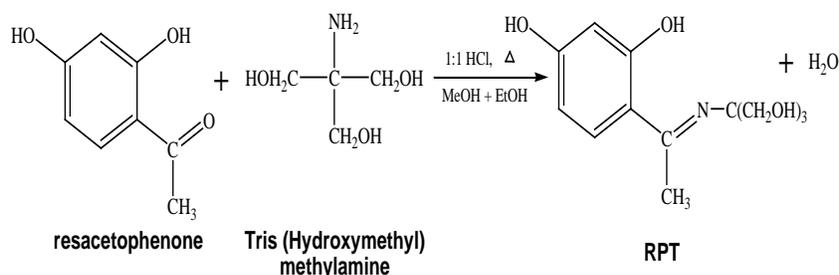
Schiff bases derived from Tris and various aldehydes was reported [10]. [11-14] reported determination of metal-to-ligand ratio and stability constants of complexes of cadmium(II) and copper(II) in presence of Schiff bases derived from Tris and various ketones in KNO₃, as supporting electrolyte at pH 10.5 in 50% DMF-water medium.

The metal ions such as Cu(II) and Cd(II), using RPT as complexing agent polarographically in NaNO₃ as the supporting electrolyte at pH 10.0 in 40 : 60 methanol-water medium. The studies include effect of pH, effect of ligand concentration, effect of height of mercury column and effect of metal ion concentration. The studies were aimed at establishing the complexing ability of 1-[2,4-dihydroxy phenyl] ethanone-Tris and developing a procedure for the determination of various metal ions present individually and in binary mixtures constituting important alloys and ores of industrial importance.

Preparation and Characterization of 1-[2,4-dihydroxy phenyl] ethanone [RPT] Ligand :

II. PREPARATION OF THE LIGAND

Equimolar concentrations of Tris (Hydroxymethyl) methylamine (TRIS) and 1-[2,4-dihydroxy phenyl] ethanone were dissolved separately in methanol and refluxed for one hour in methanol & ethanol solvent mixture in presence of few drops of acid catalyst namely SOCl₂. The refluxed solution was allowed to cool and kept aside for overnight. White crystalline needles were obtained and the compound was recrystallized. The melting point and yield of the compound were found to be 133-134°C and 74% respectively.



III. CHARACTERIZATION OF THE LIGAND

The characterization of the Schiff base was made by Elemental analysis, Chemical reactions and IR studies. Elemental analysis for Carbon, Hydrogen, Oxygen and Nitrogen present in the Schiff base was obtained from CDRI, Lucknow, India. Chemical analysis for the functional groups i.e., carbonyl (>C=O) and amine (-NH₂) groups was earned out by standard procedure and found to be absent indicating the formation of azomethine.

An infrared spectrum for the derived Schiff base was recorded by KBr Pallet method employing Perkin Elmer IR spectroscopy. The Infrared spectrum of the compound (RPT) formed between Tris(hydroxymethyl) methyl amine and resacetophenone showed peak at 1630 cm⁻¹ indicating the existence of >C=N- group in the compound. The Peaks were also observed in the region of 3340 – 3330 cm⁻¹ (broad, strong, OH-stretching), 3190–3180 cm⁻¹ (broad, medium, phenolic OH), 1600, 1580, 1500, 1480 cm⁻¹ (aromatic >C=C< vibrations) and 1220 cm⁻¹ (small, medium, >C=O stretching coupled phenolic - OH deformation). The above IR data clearly suggested that the chemical reaction between the amino group of Tris and the carbonyl group of resacetophenone resulting in the formation of respective Schiff base compound. The elemental analysis and IR data were tabulated in the Table-1.

IV. NMR SPECTRA

In the present investigation ¹H NMR spectrum was obtained for the ligand RPT using Gemini - 200MHz ¹H NMR Spectrometer from IICT, Hyderabad, in DMSO-D₆ solvent at room temperature. Important chemical shift values for various protons such as methyl proton attached to azomethine group, methyl protons of hydroxy methyl group, hydroxyl protons of hydroxy methyl group, hydroxyl protons of aromatic hydroxy group and aromatic protons present in the compound were summarized in the Table-2.

TABLE – 1
Analytical and IR spectral data of [RPT] Ligand

Molecular Formula	C ₁₂ H ₁₇ NO ₅	
Colour	White crystalline needles	
Melting point	133 – 134 °C	
Elemental analysis	Found (%)	Calc. (%)
Carbon	56.45	56.46
Hydrogen	6.69	6.71
Oxygen	31.32	31.34
Nitrogen	5.48	5.49
Yield	74%	

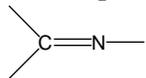
IR absorption band	1630 cm ⁻¹
	

TABLE – 2
¹H NMR spectral data for [RPT] Ligand in DMSO-D₆

Sl. No.	Different protons in the Ligand	δ Chemical shift in ppm
1	H ₃ C–C=N (methyl protons attached to azomethine group)	3.38
2	–CH ₂ OH (Methyl protons of hydroxymethyl group)	3.80
3	–CH ₂ OH (Hydroxyl protons of hydroxymethyl group)	4.57
4	Ar–OH (Hydroxyl Protons of Aromatic hydroxy group)	5.91
5	Aromatic protons	6.52 – 7.61

V. RESULTS AND DISCUSSION

i) Polarographic Behaviour of Individual Metal Ions (Cu²⁺, Cd²⁺) in Presence of [RPT]

a) Effect of pH on the Wave height

The main purpose of studying effect of hydrogen ion concentration on polarographic wave is to ascertain the hydrogen ion participation in electrochemical reduction at d.m.e. Further, it is also useful to fix an appropriate pH value at which separation of two or more metal ions is possible present in mixture solutions. In the present study, effect of pH on various metal ions in presence of 0.1M NaNO₃ as the supporting electrolyte at 0.1M ligand concentration at mercury height of 70.0 cms in 40 : 60 methanol– water medium. The pH range studied for Copper and

Cadmium was between 6.5-11.0. From E_{3/4} - E_{1/4} value computed from the polarograms of pH studies indicated that, Copper and Cadmium reduced reversibly as shown in Table 3&4 respectively.

TABLE – 3
 Effect of pH on Copper – [RPT] system

[Cu²⁺] = 1.0 mM
 [RPT] = 0.1M
 [NaNO₃] = 0.1M
 Triton –x–100 = 0.002%

pH	E _{1/2} (–V.Vs S.C.E)	E _{3/4} – E _{1/4} (mV)
6.5	0.225	54.80
8.0	0.301	54.60
9.0	0.371	54.80
10.0	0.390	54.80
11.0	0.405	53.92

TABLE – 4
 Effect of pH on Cadmium – [RPT] system

[Cd²⁺] = 1.0 mM
 [RPT] = 0.1M
 [NaNO₃] = 0.1M
 Triton –x–100 = 0.002%

pH	E _{1/2} (–V.Vs S.C.E)	E _{3/4} – E _{1/4} (mV)
6.5	0.631	30.90
8.0	0.635	30.90
9.0	0.665	30.44
10.0	0.725	28.90
11.0	0.760	27.96

b) Effect of Ligand concentration

Effect of ligand concentration on polarographic wave is of considerable importance since; it gives whether the polarographic wave is controlled by diffusion alone or depends on some other factors such as kinetic, adsorption or catalytic currents. Further, it also helps to establish the validity of Ilkovic equation. Well defined polarograms obtained with different concentrations of the ligand enables to carryout qualitative determination of metal ions in binary, ternary etc. mixtures constituting important ores and alloys. In addition to the above application, the studies also help to establish the complexation of ligand with various metal ions. In view of the above advantages,

the author in the present investigations studied effect of varying concentrations of the RPT ligand on copper(II) and cadmium (II) in the presence of 0.1 M NaNO₃ as supporting electrolyte and 0.002% of Triton-X–100 as maximum suppressor at pH 10.0. The results indicated that RPT was able to complex with copper and cadmium ions under consideration by the fact that diffusion current (i_d) decreased where as half-wave potential (E_{1/2}) shifted towards more negative values with increasing concentration of the ligand as shown in Fig1-4 and Table-5-6. Further, the studies also suggested that copper and cadmium reduced reversibly at d.m.e.

TABLE – 5
 Effect of Ligand – [RPT] concentration on Copper

[Cu²⁺] = 1.0 mM
 [NaNO₃] = 0.1M
 pH = 10.0
 Triton –x–100 = 0.002%

[RPT] (M)	E _{1/2} (–V.Vs S.C.E)	i _d (μA)	Slope (mV)
--------------	-----------------------------------	------------------------	---------------

0.02	0.355	7.7150	59.76
0.03	0.359	7.3480	58.62
0.04	0.361	7.0975	57.54
0.05	0.364	7.0143	57.74
0.06	0.367	6.6800	57.54
0.08	0.386	6.2626	57.52
0.10	0.390	5.8445	57.44
0.20	0.404	5.3440	57.48
0.40	0.419	5.0100	57.52
0.50	0.424	4.5925	57.48
0.60	0.427	4.1750	57.44
0.80	0.433	3.7575	57.42
1.00	0.437	3.3401	57.42

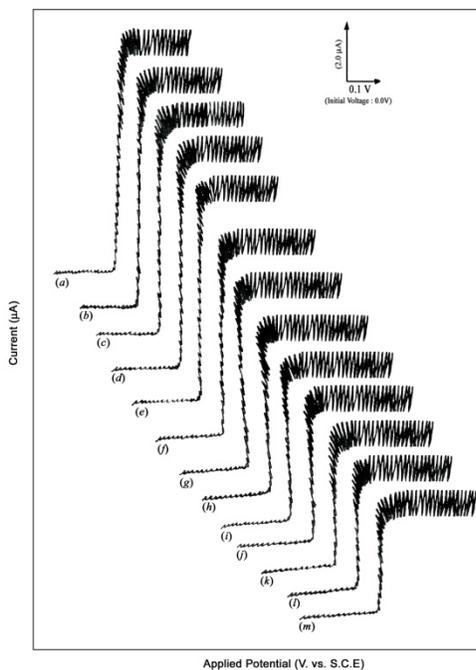


Fig. 1 : Polarograms of 0.2 mM copper ion in a) 0.02 b) 0.03 c) 0.04 d) 0.05 e) 0.06 f) 0.08 g) 0.10 h) 0.20 i) 0.40 j) 0.50 k) 0.60 l) 0.80 m) 1.00 M [RPT] and 0.1M NaNO₃ at pH 10.0

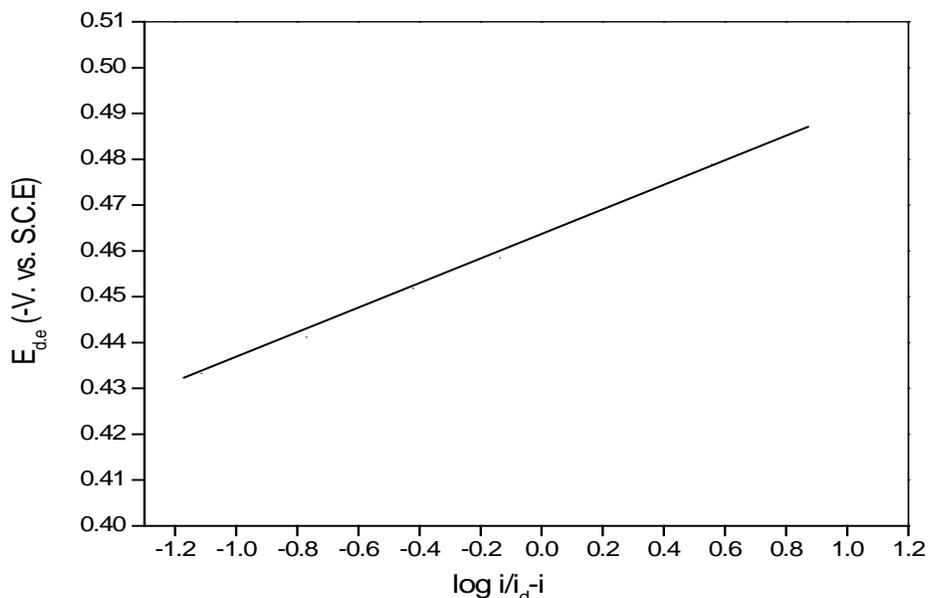


Fig. 2 : A typical log plot of 1.0 mM Copper in 0.1 M [RPT] and 0.1M NaNO₃ at pH 10.

TABLE – 6
Effect of Ligand- [RPT] concentration on Cadmium

[Cd²⁺]
 [NaNO₃]
 pH
 Triton -x-100

= 1.0 mM
 = 0.1M
 = 10.0
 = 0.002%

[RPT] (M)	E _{1/2} (-V. Vs S.C.E)	i _d (μA)	Slope (mV)
0.02	0.688	5.9702	30.50
0.03	0.695	5.9400	30.56
0.04	0.699	5.7868	30.60
0.05	0.703	5.7507	30.52
0.06	0.709	5.6986	30.60
0.08	0.717	5.6366	30.42
0.10	0.725	5.3889	30.35
0.20	0.742	4.7075	29.90
0.50	0.761	3.5306	29.60
0.60	0.766	3.3448	29.52
0.80	0.770	2.6015	29.50
1.00	0.772	2.0440	29.45

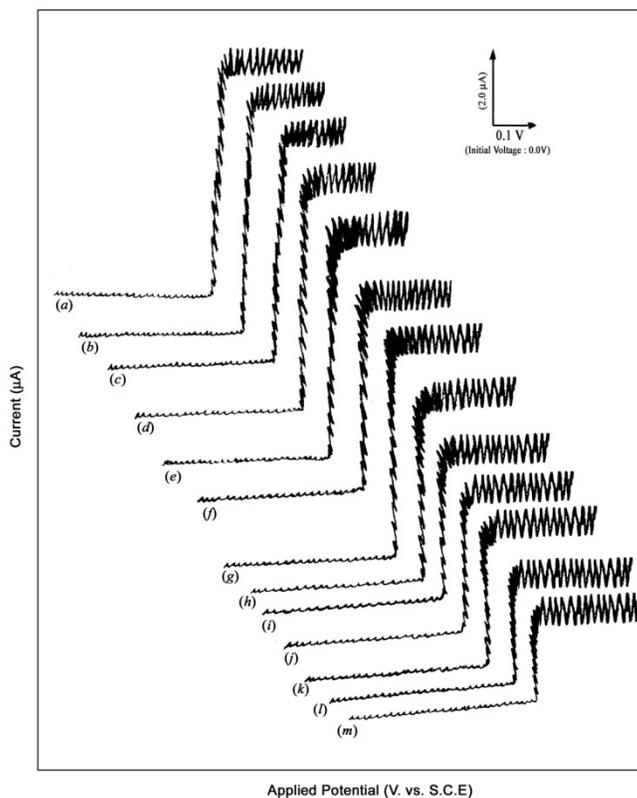


Fig. 3 : Polarograms of 0.2 mM Cadmium ion in a) 0.02 b) 0.03 c) 0.04 d) 0.05 e) 0.06 f) 0.08 g) 0.10 h) 0.20 i) 0.40 j) 0.50 k) 0.60 l) 0.80 m) 1.00 M [RPT] and 0.1M NaNO₃ at pH 10.0

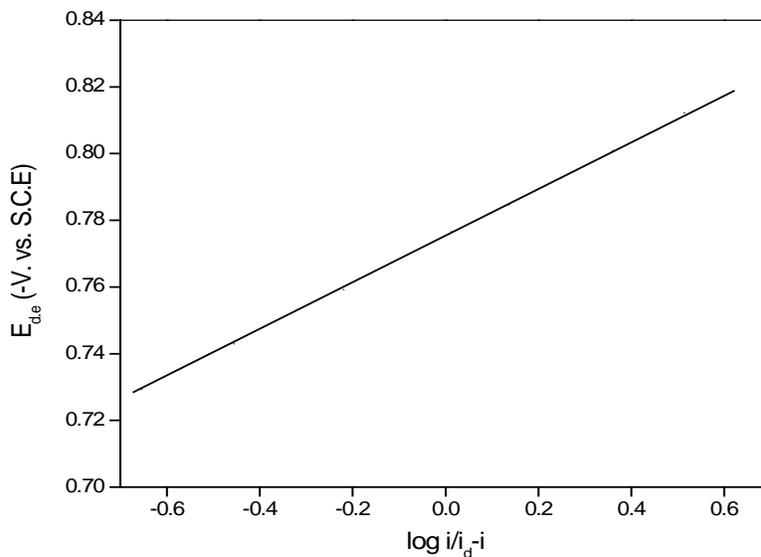


Fig. 4 : A typical log plot of 1.0 mM Cadmium in 0.1 M [RPT] and 0.1M NaNO₃ at pH 10.0

c) Effect of height of mercury column

Effect of height of mercury column on polarographic wave helps to establish the diffusion controlled nature of the electrode

reaction at d.m.e by calculating i_d/\sqrt{h} values. In the present studies, the author investigated in detail the influence of mercury height on diffusion current of metal ions such as copper(II), cadmium(II) ions at 1.0 mM concentration in presence of fixed concentration of RPT ligand (0.1M), ionic concentration 0.1M NaNO₃ as supporting electrolyte and 0.002% of Triton-X-100 as maximum suppressor

at pH 10.0. Results indicated that i_d/\sqrt{h} values were constant with in the experimental error (Tables.7-8) suggesting the diffusion

controlled nature of both the metal ions under consideration at d.m.e. Mercury height of 70.0 cms was fixed to carry out other studies like effect of pH effect of ligand concentration and effect of metal ion concentration.

TABLE - 7
Effect of height of Mercury Column on Copper – [RPT] system

[Cu²⁺] = 1.0 mM
 [RPT] = 0.1M
 [NaNO₃] = 0.1M
 pH = 10.0
 Triton -x-100 = 0.002%

Height of Mercury Column h(cm)	i _d (μA)	i _d /√h
80	6.1909	0.6921
75	6.0280	0.6960
70	5.8445	0.6985
65	5.7022	0.6971
60	5.5392	0.7098

TABLE - 8
Effect of height of Mercury Column on Cadmium – [RPT] system

[Cd²⁺] = 1.0 mM
 [RPT] = 0.1M
 [NaNO₃] = 0.1M
 pH = 10.0
 Triton -x-100 = 0.002%

Height of Mercury Column h(cm)	i _d (μA)	i _d /√h
80	5.6884	0.6359
75	5.5304	0.6310
70	5.3889	0.6421
65	5.2144	0.6467
60	5.0564	0.6425

d) Effect of metal ion concentration

The studies of effect of metal ion concentration on polarographic wave height are of immense importance due to the fact that it establishes diffusion controlled nature of the electrode reaction and the validity of Ilkovic equation. Further, the studies also help us to carryout quantitative determination of metal ions by constructing calibration plots at different concentrations of the depolarizer. In the present investigations, the carried out Polarographic studies (Fig 5 and 7) of copper and cadmium metal ions of biological and industrial importance. Metal ion concentration was varied from 0.4 mM to 1.2 mM in presence of complexing agent RPT (0.2M), 0.1M NaNO₃ as supporting electrolyte and 0.002% of Triton-X-100 at pH 10.0. Calibration graphs were drawn at different concentrations of metal ion under identical conditions as shown in Fig-6 and 8. In all the instances, straight line plots were obtained

passing through the origin indicating the validity of Ilkovic equation. Values computed for $\frac{i_d}{c}$ were constant within the experimental error (Table-9-10). The metal ions whose half-wave potential difference was more than 0.2 V were selected to carry out quantitative analysis present in binary mixtures constituting different important ores and alloys.

TABLE-9

Effect of Copper ion concentration on the Wave height

[RPT] = 0.2M
 [NaNO₃] = 0.1M
 pH = 10.0
 Triton -x-100 = 0.002%

[Cu ²⁺] (mM)	i _d (μA)	i _d /c
0.4	2.1375	5.3438
0.6	3.2063	5.3438
0.8	4.2751	5.3439
1.0	5.3440	5.3440
1.2	6.4190	5.3491

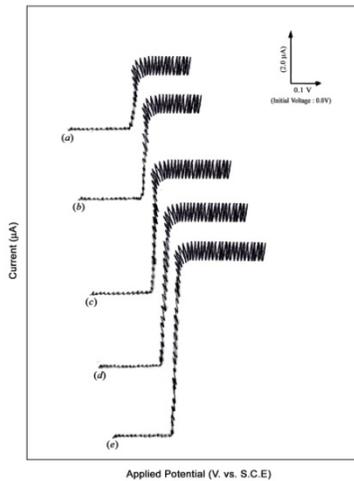


Fig. 5 : Polarograms of a) 0.4 b) 0.6 c) 0.8 d) 1.0 and e) 1.2 mM copper in 0.2 M [RPT] and 0.1M NaNO₃ at pH 10.0

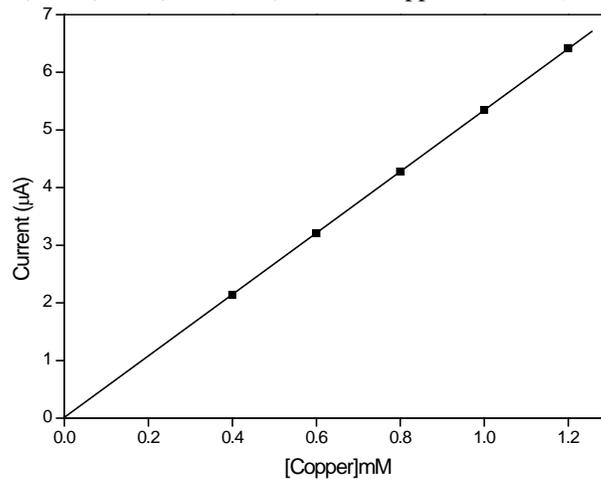


Fig. 6 : Calibration Plot of Copper ion in 0.2M ligand [RPT] and 0.1M NaNO₃ at pH 10.0

TABLE-10

Effect of Cadmium ion concentration on the Wave height

[RPT] = 0.2M
 [NaNO₃] = 0.1M
 pH = 10.0
 Triton -x-100 = 0.002%

[Cd ²⁺] (mM)	i _d (μA)	i _d /c
------------------------------	------------------------	-------------------

0.4	1.8834	4.7085
0.6	2.8250	4.7082
0.8	3.7667	4.7084
1.0	4.7075	4.7075
1.2	5.6485	4.7072

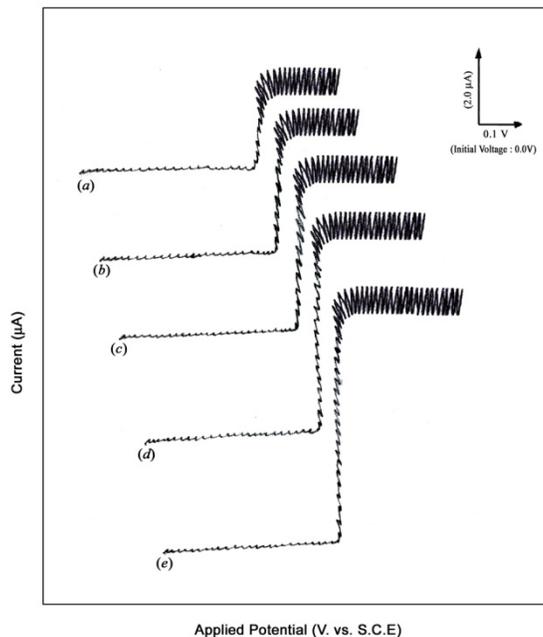


Fig. 7 : Polarograms of a) 0.4 b) 0.6 c) 0.8 d) 1.0 and e) 1.2 mM Cadmium in 0.2 M [RPT] and 0.1M NaNO₃ at pH 10.0

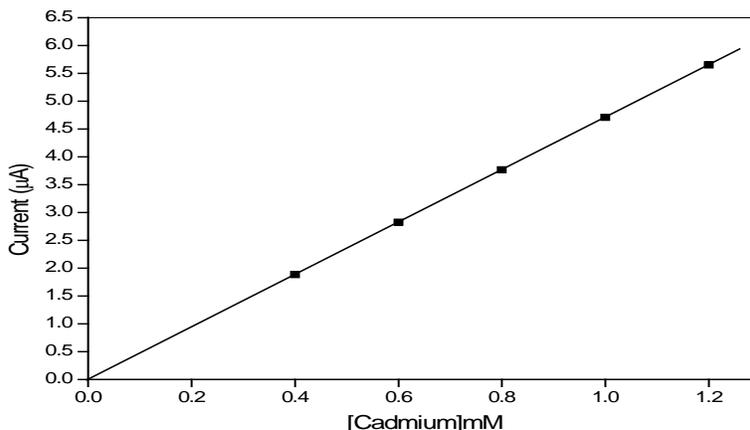


Fig. 8 : Calibration Plot of Cadmium ion in 0.2M ligand [RPT] and 0.1M NaNO₃ at pH 10.0

ii) Investigation of metal-to-ligand ratio and stability constants of cadmium – RPT reversible system

Earlier polarographic investigation on cadmium in presence of complexing agent RPT. 0.1M NaNO₃ as supporting electrolyte and 0.002% of Triton-X-1 00 as maximum suppressor at pH 10.0 revealed that cadmium undergone reversible electrode reaction at d.m.e. The graph plotted against $E_{1/2}$ and $-\log [RPT]$ gave a smooth curve showing the existence of various step-wise complex equilibria in solution. The author, therefore, employed Deford and Hume method for the determination of ligand number and formation constants of the cadmium-RPT system. To start with various $F_0[X]$ functions were determined using the equation

$$F_0[X] = \text{Anti log} \left[\frac{0.4343nF}{RT} \Delta E_{1/2} + \log \frac{I_M}{I_C} \right]$$

Where I_C representing experimental mean value of the diffusion current constant for different complex equilibria. A graph was drawn between $F_0[X]$ and $[X]$ values. From the limiting slope of the curve. β_1 , value was computed. Secondly, $F_1[X]$ values at different concentrations of the ligand calculated making use of the following equation

$$F_1[X] = \left[\frac{F_0[X] - 1}{[X]} \right]$$

A plot was constructed between $F_1[X]$ and $[X]$ values. The intercept of the curve gave β_1 value and the limiting slope of it represented β_2 . $F_2[X]$ functions were then evaluated employing the equation

$$F_2[X] = \left[\frac{F_1[X] - \beta_1}{[X]} \right]$$

A graph was plotted for the obtained values of $F_2[X]$ and $[X]$ values. A straight line parallel to X-axis was obtained. The intercept of the graph gave β_2 value. From the results, it was observed that cadmium formed 1 : 2 complex with RPT and the step-wise formation constants were found to be $\beta_1 = 0.25 \times 10^6$ and $\beta_2 = 10.80 \times 10^6$. Experimental results were tabulated in the Table-11

TABLE -11
Derived functions for Cadmium - [RPT] System

$[Cd^{+2}] = 1.0mM$
 $[NaNO_3] = 0.1M$

pH = 10.0
 Triton - x - 100 = 0.002%

[RPT] (M)	i_d (μA)	Slope (mV)	$E_{1/2}$ (-V. S.C.E)	vs	Δ (-V.vs S.C.E)	$E_{1/2}$	$\log I_M/I_C$	$F_0[X] \times 10^4$	$F_1[X] \times 10^5$	$F_2[X] \times 10^6$
0.00	6.1902	28.90	0.575	-	-	-	-	-	-	-
0.02	5.9702	30.50	0.688	0.113	0.0157	0.5856	2.9276	2.1350		
0.03	5.9400	30.56	0.695	0.120	0.0179	1.0051	3.3502	2.8333		
0.04	5.7868	30.60	0.699	0.124	0.0293	1.4010	3.5024	2.5050		
0.05	5.7507	30.52	0.703	0.128	0.0320	1.9141	3.8280	2.6560		
0.06	5.6986	30.60	0.709	0.134	0.0360	3.0562	5.0935	4.3216		
0.08	5.6366	30.42	0.717	0.142	0.0407	5.6952	7.1188	5.7725		
0.10	5.3889	30.34	0.725	0.150	0.0602	10.9808	10.9808	10.9808		
0.20	4.7075	30.34	0.742	0.167	0.1190	46.1194	23.0596	10.2795		
0.40	3.7165	29.70	0.757	0.182	0.2216	183.8771	45.9692	10.8655		
0.50	3.5306	29.60	0.761	0.186	0.2440	262.8690	52.5737	10.0146		
0.60	3.3448	29.52	0.766	0.191	0.2673	406.4937	67.7489	10.8746		
0.80	2.6015	29.50	0.770	0.195	0.3765	709.6847	88.7105	10.7762		
1.00	2.0440	29.50	0.772	0.197	0.4812	1052.3768	1052.3767	10.5237		

$\beta_1 = 0.25 \times 10^6$; $\beta_2 = 10.80 \times 10^6$
 pharmaceutical preparations and determination of pesticide or herbicide residues in the foods and other samples.

VI. CONCLUSIONS

Determination of traces quantities of elements copper(II) and cadmium(II) using RPT Schiff base by polarographic method is not tedious and do not involve any heating , separation or extraction of the components. Determination of metal ions copper and cadmium using RPT ligand is simple and selective and rapid, can be applicable in determinations in metallurgy, environmental analysis (air, water, and sea water contaminants), Food analysis, toxicology, clinical analysis, analysis of drugs,

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Examine the Performance of Telecommunication Company in Malaysia: A Case from Axiata Group SDN BHD

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Abstract- As one of Asia's leading telecommunications groups, Axiata has investments in mobile network operations, network infrastructure, and digital internet companies, serving almost 300 million subscribers in 10 countries across the region. In 2015, revenue is USD 5.1 billion, profit after tax USD 0.7 billion. Market capitalization is USD 13.2 billion. They have 275 million subscribers across the nations and employees are 25000. The aim of the study is to investigate the company in term of their business strategy, core competence, competitiveness, the role of technology and management system operation. The study found that One of the important business strategies of Axiata is doing some acquisition of telecommunication companies in several countries which this thing will increase their level of competency, competitiveness and market shares in Asia. In term of the role of technology, Axiata Group also has taken over and built up the strategic companies which those companies knew as a company which based on advanced technology to support Axiata core business such as Edotco and Axiata Digital. Furthermore, in term of management operation the company applying lean system concept which improves operating performance by focusing on the continuous flow of products, materials or services through the value stream by identifies and eliminates all type of waste or non-value-added activities.

Keywords: Axiata, Telecommunications, Competency, Technology, Competitiveness.

I. INTRODUCTION

Axiata considered being one of the best telecommunications firms in Asia. Axiata was established in Malaysia on 12 June 1992 as a private limited company under the name of Telekom Malaysia International (TMI). TMI changed its name to Axiata Group Berhad on 28 April 2008. After that, its customer number increased from 80 billion to around 275 billion customers across different Asian countries. Axiata group at the moment providing its services in five mobile operators under the brand names of 'Celcom' in Malaysia, 'XL' in Indonesia, 'Dialog' in Sri Lanka, 'Robi' in Bangladesh and 'Smart' in Cambodia, with strategic interests in 'Idea' in India and 'M1' in Singapore and Iran. The Group also having an investment in non-mobile telecommunication activities in Thailand and Pakistan. Moreover, the group providing infrastructure services in six

different countries delivering telecommunications infrastructure services throw out those countries. The group ambition to be one of the best regional tower companies and is obliged to responsible and sustainable business operations. In 2012, Axiata group has started 'Axiata Digital' to be able to better serve the increasing growth in the technology businesses. Three years later, Axiata Digital was having a portfolio of 24 digital brands, providing its services to the growing demands in mobile money, mobile advertising, e-commerce, entertainment, and education.

Table: Axiata group's main subsidiaries

Country	Brand	Ownership
Bangladesh	Robi	92.00%
Cambodia	Smart	100%
India	Idea Cellular	19.96%
Nepal	Ncell	60.4%
Indonesia	AXIS	Unknown
Indonesia	XL	66.55%
Malaysia	Celcom	100%
Pakistan	Multinet	89.00%
Singapore	M1	29.12%
Sri Lanka	Dialog	83.32%

Source: Wikipedia, 2016

Axiata's main activities in investment holding and the serving of telecommunication and consultancy services on an international scale. They have an interest to expand their activities in the emerging markets in Asia, some with low mobile penetration in South and Southeast Asia. Due to the constant change in our modern life in terms of technology Axiata tried to find wider opportunities in the field of digital services. In 2015 the group came up with new strategic equity investments in different sectors like digital services in order to provide digital trading, digital advertising, and digital entertainment moreover Axiata have developed its long-term strategy that concerns about the opportunities and challenges in the operating environment, and will take from where they are today as a Regional Champion telecommunications operator to realize our Axiata 3.0 vision and digital enterprise model by 2020.

As a result of the previous events Axiata has recorded a revenue of MR 19.9 billion according to its annual report of 2015 with a revenue growth of 6.26% and profit margin ratio of 13 %

which indicates the efficient strategy that Axiata holding in order to maintain its growth and competitive position. Moreover, Axiata had a number of 275 million subscribers and almost 25000 employees in 2015. Therefore it is very interesting to study further about this company particularly on their business strategy, competency and competitiveness, and also the role of technology in the company to maintain the competitive advantages and their management operation in the company. All of this will be discuss further.

Research Objective:

According to background above, this study will examine the performance of Telecommunication Company in Malaysia case of Axiata Berhad and it transformed into several research objectives as follow:

- A. To discuss the business strategy of Axiata Group
- B. To assess the competitiveness and competency of Axiata Group
- C. To assess the role of technology in Axiata Group
- D. To discuss the operation management in Axiata Group

II. STUDY LITERATURE

The importance of Business Strategy

All business organizations are concerned about how they will survive and success in the future. A business strategy is often thought of as a plan or set of intentions that will set the long-term direction of the actions that are needed to ensure future organizational success. The business strategy reflects the vision and the mission of the company and Affects the entire organization by providing direction and adapting the organization's business environment. The idea of using strategy was originated from the military who used it with regard of how a commander might deploy his resources. On another hand, a business organization having strategy has emerged in the 1960s, when the techniques of long-term business planning were first popularized.

A widely accepted definition is business strategy is offered by Johnson et al. (2005), as a long-term plan of action designed to achieve a particular goal or set of goals or objectives that business have. This can be achieved through taking advantage of the changing environment through and configuration of resources with the aim of fulfilling stakeholder expectations. When determination the long-term direction of an organization, the business strategy includes the interaction of three elements: the organization's external environment, its resources, and its objectives to in meeting the expectations of its stakeholders.

Competency and Competitiveness in the Company

A recent study to examine the effects of competitive priorities in the telecom industry (Krajewski et al. 2013) concluded that competitive priorities involve in the low-cost operation, in which a telecommunication company can have its competitive advantages at most in the market to achieve its goals. The study also determined that competitive priorities also involves in both Flexibility and Variety of service, in which customers have the flexibility to use the preferable service among the varieties. It makes the competitive advantages against rivals in the market. Thompson et al (2005) concluded that

sustainable Competitive Advantage depends on the situation when a company attains sustainable competitive advantage when an attractive number of customers desire its products or services over the offerings of rivals and when the choice is durable.

Moreover, Muzamil and Idris (2012) argued that when a company selects lowering cost as its competitive priorities to maintain business strategy, it is actually competing about offering services at the lower market price with its rivals. To decrease cost, firms can minimize manufacturing and resources costs rather they may enhance efficiency and productivity by developing information technology. They also stated that a company can improve its capability by making innovative competitive priorities which may lead to developing existing services and always develop new products or services. Some companies focus on their competitive priorities for producing innovative services due to competition and challenging consumers. These services are really different and unique compared to rivals' services.

In term of competency, Thompson et al (2005) also define the core competence as an important activity with the competitiveness that a company performs well than other core activities. Prahalad et al. (1990) concluded that a Core Competency is the key thing that makes a company capable of delivering unique value to customers. It represents a company's learning, diversified skills, and multiple technologies. Sustainable competitive advantage may arise for a company by a core competence and core Competencies can be benefited for a company's services offer customers.

The role of Technology in a Company

The rapid evolution of technology and globalization of the business environment have forced firms to constantly search for strategies and tactics to stay competitive or gain an advantage over their rivals. The integration of information and communications technologies has significantly changed the operational efficiency and effectiveness of companies and the competitive environment. The internet and web-based technologies allow managers and employees of corporations to conduct business and transfer data across the globe. Marketing and sales personnel are using technology to conduct market research and sell products around the world. Digital and mobile devices are used by business managers and employees to monitor business activities and communicate with business associates from the office or while on the road (Lollar et al, 2010)

Moreover, another study has been done by Jhunjunwala et al (1998) which examine the role of technology in telecom expansion in India stated that the recent technological advances in wireless and fiber-based access technology, such us open interface standards, high-speed digital transmission on the copper loop, and the internet remote access will reduce the cost feasible. Furthermore, another study comes from Powel and Micallef (1997) which investigated the linkage between information technology (IT) and firm performance. The study found that technology alone have not produced sustainable performance advantages in the retail industry, but some firms have gained advantages by using IT to leverage intangible complementary human and business resources.

In term of technological innovation in the firm, the study has been completed by Erturk (2009) which investigated the role

of technology innovation in the firm, the study found that the technological innovation in a firm will increase their competitiveness, market value and profitability. Therefore, it is very important for the firm to develop and applying optimal technology and innovation strategies to increase their level of competitiveness in the market.

Operation Management

According to Wiley and Sons (2010) stated that Operation Management is the commercial enterprise feature this is chargeable for managing and coordinating the sources needed to produce an organization's products and services. The position of OM is to transform organizational inputs into organization's services or products outputs OM is chargeable for a wide range of decisions, ranging from strategic to tactical. Companies may be divided into manufacturing and service agencies, which range in the tangibility of the products or services. Many historical milestones have shaped OM. Some of these are the commercial revolution, clinical control, and the human members of the family motion, management science, and the laptop age. OM is enormously critical function in nowadays dynamic enterprise surroundings.

Most businesses square measure supported by the functions of operations, marketing, and finance (Xin, Pearce & Guanxi, 1996). The major useful areas should act to realize the organization goals. Promoting isn't totally able to meet client desires if they are doing not perceive what operations will manufacture (Davenport & Prusak, 1998). Finance cannot decide the necessity for capital investments if they are doing not perceive operations ideas and desires. Data systems permit the data flow throughout the organization. Human resources should perceive job needs and employee skills. The accounting must take into account inventory management, capability data, and labor standards.

III. FINDING AND DISCUSSION

Axiata's Business Strategy

Axiata's business strategy can be reflected from it is Vision and mission which is to become the finest enterprise in the country through delighting its customers and building a profitable enterprise that maximizes investor returns. Also, The Company's dreaming is to empower, develop and reward their people for becoming Malaysia's preferred employer and maintaining the highest levels of transparency, integrity and professionalism. Finally, Together with all of the stakeholders, they want to make Celcom a premium brand: a brand that symbolizes the spirit of freedom, aspiration, confidence, dynamism, timelessness, universality and globalism, As stated last year 2015 in the business plan of the company Dato' Sri Jamaludin Ibrahim, C.E.O, Operating strategy of Celcom Axiata Berhad. Celcom is part of Axiata Group, one of the largest Asian telecommunication companies. It is currently the Malaysian partner of Vodafone. It focuses on low penetration emerging markets and high growth. Celcom upholds a product differentiation strategy resulting from a strong market orientation, commitment to high quality, and customization of products and services. To accomplish these goals, Celcom has built up a benchmark for progress in three different categories.

First is to use market penetration pricing, where services will be brought to the customers at affordable and reasonable prices. Secondly, by gaining a better understanding of the need and satisfaction of the current customers, they improved the service to encourage re-orders. Finally, their services are to be able to utilize its current technology and knowledge base, and research as well would be conduct on similar products with an eye towards developing the services to a specialty advertising product. (Williams & Ferrell 2007, p. 364) The role of operation strategy of Celcom AXIATA on customer satisfaction. The organization's operations function is concerned with getting things done; producing goods and/or services for customers. However, no matter how grand the operation, or how noble the intention, an organization's operation strategy can only become a meaningful reality, in practice, if it is in line with the business strategy. It is an important to function of the business as it is responsible for the day-to-day activities within the operations function and manages most of the organization's resources. The relationship between an organization's strategy and its operations is a key determinant of its ability to achieve long-term success or even survival.

The marketing strategy of Celcom is to send personal sales representatives to market their products to potential customers and create service concepts for their business or choice of order. This enhances more customer loyalty and relationship with the company. Following the sales strategy developed by their local rivals, Celcom has experienced 16% revenue increase as stated 2015 annual report and has improved their competitive level, through developing many telecommunications feature, providing quality services at a considerable price. As more and more Malaysians look for ways to keep in touch with each other, Celcom's popularity and quality services have helped draw more customers to the company through customer relationship and brand loyalty. It maintains a product differentiation strategy resulting from a strong market orientation, commitment to high quality, and customization of products and services.

The high percentage of sales, 2.4 billion which reported in their financial statement of 2014, suggest a satisfied customer base as well as positive word of mouth, which generates new business per year. On the other hand, being the oldest telecommunications service provider in Malaysia, it has a competitive edge and increased customer's trust and loyalty to the brand. But besides that, Celcom is reactive rather than assertive in its marketing efforts because of its heavy reliance on customer's reaction for product satisfaction. Also, High cost of products and service could alter the buying power of the consumers. Similarly, High cost of products and service would be a competitive advantage to their rivals over customers, through implementing low-cost quality products and services. On another hand, Celcom should consider surveying its current customers and its customers' client to better understand their needs and changing dreams.

In addition, one of the business strategies which applied by Axiata to dominate the market is by acquisition which has done, through their vision in advancing Asia, AXIATA Berhad has taken over several strategic telecommunication companies in several Asia's countries. And also they invest in several strategic telecommunication companies to increase the value of the Group.

Graph: Acquisition Spending of Axiata 2011-2015

Source: Adopted from Axiata's Annual Report

Core Competencies and Competitiveness in Axiata

Celcom is the market leader in Malaysia and its competition, particularly in publicity, is very strong both on the local, regional and national level. It is the key for them to achieve its financial objectives. Raising the sales strategy by their local competitors, Celcom Malaysia has improved the competitive level through improving many telecommunications feature, quality services at a considerable price. The latest introduction of a new telecommunications service provider (U-mobile) came in the market and has made the competition in the telecommunication industry is very high. The good strategy of Celcom is that they have reduced the cost of SMS from 50 cents to 25 cents and reduced the cost of call from 35 cents to 20 cents per minute (Axiata Official Website, 2016)

Even the competition becomes bigger as many other competitive measures are expected to enter the market soon as well. A recent study to examine the effects of competitive priorities in the telecom industry (Krajewski, Ritzman & Ferrellet 2013) concluded that competitive priorities involve in the low-cost operation, in which a telecommunication company can have its competitive advantages at most in the market to achieve its goals. So based on this study, Axiata Berhad Malaysia has the competitive priority as low-cost-operation by reducing its call rate as well as the cost of SMS. Celcom as the oldest and most experienced has many competitive advantages against its main rivals Maxis and Digi.

Graph: Sales Revenue of Axiata, Maxis and Digi 2011-2015

Source: Adopted from Axiata, Maxis, and Digi Annual Report

They currently hold the maximum trend in the market share, providing the maximum coverage, various products feature and taking the top customer size in the market of Malaysia. Moreover, the application of many future strategies makes their position as the market leader in the Malaysian market. In addition, Celcom has established competitive measures to sustain their current marketplace and fight off their challenges both now and in the future, these varieties from enjoying their customers with their various service features, rising better customer relationship strategy, applying more societal promotion systems and supporting the government (Axiata Official Website, 2016).

On the other hand, one of the main competitor of Axiata in the region of Asia is Singapore Telecom (SingTel), SingTel is the Singapore based company which owned by the government, SingTel also involves in several investment around Asia, therefore, we would like to make the comparison between these companies particularly in their gross profit margin.

Source: adopted from www.financial.morningstar.com (2016)

The Role of Technology in Axiata

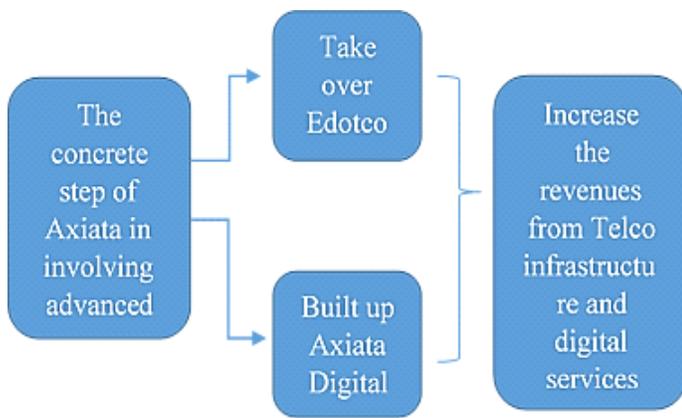
The core of the business of Axiata Group Berhad is telecommunication business which requires advance technology to operate their business. Therefore, the role of technology in the company is very important to maintain their level of competitiveness in the market. As a concrete step which has taken by the company in utilizing the technology to serve the customer is by took over a strategic company such as Edotco and built a new business unit which called as Axiata Digital.

Edotco Group is the first regional and integrated telecommunications infrastructure service company in Asia, and it wholly took over by Axiata in 2012, it providing end-to-end solutions in the tower services sector from tower leasing, co-location, built-to-suit, energy, transmission and operations and maintenance (O&M) with a regional portfolio that includes over 16,000 towers across its core markets, Edotco is now the 14th largest tower company in the world (Axiata Official Website, 2016).

Another new business unit built by Axiata group in 2014 which called as Axiata Digital Services Berhad, the built of Axiata Digital Berhad is a respond of the evolution of the communication industry and the shift of consumer behavior from offline to online. It was set up to focus on driving revenues from digital services such as in entertainment, commerce, money and advertising, and is now operating in four of Axiata's markets. This essentially places Axiata in the same space as OTT service providers, enabling the group to expand its portfolio of services to cater to online customers on smartphones, tablets, and fixed internet. The move opens up new opportunities to capture increased share of customer wallet and reach beyond Axiata's traditional mobile services and own subscribers base of over 240 million (Axiata Official Website, 2016).

Axiata's strategic and measured investments in digital services is important in positioning the Group in the 'Digital World' providing synergies, complementing and evolving its existing business, and paving the way for its transition into new generation telecommunication company in Asia.

Graph: The role of technology for Axiata

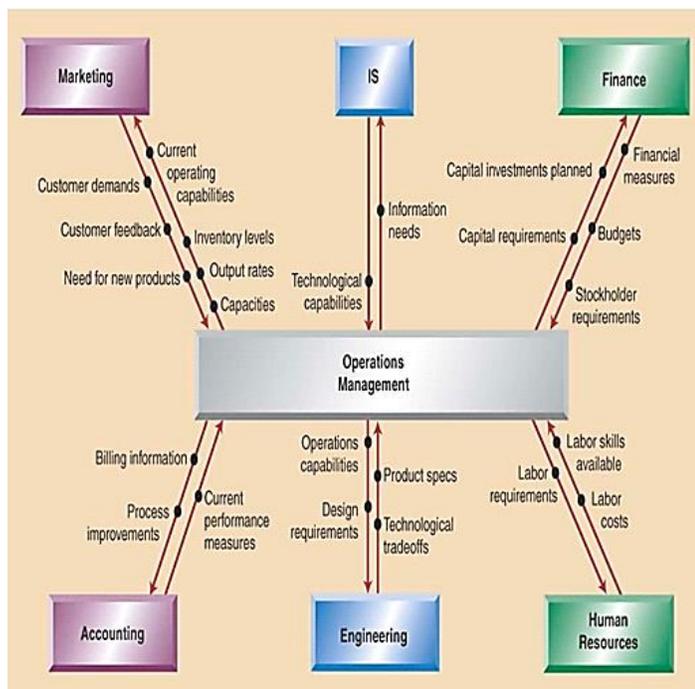


Source: Adopted from Official Website of Axiata

Management Operation in Axiata

Operation management is not involved with the one department rather all division of the company. They have to work with marketing, finance, human resource, IT department constantly. If they maintain the good feedback efficient challenging environment they can expect to do well in business in the very high competitive market. AXIATA Berhad implements lean system concepts, this concept is a systematic methodology that identifies and eliminates all types of waste or non-value-added activities. Lean emphasizes on the improvements in the whole business process. Lean concepts improve operating performance by focusing on the unceasing flow of products, materials or services through the value stream. To achieve this, the various forms of waste must be identified and eliminated. This company also manage information using ERP and CRM system which is very common in the present operation management. This is a big company where they have to do practice in increasing cross-functional decision making.

Graph: Operation Management Flow Chart



AXIATA's operation management has the most diverse organizational function. They also manage the transformation process. This company has many faces and names such as; V. P. operations, Director of supply chains, Manufacturing manager, Plant manager, Quality specialists, etc. All business functions need information from OM in order to perform their tasks.

IV. CONCLUSION

As one of Asia's leading telecommunications groups, Axiata has investments in mobile network operations, network infrastructure, and digital internet companies, serving almost 300 million subscribers in 10 countries across the region. In 2015, revenue is USD 5.1 billion, profit after tax USD 0.7 billion. Market capitalization is USD 13.2 billion. They have 275 million subscribers across the nations and employees are 25000. One of the important business strategies of Axiata is doing some acquisition of telecommunication companies in several countries which this thing will increase their level of competency, competitiveness and market shares in Asia. In term of the role of technology, Axiata Group also has taken over and built up the strategic companies which those companies knew as a company which based on advanced technology to support Axiata core business such as Edotco and Axiata Digital. Furthermore, in term of management operation the company applying lean system concept which improves operating performance by focusing on the continuous flow of products, materials or services through the value stream by identifies and eliminates all type of waste or non-value-added activities.

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Survey on knowledge, attitudes and practices on urolithiasis among final year students in Faculty of Medicine, University of Peradeniya.

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Abstract –Urolithiasis is one of the major problems in urology practice. The health care providers' knowledge, attitudes and practices are important factors causing delay in treatments. The objective of this study was to determine knowledge, attitudes and practices regarding urinary tract stones among final year medical students. This study was a descriptive cross sectional study conducted over a period of six months with 102 students within the age range of 22 to 28 years. The mean age was 25.21 ± 1.04 years and mean knowledge score was 72.72%. Out of the sample 55.55% had positive attitudes towards the urolithiasis. There were 90.12% (n= 92) of them recommended to drink more than 2 liters of water instead of other liquids for patients who suffered from kidney stone disease. Out of the sample 83.35% (n=85) participants agreed to advice to avoid highCa containing foods. Therefore the knowledge and practices of medical students towards urolithiasis was good and attitudes were poor.

Index items - urolithiasis, knowledge, attitudes and practices.

I. INTRODUCTION

Urolithiasis is one of the major problems in urology.⁽¹⁾ The presence of a solid material in the urinary tract, normally devoted to the passage of urine is termed 'nephrolithiasis' or 'renal stone disease'. The solid bodies formed in the urinary tract are termed 'stones'.⁽²⁾ The main symptom of a kidney stone disease is an extreme pain in the back (which begins when a moving stone blocks the urethra), nausea and vomiting can also accompany the pain.⁽³⁾ There are several risk factors associated with the development of kidney stone disease such as genetic factors, age, gender, climate, Body Mass Index (BMI), weight, water intake, co-morbidities, occupation and diet.⁽⁴⁾ The epidemiology of urolithiasis differs according to the geographical area in terms of prevalence and incidence, age and sex distribution, stone composition and stone location. Urolithiasis is twice more common in males than in females.⁽⁸⁾ Usually the first episode of renal stone occurs commonly in young people (20-40 years)⁽⁹⁾ and peak incidence is reported in second or third decades of life.⁽¹⁰⁾ As it mostly affects working age group, it is a major socioeconomic burden for the society.⁽¹¹⁾ Ureteric stones contribute 20% of all urinary tract stones and 70% of which are located in the distal ureter.⁽¹²⁾

Urinary tract stones affect up to 2-5% of the Asian population⁽⁵⁾ and up to 15% of population in the western countries.⁽⁶⁾ Although such data is not available for Sri Lanka, the fact that nearly 3000 patients are treated with extra-corporeal shock wave lithotripsy (ESWL) at the National Hospital of Sri Lanka alone every year is an indirect indicator of the size of the problem.⁽⁷⁾ There were several studies done to assess knowledge and attitude of urinary tract stones among primary care physicians and medical students.⁽¹³⁾ A study conducted in 2008 in New York to see deficits in urological knowledge among medical students and primary care providers. It revealed that the general urological knowledge with regard to primary care setting was insufficient.⁽¹⁴⁾

The health care providers' knowledge, attitudes and practices are important factors causing delay in treatments. Therefore it is important to assess future health care providers' knowledge, attitudes and practices of urinary tract stones before planning health care education programs later on. The objective of this study was to determine knowledge, attitudes and practices regarding urinary tract stones among final year medical students, Faculty of Medicine, University of Peradeniya.

II.METHODOLOGY

This study used the descriptive cross sectional design with an analytical component. The final year medical students were the study population. There were 102 students selected by simple random sampling technique. The study was based on a closed ended self-administered questionnaire. The test-retest reliability was measured in a pilot study of 20 participants before data collection. The questionnaire composed of five parts.

The first part collected demographic data of the participants and their exposure to surgical appointments. The second part was to assess the level of knowledge regarding urolithiasis. There were 17 questions prepared to assess the knowledge on urolithiasis. The questions were to assess knowledge on food habits, type and amount of liquid intake, risk factors, symptoms of stone disease, methods of laboratory investigations and stone disease associated occupations. The correct responses were scored as "1" incorrect and "don't know" responses were scored as "0." An overall knowledge score was calculated by summing the scores for the statements. Thus, the highest possible score is 36. Then mean percentage score was calculated. The third part concerns attitudes towards urolithiasis. Nine attitude statements that used a five-point Likert scale to evaluate the participants' attitudes toward beliefs about urolithiasis and its social consequences. Likert scale was used to scale the attitudes, the respondent was not asked to decide just whether he or she agreed or disagreed with the statement, but rather to choose between several response categories indicating the various degrees of agreement or disagreements. The statements were assigned a score and the respondent's attitudes were measured by his or her total score, which was the sum of the scores for each of the statement. The fourth part concerned various practices of urolithiasis. There were some additional questions to gain more information for health education.

III.RESULTS

A total of 102 participants with in the age range of 22 to 28 years were included in this analysis. The mean age was 25.21 ± 1.041 years. Out of the sample 50.98% (n=52) were males and 49.02% (n=50) were females.

The results showed that the mean knowledge score was 26.18 ± 3.13 out of 36.00. None of the participants scored 0 and none of the participants had the maximum score. Out of the sample 100% (n=102) had seen a patient with urolithiasis. Also 72.55% (n=74) had known that farmers and manual laborers are associated with stone disease. Only 23.53% (n=24) had known that managers are also under the risk of urolithiasis. However, most of them 73.53% (n=75) believed that hard water causes urinary tract stones. Out of the sample 71.57% (n=73) were aware regarding food habits and stone formation and 85.30% (n=87) thought that it runs through families and 74.51% (n=76) believed that stress is a precipitating factor for stone formation.

Their knowledge on risk factors of urolithiasis was poor. Only 20.58% (n=21) had a clear idea of risk factors such as family history, obesity, medullary sponge kidney and gastric bypass. However they were familiar with the symptoms of stone disease and 96.08% (n=98) had better knowledge about symptoms. Also 46.08% (n=47) had an idea of the first line laboratory investigations in a patient with ureteric colic. Out of the sample 75.49% (n=77) were aware with the first drug for pain relief in patients with ureteric colic. Only 66.66% (n=68) had an idea of the drugs which use in Medical Expulsion therapy. Regarding consultation for stone disease, 88.23% (n=90) believed that urologists can give the best treatment for stone disease and 8.82% (n=9) preferred surgeon and 2.94% (n=3) preferred nephrologist for treatments.

Regarding attitudes,

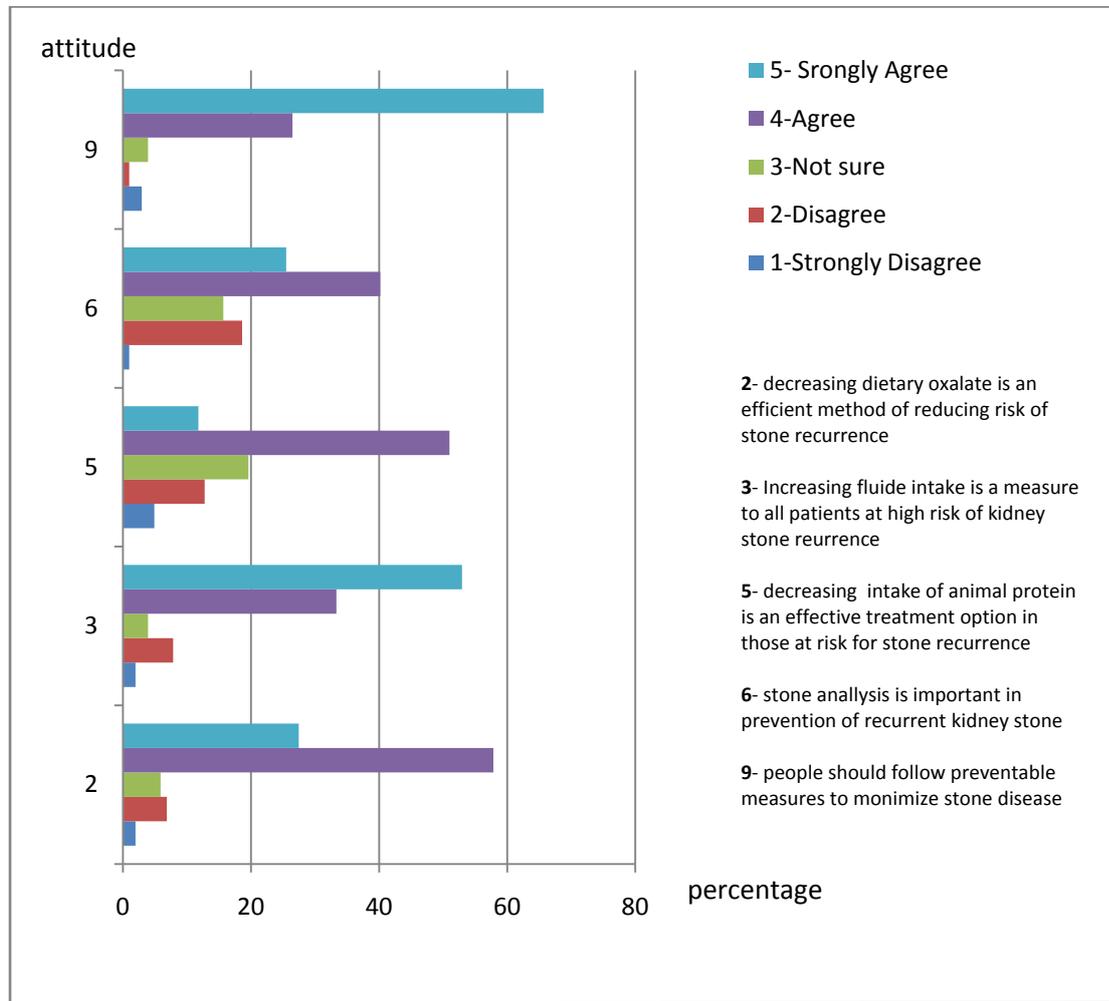


Figure 01- Percentages of positive attitudes of the study sample regarding urinary tract stones

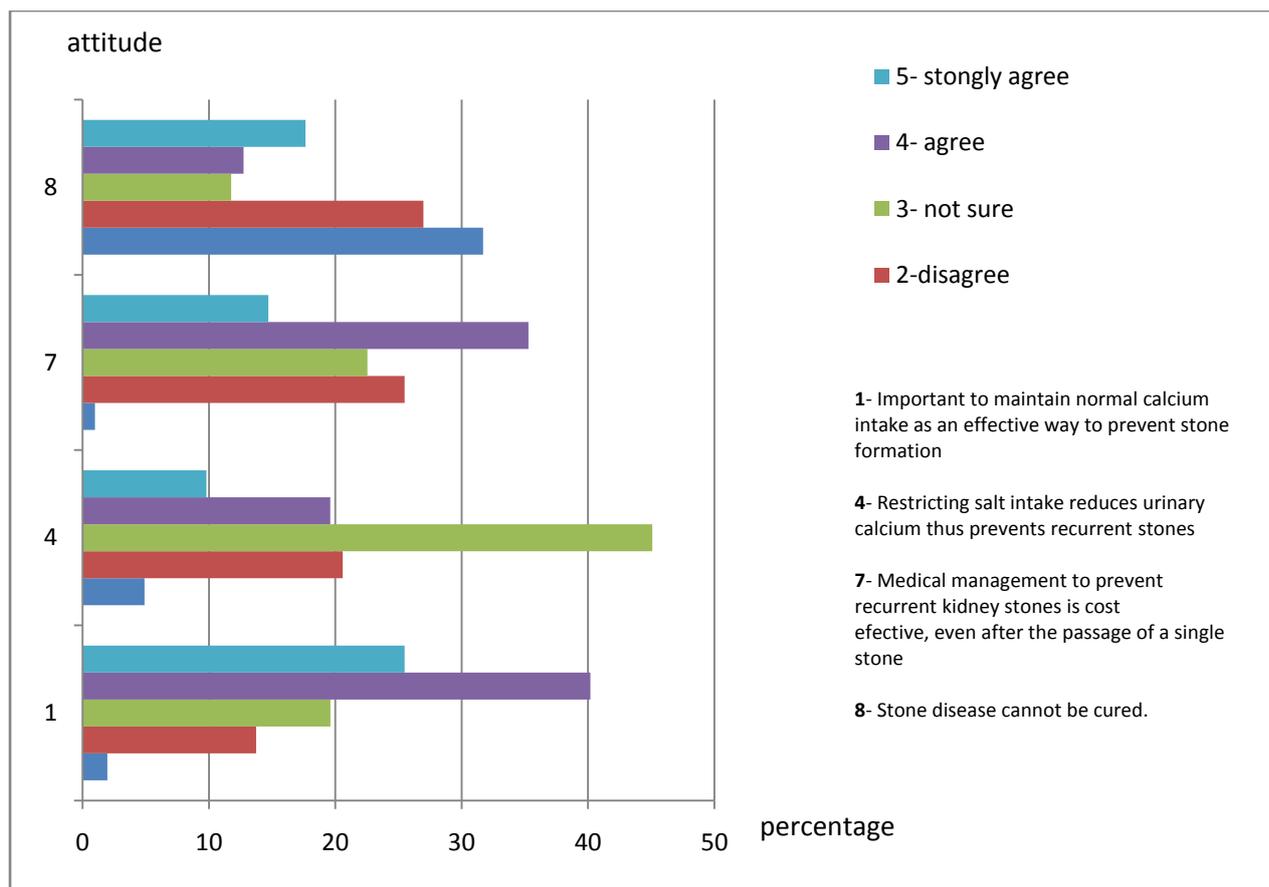


Figure 02- Percentages of negative attitudes of the study sample regarding urinary tract stones

Regarding practice,

90.12% (n= 92) recommended to drink more than 2 liters of water instead of other liquids for patients who suffered from kidney stone disease. Out of the sample 83.35% (n=85) participants agreed to advice to avoid high Ca containing food like sprats, milk and cheese and also to eat more sour sap ('katuanoda').

1V. DISCUSSION

This study was designed to collect information regarding knowledge, attitudes and practices of urolithiasis inmedical students. Though it is not possible to find out a published survey on knowledge, attitudes and practices of urolithiasis in medical studentsdirectly, there are some studies from which we can have an idea aboutgeneral populations' knowledge and attitude about urolithiasis.

According to one of the study ,140 patients who had treated by lithotripsy in Armenia, found that mean knowledge score was 15.6 out of 19 (82.1%) and the mean practice score for participants was 9.1 out of 19 (47.8%).⁽⁴⁾The study showed that despite respondents' sufficient knowledge about kidney stone disease prevention they did not practice protective behavior. Another study was done among 68 health care workers on knowledge, attitudes and practice on prevention of recurrent kidney stones revealed that 70% of respondents were aware the current guidelines and 43% of respondents utilized their knowledge in clinical practice.⁽¹⁰⁾

Results of this study indicate that the knowledge of the medical students regarding urolithiasis is much better. They have better knowledge on type of occupations which associate with urinary tract stones, food habits, and amount of water intake, family risk, symptoms and pain relief drugs. But their knowledge on risk factors, laboratory investigations of urolithiasis and drugs use in medical expulsion therapy seems to be poor. Most of the participants 88.23% (n=90) selected Urologist to take treatment for urolithiasis but some of them preferred surgeon and Nephrologist. Urologists are the doctors specialized in the management of urolithiasis, but some of the participants in our study population did not see any difference between urologist and nephrologist with regard to the management of urinary tract stones.

Attitudes regarding urolithiasis was poor than their knowledge. Only 19.60% (n=20) of participants had positive attitudes towards the statement of “restricting salt intake reduces urinary calcium thus prevents recurrent stones” and 40.19% (n=41) believed that stone analysis is important in prevention of recurrent kidney stones. Out of the sample 35.29% (n=36) agreed with the statement of the “medical management to prevent recurrent kidney stones is cost effective, even after the passage of a single stone”. But Most of the participants more than 50% have positive attitudes with the statements of “decreasing dietary oxalate is an efficient method of reducing risk of stone recurrence”, “increasing fluid intake is a measure to promote for all patients who are at high risk of kidney stone recurrence” and “preventable measures can be minimize stone disease”

In a research which was done among 100 patients who referred for active stone removal in Sweden, showed positive attitudes on prevention of recurrent kidney stones.⁽⁹⁾ In Hong Kong, a research has done to evaluate awareness of prevention strategies on renal stones and found to have that public and the stone patients in the city have little knowledge and awareness.⁽¹⁰⁾ According to our study, the knowledge score and their practice score was comparatively high. It suggested that there was a connection between the knowledge level of participants and their behavior.

V. CONCLUSION

The knowledge score and practice score was comparatively high in our study population. It suggests that there was a connection between the knowledge level of participants and their behavior. Also they were practically applying their theoretical knowledge. However, attitudes were poor. All these attributes was found be better than the general population.⁽¹⁵⁾

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Model studies of single bent pile with respect to different density i.e. loose, medium and dense of cohesion less soil

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Abstract- All engineered construction resting on the earth must be carried by some kind of interfacing element called a foundation. The foundation is the part of an engineered system that transmits to, and into, the underlying soil or rock the loads supported by the foundation and its self-weight. The resulting soil stresses except at the ground surface are in addition to those presently existing in the earth mass from its self-weight.

Piles are used to support the structures. Piles are frequently required because of the relative inability of shallow foundation to transmit inclined, horizontal, or uplift force and over-turning moments. Such situations are common in design of earth retaining structures and tall structures subjected to high wind and earthquake force.

Considering importance and necessity of pile in construction work. This thesis is based on the piles and topic name "Model studies of single bent pile with respect to different density i.e. loose, medium and dense of cohesion less soil".

The main objective of thesis is to determine reduction in load carrying capacity due to bending of single bent pile and also to determine the load carrying capacity of bent pile with respect to different density i.e. loose, medium and dense of cohesion less soil. In the present study, the carrying capacity of pile shall be ascertained under different conditions of soil and bending. The effect of degree of bending shall be studied by at different angle of bend. The study shall be made only in cohesion less soil under different degree of compaction. The study is made on one type of pile material-timber.

I. INTRODUCTION

Driving bearing piles to support the structures is one of the earliest examples of art and science of the civil engineers. Foundations may be classified based on where the load is carried by the ground:

Shallow foundations—termed bases, footings, spread footings, or mats. The ratio $D/B < 1$ but may be somewhat more. Deep foundations—piles, drilled piers, or drilled caissons. $L_p/B > 4+$ with a pile. Need for a pile foundation can be justified in the following situation:

- Upper soil strata are too compressible or generally too weak to support the heavy vertical reaction transmitted by super structure.
- Piles are frequently required because of the relative inability of shallow foundation to transmit inclined, horizontal, or uplift force and over-turning moments. Such situations are common in design of earth retaining structures (walls and bulk-heads) and tall structures subjected to high wind and earthquake force.

- Horizontal forces are resisted either by vertical piles in bending or by groups of vertical and battered piles.
- Pile foundations are often required when scour around footing could cause erosion in spite of the presence of strong, incompressible strata (such as sand and gravel) at shallow depth.
- In areas where expansive or collapsible soils extend to considerable depth below the soil surface, pile foundation may be needed to assure safety against undesirable seasonal movements of the foundations

These piles are classified on following basis:

On the basis material:

- Timber
- Steel
- Plain cement concrete
- Reinforced cement concrete
- Pre-stressed
- Composite

On the basis of method of construction:

- Driven/ displacement precast piles
- Driven/ displacement cast in situ piles
- Bored/ replacement precast piles
- Bored/ replacement cast in situ piles

On the basis of sectional area:

- Circular
- Square
- Tubular
- Octagonal
- H-section

On the basis of load transfer:

- End bearing pile
- Friction pile
- End bearing & frictional pile

On the basis of size of pile:

- Micro/mini pile ($<150\text{mm}$)
- Small diameter pile ($150\text{mm} < \text{diameter} < 600\text{mm}$)
- Large diameter pile ($>600\text{mm}$)

On the basis of inclination of pile:

- Vertical piles
- Raker/batter pile

Principal advantages and disadvantages of different pile materials:

Material	Advantages	Disadvantages
Timber	Easy to handle or cutoff, relative inexpensive material, ready available, naturally tapered, light and very durable below ground level.	Decay above water table, especially in marine environment, limited in size and bearing capacity, prone to damage by hard driving, noisy to drive.
Steel	Easy to handle, cutoff, extend. Available in any length or size, can penetrate hard strata, boulder, soft rock. Convenient to combine with steel superstructure, ability to withstand hard driving, capable for heavy loads.	Subject to corrosion, require protection in marine environment. Flexible H-piles may deviate from axis of driving. Relatively expensive material than timber and concrete. Noisy to drive
Concrete precast	Durable in almost all environment. Convenient to combine with concrete super-structure	Cumbersome to handle and drive. Difficult to cutoff or extend. Noisy to drive.
Cast in situ	Allow inspection before concreting, easy to cutoff and extend	Casting cannot be reused, thin casing may be damaged by impact or soil pressure.

II. REVIEW OF LITERATURE

Boussinesq & Westerguard (1885) developed a method based on elastic analysis for estimating soil pressures at various points in semi-infinite, isotropic, homogeneous and elastic mass of soil continuum. Here loading is vertical point load at the surface.

Mindlin (1936) produced a set of equations giving the stresses due to vertical point load applied below the surface of a semi-infinite medium. The use of this was reported by Khalifa (1940), Grilla(1914). Mindlins equation was extended by J. D. Geddas (1966) for different cases of loading.

Berezantzev, Khristoforov, V. and Glubkov, V. (1961) made theoretical and experimental investigations on the load bearing capacity of single pile and group of piles in sand. They have developed a formula for load bearing capacity and settlement of pile foundation. The settlement was observed to be proportional to square root of the size of footing. Their work on pile groups and pile test demands that the design of pile foundation with free length of piles should be based on the analysis of deformation of frames with rigidly anchored struts

Whitaker and Cooke (1966) presented a simplified method of construction load settlement curve taking account of pile soil slip along the shaft. This type of analysis revealed that for normal piles having a length to diameter ratio (L/d) greater than about 20, the load settlement curve is substantially linear until a load of about 50% to 70% of failure load is reached. The overall load settlement curve is constructed as a combination of relationship between shaft load-settlement, and base load & settlement. Shaft load- versus-settlement and base load-versus-settlement curves were constructed relying on empirical data.

Orrje, O. & Broms, B.B. (1967) studied the effects of pile driving on soil properties. They have concluded that the undrained shear strength of clay is not affected appreciably by pile driving except possibly in the case when the spacing between the individual pile is small (Less than 4 pile diameter).

Johnson (1962) made field measurements on 27m long composite piles in sand and observed that the out-of-plan position of the pile base was of the order of approximately 10% of the pile length. Like parsons & Wilsons (1954) he presented a method of safe load estimation that depended on knowledge of the deflected shape of the pile and the load distribution along the pile shaft.

Hanna (1963) reported the results of three tests on long H section steel piles driven through firm clays to bed rock at 44m depth. A Wilson slope indicator was used to determine the plan position of these piles with depth. In contrast to the pile bending observation of others these piles had two bends and the field observations are reproduced. The top part of this diagram gives the measured components of pile deflections for two of the piles; in the lower part of the figure the plan positions of three piles with depth are shown. In addition to these observations extensive load testing was carried out to arrive at permissible load. Attempts were also made to control pile

III. EXPERIMENTAL INVESTIGATION

General:

To proof the validity of the theoretical analysis an attempt has to be made to analysis the settlement behavior of initially bent piles and pile group in the laboratory under vertical load embedded in sand. An extensive experimental project has to be under taken to evaluate the extent of pile-soil-pile interaction. Emphasis on model test has to be found worth in enhancing an easy and rapid comparison of many combinations of variables. Therefore the principles of dimensional analysis is one of the most systematic approach to interpret ate the results to prototype. In the present investigation, locally available Swarnrekha River sand will be used as soil medium and placement of soil has been made by rainfall method. The soil media will be chosen as loose, medium dense and dense by varying the height of fall of sand while filling the test tank. The behaviors of single wooden bent pile as well as bent piles in a group will be study in the laboratory. The group of piles may be extended to two, three, four and five pile groups respectively. Keeping in view the practical limitations viz. space, size of test tank, time allotted and other constraints, the pile bent will restricted to 0°, 6°, 15°, and 30° and space-diameter ration will be chosen for 2, 4, 6 and 8. The tests shall conduct under loose, moderately dense and dense

state of soil medium. The entire tests will subject to vertical compressive load.

The following experimental program has to be made for undertaking this project. The entire program has to be divided qualitatively and quantitatively into the following major groups.

Single piles						
Angle	L/d Ratio			Soil Medium		
	0°	10	20	40	Loose	Medium dense
6°	10	20	40	Loose	Medium dense	Dense
15°	10	20	40	Loose	Medium dense	Dense
30°	10	20	40	Loose	Medium dense	Dense

Where Soil Medium: - Loose, Dense, Medium dense

Material Sand:- Sand has to be chosen as soil medium for the tests because it is easy to handle and is free from time effects. Dry sand transported from Local River has to be used. Various physical properties of sand has to be found by laboratory method.

Experimental set up:- Experimental set up mainly consists of test tank, loading frame with loading arrangement, pile, pile group and pile caps for testing purpose and measuring devices.

Model piles:-	5 Nos	Straight piles	L/d = 10
	5 Nos	6° Inclined piles	L/d = 10
	5 Nos	15° Inclined piles	L/d = 10
	5 Nos	30° Inclined piles	L/d = 10
	5 Nos	Straight piles	L/d = 20
	5 Nos	6° Inclined piles	L/d = 20
	5 Nos	15° Inclined piles	L/d = 20
	5 Nos	30° Inclined piles	L/d = 20
	5 Nos	Straight piles	L/d = 40
	5 Nos	6° Inclined piles	L/d = 40
	5 Nos	15° Inclined piles	L/d = 40
	5 Nos	30° Inclined piles	L/d = 40

Hence 5 Nos cylindrical wooden piles of 0° inclination, 5 Nos cylindrical wooden piles of 6° inclination, 5 Nos cylindrical wooden piles of 15° inclination and 5 Nos cylindrical wooden piles of 30° inclination of length 300, 600, 1200 mm in length

and 30 mm dia in section shall be made. Young's Modulus of elasticity of pile material has to be found.

Pile caps:- Wooden pile caps have to be fabricated according to different group of pile spacing. Keeping in mind the practical limitations of size of the tank, capacity of loading mechanism, volume of sand to be handled following groups are decided for testing programme.

Single pile: - Angle 0°, 6°, 15°, & 30°

Where d = diameter of the pile

Test Tank: - A wooden tank of size 100 X 100 X 150 cm will be made with 6mm ply board and sufficiently stiffened with 2cm thick wooden plank and 7.5cm x 7.5cm asserted length of wooden runner to serine as a container of sand. The size of tank will be chosen on the basis of following assumptions.

(I) The intensity of stress at the base of tank due to the load on the pile should be small fraction of applied load (5%)

(II) The dispersion planes of stress distribution should not interfere with the walls of the tank.

As the above conditions are satisfied, the sand contained in the tank can be treated as a semi-infinite cohesion less sand media.

Loading arrangements: - The loading arrangement is shown in figure. The loading frame will composed of two vertical channels anchored at bottom. Two channels of the same section will be bolted at tip of the frame to mount screw jack with proving-ring. Load will be applied through a screw jack operated by a gear system. Load will measured by a proving-ring. A Proving ring of required capacity will be used. The proving-rings having calibration 1 div = 1.447 kg will be used to apply load on single pile, group of 2 piles group, 3 piles group, 4 piles group and 5 piles group of straight in nature and inclined in nature of 6°, 15°, & 30°.

Measuring Devices: - Load has to be measured by proving-ring and two numbers dial gauges of least count 0.01 mm will be used to measure the settlement of piles.

Placement of sand:- As it is already been stated earlier that locally available river sand will be used as the soil medium and to maintain the same, placement density for each test while pouring the dry sand through hopper by rain fall method, the height of fall of sand is kept almost constant and the quantity of sand taken every time into hopper was also kept more or less constant to confirm the equal placement density of different layer of deposits, a penetrometer has been used to get the same penetration at each layer.

In the experimental work, three, type of sand deposits i.e. loose deposits, medium dense deposits and dense deposits shall be maintained. The corresponding relative densities shall be determined. The details of soil properties shall be presented. The angles of shear resistance from direct shear tests shall be determined for loose, medium dense and dense sand.



IV. EXPERIMENTAL PROCEDURE

Vertical Load Test

Due to specific time limit and depending on the availability of the instruments in the laboratory the experimental investigation has been restricted to vertical pile load test only. However a good number of tests have been carried-out on a single bent pile and bent pile groups.

Single Pile Load Test: - At first a sand layer of 200mm will be provided at the bottom of the tank by pouring sand from constant height. Then the pile with pile cap will be placed in a vertical position by little penetration into the sand to ensure proper seating of the pile and will be held in position till the tank is filled up. The tank will be filled up to the required level by pouring sand from some constant height. Single pile will be tested for three depths of embedment i.e. 275 mm. ($L/d = 10$), 575 mm. ($L/d = 20$), 1175 mm. ($L/d = 40$) for straight pile and different angle inclined piles i.e. ($6^\circ, 15^\circ, 30^\circ$). The dial gauges of least count 0.01 mm will be placed in two opposite sides of the pile on the pile cap for measuring the settlement at different loading increments. Load will then apply with the help of screw jack and was measured with proving ring having calibration 1 div. = 1.447 kg till the failure takes place. Failure of pile will assumed when the proving ring dial gauge shows no further resistance for increasingly applied displacements for the test. The tests have to be done for different density of sand such as loose, medium dense and dense on straight and inclined piles of angle of bent $6^\circ, 15^\circ$, & 30° by varying the height of fall of sand.

Load versus settlement curve have to be shown by graphical representation. The ultimate load capacities will be obtained from the load displacement curve.

V. PRESENTATION OF RESULTS & DISCUSSIONS

6.1 GENERAL: - In the present investigation locally available cohesion less soil has been used as soil medium and placement of soil has been made by rainfall method. Throughout the investigation identical method for placement of soil was used for different densities. For a particular density viz. loose or medium or dense. The variation being marginal for each cases for that particular density. Relevant soil properties required for the theoretical analysis and to represent the particular soil, details of test results are presented appendix -A. As the nature of problem is three dimensional, tri-axial test was performed to get the value of angle of shearing resistance (Φ).

Considering the main objective of present investigation i.e. to know the behavior of bent piles and pile groups under vertical load, a series of single pile test and tests on group of two piles, three piles, four piles and five piles have been carried out. Due to practical limitations of the size of the tank, capacity of the loading arrangement and volume of sand to be handled, spacing of pile has been restricted to 2d, 4d, 6d & 8d. The details of tests procedure and setup have already been discussed in unit-V of this thesis.

6.2 SINGLE PILE TEST AND LOAD SETTLEMENT BEHAVIOUR

The load settlement behavior for single vertical straight pile and bent piles of different angle of bent embedded in locally available cohesion-less soil have been carried out in the laboratory and test results have been presented on table no:-6.1 to 6.3 and fig no:-6.1 to 6.3.

It is observed from the figure that all cases the safe load carrying capacity is decreasing with respect to increase in angle of bent (β). The numerical value of safe load (Q) is dependent on soil density and slenderness ratio(L/d) of pile.

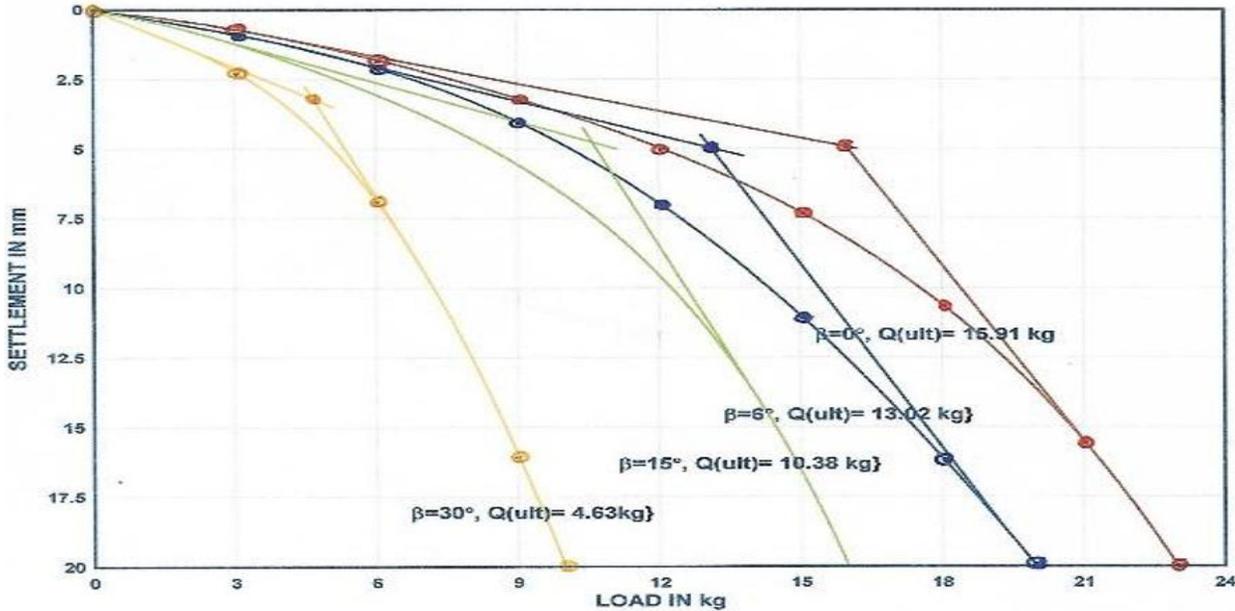
TYPICAL LOAD Vs SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND

TYPE OF SOIL: - LOOSE

SLENDERENESS RATIO (L/d) = 10, ONE PILE

$\beta=0^0$		$\beta=6^0$		$\beta=15^0$		$\beta=30^0$	
LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE
0	0	0	0	0	0	0	0
1	0.33	1	0.33	1	0.5	1	0.67
2	0.51	2	0.51	2	0.67	2	1.42
3	0.68	3	0.83	3	1.17	3	2.17
4	0.91	4	1.25	4	1.84	4	3.34
5	1.33	5	1.66	5	2.34	5	3.68
10	3.84	10	3.84	10	6.68	8	20
15	7.18	15	11	15	16.54	Q(ULT)=4.63kg	
20	13.69	19	20	16	20		
23	20	Q(ULT)=113.02kg		Q(ULT)=10.38kg			
Q(ULT)=15.91kg							

TYPICAL LOAD VS SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND(β)
 SELENDERNESS RATIO (L/d)=10
 TYPE OF SOIL-LOOSE
 SINGLE PILE



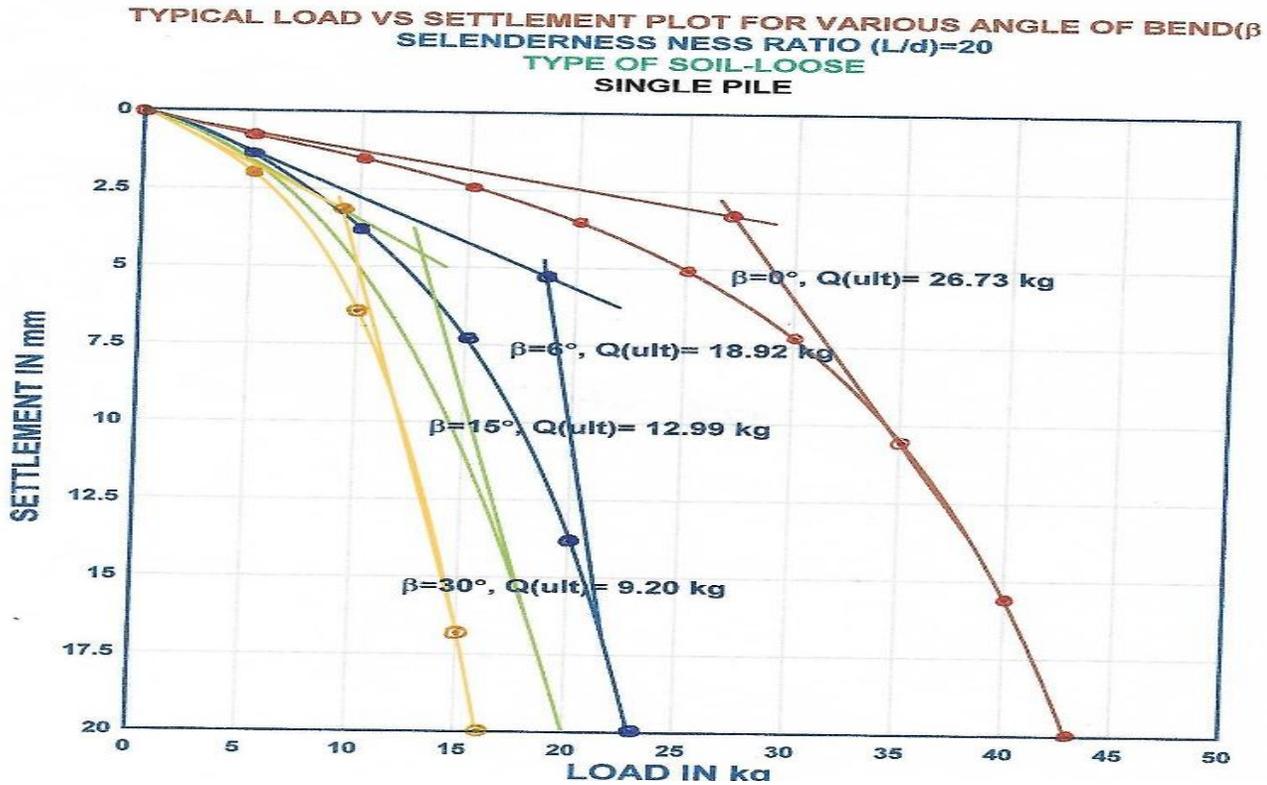
TYPICAL LOAD Vs SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND

TYPE OF SOIL: - LOOSE

SLENDERENESS RATIO (L/d) = 20, ONE PILE

$\beta=0^0$		$\beta=6^0$		$\beta=15^0$		$\beta=30^0$	
LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE
0	0	0	0	0	0	0	0
10	1.5	1	0.33	1	0.33	1	0.5
20	3.25	2	0.51	2	0.51	2	0.66
30	7.75	3	0.68	3	0.83	3	1.25
40	13.25	4	0.91	4	1.25	4	2.25
43	20	5	1.33	5	1.66	5	3.5
Q(ULT)=26.73kg		10	3.84	10	4.84	10	4.5
		15	7.18	15	11	15	16.53
		20	13.69	20	20	16	20

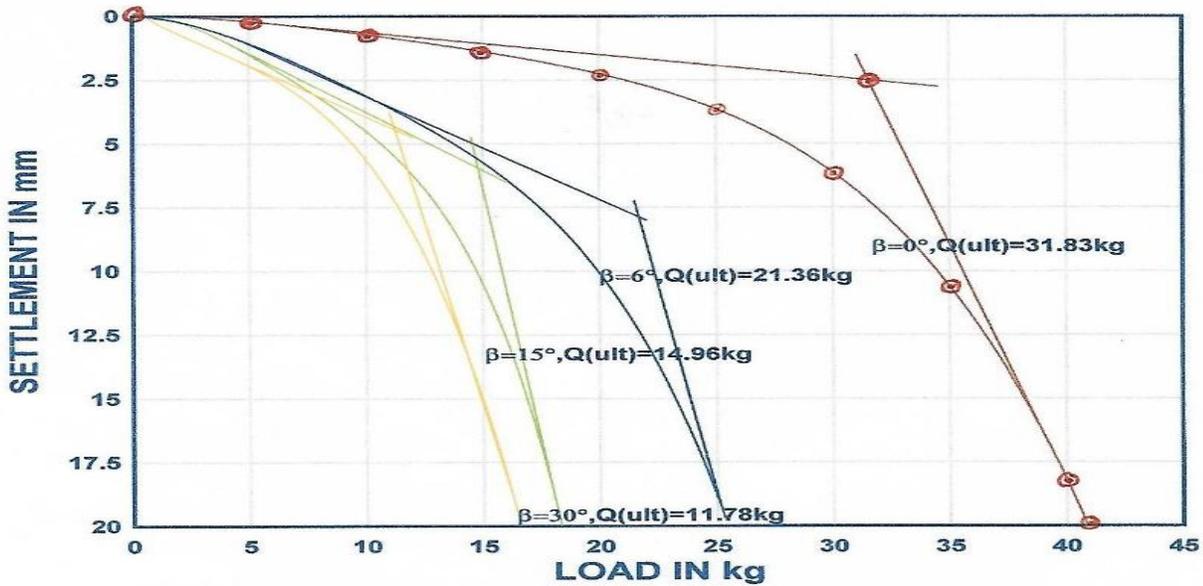
		23	20	Q(ULT)=12.99kg	Q(ULT)=9.20kg
		Q(ULT)=18.92kg			



TYPICAL LOAD Vs SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND
 TYPE OF SOIL: - LOOSE
 SLENDERNESS RATIO (L/d) = 40, ONE PILE

$\beta=0^0$		$\beta=6^0$		$\beta=15^0$		$\beta=30^0$	
LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE
0	0	0	0	0	0	0	0
5	0.25	5	1.17	5	1.5	5	1.75
10	0.69	10	2.93	10	4.50	10	5.75
15	1.34	15	5.85	15	10.5	15	11.75
20	2.34	20	8.35	18.33	20	16	20
25	3.75	25	18.5	Q(ULT)=14.96kg		Q(ULT)=11.78kg	
30	6.01	25.33	20				
35	10.52	Q(ULT)=21.36kg					
40	18.54						
41	20						
Q(ULT)=31.83kg							

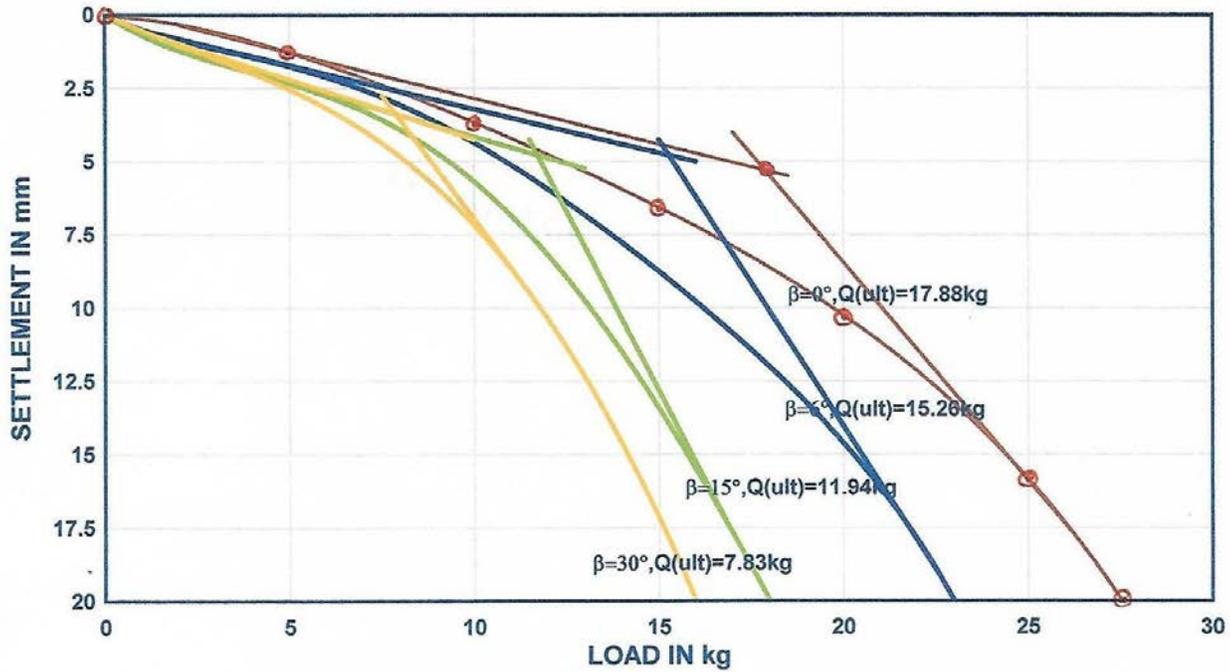
TYPICAL LOAD VS SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND (β)
SELENDERNESS RATIO $-(L/d)=40$
TYPE OF SOIL -LOOSE
SINGLE PILE



TYPICAL LOAD Vs SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND
 TYPE OF SOIL: - MEDIUM DENSE
 SLENDERENESS RATIO (L/d) = 10, ONE PILE

$\beta=0^0$		$\beta=6^0$		$\beta=15^0$		$\beta=30^0$	
LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE
0	0	0	0	0	0	0	0
5	1.67	5	1.75	5	2.34	5	2.84
10	3.26	10	3.84	10	6.68	10	7.18
15	6.85	15	7.18	15	16.54	15	17.16
20	10.35	20	13.69	18	20	16	20
25	15.70	23	20	Q(ULT)=11.94kg		Q(ULT)=7.83kg	
27.5	20	Q(ULT)=15.26kg					
Q(ULT)=17.88kg							

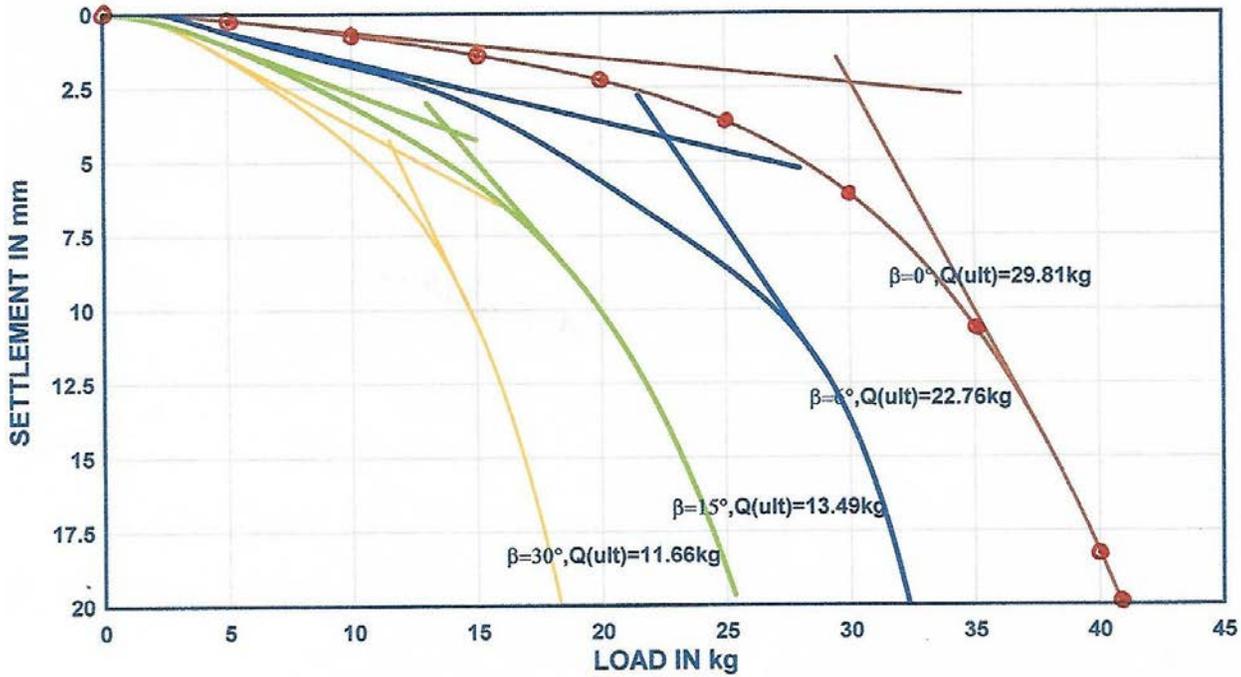
TYPICAL LOAD VS SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND (β)
SELENDERNESS RATIO $-(L/d)=10$
TYPE OF SOIL -MEDIUM DENSE
SINGLE PILE



TYPICAL LOAD Vs SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND
 TYPE OF SOIL: - MEDIUM DENSE
 SLENDERENESS RATIO $(L/d) = 20$, ONE PILE

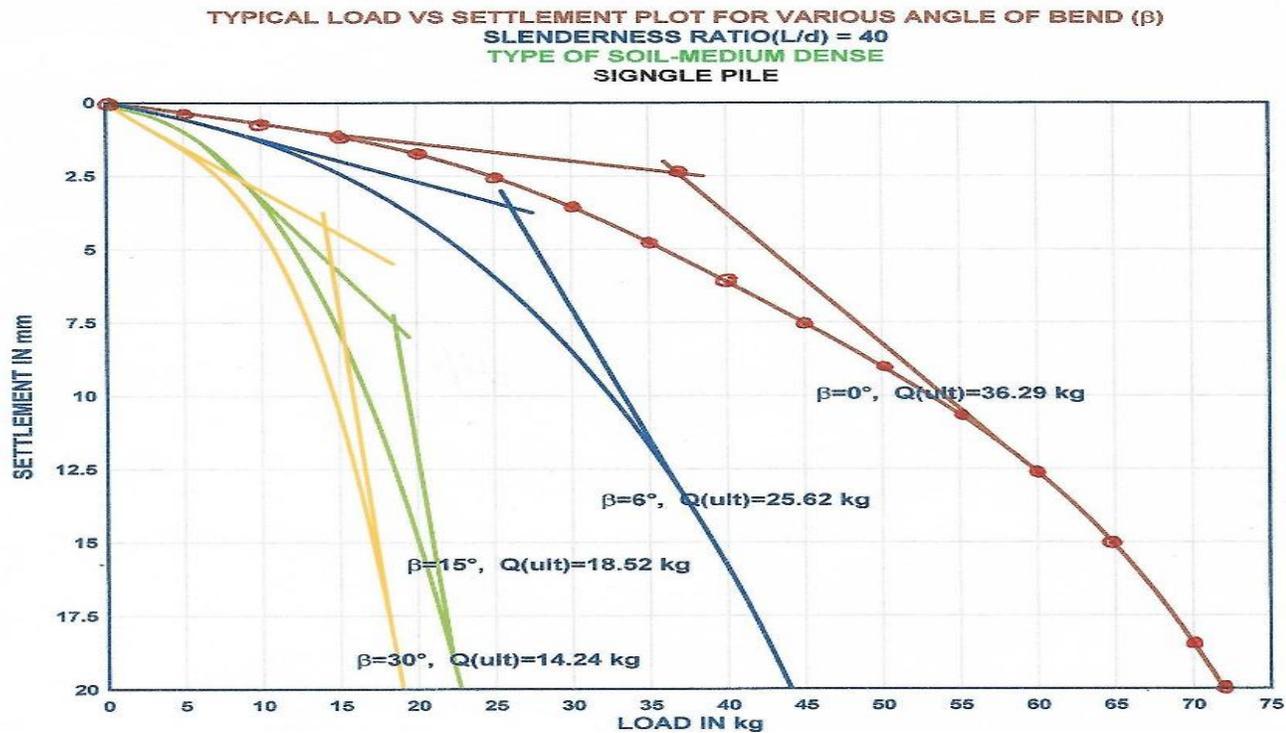
$\beta=0^0$		$\beta=6^0$		$\beta=15^0$		$\beta=30^0$	
LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE
0	0	0	0	0	0	0	0
5	0.25	5	0.66	5	1.17	5	1.50
10	0.67	10	1.67	10	2.92	10	3.76
15	1.34	15	3.20	15	5.85	15	8.35
20	2.34	20	5.51	20	10.02	18.33	20
25	3.76	25	8.68	25	16.78	Q(ULT)=7.83kg	
30	6.01	30	13.69	25.33	20		
35	10.52	32.33	20	Q(ULT)=13.49kg			
40	18.54	Q(ULT)=22.76kg					
41	20						
Q(ULT)=29.81kg							

TYPICAL LOAD VS SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND (β)
SELENDERNESS RATIO $-(L/d)=20$
TYPE OF SOIL -MEDIUM DENSE
SINGLE PILE



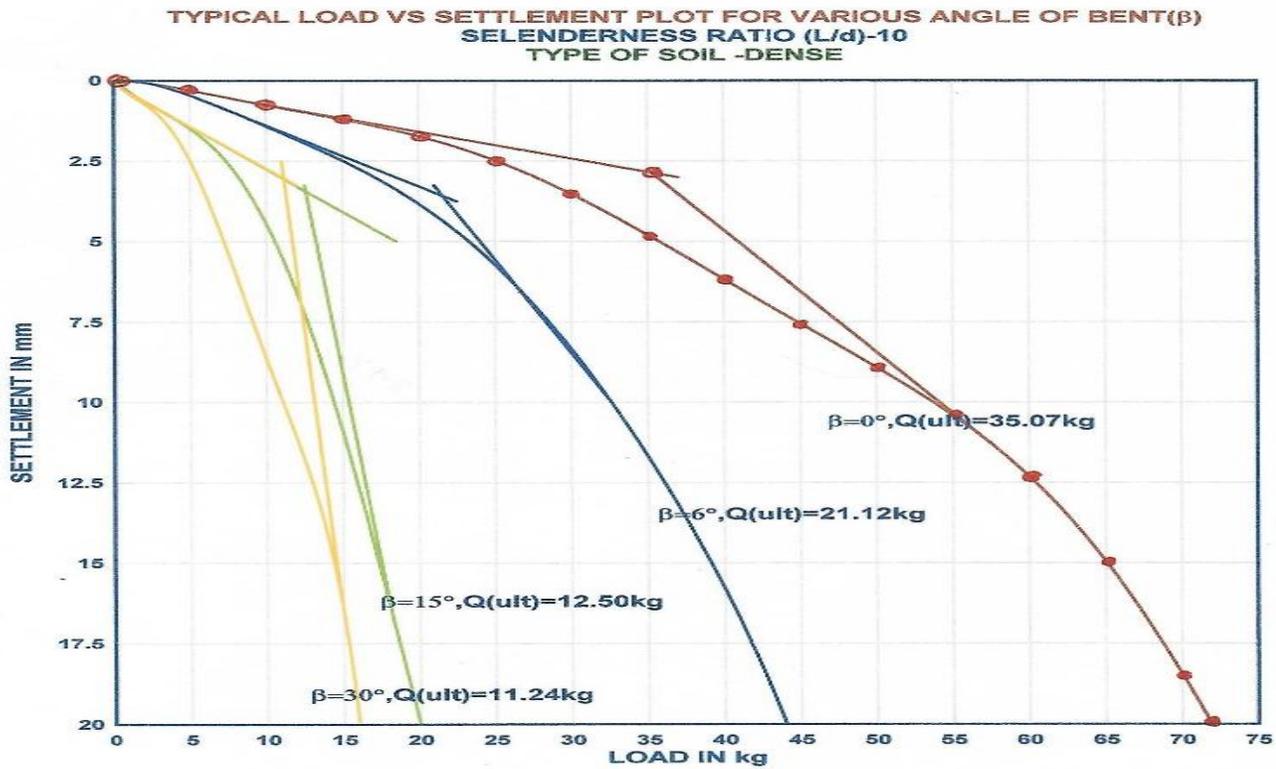
TYPICAL LOAD Vs SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND
 TYPE OF SOIL: - MEDIUM DENSE
 SLENDERNESS RATIO $(L/d) = 40$, ONE PILE

$\beta=0^0$		$\beta=6^0$		$\beta=15^0$		$\beta=30^0$	
LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE
0	0	0	0	0	0	0	0
5	0.33	5	0.50	5	1.33	5	1.50
10	0.50	10	1.34	10	3.84	10	4.50
15	1.17	15	2.51	15	7.18	15	10.5
20	1.67	20	3.84	20	13.69	18.33	20
25	2.59	25	5.85	23	20	Q(ULT)=14.24kg	
30	3.50	30	8.52	Q(ULT)=18.52kg			
35	4.84	35	11.86				
40	6.01	40	15.70				
45	7.52	44	20				
50	9.02	Q(ULT)=25.62kg					
55	10.69						
60	12.02						
65	15.03						
70	18.54						
72	20						
Q(ULT)=36.29kg							



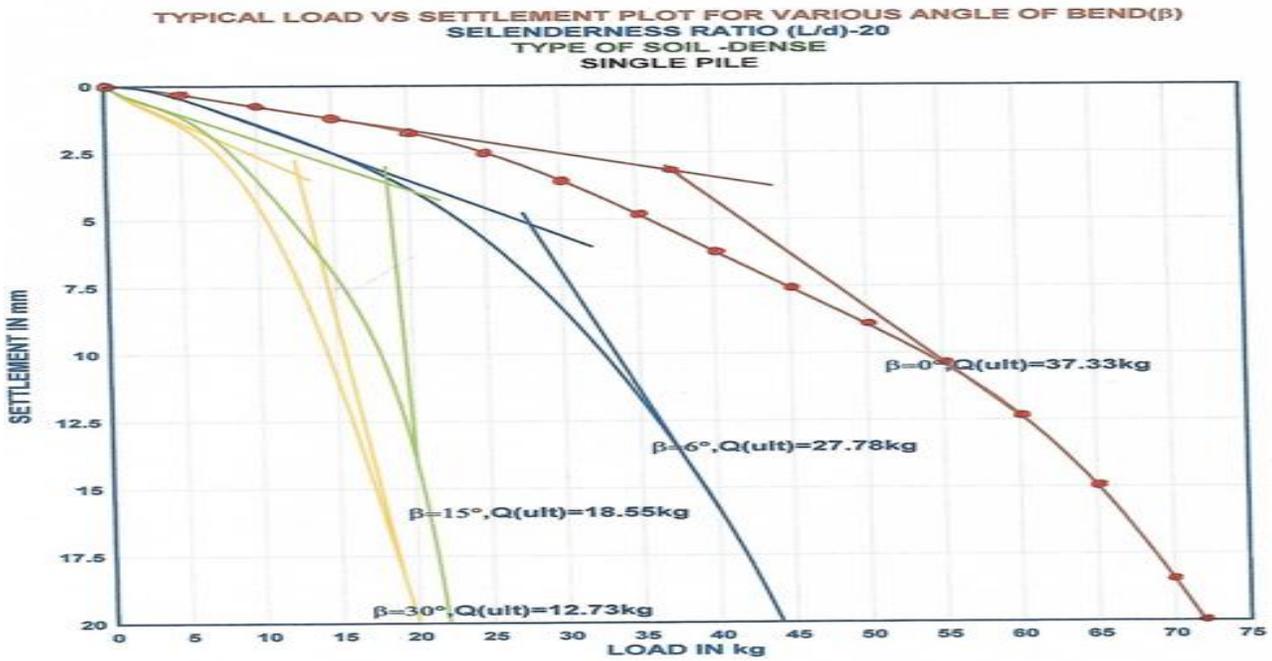
TYPICAL LOAD Vs SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND
 TYPE OF SOIL: - DENSE
 SLENDERENESS RATIO (L/d) = 10, ONE PILE

$\beta=0^0$		$\beta=6^0$		$\beta=15^0$		$\beta=30^0$	
LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE
0	0	0	0	0	0	0	0
5	0.33	5	0.50	1	.33	1	0.5
10	0.50	10	1.34	2	0.51	2	0.67
15	1.17	15	2.51	3	0.83	3	1.17
20	1.67	20	3.84	4	1.25	4	1.84
25	2.59	25	5.85	5	1.66	5	2.34
30	3.50	30	8.52	10	4.84	10	6.68
35	4.84	35	11.86	15	11	15	16.54
40	6.01	40	15.70	20	20	16	20
45	7.52	44	20	Q(ULT)=12.50kg		Q(ULT)=11.26kg	
50	9.02	Q(ULT)=21.12kg					
55	10.69						
60	12.02						
65	15.03						
70	18.54						
72	20						
Q(ULT)=35.01kg							



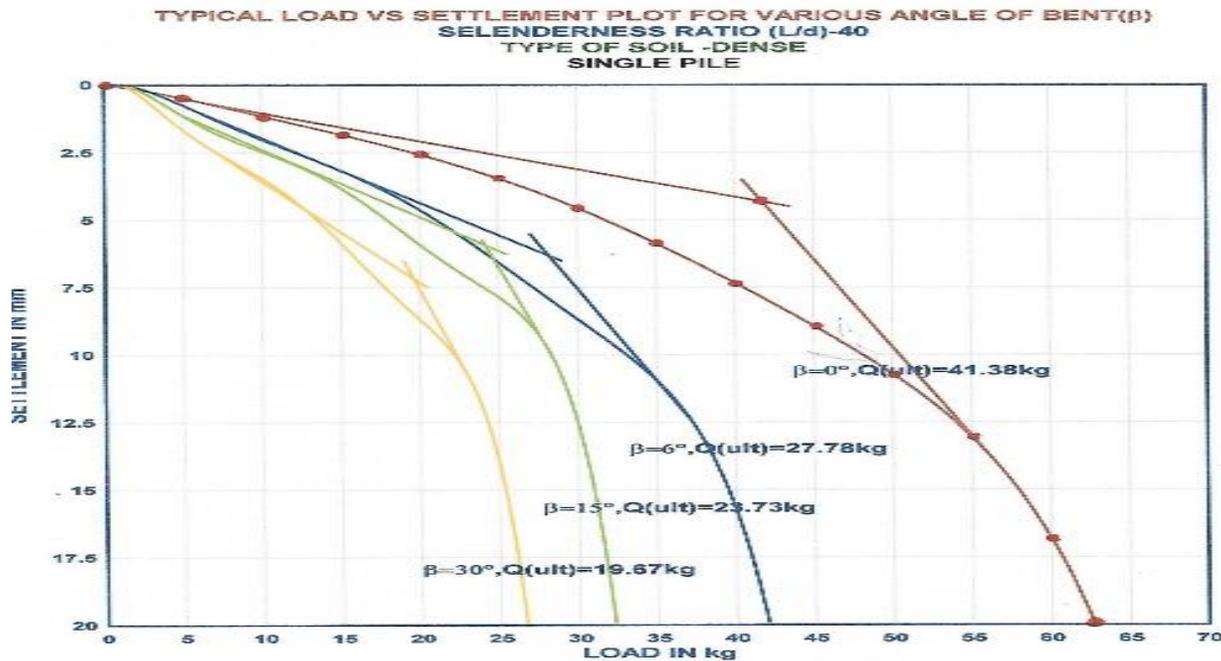
TYPICAL LOAD Vs SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND
 TYPE OF SOIL: - DENSE
 SLENDERNESS RATIO (L/d) = 20, ONE PILE

$\beta=0^0$		$\beta=6^0$		$\beta=15^0$		$\beta=30^0$	
LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE
0	0	0	0	0	0	0	0
5	0.33	5	0.50	1	0.33	1	.33
10	0.50	10	1.34	2	0.51	2	0.51
15	1.17	15	2.51	3	0.68	3	0.83
20	1.67	20	3.84	4	0.91	4	1.25
25	2.59	25	5.85	5	1.33	5	1.66
30	3.50	30	8.52	10	3.84	10	4.84
35	4.84	35	11.86	15	7.18	15	11
40	6.01	40	15.70	20	13.69	20	20
45	7.52	44	20	23	20	Q(ULT)=12.73kg	
50	9.02	Q(ULT)=23.73kg		Q(ULT)=18.55kg			
55	10.69						
60	12.02						
65	15.03						
70	18.54						
72	20						
Q(ULT)=37.33kg							



TYPICAL LOAD Vs SETTLEMENT PLOT FOR VARIOUS ANGLE OF BEND
 TYPE OF SOIL: - DENSE
 SLENDERNESS RATIO (L/d) = 40, ONE PILE

$\beta=0^0$		$\beta=6^0$		$\beta=15^0$		$\beta=30^0$	
LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE	LOAD	SETTLE
0	0	0	0	0	0	0	0
5	0.50	5	0.84	5	1.17	5	1.67
10	1.17	10	1.84	10	2.39	10	3.44
15	1.84	15	3.26	15	3.94	15	5.85
20	2.42	20	4.68	20	5.76	20	8.68
25	3.50	25	6.51	25	7.95	25	14.03
30	4.68	30	8.52	30	11.36	26.66	20
35	5.85	35	11.19	32.3	20	Q(ULT)=19.67kg	
40	7.27	40	15.53	Q(ULT)=23.73kg			
45	8.77	42	20				
50	10.86	Q(ULT)=27.78kg					
55	13.19						
60	16.54						
62.65	20						
Q(ULT)=41.38kg							



VI. CONCLUSIONS

It is noted that the behavior of various bent pile tests with respect to load carrying capacity is imaging good and this confirms that contrary to general belief the bent piles have relatively good load carrying capacity. In all cases there is load reduction in capacity with respect to the straight vertical piles.

It was observed that the variation in load reductions are less with respect to variation in angle of bent i.e. 0° to 15° but the load reduction is large when angle of bent is greater than 15° (i.e. 30°). Thus, as the bend increases, the load carrying capacity decreases.

The ultimate load carrying capacity is lesser cohesion-less soil for the same type of pile (i.e. same L/d ratio & same angle of bent) than dense soil. But the percentage reduction in load carrying capacity of pile is lesser in loose soil as compared to dense soil. In case of loose soil percentage reduction in load bearing capacity is 33% to 37% and in case of dense soil percentage reduction in load bearing capacity is 38% to 45%.

A bent pile having sharp bent gives more reduction in capacity as compared to piles having long sweep. On the other hand it can be stated that a sharp bend or knuckle is more detrimental than a long sweep.

The load carrying capacity of initially bent piles has great influence of on slenderness ratio. From fig no-4.16 to 4.30, it is noted that the increase in L/d ratio increases the ultimate load carrying capacity. The percentage reduction in ultimate load carrying capacity is lesser for higher slenderness ratio.

From table 4.16 to 4.22 it is observed that the variation of theoretical results and experimental results are marginal. In single pile theoretical load carrying capacity of pile is higher than that of experimental values. The increases of values are within the range of 2.5% to 18% in all cases. In group of piles the trends are observed of similar nature, for two pile group the variation are within the range of 2.75% to 12.5%, for group of three piles

0.80% to 7.50% , for group of four piles 1% to 4% and for group of five piles 0.45% to 4%. These variations incorporate all variables e.g. slenderness ratio (L/d), angle of bent (β) and change of degree of compaction of soil.

The objective of this detail experimental study on initially bent model piles made of wood is to know the behaviour of pile capacity under vertical load. The behaviour of such piles for a range of loading and pile conditions has been presented. This has enabled areas of importance to be identified that will provide a basis for further laboratory, field and analytical study. It is clear that much in foundation or much investigation still has to be done before a full understanding of the behavior of the bent piles can be achieved.

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Impacts of Relative Humidity and Mean Air Temperature on Global Solar Radiations of Ikeja, Lagos, Nigeria

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Abstract- This study was aimed at the determination of the relationships between the global solar radiation, relative humidity and mean air temperature of Ikeja, Lagos state Nigeria, for the month of June, 2016. The data of minimum and maximum temperature as well as the relative humidity and Microsoft excel tool was used for this work. From the study, it was observed that global solar radiation is affected by both the mean air temperature and relative humidity. The positive correlation of 0.460648 (46.648%) shows that global solar radiation increases with increase in mean air temperature. While global solar radiation increases with decrease in relative humidity based on its negative correlation value of -0.47686 (-47.686%). An accurate knowledge of solar radiation distribution at a particular location is very useful in the sizing of the thermal solar systems to estimates their performances.

Index Terms- Seasonal Global solar radiation, relative humidity, mean temperature, correlation.

I. INTRODUCTION

The weather conditions of any given location is often described in terms of the meteorological elements which include the state of the sky, temperature, winds, pressure, precipitation, and humidity. These factors initiate and influence the atmospheric processes (Ayoade, 1993).

Solar radiation is the most important parameter in the design and evaluation of solar energy devices. An accurate knowledge of solar radiation distribution at a particular geographical location play a vital role in the surveys of agronomy, hydrology, ecology and sizing of the photovoltaic or thermal solar systems and estimates of their performances (Ituen, *et.al.*(2012)). Research outcomes on studies of global solar radiation have facilitated improvement in Agronomy, power generation, environmental temperature controls, etc. (Ugwu, & Ugwuanyi, (2011)). For instance, knowing how some of these metrological elements-the state of the sky, temperature, winds, pressure, precipitation, and humidity affect the amount of solar radiation reaching a particular place at a particular time of the year will in no small way help for proper planning in the area of solar power generation. The knowledge of when less solar radiation or solar energy will be less will aid in adequate planning such as having other backup power such to supplement for the insufficiency of the installed solar power system.

Irrigation farmers will also know when to apply less water to their crops which may results in excess water in the soil, hence causing adverse effects to the crops.

According to Dimaset.*al.* (2011), in their report, two methods were used, (building a decision matrix, and finding the correlation between relative humidity, clearness index and beam transmittance), and was observed that during the dry season, the solar radiation was high on the most of the days and the estimated results show good compromise with the measured results. In other words, when there is high relative humidity (wet period), solar radiation will be low while in dry season, the solar radiation will be high, showing that relative humidity has effects on solar radiation of a place.

Olusola & Babatunde (2014), made use of Hargreaves-Samanni model and observed that strong correlation exists between solar radiation and air temperature together with latitude and longitude of the selected stations. It made use of only maximum and minimum air temperature but with little element of relative humidity in it.

Solar energy has many applications some of which are generation of electricity for rural areas, powering of satellites in space, and the advantages of solar energy includes environmental friendliness, noise free, pollution free, renewable, always available, and easy to maintain (Mathias, 2014).

II. MATERIALS AND METHOD

2.1 Materials

The materials used for this work are the data of minimum and maximum temperature as well as the relative humidity of Ikeja, Nigeria, for June 2016obtained from the achieve of weather online limited, and the Microsoft excel software. The study area is Ikeja, the capital of Lagos state, Nigeria. Lagos state is located in the South-Western Nigeria. The study location is within latitude and longitude 6.4N and 3.35E respectively. Because water is the most topographical feature of Lagos state, water and wetlands cover 40% of the total land area in the state (Albert *et al.*(2006)). Lagos state is bounded from the North and East by Ogun state, West by the Republic of Benin, and South by the Atlantic Ocean. It has two seasons; rainy and dry seasons due to its tropical savanna climate. The rainy season is from April to September, but the intense rain is from April to July, and the dry season is from October to March. It has an average temperature of 27^oc.

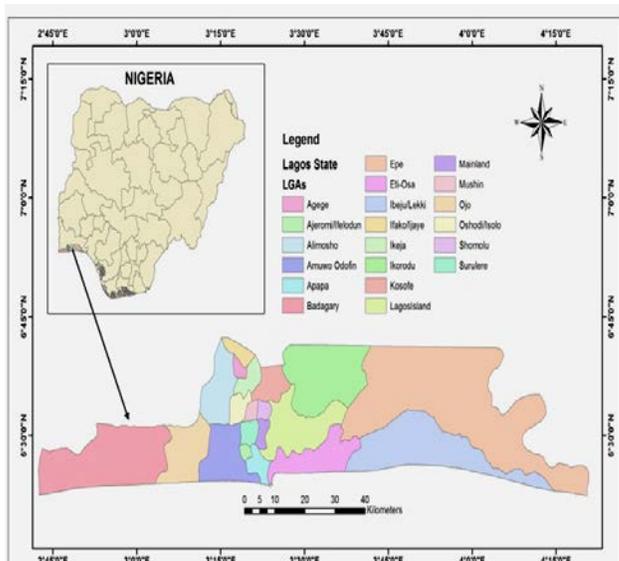


Fig. 1: Map of Nigeria showing the study area

2.2 Methods

The global solar radiation is defined as the total amount of solar energy received by earth’s surface. The global solar radiation was calculated using Hargreaves-Samanni model equation. This model uses data of minimum and maximum air temperatures on the location or study area to predict the global solar radiations. Hargreaves-Samanni model equation is given as:

$$R_s = K_{RS} (\sqrt{T_{max} - T_{min}}) R_a \quad \text{----- 1}$$

Where, T_{max} represents the maximum temperature, T_{min} represents minimum temperature, R_a represents the extraterrestrial solar radiation of the area and K_{RS} is a constant called adjustment coefficient. It has an approximate value of 0.16 for ‘interior’ locations (where land mass dominates and air masses are not strongly influenced by a large water body), and 0.19 for ‘coastal’ locations, situated on the coast of a large land mass and where air masses are influenced by a nearby water body. The value of 0.19 was used for this work as a result of the location of the study area (Lagos state) in the coastal area.

2.2.1 Calculation processes

2.2.1.1 Global solar radiation

To calculate the Global solar radiation, the following parameters were first calculated using the following steps:

(i) **Calculation of solar radiation declination:** It is defined as the angle made between a ray of the sun, when extended to the centre of the earth and the equatorial plane. The solar radiation declination of the area is given by the formula;

$$\delta = 23.44 \cos \left\{ \left(\frac{360}{365} \right) * (J + 10) \right\} \quad \text{----- 2}$$

Where J is the number of the day in the year between 1 (1 January) and 365 or 366 (31 December) and δ is solar radiation declination in degree .

Solar radiation declination is to be in radians, thus (2) is converted to radian as in (3).

$$\delta_{rad} = \frac{\delta \times \pi}{180} \quad \text{----- 3}$$

(ii) **Calculation of sunset angle:** It is defined as the angle of the daily disappearance of the sun below the horizon due to the rotation of the earth. Sunset time is the time in which the trailing edge of the sun’s disk disappears below the horizon. It is determined using the expression given as;

$$\omega_s = \cos^{-1}(-\tan(\phi) \tan(\delta)) \quad \text{----- 4}$$

Where ω_s is sunset angle in radians, δ is the solar radiation declination in radian, and ϕ is the angle of latitude of the location.

(iii) **Calculation of inverse relative distance Earth-sun:** It is defined as the inverse distance of the sun relative to the earth at the location. It is calculated using the expression given as;

$$d_r = 1 + 0.033 \cos \left(\frac{2\pi J}{365} \right) \quad \text{--- 5}$$

(iv) **Calculation of extraterrestrial solar radiation:** It is defined as the solar radiation outside the earth’s atmosphere. The extraterrestrial radiation is calculated using the expression given as;

$$R_a = \frac{24(60)}{\pi} G_{sc} d_r [w_s \sin(\phi) \sin(\delta) + \cos(\phi) \sin(w_s)] \quad \text{--- 6}$$

where R_a is extraterrestrial radiation , d_r is the inverse relative earth-sun distance, ϕ is the latitude angle, w_s is the sunset angle, and G_{sc} is solar constant = 0.0820 MJ m⁻² min⁻¹ or 1367wm⁻².

(v) **Calculation of global solar radiation:** The global solar radiation is now calculated using the formula given as;

$$R_s = K_{RS} (\sqrt{T_{max} - T_{min}}) R_a \quad \text{----- 7}$$

2.2.1.2. Mean air temperature (T_{Av})

The mean air temperature is the average of the maximum and minimum air temperatures. It was calculated from the average of the minimum and maximum temperatures of the study area.

$$T_{av} = (T_{max} + T_{min})/2 \quad \text{----- 8}$$

Table 1: Relative humidity, minimum and maximum air temperatures for June, 2016.

s/n	T _{max} (0c)	T _{min} (0c)	RH (%)	T _{av} (0c)
1	33	24	65	28.5
2	29	24	50	26.5
3	33	24	70	28.5
4	33	24	65	28.5
5	33	26	80	29.5

6	33	25	75	29.0
7	28	25	90	26.5
8	33	22	60	27.5
9	30	24	85	27.0
10	32	22	75	27.0
11	32	24	70	28.0
12	28	22	90	25.0
13	33	24	75	28.5
14	30	25	80	27.5
15	27	25	90	26.0
16	31	22	75	26.5
17	30	21	85	25.5
18	32	24	75	28.0
19	32	22	80	27.0
20	26	23	95	24.5
21	29	22	95	25.5
22	31	22	83	26.5
23	31	23	83	27.0
24	30	24	75	27.0
25	30	23	85	26.5
26	30	23	85	26.5
27	29	24	85	26.5
28	30	23	80	26.5
29	30	23	75	26.5
30	31	23	65	27.0

180	23	30	26.5	80	32.505	16.340
181	23	30	26.5	75	32.512	16.344
182	23	31	27.0	65	32.521	17.477

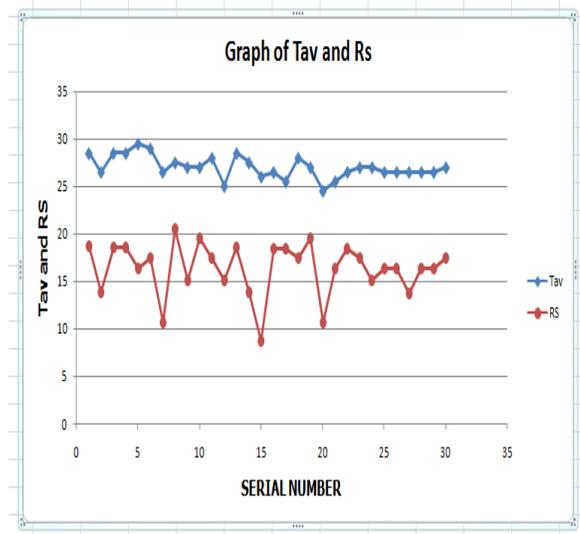


Fig 2: Graph of mean air temperature and global solar radiation

III. RESULT AND DISCUSSIONS

Table 2: Calculated global solar radiation

J	T _{min} (0c)	T _{max} (0c)	T _{av} (0c)	RH (%)	Ra (kwh)	Rs(kwh)
153	24	33	28.5	65	32.800	18.696
154	24	29	26.5	50	32.773	13.924
155	24	33	28.5	70	32.746	18.665
156	24	33	28.5	65	32.722	18.651
157	26	33	29.5	80	32.698	16.437
158	25	33	29.0	75	32.676	17.560
159	25	28	26.5	90	32.654	10.746
160	22	33	27.5	60	32.635	20.565
161	24	30	27.0	85	32.616	15.180
162	22	32	27.0	75	32.599	19.586
163	24	32	28.0	70	32.583	17.510
164	22	28	25.0	90	32.568	15.157
165	24	33	28.5	75	32.554	18.556
166	25	30	27.5	80	32.542	13.826
167	25	27	26.0	90	32.531	8.741
168	22	31	26.5	75	32.521	18.537
169	21	30	25.5	85	32.513	18.532
170	24	32	28.0	75	32.506	17.469
171	22	32	27.0	80	32.500	19.527
172	23	26	24.5	95	32.495	10.694
173	22	29	25.5	95	32.492	16.334
174	22	31	26.5	83	32.490	18.519
175	23	31	27.0	83	32.489	17.460
176	24	30	27.0	75	32.490	15.121
177	23	30	26.5	85	32.492	16.333
178	23	30	26.5	85	32.495	16.335
179	24	29	26.5	85	32.500	13.808

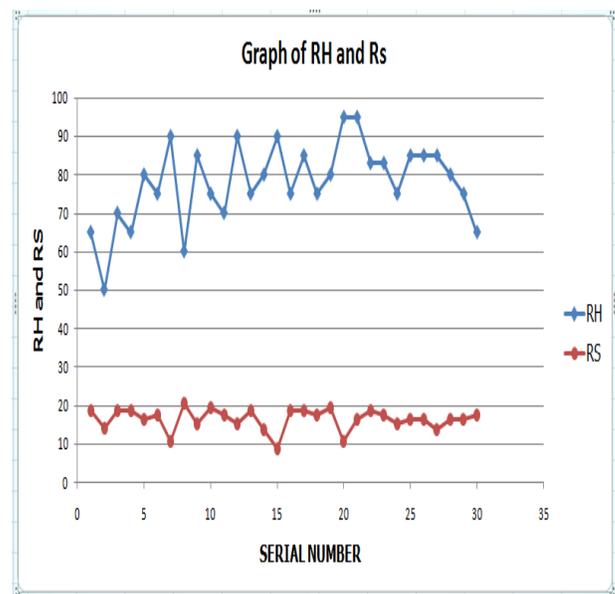


Fig 3: Graph of relative humidity and global solar radiation

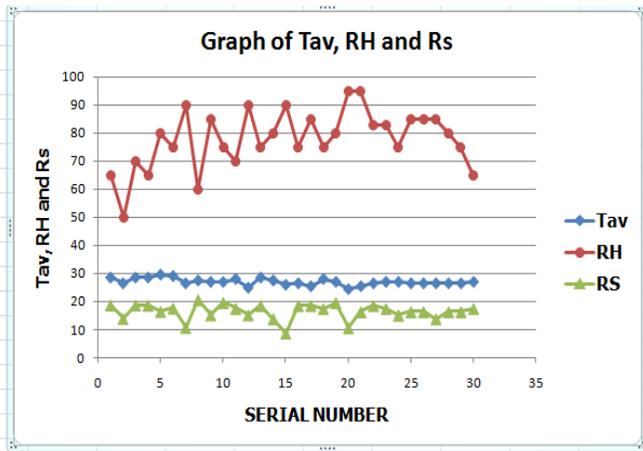


Fig. 4: Graph of mean air temperature, relative humidity and global solar radiation

IV. DISCUSSIONS

The relationship between global solar radiations, relative humidity and mean air temperature of the study area was determined using the data of minimum and maximum temperature obtained from archive of weather online and a Microsoft excel tool, and the results is presented in Table 2. Hargreaves –Samanni model of global solar radiation was used for the prediction of the global solar radiation using the maximum and minimum temperature data for the month of June, 2016. Mean temperature was gotten from the maximum and minimum data already acquired and the relative humidity for the month of June, 2016 was obtained from the same achieve of weather online limited. From Table 2, it was observed that, the mean air temperature (Tav) has effect on the global solar radiation(Rs) to some extent. The comparison between the two quantities shows the positive correlation coefficient of 0.460648 (46.06%), implying that the two quantities would increase and decrease in the same way, but not in all the values due to the correlation coefficient value that is below average, i.e. 50%. Okonkwo & Nwokoye (2014), reported that, global solar radiation was highest in the month of November, while the lowest value was recorded in August. This is attributed to the highest and lowest values of clearness index obtained for these months respectively. Also, from Table 2, it was observed that relative humidity has effects on global solar radiation to some extent. The comparison between the two quantities shows a negative correlation of -0.47686 (-47.69%), implying that when one quantity is increasing, the other will be decreasing and vice versa, though not in all the values due to the correlation value that is below average, i.e. 50%. According to Fatayi (2013), cloud cover and relative humidity are higher in wet than in dry season, meaning more rainfall between the months of May and October, with low surface temperature, high relative humidity and low cloud cover. The effects of mean air temperature and relative humidity on global solar radiation is shown Figures 2 and 3 respectively. But relative humidity has more impacts on global solar radiation than mean air temperature. This is also displayed in figure 4, in which the trend of change of global solar radiation and relative humidity are very close when compared to the graph of mean temperature.

V. CONCLUSION

In this work, the relationship between the global solar radiation, relative humidity and mean air temperature of Ikeja, Lagos State Nigeria, was determined for the month of June, 2016. It can be said that global solar radiation is affected by both the mean air temperature and relative humidity as given by the correlation results. However, the positive correlation between the average or mean temperature shows that global solar radiation increases with increase in mean temperature, while global solar radiation increases with decrease in relative humidity based on its negative correlation value (-0.47686). In other words, high relative humidity is associated with low global solar radiation and low relative humidity is associated with high global solar radiations. Also, high average temperature is associated with high global solar radiations and low average temperature is also associated with low global solar radiation. Conclusively, relative humidity and mean air temperature have effects on global solar radiation of an area, but with that of relative humidity more pronounced than that of mean air temperature.

VI. RECOMMENDATION

It has been concluded that global solar radiation is affected by both mean air temperature and relative humidity using Hargreave-Samanni model with the minimum and maximum temperature data for rainy season (June), as obtained from achieve of weather online limited from their website, similar method should be employed using the data (relative humidity, maximum and minimum temperature) for dry season.

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The Perceived Relationship between Employee Retention Practices and Organization Citizenship Behaviour at D.T.Dobie (K) Ltd.

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DECLARATION

I hereby declare that this MSC – HRM research project is my original work and that it has not been submitted for any degree or any other academic award at this university or any other institution of learning. Sources of information used here have been duly acknowledged.

Signed.....Date.....

Ombanda Paul Olendo

D64/69384/2013

Supervisor

This research project has been submitted for examination with my approval as the appointed university supervisor

Signed..... Date.....

Dr. Florence K.Muindi

Lecturer, School of Business

University of Nairobi

DEDICATION

To my beloved wife Judith Achien'g Otieno

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ABBREVIATIONS AND ACRONYMS

CEO	: CHIEF EXECUTIVE OFFICER
CSR	: CORPORATE SOCIAL RESPONSIBILITY
D.T.Dobie	: DAVID THOMAS Dobie
ECB	: EMPLOYEE CITIZENSHIP BEHAVIOUR
EQ	: EMOTIONAL QUOTIENCE
HR Diary	: HUMAN RESOURCE Diary
IQ	: INTELLIGENCE QUOTIENCE
NGO	: NON-GOVERNMENTAL ORGANIZATION
OCB	: ORGANIZATIONAL CITIZENSHIP BEHAVIOUR
OCBI	: ORGANIZATIONAL CITIZENSHIP BEHAVIOUR for INDIVIDUAL
OCBO	: ORGANIZATIONAL CITIZENSHIP BEHAVIOUR for ORGANITION
RJP	: REALISTIC JOB PREVIEW
SD	: STANDARD DEVIATION
VW	: VOLKS WARGEN

Abstract- The objective of this study was to establish the relationship between employee retention practices and OCB at D.T.Dobie (K) Limited. The factors explored on retention practices were Recruitment and selection, Realistic Job Preview, Corporate Image, Organizational Culture, Leadership style, Employee Relations, Communication, Reward and Recognition, Training and Development, Work Life Balance and Geographical Location/Transfers. The study then explored the intervening relationship of OCB factors thus; Helping Behaviours/ Altruism, Sportsmanship, Loyalty/General compliance, Conscientiousness/ Individual imitative, Civic Virtue and Courtesy. The study population comprised of all the D.T.Dobie staff that were present at the time of data collection in July 2015. A sample of 151 respondents was selected from the population using Stratified Random sampling method that captured 30% of the total population in the ratio of 3.1 with representation from all categories of employment. A descriptive research design was used. Primary data was collected using five point Likert scale design questionnaires with varying degrees of measurement from strongly disagree to strongly agree. Data was analyzed using descriptive statistics and inferential statistics. The study revealed the relationship between recruitment and selection practice and conscientiousness dimension was statistically significant. The study showed that Realistic Job Preview practice significantly contributes to existence of OCB dimensions thus Loyalty, conscientiousness and civic virtue of employees. The other retention practices; Organizational culture and employee relations, leadership styles showed equally significant relationship with OCB dimensions. The study revealed that there is a significant relationship between employee retention practices and OCB dimensions and is an indication that progressive and attractive employee retention practices are linked to OCB dimensions and contribute to employee retention at D.T.Dobie. The study also concluded that employees' dissatisfaction with retention practices and OCB dimensions at D.T.Dobie is major cause of employees' exits from the organization. Additionally the study revealed that retention practices have a positive influence on OCB dimensions. The study has made contribution to theory, policy and practice in relation to employee retention practices and OCB dimensions in the quest to retain employees. The study therefore offered further clarification into the relationship between employee retention practice and OCB. The limitations of this study arose from the selection of study variables, the scope of the study which involved one organization only and use of a single informant approach which deprived broad base information access. Lastly the study recommended future research should seek to address these limitations by inclusion of additional factors, expanding the scope of the study to include NGOs, Government institutions and SMEs and thus compare results similarities across the board. That could serve as a useful reference for future research.

Index Terms- About four key words or phrases in alphabetical order, separated by commas. Keywords are used to retrieve documents in an information system such as an online journal or a search engine. (Mention 4-5 keywords)

I. INTRODUCTION

E1.1 Background to the Study

Employee retention is today more than ever becoming the main concern of almost all organizations. A historical analysis of the strategies for employee retention practices were basically aimed at enhancing employee commitment and satisfaction to the organization. Maslow's and Herzberg's motivation theories were practiced to induce stimuli that could eventually enhance retention (Cascio, 2006). The major role of employee retention is to enable employees stick to an organization for a longer time. Empirical studies have shown positive linkage between employee retention practices and OCB in the effort of organizations to retain staff in the past instances (Allen, 2011). Although there is much evidence confirming the influence of organizational citizenship behaviour (OCB) on employee retention (Podsakoff, 2005), some studies have recommended for further research to improve our understanding of the relationships between OCB and HRM practices involved in the decision of employees to remain or resign from their organizations (Organ, Podsakoff and MacKenzie, 2006).

A closer look at the retention theories, one realizes that the concepts were drawn more from the education sector than the manufacturing work place. Astin's (1984) theory of Involvement says; the more involved a student is with the college, the higher likelihood of student's retention. Involvement here is understood to refer to the organization citizenship behavior. Herzberg's theory of motivation has been argued to be very effective in retaining employees through its hygiene factors. Bean and Metzger's (1985) model conquers that Environmental factors (OCB) have a greater impact on departure decisions of adult students than academic variables. Studies by Smith, Organ and Near (1983) proposed two dimensions of OCB, as we shall see later in chapter two 2.4, that enhances retention thus, altruism and general compliance.

The perennial high attrition problems experienced at D.T.Dobie Company year in year out can never be overstated. The notion of everyday recruiting needs more attention as it produces heavy strain on budgets. Experienced personnel are now diminishing. Operational disruptions following the departure of key employees are becoming a serious challenge. Training and retraining of new personnel is probably a factor draining financial and personnel resources. Loyalty of employees has taken a down turn with repercussions on quality of work besides attrition. Employees who stay do so for convenience and not out of loyalty. Staff are demoralized may be due to the loss of their respected colleagues or the fact that turnover requires additional workload to be absorbed by remaining employees whose capacity is already stretched. Much of the negative effects seems to be spiraling in the public domain and may dent the public image of D.T.Dobie if left unchecked (D.T.Dobie "What is the weather like" survey report by Delloite, 2012).

1.1.1 Perception

Perception is a person's mental image of the world. It is what we think is and not what it should be (Metzger, 2006). Perception involves paying attention to situations, objects, behaviours etc. A perceptual process is where observers decide on causes of other people's behaviour. Such perceptual processes may be true or not depending on the influence of one's psychological perceptual orientation that is errors or defense for example; Similarity Error –giving people similar traits .e.g kikuyus – thieves, Luos - proud etc, Contrast error – are comparisons that may not be objective or true, Race/Age/Gender Bias – are perceptions tempered by prejudice, First impression error – judging people on first appearances and making an impression and so on.

According to Gillenfield (2010) perceptions may also be defended depending on people's attitudes and attributes for example, People tend to defend the way they perceive things and they may become highly resistant to change and lead to negative consequences. Defense may inhibit learning and employees ability to be creative. Stereotyping would be hard to crack as people may believe certain groups share similar traits. Perceptual processes have a very critical role in individual and group decision making in organizations as it also define group dynamics. Perceptual decisions influence behaviours and how employees relate to one another in organizations. This has a major impact on individual's motivation, interpersonal relations, productivity, commitment and retention (Ulrich 2007).

1.1.2 Employee Retention Practices

According to Armstrong (2007) employee retention refers to the ability of an organization to retain its employees. Retention practices refer to the strategies or road maps employers use to make retention a success. They are the various policies and practices which enable the employees stick to an organization for a longer period of time. Ulrich (2007) says retention practices includes assigning challenging work, encouraging informal relationships, team building, recognitions, involvement in decision making, open door management styles, offering cash prizes and birthday parties for age groups.

According to Thabaur et al. (2008) hiring the right candidate, designing good job descriptions, realistic job previews, commensurate remuneration, training and development opportunities, favourable health plan schemes, performance appraisals and reward and incentives, effective communication, transparent promotion, growth patterns, transparent discipline procedures and transparent redundancy programs are the retention practices used by some organizations. Those who stay tend to know the organization better and develop a feeling of attachment towards it. The employees who stay for a longer duration are familiar with the company policies, guidelines as well as rules and regulations and thus can contribute more effectively than individuals who come and go (Graham, 2000).

1.1.3 Organization Citizenship Behaviour

According to Organ (1988) OCB is defined as work-related behaviours that are discretionary, not related to the formal organizational reward system, and, intended to promote the effective functioning of the organization. OCB extends beyond the performance indicators required by an organization in a formal job description. It reflects those actions performed by employees that surpass the minimum role requirements expected by the organization and promote the welfare of co-workers, work groups, and/or the organization (Lovell, et al., 1999).

The social exchange theory is often used to examine various aspects of employee reciprocity including OCB. This concept proposes that "gestures of goodwill" are exchanged between employees and the organization as well as between subordinates and their supervisors when particular action warrants reciprocity (Hopkins, 2002). Integral to both social exchange and reciprocity is the fact that individuals are connected through mutual dependencies. This dependency is a characteristic of the relationship between the employees and the organization and if the relationship is deemed favourable by the employee then a sense of commitment and trust is built and the employee as a result feels no need for changing jobs (Baron & Kreps, 1999).

1.1.4 D.T.Dobie (K) Limited

The late Colonel David Dobie, a veteran of World War 2, started D.T Dobie in 1949. The company started out with the Mercedes-Benz franchise for East Africa, which included both saloon cars and heavy commercial vehicles. It is situated in industrial area along Lusaka road with branches in Mombassa Kisumu and Nakuru. In 1964 the organization was awarded the sole franchise distributorship of Nissan passenger and light commercial vehicles in Kenya. In 2001, the company was awarded the Jeep franchise for Kenya. In 2007, they acquired the Renault brand for saloons and light commercial vehicles.

In 2015 the company has gone on a new transition again, shedding off the Nissan brand and taking on the Volkswagen (VW) franchise for Kenya market. (Company Website). The company has a total workforce of 500 staff with a structure comprising the Managing Director who is the CEO, his deputy, the HR manager, Finance manager, Sales and marketing manager and the service Manager who all report to the CEO. The HR department is equally much flatter with a structure of the HR manager her assistant and one HR officer (Company Employee Hand book, 2010).

1.2 Research Problem

Despite the rationale of organizations striving to gain competitive advantage, the current trend of employees changing jobs on average five times or more in a span of less than 5years becomes an impediment to this fact. Most organizations do experience higher rates of staff turn over than ever. A research by Deloitte (2008) reported that 87% of HR directors believed that employee retention and motivation are the biggest issues they face today. OCB on the other hand is perceived to give a window that can support the

social and psychological environment of employees in organizations to induce satisfaction and retention (Organ, 1997). So far there are quite a number of empirical evidence that relates retention practices and growth of OCB to retention (Allen and Smith, 1987). OCB has been seen to significantly impact on performance and retention of employees (Bergeron, 2007). The overall problem then is to determine the clear relationship between retention practices and OCB dimensions and examine how such relationship can influence the retention of employees and mitigate the consequences of voluntary exits in organizations today.

Like many organizations, D.T.Dobie Kenya limited has a very fragile position as an employer of choice. The major challenge that D.T.Dobie faces is the high rate of staff exits. In the last 4 years the company has experienced a high rate of labour turn over with the majority of the employees who exit are of age group 20years - 40years (HR Diary, 2011 to 2014, Leavers and Joiners section). Some of the reasons the leavers cite include lack of recognition, lack of growth opportunities, poor pay, poor teamwork and such like. No survey has ever been carried out to understand the reasons behind the high rate of staff turnover.

Quite a number of studies have been carried out on related areas of retention and job satisfaction, OCB and job satisfaction, organizational structure and OCB, Employee psychological contract and OCB and the relationship between employee retention and voluntary exit. Organ's (1977) conceptualized the first empirical study on citizenship behaviour in 1983 and proposed the relationship between OCB and job satisfaction in relevance to qualitative performance. Findings were that there was sufficient evidence to support the relationship between OCB and satisfaction. Omani (2013) conducted a study to determine the perceived influence of organizational structure on employee citizenship behaviour (ECB) at Vivo Energy Kenya. The study established that Vivo Energy had an organic structure and the association between the organizational structure and employee citizenship behavior was strong.

Namabaka (2010) did a study to determine the relationship between employees' psychological contract and organization citizenship behavior. The study established that there exists the exchange relationship between employee psychological contract and organization citizenship behaviour, and that the fulfillment of the organization's obligations towards its employees is important in explaining the willingness of employees to engage in organization citizenship behaviour. Lepilale (2009) did another research to establish employee retention practices used by the five star hotels in Kenya to retain critical employees and to determine the relationship between employee retention practices and voluntary labour turnover. The findings of the study revealed that regardless of the absence of the retention practices employees still stayed on and labour turnover was low. The study revealed that the low levels of voluntary labour turnover could be attributed to OCB factors other than retention practices alone.

The studies by Organ, Omani, Namabaki and Lepilale focused more on performance, organization structure, psychological contract and labour turnover variables in relation to employee retentions. Their researches were void of the facts of what retention practices and OCB dimensions would go a long way in enhancing the length of employee's stay in an organization. This study therefore is going to examine the relationship of retention practices with the presence of OCB dimensions that may motivate employees to stay in one organization for a long period of time. No known similar study has been carried out before, and therefore this study will try to size the gap left by the previous researchers in this respect. This study attempted to answer the question, what is the relationship between employee retention practices and organization's citizenship behavior at D.T.Dobie Company?

1.3 Objective of the Study

The objective of this study was to establish the relationship between employee retention practices and organization citizenship behaviour at D.T.Dobie Kenya Limited.

1.4 Value of the Study

The study will be an eye opener and will create a greater understanding to HR managers, other line managers and supervisors, who are in positions of authority to appreciate the adoption of the retention practices and create conducive environment for OCB factors that can really help companies meet their bottom line, remain competitive and achieve innovation and quality of products through retention of key staff.

In terms of policy and decision making, this study will be beneficial not only to practitioners like the HR managers but to the other stakeholders such as the government, employers association, unions etcetera to create an awareness that may initiate policy change in the labour practice. Other organizations will also benefit by way of making decisions in the development of OCB dimensions and retention practices that will enable the retention of talented employees, thus improving their growth as well as those of their staff and achieving their bottom line in tandem.

Not least, the study will also be a rich field for further academic research. Researchers and Scholars in social studies will find this valuable for review and analyze the gaps that may not have been captured here for the development of a working theory in the relationship between employee retention practices and OCB, as it were for the development and progression of knowledge anchored in motivational theories.

II. LITERATURE REVIEW

2.1 Introduction

This chapter summarized the various studies that have been carried out by other scholars in the similar area of research. We looked at the theoretical foundation of the study together with the various retention practices that have been established, the dimensions of OCB and finally the empirical linkage or relationship between retention practices and OCB.

2.2 Theoretical foundation of the study

This study was guided by Herzberg's theory of motivation (Armstrong, 2007) and the Social Exchange Theory (Hopkins, 2002)

2.2.1 Herzberg's theory of motivation

The two-factor theory of work motivation was developed by Herzberg in 1959 and it later provided the foundation for numerous other theories and frameworks in human resource development. The theory states that job satisfaction and dissatisfaction are affected by two different sets of factors thus the motivators and the hygiene factors (Herzberg, 1987). The theory suggested that while some job factors lead to employee satisfaction, others just prevent dissatisfaction but do not serve as sources of satisfaction. The satisfiers/motivators include the work itself, recognition, advancement, and responsibility and dissatisfiers, include company policy and administration, supervision, salary, interpersonal relations and working conditions (Herzberg, 1966).

According to Armstrong (2007) the hygiene/dissatisfiers factors, are associated with an individual's positive or negative feelings about the job context and they variably lead to employee exits. This theory suggests that to improve job attitudes and productivity, administrators must recognize and attend to both sets of characteristics and not assume that an increase in satisfaction leads to decrease in dissatisfaction as both are not on the same continuum.

2.2.2 Social exchange theory

Social exchange theory was introduced by Homans in 1958 in his work "Social Behavior as Exchange". He defined social exchange as the exchange of activity, tangible or intangible, and more or less rewarding or costly, between at least two persons. Social exchange theory explains the process of negotiated exchanges between parties. It posits that human relationships are formed by the use of a subjective cost-benefit analysis and the comparison of alternatives. The theme of this theory is that social behaviour is moderated by the amount of additions or withdrawals of bargainable instruments (Blau 1964).

According to Harrington et al (2007) individuals base their next social move on past experiences which they may chose to reinforce or withdraw. The theory also suggests that social exchange result in both economic and social outcomes that is mutually beneficial for the relationship to be sustained. West et al (2007) infer Social exchange theory is a theoretical explanation for OCB as it examines a model of leadership and relational building between leaders and employees as a consequence of employer employee exchange. In this case the employer has to provide a warm environment for OCB growth in order for the employees to be committed hence their retention is made possible.

2.3 Employee Retention practices

Most organisations like to pride the idea that employees are their biggest source of competitive advantage yet, interestingly too many organisations are unprepared for the challenge of finding, motivating and retaining skilled and talented employees in today's labour market (Harrington et al., 2007). According to O'Neal (2005) employee practices include providing better employee relations, the opportunity to train and grow, fair compensation reflecting an employee's contributions and value to the organization, effective communication, realistic job preview (RJPs) and above all, recognition and respect for the uniqueness of each person's competencies, needs, desires and style. Armstrong (2007) added Challenging work, supportive leadership/management style, effective recruitment and selection, organizational culture, corporate image, geographical location, and work life balance.

2.3.1 Employee relations

Nurturing good employee relations is fundamental in enhancing retention. This involves engaging and involving employees' participation in matters of the organization such as decision making. When giving employees a chance to participate in making decision over matters that affect their working life, they feel valued, especially when their knowledge, skills, competencies and experience is used to make quality business decision and vice versa (Hertzberg 1968). Storey (2007) also recognises the linkage between retention and the employee manager relationship by saying, "Get it right and acceptable, retention is almost assured; get it wrong and everything else will count for naught".

Ulrich (2007) states that having strong employer and employee relations reaps a lot of benefits for organizations as it creates a pleasant working atmosphere, increases employee motivation and improves employee morale. Podsakoff (2000) says a happy workforce is a productive workforce. Creating a sound and efficient work environment with good management and a strong employer-employee relation can be the vital key to exits or retention.

2.3.2 Realistic Job Previews

Realistic job previews (RJPs) is a recruitment approach designed to improve retention of new employees by providing potential new hires with an accurate picture of the job for which they are interviewing before the organization makes a job offer. RJPs were first proposed in the late 1950s and became popular during the 1970s and 1980s to promote retention and reduce early voluntary turnover among new employees (Steers 1996). Realistic job previews (RJPs) are an evidence-based human resource management intervention used to support employee career transitions, promote person-job fit, job satisfaction, and ultimately reduce avoidable turnover of highly skilled employees hence retention (Brockbank, et al, 2003).

The philosophy behind RJPs is two pronged, first to calibrate participants' expectations about the job by learning about the positive and negative aspects of the job at the beginning of the recruitment process works to either lower or heighten a person's expectations about what it would be like to work in the job. Second, RJPs participants are able to assess the extent to which the organizational culture aligns with their values, work style, and career goals (Earnest et al., 2011). RJPs shape employees' perceptions

that the organization cares about and supports individuals' professional development and career progression. Individuals' perceptions of organizational support promote higher levels of employee performance and retention (Allen, Fiorini, & Dickey, 2010).

2.3.3 Communication

Communicating effectively with employees is something that businesses need in order to be competitive. That means tying communication to specific goals as employees need to clearly understand their benefits so that they can make wise benefit choices. They need to understand organizational policies and procedures so they can work efficiently and effectively. They need to understand the company's products and services so they can communicate about them to customers as well as to personal friends and relatives. Devising an effective medium of communication is key to its success, face to face, bulletins, notices, meetings newsletters, magazines and many others enhances effective communication. Good communication mechanism which is vertical that is from management to employees and from the employees to management (GoodMan & Hirsch, 2010).

In order to make good retention strategies the HR managers should occasionally schedule stay in interviews whereby the HR should interview the long staying or serving employees and ask them questions like why have you stayed longer with us. An appraisal program is essential for employee to understand their performance levels and obtain feedback on their progress, gaps and gains. The employee's participating in appraisal interviews will help the HR specialist to device stronger employee retention strategies. An effective communication network is vital to 'Keep your door open' to any inquiries or concerns, and are ready to listen. Maintaining an open channel of communication will make you aware of problems quickly, which is beneficial for quick resolution of conflicts and disharmony (Armstrong 2007).

2.3.4. Rewards and Recognition

Reward and other financial incentive programs are designed to inspire employee loyalty and increase their productivity. Employees need to understand the criteria for receiving the incentives and how the amount is determined. Financial incentives include stock options which give them the right to purchase company stock at a fixed price (usually below market value), medical health cover for the employee and their family members, school fees for the children of some the key staff that must be retained, Profit sharing by setting aside a percentage of their profits for employees, Salary Raises most companies implement raises once-a-year and are greatly anticipated by employees.

The amount generally varies depending on the individual's performance and the philosophy of the company. Bonuses occur one time per year or at a certain number of predetermined times each year and can range from 50% to 200% of employees basic pay. It may be varied in accordance to performance. Other financial incentives may relate to time pay, piece rate, pay on commissions, and pensions (Ojokuku, 2011). A successful employee recognition program is one that allows employees to participate easily. Studies have found that employees who feel more satisfied, valued, and appropriately compensated are less likely to become disengaged on the job, leave their employment (Nelson 2003).

2.3.5 Recruitment and Selection

The current overflowing Labour market is making recruitment and selection be a more difficult exercise to handle nowadays. Getting the right candidate from a multitude of similar qualifications complicates the exercise farther; hence employers are left to fight for talents. Recruitment and Selection is critical to effective HR Management and need to be carried out with the focus on training and development, succession planning, performance planning, HR planning and talent management, so that attracting, developing and retaining individuals with high potential is made successfully. The recruitment and selection process need to be driven by clear policies, accountability, and shared responsibility and most importantly by professionals who have the capacity to deliver on intended goals. Use of recruitment tests/examination tools such as IQ, EQ, or psychometric tests help organizations' understand and predict the retention abilities of skilled candidates (Armstrong, 2007).

Storey (2007) stated that the war for talent led organizations to shift from the historical selection to the modern ways of attracting employees. Recruitment and selection includes those practices such as company branding, culture dominance, CSRs and bragging about high perks and incentives in order to identify and attract potential employees. The principle significance of the process is the need to attract and retain high quality people in order to gain a competitive advantage. When the right candidates are recruited, the organization benefits on reduced training costs, reduced intra and inter personal conflicts, quality production or service increased and more important reduced attrition rates putting the organization in a position of achieving its key performance objectives.

2.3.6 Organizational Culture

One of the deciding factors of employee retention is organizational culture. The HR Manager can facilitate a corporate culture which is intended to support and enhance creativity and innovation. Sheridan (1992) noted that a corporate culture that values team spirit, collaboration, interpersonal relationship as well as respect for persons has evidently shown to result into longer tenure of its employees. Some of the drivers of retention are the sense of connection between a workers' job and the corporate strategy, corporate innovation culture, corporate reputation of integrity as well as the success of the organization (Broeckbank, 1999).

Organizational cultures are driven by Mission and vision statements which should demonstrate that the organization understands the necessity of acquiring and developing appropriate employees to achieve its strategic plans. According to Atwood (2007) a strong organizational culture is not only critical for engaging, attracting and retaining senior executives but all other staff as well. Research

recently performed by Inc. magazine revealed that 18% of 2012 college graduates consider 'company culture and the perks' as their top priority in evaluating prospective employers.

2.3.7 Corporate Image

Corporate image and reputation is considered to be a critical factor in the overall evaluation of any organization. Thus, continuous self assessment on corporate image and reputation is a must for those organizations that want to successfully differentiate their positioning in the market. Corporate image consists of emotions such as feelings, attitudes and beliefs that people have towards the organization. These emotional components are consequences from accumulative experiences the public have with the passage of time with the organization. These overall impressions of the organization is what attracts the best employees to an organization and gives them satisfaction and loyalty hence retention is achieved (Bitner, 1990).

CSR programs are some of the tools companies use to create good image. CSR provide valuable opportunities for employees to become engaged in new ways, not just as active citizens in their communities but also as valued team members when undertaking team projects. When employees take on new roles that are different from the ones they hold at their corporation, they are learning new skills and their co-workers can recognize different strengths they might not employ in the workplace. A good reputation of the organization to the external world helps in attracting competent skills and talents to work for the organization that can then easily be retained. (Atwood, 2007).

2.3.8 Training and Development

Training and development of staff is gaining importance to companies seeking to have an advantage among competitors. Previous researches show that employers use varying techniques for the retention of employees that includes training, better work environment, compensation, and many more. The importance of ensuring employee retention following training may lie in the strategic approach that is utilized. One such approach is commitment strategy which attempts to develop psychological connections between the company and employee as a means of achieving goals (Scholl, 2003).

In an attempt to ensure that the employee remains with the company following training, Deckop et al. (2006) says employers may implement a strategy to training that fosters commitment. Training that attempts to increase employee commitment may serve to counter the numerous direct and indirect costs associated with turnover. Although a commitment strategy can be tied to all company human resource practices; recruitment and selection, performance evaluation, and so on, continuous training can never be underestimated. According to Griffeth et al. (2000), development reduces the turnover rate of employees. Advancement opportunities not only reduce absenteeism, but also increase employee commitment and satisfaction which helps in reducing turnover.

2.3.9 Geographical Location/ transfers

The challenge of attracting and retaining populations in remote location/upcountry has intensified over the last couple of decades with the shift towards a market-led allocation of resources and government policies that have encouraged rationalization and devolution of services to remote regions. Attracting and retaining skilled and professional staff in remote locations has continually declined (Haslam McKenzie & Stehlik 2005). This is particularly evident in the youth cohort and many young people drift to cities for education and work and usually stay there. This structural social shift has an impact on the economic health of a community as well as diminishing the sense of wellbeing for the remote communities from which they left. At the same time, there have been significant population increases in cities making recruitment and retention difficult.

Remote and non-remote areas are similar in that both increasingly need skilled workforces to fill vacant jobs and career opportunities. Both regions are also increasingly driven by external market forces. For retention to be achieved employers need to recruit or transfer staff who fit well with the local community in terms cultural orientations, religion, beliefs and the least language. Provision of leisure through social interaction is also fundamental to enhancing wellbeing of the employees and by extension retention. A focus on lifestyle and community is therefore very important for attraction and retention of people to a remote location. Attracting and retaining skilled and professional staff is a problem not limited to remote locations only but there is strong evidence to suggest that it is increasingly a global problem and organizations throughout the world are seeking innovative strategies to attract and retain staffs who work in remote areas (Hofstede 2001).

2.3.10 Work Life Balance

Staff exits an organization for many reasons ranging from career advancement, better job opportunities, and layoffs to retirement. Some of these departures may be difficult to prevent. However a recent area of concern and is another key reason staff – and in particular women employees - leave their job is to find a better work life balance. Work – family conflict is a form of responsibility conflict in which the role pressures from the work and family domains are incompatible in some respect. It is a conflict where employees work life is interfering with their family life or vice versa (Cooper, 2008). Changes to the family situation most often tend to impact upon women and results in increasing difficulty in managing a balance between work and family responsibilities.

Organizations initiatives to help employees balance their work and family lives are becoming increasingly popular. The emerging initiatives of work life balance, Retention and attraction Strategies include flexible working hours, providing more part time jobs with less hours, job sharing arrangements, access to childcare, flexible leave arrangements - providing greater flexibility in leave arrangements to suit employees' personal circumstances, including leave for school, leave in single days - allowing employees to request and take leave in single days and accrued hours as time off in lieu of payment (Mercer 2000). Job mobility - providing increased mobility for employees to transfer between work areas, Safety and wellbeing - improving safety, wellbeing and respect for

all employees in the workplace, telephone access - ensuring all employees are able to receive urgent telephone calls or messages from family members at work and have access to a telephone to remain contactable with their family during working hours, casual work - introducing pools of permanent flexible part time or casual employees, are all strategies employers use to mitigate work-life balance and improve on retention (Decarlo & Gruenfeld 1989).

2.3.11 Leadership Styles

Leadership is about influencing, motivating and enabling others to contribute toward the effectiveness and success of the organization (Armstrong 2007). A leader's behavior is very important regardless of varying situational conditions at the workplace (Podsakoff, et al 2000). Actions by a leader can have a strong effect on the motivational and emotional states of followers and on the successful accomplishment of the task. Numerous aspects of the organizational culture are connected to the role of leaders in creating and maintaining particular types of culture. The responsibilities of the HR-department are increasingly being devolved to line managers. There might be differences in the way of working and leadership between managers should be managed by the HR for conformity of leadership behaviour across the organization (Bass, 1990).

Over the past twenty years, theories of charismatic, transformational and visionary leadership emerged to dominate much of the empirical and scientific literature on leadership. These theories investigated leaders' behaviors, which evoke confidence and acquire support of followers. Leadership often leads to productivity and satisfaction. The model of Leadership provides a more complete view on leadership and is perhaps the most widely cited theory of leadership. The transformational perspective is currently the most popular and important perspective on leadership that is required to change, motivates, inspire and retain employees. Transformational leaders are agents of change. They communicate, create and model a shared vision for team or organization and inspire their employees. There is considerable evidence that transformational leadership is effective and it has been positively related to performance and employee satisfaction and retention (Tejeda et al., 2001)

2.4 Dimensions of OCB

Williams and Anderson (1991) classified OCB into two groups thus OCB-Organizational and OCB- Individual. According to Organ (1988) the Citizenship behaviours directed toward individuals (OCBI) where OCBI refers to the behaviours that immediately benefit specific individuals within an organization and, thereby, contribute indirectly to organizational effectiveness. Altruism is an aspect of OCBI and is defined as voluntarily helping others with work-related problems (Lee & Allen, 2002). OCB-Organizational on the other hand benefits the organization in general such as adhering to informal rules devised to maintain order. Podsakoff et al (2000) identified almost 30 different forms of behaviors in examination of the literature and classified them into seven common dimensions: Helping behavior, sportsmanship, organizational loyalty, organizational compliance, individual initiative, civic virtue and self development.

Borman et al.(2001) stated that altruism and conscientiousness are the two major or overarching dimension of OCB, where as Organ (1988) identified five major types (dimensions) of OCB; Altruism, conscientiousness, sportsmanship, courtesy, civic virtue (Podsakoff et al, 1990). Altruism can be called simply helping or helpfulness (Organ, 1997). Altruism consists of voluntarily actions that help others with an organizationally relevant task such as voluntarily helping orientation of a new employee, sharing sales strategies, teaching employees useful knowledge or skills, showing employees how to accomplish difficult tasks and so on. Conscientiousness is a discretionary behavior that goes well beyond the minimum role requirement level of the organization, such as obeying rules and regulations, not taking extra breaks, working extra-long days (MacKenzie et al, 1993).

2.5 Relationship between Retention Practice and OCB

Drucker (2001) stated that the greatest challenge for most HR managers which is now widely recognized is the retention of the highly talented employees. Knowledgeable workers who in most cases possess high degree of education, experience, expertise and whose primary job is to cause the creation, distribution and the application of this knowledge at work place has become critical due to unpredictable voluntary staff exits.

Several empirical studies have tested the link between organizational retention and OCB. Allen and Smith (1987), Meyer and Allen (1991) and Chen et al. (1998) found that affective commitment and retention correlated positively with self-report measures of OCB. According to Organ (1988), high levels of OCB lead to high levels of organizational efficiency, effectiveness and adaptability. It is considered as one of the most important factors influencing organizational effectiveness. Walz and Niehoff (2000) found that OCB dimensions enhance organizational efficiency, performance, satisfaction and retention.

According to Meyer and Allen (1996) retention is the main construct in order to understand the relationship between the employee and the employer. Harrington et al (2007) believe that leadership has become a key factor in increasing employees' retention and reducing employees' turnover. The relationship between retention and OCB has been demonstrated by many studies (Wagner & Rush, 2000). In fact, it is expected that employees with high level commitment to their organization are more focused on their work than employees reporting lower levels (Story 2007). HR retention practices are the means through which employee perceptions, attitudes and behaviors are shaped. Morrison (1996) mentioned that because HR retention practices set the tone and conditions of employee employer relationship, an organization can foster OCBs through human resource management. However, what specific HR practices can be used to elicit OCBs will be identified at the findings stage of this study.

Employee retention has the attention of top-level managers in today's organizations because the personal and organizational costs of leaving a job are very high (Mitchell, et al 2001). It is a business management term which refers to the efforts made by employers to retain employees in their workforce. A number of studies (Meyer, Ristow, & Lie, 2007; Podsakoff & Mackenzie, 1997) revealed that OCB dimensions like altruism and sportsmanship improve organizational capacity to attract and retain best employees. Retention has a direct and casual relationship with employee's needs and motivation. Employees with altruism behavior help each other in the organization which leads to healthy interpersonal relationship. HR practices and job embeddedness have been taken as determinants of OCB and employee retention, job satisfaction, low absenteeism, work-family conflict, and role-overload. Managers should give adequate importance to OCB because it is accepted as an indispensable condition for increased retention (Organ, 1990).

III. RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter presented the procedure and the methodology that was used to carry out the study. The chapter described the proposed research design, Population of the study, data collection instruments and how data will be analyzed, interpreted and presented.

3.2 Research Design

The study adopted a descriptive research design. Descriptive survey is used to obtain information concerning the current status of the phenomena to describe what exists with respect to the variables in a situation (Orodho 2004). Descriptive studies are pretty much as they sound - they describe the situation. They encompass observations, case study and surveys or use of questionnaires. Descriptive survey is therefore appropriate for this study to obtain and correlate the information on the relationship between retention practices and OCB as it was at D.T.Dobie Company.

3.3 Population

The total aggregate of the study Population was 500 members of staff. D.T.Dobie, by end of March 2015 had total staff population of 500 employees based at the company's entire branches made of the executive staff, senior managers, junior managers, administration staff and the unionizable staff and distributed in the following departments; accounting and finance, Sales and marketing, Service and parts, HR, IT, and the Operations department.

3.4 Sampling Design

The sample size for this study was 30% of the total population. That was appropriate to achieve the confidence level and reduce on sampling error of the research as it compensated for possible non response (Cochran, 1963). Stratified random sampling method was used to arrive at the sample size of the study in the ratio of 3:1 with representation from all levels of measure calculated as follows;

Table 3.1 sampling design

Level Of Measure	Population	Sample Size (30%)
Executive Staff	3	1
Senior Managers	18	5
Junior Managers/Supervisors	56	17
Administration Staff	98	30
Unionizable Staff/Support Staff	325	98
Total	500	151

3.5 Data Collection

The study used primary data which was collected using questionnaires. The questionnaires comprised of a five- point Likert scale design with varying degrees of measurements from strongly disagree to strongly agree. The questionnaire will be divided into three parts: Part A was to seek general/demographic details; Part B focused on Employee Retention practices and part C on Organizational citizenship behaviour (OCB) domains. A drop and pick method was used to collect data. Samples were identified randomly in the ratio of 3:1, that is in every strata one staff out of every three was picked at random.

3.6 Data analysis

The data collected was analyzed using descriptive statistics such as, mean scores, standard deviations, frequencies and percentages. The Pearson's product-moment correlation was used to analyze the relationship between employee retention practices and OCB. Data was presented in form of graphs, charts and tables.

IV. DATA ANALYSIS, RESULTS, AND DISCUSSIONS

4.1 Introduction

The objective of this study was to establish the relationship between employee retention practices and OCB dimensions at D.T.Dobie. This chapter provides data analysis, findings and discussions of the results based on the objectives of the study. Primary data was used for this research and was collected from all level of employee job categories. Questionnaires were used to seek the respondents' views on employee retention practices and OCB dimensions to measure their level of agreement or disagreement with the questions.

4.2 Response Rate

Out of the 151 questionnaires distributed in all the levels of job category thus; the executives, senior managers, junior managers/supervisors, administration staff and the unionizable staff, 142 were returned fully completed. A confidence return rate of 94% was achieved and is highly acceptable for this research as confirmed by Mugenda and Mugenda (2003) that a higher response of over 70% is representative. This was therefore considered a representative sample for further analysis. In comparison, the response rate was higher compared to that of similar studies conducted by Maliku (2014) at 57%, Omani (2013) at 71.4%, and Lepilale (2009) at 71.4%. Table 4.1 shows the response rate per job category.

Table 4.1: Distribution by job category

Job category	No of respondents	Percent
Executive staff	1	0.7
Senior manager	5	3.5
Junior manager/supervisor	17	12
Administration staff	25	17.6
Unionized staff	92	64.8
Total	142	98.6

Over half 64.8% of the respondents were unionized staff, 17.60% administration staff, 12% junior managers/supervisors, 3.5% senior managers and 0.7% executive staff. Results show that responses were collected from all job categories in the organization.

4.3 Demographic Variables of the Respondents

This section sought to identify the demographic characteristics of the respondents including job category, length of service at D.T.Dobie, highest level of education, gender dynamics and respondents age. These characteristics are important because they are known to influence the variables in this study including perceptions, training, leadership, conscientiousness, employee relations, culture, and loyalty among other factors. Metzger (2006) in his study of perceptual process found that perception is a person's mental image of the world, it is what a person thinks and not what it should be and that is influenced by a person's experiences, age, gender and level of knowledge. Metzger found out that younger people had a higher chance of exiting jobs than older people. Additionally, the study found that age and length of service were significantly related to job satisfaction, commitment and retention. Harrington et al (2007) noted that there is a strong support for gender difference characteristics like display of emotion, irritability and ease of job change.

4.3.1 Gender of Respondents

The study sought to identify the gender composition of the respondents for the reason that some studies have shown a relationship between gender and retention propensity. Cooper, (2008) noted that there were significant gender differences recorded in perceived relationship between work life balance and retention with a bias on female employees. While the research was not focusing on gender equity parse, the findings reflected that the sample was biased towards males. As shown in Figure 4.2, majority of the respondents (71.8%) were male and (28.2%) were female.

Table 4.2: Distribution by gender

Gender	No of respondents	Percent
Male	102	71.8
Female	40	28.2
Total	142	100

The finding indicates that majority of staff at D.T.Dobie are male and this was attributed to the nature of work that requires high masculine input.

4.3.2 Age of Respondents

This study sought to establish the age of the respondents as age has been associated with job experience and retention ability to some extent Drucker (2001). He further noted in his finding on the relationship between OCB and job commitment that older employees due to other intervening reasons other than the job itself tend to stay longer in an organization. The table below showed age distribution of the respondents at D.T.Dobie.

Table 4.3: Age distribution

Age bracket	No of respondents	Percent
20 - 29 years	37	26.1
30 - 39 years	51	35.9
40 - 49 years	54	38
Total	142	100

As shown in Table 4.3, a majority of the respondents (38%) were between the age of 40 and 49 years old. Thirty five point nine percent (35.9%) were in the age bracket of 30 to 39 years while (26.1%) were between 20 to 29 years of age. This indicated that majority of staff at D.T.Dobie are older employees of over 40 years of age.

4.3.3 Length of Service of Respondents

The study purposed to establish the length of service of the respondents at D.T.Dobie. The years worked would be an indication of their level of appreciation and application of the variables of the study in the organization. The longer they have been, the more they are able to appreciate questions regarding employee retention practices and OCB dimensions.

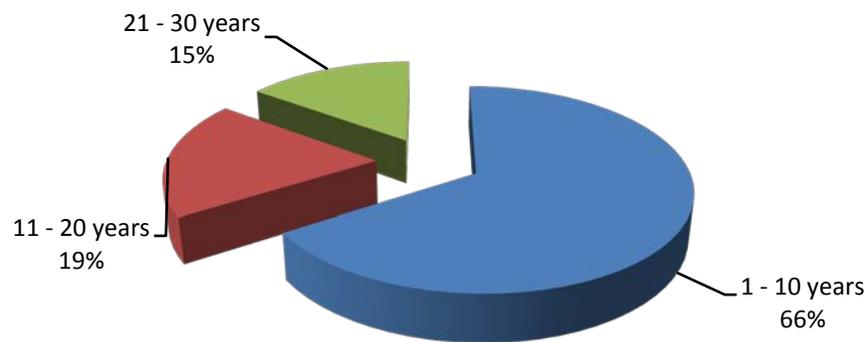


Fig. 4.1: Work experience

As shown in figure 4.1, most of the respondents (66%) have been in the organization for 1 – 10 years while 19% of the respondents have been working for 11 to 20 years. Another 15 % have worked for 21 to 30 years. This implies a sense of consistency in working for D.T.Dobie and hence ability to appreciate the application of the variable in this study to their respective circumstance.

4.3.4 Respondents Level of Education

The study sought to establish the highest level of education of the respondents. According to Organ (1992) Education levels include level of knowledge and skills and this is one way of measuring competence, commitment and retention.

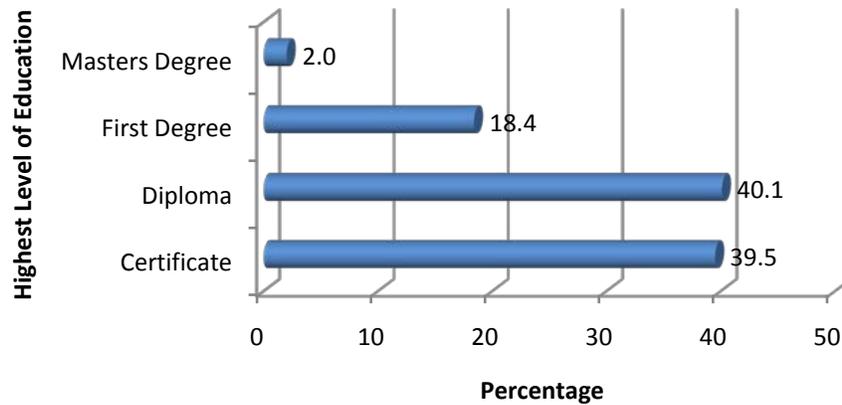


Fig. 4.2: Highest level of education

Fig. 4.2 above shows that 40.1% of the respondents had attained Diploma level of education while 39.5% were O’level Certificate holders, 18.4% were holders of First Degrees and 2.0% had Masters Degrees. This dispersion is in line with the requirement that all employees must have a minimum O level education while mechanics are required to have a minimum diploma qualification at entry level.

4.4 Employee Retention Practices

The research objective was to establish the relationship between employee retention practices and OCB at D.T.Dobie. This section therefore reports on the Employee retention practices at D.T.Dobie. In order to determine this relationship, it was important to establish the respondents’ perception of the employee retention practices. This section therefore reports on the analysis of Employee Retention Practices at D.T.Dobie. Employee Retention practices were rated as Strongly Disagree, 1 Disagree, 2 Neutral, 3 Agree 4 and Strongly Agree 5. A score of ≤ 1.5 was interpreted to mean strongly disagree, while a score 1.5 to ≤ 2.5 implied that the respondents disagrees and 2.5 to ≤ 3.5 was interpreted to mean that the respondent was neutral. A mean score of $3.5 \leq 4.5$ was interpreted to mean that respondents agree while a score of ≥ 4.5 was interpreted to mean strongly agree. A standard deviation of ≤ 1 was interpreted to mean that respondents had a consensus in the rating of the statement while a standard deviation greater than 1 was interpreted to mean that the respondents differed in their perception about the statement. There were 14 statements used to measure employee retention practices at D.T.Dobie. These statements were adopted from Armstrong (2007) and measured employee retention practices in terms of Recruitment& Selection, Realistic job preview, corporate image, leadership style, employee relations, Training & Development, Communication, reward and recognition, Work life balance and geographical location. Respondents’ perception relating to the variables under each of the statements of employees retention practices is presented in the following sections

4.4.1 Recruitment and Selection

Recruitment and selection has been said to influence retention of employees. Armstrong (2007) on Talent management said that well designed talent pipeline enhances retention. This study therefore sought to establish this. The respondents were asked to indicate the extent to which they agree or disagree with the statements of recruitment and selection at D.T.Dobie. A set of three statements were used to measure the respondents’ feelings towards recruitment and selection as shown in Table 4.4.

Table 4.4: Recruitment and selection

	Mean	SD
Do you feel you were competitively recruited?	4.6	0.75
Were your job responsibilities clearly explained to you?	4.2	0.92
Are you satisfied with your position and role at D.T. Dobie?	4.0	1.07
Average	4.3	0.91

The results in Table 4.4 reveal that the average mean score for recruitment and selection was 4.3. This shows that the respondents agreed with the recruitment and selection practice. More specifically, the respondents agreed about the extent to which they were competitively recruited (Mean 4.6, SD 0.75) and clear explanation of job roles (Mean 4.2, SD 0.92). The respondents also agreed with the level of their satisfaction with their position at D.T.Dobie (Mean 4.0, SD 1.07) This analysis implies that on average the respondents were agreeable to recruitment and selection practice at D.T.Dobie. It can be seen that in all statements, the standard deviation was less than 1 or near 1 and ranged from 0.7 to 1.0. This means that there was consensus in the way the respondents felt about the recruitment and selection practice.

4.4.2 Realistic Job Preview

Realistic job preview has been said to influence employee retention from the onset. Brockbank, et al, (2003) in his study on effects of RJP found that effective RJP leads employee retention. The respondents were asked to indicate the extent to which they agree or disagree with aspects of realistic job preview at D.T.Dobie. A set of three statements were used to measure the respondents' feelings towards RJP as shown in Table 4.5.

Table 4.5: Realistic job preview

	Mean	SD
Do you feel the position's responsibilities and requirements and expectations were deliberately communicated to you?	4.1	0.9
Based on your experience, would you refer someone for a position with D.T. Dobie company?	3.9	1.29
Do you feel there was some information had you known earlier about your job you could have considered not taking up the job?	2.6	1.12
Average	3.5	1.1

The results in Table 4.5 reveal that the average mean score for realistic job preview was 3.5. This shows that the respondents do not necessarily agree or disagree with the realistic job preview practice. In fact, the average score borders more towards respondents agreeing than disagreeing. More specifically, the respondents agreed about the extent to which their job roles and expectations were communicated to them (Mean 4.1, SD 0.9), referring someone to D.T.Dobie (Mean 3.9, SD 1.29). The respondents disagreed on the extent to which they wouldn't have taken up the job should certain information had been made clear to them (Mean 2.6, SD 1.12). This analysis implies that on average respondents were neutral on realistic job preview practice at D.T.Dobie. This is especially so with the competitiveness of the pay, the extent to which pay is fair and related to effort, qualification and experience. It can be seen that in two statements, the standard deviation was more than one and ranged from 1.12 to 1.29. This means that there was no consensus in the way the respondents felt about realistic job preview practice at D.T.Dobie.

4.4.3 Corporate Image

Respondents were asked to indicate the extent to which they agree with various aspects of corporate image of D.T.Dobie. Corporate image has been identified as a factor which influences employee attraction and retention. A good reputation of the organization to the external world helps in attracting competent skills and talents to work for the organization that can then easily be retained. (Atwood, 2007). Questions asked related to the strength of public image and brand of DTDobie as shown on Table 4.6.

Table 4.6: Corporate Image

	Mean	SD
Are you proud to tell others that you are part of this organization?	3.6	1.39
Do you believe that there is a superior brand that makes D.T. Dobie popular?	4.6	0.76
Do you think the company attracts more people who would wish to work for it?	3.8	1.27
Average	4	1.14

The results in table 4.6 show there was overall agreement corporate image (M=4.0, SD=1.14) with most of the respondents believing that there is a superior brand that makes D.T. Dobie popular (M=4.6, SD=0.76). Similarly, they did think the company attracts more people who would wish to work for it (3.8, SD=1.27) and were proud to tell others that they are part of the organization (M=3.6, SD=1.39).). This two were much closer to being neutral. Worth noting also is that in two cases where there was slight agreement, the standard deviation was greater than 1 indicating that there was marginal consensus about these aspects of corporate image among the respondents. The analysis of the statements revealed that corporate image is important in attracting good employees and that it influences retention at D.T.Dobie. In conclusion, it can be stated that the staff are agreed with the corporate image.

4.4.4 Organizational Culture

Respondents were asked to indicate the extent to which they agreed with various statements on organizational culture. Organizational culture has been identified as a factor which influences retention in organizations. Sheridan (1992) noted that a

corporate culture that values team spirit, collaboration, interpersonal relationship as well as respect for persons has evidently shown to result into longer tenure of its employees. Questions asked related to provision of a good organizational culture as shown in table 4.7 below.

Table 4.7: Organizational culture

	Mean	SD
Do you believe you can influence your work place through your ideas and participation?	3.8	1.21
Do individuals and teams have clear defined goals that relate to the objectives and mission of the organization?	3.3	1.35
Do people in this organization believe in working together collaboratively, preferring corporation over completion?	3.0	1.53
Average	3.4	1.36

The results in Table 4.7 showed an overall mean score of 3.4 on organizational culture. This means that the respondent were neutral on the adequacy of organizational culture. The only statement there was slight agreement was the extent to which employees believe they participate in idea generation at D.T.Dobie (Mean 3.8, SD 1.21). There are clear defined goal and mission statement that staff uses as guides (Mean 3.3, SD 1.35). The respondents were neutral on the extent to which DTDobie believes in team work (Mean 3.0, SD 1.53). In conclusion, it can be stated that D.T.Dobie staff are indifferent organizational culture in relation to retention. However the staffs are somewhat happy with the participation process. Worth noting also is that in all cases where there was neutrality , the standard deviation was greater than 1 indicating that there was no consensus about these aspects of organizational culture among the respondents. The analysis of these findings revealed that D.T.Dobie does not have a well defined organizational culture.

4.4.5 Leadership Style

Leadership styles have been said to have greater influences on employees’ perception of a good employer. Tejada et al (2001) in his study on leadership found that there is considerable evidence that transformational leadership is effective and has been positively related to performance, employee satisfaction and retention. Respondents were asked to indicate the extent to which they agreed or disagreed with leadership style at D.T.Dobie. The analysis of responses was as shown in Table 4.8

Table 4.8: Leadership Style

	Mean	SD
Does your boss ask for team ideas and input and have decisions made by team consensus?	2.6	1.41
Does your supervisor tell you what to do, how to do it and when to have it completed?	3.4	1.32
Does your leader use his powers to help you grow both on the job and mentally?	2.8	1.41
Average	2.9	1.38

The results in Table 4.8 reveal that the average mean score for leadership styles was 2.9. This shows that the respondents were neutral about leadership style practice. More specifically, the respondents were neutral about the extent to which their bosses ask for team ideas /input in decision making (Mean 2.6, SD1.41), supervisors giving ideas on how to perform work (Mean 3.4, SD 1.32). The respondents also were neutral with the level of their satisfaction with their leaders helping them to grow on job (Mean 2.8, SD 1.41) This analysis implies that on average the respondents were neutral on leadership style practices at D.T.Dobie. It can be seen that in all statements, the standard deviation was more than 1 and ranged from 1.32 to 1.41. This means that there was no consensus in the way the respondents felt about the leadership style and staff are not happy with the leadership style at D.T.Dobie

4.4.6 Employee relations

Employee relations have been seen to influence retention to a greater extent. Storey (2007) in his study found a strong linkage between retention and the employee/manager relationship. Three statements were used to measure employee relations practice at DTDobie. The respondents were asked to indicate the extent to which they agreed or disagreed with the employee relations practices at D.T.Dobie. The analysis of responses was as shown in Table 4.9 below.

Table 4.9: Employee relations

	Mean	SD
If you had the opportunity to get a similar job with another company, would you stay with this company?	2.9	1.38
Do you feel your supervisor provides you with feedback, guidelines and encourages you to develop?	2.5	1.23
Do you feel you work with people who are pleasant and co-operative enough?	3.4	1.4
Average	2.9	1.33

The results on table 4.9 showed, the respondents were neutral on the extent to which they feel employee relations practices are implemented by management with an overall mean score of 2.9. Specifically, the respondents were neutral in the extent to which they would stay back with D.T.Dobie should another job offer come their way (Mean 2.9, SD 1.38), they were neutral on the extent to which they feel their supervisors provides them with feed and opportunities to develop (Mean 2.5, SD 1.23), and also neutral on the extent to which they felt they work with people who co-operative (Mean 3.4, SD 1.4). It can be seen that in all statements, the standard deviation was more than 1 and ranged from 1.23 to 1.40. This means that there was no consensus in the way the respondents felt about employee relations practices at D.T.Dobie.

4.4.7 Communication

Effective communication influences employees’ perception of a good employer to stay with. Armstrong (2007) confirmed that maintaining an open channel of communication makes both employee and employer be aware of problems quickly, which is beneficial for quick resolution of conflicts and disharmony hence retention. Respondents were asked to indicate the extent to which they agreed or disagreed with communication practices at D.T.Dobie. The analysis of responses was as shown in Table 4.10 below.

Table 4.10: Communication

	Mean	SD
Do you have access to timely information about what is happening in the organization?	2.3	0.91
Is positive and productive feedback clearly given to you to help you improve/achieve success in your work?	2.7	1.17
Do you agree that lack of effective communication frustrates your efforts to perform well?	3.9	1.26
Average	3.0	1.11

The findings from Table 4.10 revealed the respondents view was overall neutral with a mean score of 3.0. specifically they were neutral about how they felt access to timely information was handled (Mean 2.3, SD 0.91), that positive and productive feed given to help them improve in their work (Mean 2.7, SD 1.17) and they agreed that lack of communication frustrates their efforts to perform well (Mean 3.9, SD 1.26). It can be seen that in two statements, the standard deviation was more than 1 and ranged from 1.17 to 1.26. This means that there was no consensus in the way the respondents felt about communication practices at D.T.Dobie. It can then be deduced that effective communication is not practiced at D.T.Dobie.

4.4.8 Reward and Recognition

Studies have found that employees who feel appropriately compensated and valued are less likely to become disengaged on the job (Nelson 2003). Therefore reward and recognition is found to influence retention of staff. The respondents were asked to indicate the extent to which they agree with aspects of reward and recognition at D.T.Dobie and results were shown in Table 4.11 below.

Table 4.11: Reward and Recognition

	Mean	SD
Do you get recognition and praise for work well done?	2.4	1.30
Are you satisfied with your pay and how it is determined?	1.9	1.15

Do you feel satisfied that the rewards you earn are as a result of your pay negotiations?	2.4	1.15
Average	2.3	1.2

The results in Table 4.11 revealed that the mean score for reward and recognition was 2.3. This showed that the respondents did not agree with the reward and recognition practice at D.T.Dobie. In fact, the average score borders more towards respondents strongly disagreeing. More specifically, the respondents are disagreed about the extent to which employee recognition and praise for work well done is practiced (Mean 2.4, SD 1.30) and strongly dissatisfied with how pay is determined (Mean 1.9, SD 1.15). The respondents also disagreed that the rewards and recognition earned are as a result of negotiation (Mean 2.4, SD 1.15). It can be seen that in all statements, the standard deviation was more than one and ranged from 1.15 to 1.30. This means that there was no consensus and that staffs are not happy in the way the respondents felt about reward and recognition at D.T.Dobie.

4.4.9 Training and Development

Training and development is said influences employees’ perception to stick in an organization. Griffeth et al. (2000), in his study found that training and development reduces the turnover rate of employees and he said not only reduce absenteeism, but also increase employee commitment and satisfaction which helps reinforce commitment. Respondents were asked to indicate the extent to which they agreed or disagreed with training and development opportunities at D.T.Dobie and the analysis of responses was as shown in Table 4.12.

Table 4.12: Training and development

	Mean	SD
Do you feel you have opportunities for career growth through training and development and upward mobility at D.T. Dobie?	2.9	1.39
Is it agreeable that all employees have attended any company sponsored training for the last one year of service in this company?	2.2	1.14
Do you feel training is given to a few employees only most of the times?	3.4	1.31
Average	2.8	1.28

As shown in Table 4.12, training and development revealed a mean score of 2.8. Respondents were neutral that they have opportunities for growth and development and promotions (Mean 2.9, SD 1.39) and also neutral that all employees have attended training in the last year (Mean 2.2, SD 1.14).. Respondents were neutral on whether training is given to a few employees all the time (Mean 3.4, SD 1.31). It can be noted that in all cases, the standard deviation is more than 1 ranging from 1.14 to 1.39 which means that there is a general no consensus on training and development at D.T.Dobie. This analysis implies that overall staffs are not happy with training and development practices at D.T.Dobie.

4.4.10 Work Life Balance

Work life balance is a contemporary challenge to employee retention. Cooper (2008) in his study revealed that, changes to the family situations today tend to impact upon women employees and results in non retention and increasing difficulty in managing a balance between work and family responsibilities. Respondents were therefore asked to indicate the extent to which they agreed or disagreed with work life balance at D.T.Dobie and the analysis of results was as shown in Table 4.13.

Table 4.13: Work life balance

	Mean	SD
Are you satisfied with the working hours of the organization?	3.7	1.39
Does after working hours get you enough time for your family?	3.3	1.27
Do you feel that you often need some time off to attend to personal domestic matters?	3.8	1.23
Average	3.6	1.30

As shown in Table 4.13, respondents slightly agreed with the work life balance as an aspect of employee retention at D.T.Dobie with a mean score of 3.6. In fact it majors on the border of neutral rating. The respondents were agreeable that they are satisfied with the working hours (Mean 3.7, SD 1.39) and were neutral that they have enough family time after working hours (Mean 3.30, SD 1.27).

1.27). They were also agreeable that they often need more off to attend to personal matters (Mean 3.8, SD 1.23). The standard deviations for all statements of work life balance were more than 1 ranging from 1.23 to 1.39. It can therefore be interpreted that their was no consensus on work life balance at D.T.Dobie.

4.11 Geographical Location

Geographical location has been said have influence on employee retention. Haslam et al (2005) in the study of employee retention of generation Y, found that attracting and retaining skilled and professional staff in remote locations has continually declined particularly with the youth cohort and many young people. Respondents were therefore asked to indicate their degree of agreement or disagreement with two statements relating geographical location transfers. Results of these statements were as presented in Table 4.14.

Table 4.14: Geographical location

	Mean	SD
If you were to be transferred to a smaller town office, would you prefer to be transferred to a location that is not your home area?	2.8	1.6
If a vacancy for promotion occurs in an office in the remote geographical location, would you easily take it up?	3.0	1.47
Do you agree that in the event of a transfer, you would consider other factors other than the salary?	3.6	1.69
Average	3.1	1.58

Results from table 4.14 showed, the respondents were neutral on the extent to which they perceive geographical location /transfer at D.T.Dobie with a mean score of 3.1. Specifically, the respondents were moderate in the extent to which they can accept to be transferred to locations that are not their home areas (Mean 2.8, SD 1.6) and also moderate on the extent to which they can take a vacancy or promotion in a remote area (Mean 3.0, SD 1.47). There was however slight agreement to the extent in which they would consider other factors in the event of a transfer other than salary (Mean 3.6, SD 1.69).The analysis implied that D.T.Dobie staffs are moderate on the extent of geographical location transfers. It should be noted that the standard deviations in these statements are more than 1 ranging from 1.47 to 1.69, meaning that there was lack of consensus in terms of the way staffs at D.T.Dobie perceive geographical location transfers.

4.5 Organization Citizenship Behaviour

This section of the study examined the perceived influence OCB dimensions have on employee retention at D.T.Dobie. Chen et al. (1998) in his study found that affective commitment and retention correlated positively with self-report measures of OCB. Organ (1988), also found out that high levels of OCB lead to high levels of organizational efficiency, effectiveness and adaptability and satisfaction. It is considered as one of the most important factors influencing organizational effectiveness. It was therefore important to establish the respondents’ perception to be able to test the hypothesis. OCB in this research was measured using five Likert scale rated as Strongly Disagree, 1 Disagree, 2 Neutral, 3 Agree 4 and Strongly Agree 5. A score of ≤ 1.5 was interpreted to mean strongly disagree, while a score 1.5 to ≤ 2.5 implied that the respondents disagrees and 2.5 to ≤ 3.5 was interpreted to mean that the respondent was neutral. A mean score of $3.5 \leq 4.5$ was interpreted to mean that respondents agree while a score of ≥ 4.5 was interpreted to mean strongly agree. A standard deviation of ≤ 1 was interpreted to mean that respondents had a consensus in the rating of the statement while a standard deviation greater than 1 was interpreted to mean that the respondents differed in their perception about the statement. There were 5 statements used to measure OCB dimensions at D.T.Dobie. These statements were adopted from Organ (1988) and measured Altruism, Sportsmanship, Loyalty, Conscientiousness, Civic Virtue and Courtesy. Respondents’ perception relating to the variables under each of the statements of OCB was presented herein as follows;

4.5.1 Helping behaviour/altruism

This study sought the respondents view on the extent to which they agree or disagree with Altruism dimension at D.T.Dobie. Lee & Allen (2002) found that Altruism is an aspect of OCBI and they defined it as voluntarily helping others with work-related problems. Table 4.15 shows the analysis of their level of agreement on statements relating to Altruism/ helping behaviour.

Table 4.15: Helping behavior/altruism

	Mean	SD
Do you feel compelled to help your colleagues accomplish their tasks?	3.4	1.53
Do you feel satisfied when you assist your workmates go through a problem whether personal or work related?	3.6	1.61

Would you assist your colleagues finish up work they are given past working hours?	3.7	1.49
Average	3.6	1.54

Results from Table 4.15 on Altruism dimensions, showed that there was general slight agreement on helping behavior/altruism with a mean score of 3.6. The respondents agreed they could assist their colleagues finish up work they were given past working hours (M=3.7, SD=1.49) and did feel satisfied when they assisted their workmates go through a problem whether personal or work related (M=3.6, SD=1.61). They slightly agreed that they would assist their colleagues accomplish their tasks (M=3.4, SD=1.53). It can be noted that in all cases, the standard deviation is more than 1 ranging from 1.49 to 1.61 which means that there is a general no consensus on Altruism at D.T.Dobie. This analysis implies that overall staffs are not happy with helping behaviours dimension.

4.5.2 Sportsmanship

Sportsmanship is a dimension that is said to have influence in retention. Organ (1982) revealed that Sportsmanship is the employee's tolerance of less-than-ideal organizational circumstances without complaining and blowing problems out of proportion in the organization. Respondents were therefore asked to indicate the extent to which they agreed or disagreed with sportsmanship dimension at D.T.Dobie and the analysis of results was as shown in Table 4.16.

Table 4.16: Sportsmanship

	Mean	SD
Do you agree that you can tolerate a decision that no more bonuses are given in spite for it being routine?	2.7	1.38
Is it agreeable that you would complain bitterly if your team members were rewarded and you left out?	2.9	1.7
Do you agree that you would go to deliver goods on a Sunday without pay to a customer who can't wait for Monday because he/she must fly out same Sunday evening with the goods?	3.5	1.07
Average	3.0	1.38

Results showed overall rating on sportsmanship dimension was moderate with a mean score of 3.0 and a standard deviation of 1.38. Respondents rating was highest on going to deliver goods on a Sunday without pay (Mean 3.5, SD 1.07) followed by whether they would complain bitterly when some colleagues are rewarded and some are left out (Mean 2.9, SD 1.7). The lowest rating was on whether they would tolerate a decision on routine bonus cuts (Mean 2.7, SD 1.38). It can be noted that in all cases, the standard deviation was more than 1 ranging from 1.07 to 1.70 which means that there was a general no consensus on sportsmanship at D.T.Dobie.

4.5.3 Loyalty /General compliance

This study sought the respondents views on the extent to which they agree or disagree with loyalty dimension at D.T.Dobie. Lee & Allen (2002) found that loyalty is an aspect of OCBI and they defined it as voluntarily obeying orders, rules and regulations of the organization. Table 4.17 shows the analysis of their level of agreement on statements relating to loyalty.

Table 4.17: Loyalty/General compliance

	Mean	SD
Do you sometimes voluntarily fail to report to work for no good reason at all?	2.8	1.88
Do you feel comfortable to walk around outside the company in a company branded outfit or clothing?	3.3	1.48

Do you agree that if you were given a chance to continue working in this company till retirement you would quickly take up the chance?	3.1	1.44
Average	3.1	1.6

The analysis on Table 4.17 shows that overall respondents rating on loyalty was (Mean 3.1, SD 1.6). the respondents were uncertain whether they felt comfortable to walk around outside the company in a company branded outfits or clothing (M=3.3, SD=1.48), they were also neutral on whether, if given a chance to continue working in this company till retirement they would quickly take up the chance (M=3.1, SD=1.44) and non-committal on whether they sometimes voluntarily fail to report to work for no good reason (M=2.8, SD=1.88). From the analysis it can be noted that in all cases, the standard deviation was more than 1 ranging from 1.44 to 1.88 which means that there was a general no consensus on loyalty dimension at D.T.Dobie. This may imply that, employees may or may not generally comply with most of the policies, rules and regulations. Perhaps due to the perception that policies are inconsistent, unfair or discriminative and that adherence to policies and rules are perceived optional.

4.5.4 Individual initiative/ conscientiousness

Conscientiousness relates to dependability, hardworking, organized, self disciplined, persistent, responsible, and having high performance expectations among other attributes. MacKenzie et al, (1993) in his study of OCB found that conscientiousness is a discretionary behavior that goes well beyond the minimum role requirement level of the organization, such as obeying rules and regulations, not taking extra breaks, working extra-long days . The study sought the respondents views on the extent to which they agree or disagree on conscientiousness. Table 4.18 shows the analysis of their level of agreement on statements relating to conscientiousness.

Table 4.18: Individual initiative/conscientiousness

	Mean	SD
Would you do a duty that is within your job description when called to do so?	3.3	1.22
Do you agree that when in a senior position would you punish an employee simply because your boss has asked you to do so?	2.7	1.48
Is it agreeable that before you assist your colleagues in work related or personal issues you put in a lot of considerations?	2.8	1.15
Average	2.9	1.28

From the analysis on table 4.18, respondents were neutral that they have individual initiative with a mean score of 2.9. They were not sure whether they would do a duty that is not within their job description when called to do so (M=3.3, SD=1.22), they were not sure as well that they would put some consideration before they assist their colleagues in work related or personal issues (M=2.8, SD=1.15) and also neutral that when in a senior position they would punish an employee simply because the boss has asked them to do so (M=2.7, SD=1.48). From the analysis it can be seen that the standard deviations for all statements of conscientiousness were more than 1 ranging from 1.15 to 1.48. It can therefore be interpreted that there was no consensus on individual initiative /conscientiousness at D.T.Dobie. It also implies that staffs are not self driven especially in terms of having things done promptly, paying attention to details, following schedule, and getting chores done in the right way at the right time.

4.5.5 Civic Virtue

Civic virtue has been said to have some influence on employee retention. Law et al (2005) in his study on Civic virtue found that it is characterized by behaviors that indicate the employee’s deep concerns and active interest in the life of the organization. Respondents were therefore asked to indicate their degree of agreement or disagreement with two statements relating to Civic virtues at D.T.Dobie. Results of these statements were as presented in Table 4.19 below.

Table 4.19: Civic Virtue

	Mean	SD
Do you agree that sometimes you deliberately miss company functions like general meetings for no reason?	3.2	1.23
Would you defend the current company policies and regulations as the most fair?	3.0	1.04

Do you agree that you are always aware of the future plans, undertakings or even planned changes?	2.2	1.26
Average	2.8	1.17

The results in Table 4.19 revealed that the mean score for reward and recognition was 2.8. The respondents were neutral that sometimes they deliberately missed company functions like general meetings for no reason (M=3.2, SD=1.23) and also neutral in whether they would defend the current company policies and regulations as the most fair (M=3.0, SD=1.04). They however were in disagreement that they were always aware of the future plans, undertakings or even planned changes (M=2.2, SD=1.26). It can be noted that in all statements, the standard deviation was more than one and ranged from 1.04 to 1.26. This means that there was no consensus on civic virtues and that staffs are not so committed or concerned with the life of D.T.Dobie.

4.5.6 Courtesy

This study sought the respondents view on the extent to which they agree or disagree with courtesy dimension at D.T.Dobie. Law et al (2005) found courtesy to be discretionary behaviors that aims at preventing work-related conflicts with others. Respondents were asked to rate their level of courtesy with other colleagues and the results were shown on table 4.20 below.

Table 4.20: Courtesy

	Mean	SD
Do you feel enthused to train a newly recruited/transferred staff in your department?	3.4	1.38
Would you serve your immediate workmate a cup of tea when you are serving yourself at the urn?	3.7	1.57
Would you agree to carry extra copies of the meeting minutes when they did not attend?	3.6	1.15
Average	3.6	1.37

Results from Table 4.20, showed that there was general slight agreement on courtesy dimension at D.T.Dobie with a mean score of 3.6. Respondent had a neutral rating on whether they felt enthused to train new recruits (Mean 3.4, SD 1.38), they agreed that they would serve colleagues tea (Mean 3.7, SD 1.57), and slightly agreed that they would carry extra copies of minutes for those who missed meeting (Mean 3.6, SD 1.15). The standard deviations for all statements of courtesy dimension were more than 1 ranging from 1.15 to 1.57. It can therefore be interpreted that their was no consensus on courtesy dimension at D.T.Dobie..

4.6 Relationship between Employee Retention Practices and OCB dimensions.

In this study, Pearson correlation was used to explore the relationships between employee retention practices and OCB variables, in order to assess the direction positive or negative and strength of the relationship between the variables. The relationship results were shown in the table below;

Table 4.6: Relationship between Employee Retention Practices and OCB Dimensions (N=142)

Employee Retention Practices		OCB Dimensions						Overall
		Helping Behavior /Altruism	Sponsorship	Loyalty /General Compliance	Individual Initiative /Conscientiousness	Civic Virtue	Courtesy	
Recruitment and Selection	r	-.031	.158	.179*	.249	.096	.081	.225
	p	.71	.055	.03	.002	.246	.331	.006
Realistic Job Preview	r	-.076	-.174	.428	.503	.510	-.094	.317
	p	.362	.035	.000	.000	.000	.256	.000
Corporate Image	r	.190*	.054	-.228	.013	.314	.323	.254
	p	.021	.519	.006	.878	.000	.000	.002
Organizational	r	-0.157	-.145	.101	.614	.458	-.158	.153

Employee Retention Practices	OCB Dimensions							
	Helping Behavior /Altruism	Sponsorship	Loyalty /General Compliance	Individual Initiative /Conscientiousness	Civic Virtue	Courtesy	Overall	
Culture	p	.057	0.079	.221	.000	.000	.056	.065
Leadership Style	r	.214	.397	-.241	.319	.259	.393	.453
	p	.009	.000	.003	.000	.002	.000	.000
Employee Relations	r	.114	.149	-.259	.316	.181	.142	.199
	p	.17	.072	.002	.000	.029	.086	.016
Communication	r	.075	.348	-.084	.304	.173	.127	.286
	p	.365	.000	.315	.000	.036	.124	.000
Reward and Recognition	r	-.125	.362	.006	.497	.365	-.089	.240
	p	.132	.000	.94	.000	.000	.283	.003
Training and Development	r	.198*	.444	.262	.267	.239	.175	.527
	p	.016	.000	.001	.001	.004	.035	.000
Work Life Balance	r	.186*	.07	.428	.336	-.234	.079	.327
	p	.024	.4	.000	.000	.004	.344	.000
Geographical Location	r	.094	.247	-.007	.043	.062	.471	.345
	p	.259	.003	.938	.609	.455	.000	.000
Overall	r	.102	.291	.028	.527	.380	.242	.495
	p	.218	.000	.74	.000	.000	.003	.000

Where: r = Correlation Coefficient and
 p = Significance level

Results from table 4.6 above show there was a significant correlation between overall employee retention practices and overall OCB dimensions, $r = .495$, $n = 142$, $p < .01$, two tails. Attractive employee retention practices were associated with good organizational citizenship behavior.

4.6.1 Summary of Pearson Correlation

Table 4.7: Relationship between Employee Retention Practices and OCB Dimensions

		Employee Retention Practices	OCB Dimensions
Employee Retention Practices	Pearson Correlation	1	.495
	Sig. (2-tailed)		.000
	N	142	142
OCB Dimensions	Pearson Correlation	.495	1
	Sig. (2-tailed)	.000	
	N	142	142

Correlation analysis results between employee retention practices and OCB dimensions are shown in table 4.6 and summary in table 4.7 above. The two tables showed clearly that there was a strong and positive correlation between overall employee retention practices and OCB dimensions ($r = .495$, $p < .01$). This is an indication that attractive retention practices are associated with OCB dimensions and by large contributes to employee retention. Better employee retention practices and OCB dimension strategies and policies positively influence retention of employees.

There was a strong and positive correlation between realistic job preview and conscientiousness ($r = .503, p < .01$), indication that job preview and conscientiousness has strong influence on employee retention at D.T.Dobie. Organizational culture and conscientiousness ($r = .614, p < 0.01$) indication that organization culture and conscientiousness has strong positive impact on retention. Leadership and sportsmanship ($r = .397, p < .01$), indicated significant impact on employee retention. Employee relations and conscientiousness ($r = .316, p < 0.01$), equally indicated positive influence on employee retention. Communication and conscientiousness ($r = .304, p < .01$), significantly influence employee retention. Reward and recognition and conscientiousness ($r = .497, p < .01$), has positive relation to retention of employees at D.T.Dobie. Training and development and sportsmanship ($r = .444, p < .01$), indicated strong positive influence on employee retention. Work life balance and loyalty ($r = .428, p < .01$), an indication of great influence on employee retention. Geographical location and courtesy ($r = .471, p < .01$) also indicated strong positive influence on employee retention at D.T.Dobie. In summary the results of the study confirmed that employee retention practices in relation to OCB dimensions influences employee retention at D.T.Dobie.

4.7 Discussion of Results

This section discusses the results in line with the objective of the study. The study set out to assess the relationship between employee retention practices and OCB dimensions at D.T.Dobie. The research problem was to determine the clear relationship between retention practices and OCB dimensions and examine how such relationship can influence the retention of employees and mitigate the consequences of voluntary exits in organizations today. The results of the study indicated significant relationship between employee retention practices and OCB at D.T.Dobie. Thus, when employee retention practices are considered positive, OCB dimensions is high. The result of this research is confirming Allen and Smith (1987); Meyer and Allen (1991) and Chen et al. (1998) who found that commitment and retention correlated positively with self-reported measures of OCB and Organ (1988), who found that high levels of OCB lead to high levels of satisfaction and commitment hence retention. The theoretical foundation of the study was guided by Herzberg's theory of motivation (Armstrong, 2007) and the Social Exchange Theory (Hopkins, 2002). The study confirmed that there is significant correlation between employee retention practices and OCB at D.T.Dobie.

The objective of the study was to establish the relationship between employee retention practices and OCB at D.T.Dobie. The findings showed that, out of the eleven statements on employee retention practices, majority respondents scored overall moderate ratings of 63.7%. On six OCB dimensions majority scored moderate rating of 66.7% making it almost a similar perception on both variables. This implied that there was no consensus on most employee retention practices and OCB dimensions. This means that employee retention practices and OCB are moderately practiced at D.T.Dobie. The survey did not find any relationship between the demographic profile of the respondents and retention. The gender of the respondents also did not show any relationship with retention as much as there is skewed gender disparity at D.T.Dobie with more males than females. The position/ grade of the respondents did not provide any link with retention as well. Most respondents were unionized staff category which is consistent with expectations for generation Y employees at D.T.Dobie. Most respondents have worked for the organization for less than 10 years. Majority of the respondents were aged between 40 to 49 years.

On specific measurements of the study, the first statement was to examine the level of recruitment and selection as a practice to enhance retention in relation to OCB and we found that it did not significantly predict correlation with OCB. This finding is contradictory with Herzberg (1959) two factor theory which identified recruitment and selection as hygiene factor that motivates and leads to satisfaction and hence retention. Specifically the study found that competitive recruitment did not motivate employees to stay at D.T.Dobie.

The study on realistic job preview (RJP) was found to moderately influence retention at D.T.Dobie. The study proposed that RJP's have positive effect on employee retention at D.T.Dobie. This confirmed Allen's (2010) study that RJP's shape employees' perceptions in the organization and that, such perceptions of the organization promotes higher levels of employee commitment, performance and retention. This means that indeed RJP contributes to employee retention. Specifically open job details are most significant and such would help draw more people to the organization. On the other hand lack of full information disclosure about the job was found to lead to non retention of employees'. This confirms Steer (1996) study that lack of well managed RJP leads to early exits. The correlation of RJP's and OCB was significant at D.T.Dobie.

Study on corporate image proposed that a good corporate image influences employees' retention. This confirmed the study by Bitner (1990) who found that the overall impressions of the organization is what attracts the best employees to an organization and gives them satisfaction and loyalty hence retention is achieved. The relationship between organizational culture and OCB was significant according to the analysis results. The correlation coefficient values indicate that organizational culture has moderate positive relationships with OCB conscientiousness dimension. Thus, when organizational culture is positive, OCB is high hence retention. This finding is confirmed by Atwood (2007) who found that strong organizational culture is not only critical for engaging, attracting and retaining senior executives but all other staff as well.

Study on leadership styles indicated significant relationship between leadership style and OCB courtesy dimension at D.T.Dobie. This is confirmed by Tajeda et al (2001) who agreed that there is considerable evidence that transformational leadership is effective and has been positively related to performance, employee satisfaction and retention. When leaders involve employees, advice on work methodology and help employees grow on job such will directly motivate them not only to get the job done but retain them as well. Based on the result of the previous studies and result outcomes of this study, we may confirm that the negative relationship between leadership style and OCB at D.T.Dobie was convincing.

The survey results indicated strong relationship between reward and recognition practices and OCB at D.T.Dobie. Most respondents indicated dissatisfaction with reward practices at D.T.Dobie. In particular most respondents are not satisfied with the recognition practice for work well done, they were not in agreement with their pay and how pay is determined indicating that pay was not equitable, and majority also expressed dissatisfaction with lack of pay policy. In summary it can be concluded that staff at D.T.Dobie are dissatisfied with the reward and recognition practices at D.T.Dobie.

Work life balance predicted significant relationship with OCB. It confirmed a significant correlation with OCB. This confirms Cooper (2008) study that emerging initiatives of work life balance provide greater flexibility in leave arrangements to suit employees' performance, attraction and retention. The study therefore concluded that work life balance relates significantly with OCB at D.T.Dobie. It also meant that D.T.Dobie has some moderate criteria for work life balance.

Study on effective communications proposed that communication had an influence on employee retention. This is in line with Armstrong (2007) who contend that effective communication is maintaining an open channel of communication that make an organization be aware of problems quickly, and have a quick resolution of conflicts, disharmony, performance or skills issues. Analysis on the descriptive statistics showed that communication had moderate score under the measurement subscales. The analysis implied that communication had a positive moderate relationship with OCB. This supports Podsakoff & Mackenzie (1997) who revealed that OCB dimensions like conscientiousness and sportsmanship improve organizational capacity through proper communication and such has a direct and casual relationship with employee's needs and motivation to stay on. The study found that communication correlated moderately with OCB at D.T.dobie.

Results on Training and development revealed a moderate score at D.T.Dobie. This implied that the company provides training and development moderately. This contradicts Deckop et al. (2006) who contend that continuous implementation of training fosters commitment and that it reduces employees' numerous direct and indirect costs associated with turnover. Although retention strategy can be tied to all other company human resource practices, continuous training can never be underestimated. This is in line with Scholl (2003) who asserts that training and career development are key factors in attraction and retention. The analysis showed the correlation coefficient between training and OCB was significantly strong and had the highest value in the study. In conclusion, based on the findings and results of previous studies, it was confirmed that training and development was being practiced moderately at D.T.Dobie.

Study on geographical location proposed that geographical transfers influence employee retention at D.T.Dobie. This is in line with Haslam et al (2005) who contend that the challenge of attracting and retaining populations in remote location/upcountry has intensified over the last couple of decades with the shift towards a market-led allocation of resources and government policies that have encouraged rationalization and devolution of services to remote regions. Stehlik (2006) found that attracting and retaining skilled and professional staff in remote locations has continually declined. The coefficient correlation analysis showed that geographical location significantly influences positively employee retention practices and OCB at D.T.Dobie. This confirmed the moderate perspective of this measure at D.T.Dobie .

Study on employee relations proposed that employee relations in relationship with OCB have a positive and significant effect on employee retention at D.T.Dobie. Ulrich (2007) states that having strong employer and employee relations reaps a lot of benefits for organizations as it creates a pleasant working atmosphere, increases employee motivation and improves employee morale. The results of this study revealed that there is insignificant relationship between employee relations and OCB at D.T.Dobie. This contradicts Podsakoff (2000) who contend that a happy workforce is a productive workforce and creating a sound and efficient work environment with good management and a strong employer- employee relation can be the vital key to exits or retention. This confirms that staffs at D.T.Dobie are not satisfied with the employee relations practice.

In conclusion, based on the analysis of the results of this survey, the relationship between employee retention practices and OCB is significant. All the parameters in the analysis measuring employee retention practices indicated a strong relationship with OCB dimensions. Thus, when employee retention practices are high, OCB is high. The results of this research have been proven by Meyer and Allen (1991) in their study in which they found that OCB has a strong positive relationship on employee retention. The correlation coefficient value in this study indicated that organizational employee retention practices and OCB have positive relationship with employee retention at D.T.Dobie. The relationship between retention and OCB has been demonstrated by many other studies (Wagner & Rush, 2000) confirmed that employees who have high level commitment to their organization are more focused on their work than employees reporting lower levels. Story (2007) confirmed that HR retention practices are the means through which employee perceptions, attitudes and behaviors are shaped. Morrison (1996) concluded that because HR retention practices set the tone and conditions of employee/ employer relationship, then organizations should foster OCBs through human resource management.

V. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The purpose of this study was to examine the relationship between employee retention practices and OCB at D.T.Dobie. This chapter provides a summary of the major findings of the study, discussions on theory and practice, implications, recommendations and

conclusions. It also highlights the limitations of the study and outlines proposed areas of future research. The objective of this study was to establish the relationship between employee retention practices and OCB at D.T.Dobie.

5.2 Summary of Findings

The study established that majority of D.T.dobie staff are unionized employees and hence feel more protected by the union body. Majority of the respondents were male employees. This is in line with the gender distribution of the study which showed that more males were in employment than females. While the research did not focus precisely on gender equity, the findings reflect that the sample is biased towards males as they constituted a higher percentage of the respondents. Most of the 142 staff had been in same position all through and have worked for less than 10 years. A small number of staff has worked for more than 21 years. Majority of the respondents were aged 40 years and above. This analysis implied that there was a disagreement on growth and upward mobility of employees at D.T.Dobie. The majority of the employees had been in this company for less than 10 years. The implication of this is that there is a sense of labour instability in D.T.Dobie. Most of the staffs have Diploma qualifications and this is in line with the requirements for employment as a workshop mechanic.

The results indicated a general dissatisfaction with reward management practices by employees at D.T.Dobie. Similarly, the results also indicated dissatisfaction with training and development practice. The results general indicated dissatisfaction with the leadership styles practice at D.T.Dobie. Most of employees at D.T.Dobie did not necessarily agree or disagree with the realistic job preview (RJP) practice. Most respondents were satisfied with recruitment and selection practice at D.T.Dobie and were similarly satisfied with the corporate image of the company. The results however indicate a neutral response on organizational culture at D.T.Dobie. Most of the employees neither agreed nor disagreed with employee relations practices at D.T.Dobie. Similar response was indicated with communication practice at D.T.Dobie with majority neither agreeing nor disagreeing. The study established that most respondents were slightly satisfied with the work life balance practice at D.T.Dobie.

The study also established that most employees neither agreed nor disagreed with geographical location/transfers practice at D.T.Dobie. The study on OCB established most respondents slightly agreed with helping behaviour/altruism dimension at D.T.Dobie. The study revealed a neutral response with sportsmanship dimension and a similar neutral result with loyalty /compliance dimension at D.T.Dobie. The study also indicated neutral results on conscientiousness dimension and similar neutral results on civic virtue dimension at D.T.Dobie. However results indicated slight satisfaction on courtesy dimension at D.T.Dobie. The study confirmed employee retention practices jointly with OCB had a greater effect on employee retention than any one individual variable. The correlation coefficient was statistically significant hence the objective of the study was supported.

5.3 Conclusions

The results of this study enabled a better understanding of the relationship between employee retention and OCB at D.T.Dobie. Based on the findings, the eleven factors of measurement for employee retention practices and six OCB dimension used in the research, showed that there was a significant relationship between employee retention practices and OCB dimensions at D.T.Dobie.

The results of this study may be useful to D.T.Dobie and other organizations in the effort to retain employee and reduce labour turn over. A deliberate effort is needed by organizations with the intention of improving employees' job satisfaction in the workplace and also to help ensure a more stable workforce. It is hence important to monitor and evaluate employee retention practices and OCB dimensions to make them more attractive and appealing to the staff in order to spur retention.

It is important for management to develop an employee retention practice and OCB dimension policy that is inclusive and flexible to the contemporary employees. Based on the findings of the study, we may confirm and conclude that general employees' dissatisfaction with employee retention practices and OCB is a major contributory factor to employee exits and non retention at D.T.Dobie.

5.4 Recommendations

The study recommends that in order to enhance employees retention, D.T.Dobie should formulate clear policies on retention practices and OCB dimensions. The company should carry out an independent survey to come up with the micro retention practices and relevant OCB dimensions that will enable them retain the voluntary leavers. Change of attitude and leadership styles predominant in the findings exposed the company as a bad employer and such need to be changed to improve further the corporate image of D.T.Dobie. Employee perceptual processes as we have seen influences their decision making principles and D.T.Dobie need to redefine her organization culture to induce loyalty, favourable employee relations and hence retention.

The study also recommends that, employee retention practices and OCB are no longer stand alone activities but should be linked together in a wider perspective to motivate different individuals who may not find fulfillment in one variable. The combination of retention practices and OCB should be seen as a contemporary issue to D.T.Dobie in order to spur retention, especially the generation Y staff who is hyper in their demands for transparency in the recruitment process, realistic job preview, corporate image, leadership styles, communication and media, higher rewards, work life balance and OCB dimensions for them to stay in an organization longer.

5.5 Limitations of the Study

This study provided a great insight into the relationship between employee retention practices and OCB at D.T.Dobie but it had some limitations. Firstly, the selection of the study variables that comprise employee retention practices and OCB dimensions were not exhaustive. Only eleven employee retention practices and six OCB dimensions were used in this study to link and explain

employee retention. There may be other employee related factors and the use of such limited factors may have not provided a complete image of the relationship between employee retention practices and OCB dimensions. Secondly, the scope of the study included only one private organization and left out the public organizations. This means that the results may not be generalized for all employees in both public and private organizations. Finally, the results of this study were collected using a single key-informant approach which limits the ability to access broad based information. Although the choices of each question were adopted from previous studies, all possible alternatives might not have been considered. The findings of a survey based on other sources of information could have provided additional insights.

5.6 Recommendation for Further Research.

This study investigated the perceived relationship between employee retention practices and OCB at D.T.Dobie. The findings of this study added to the existing empirical evidence that employee retention practices and OCB dimensions influence the retention of employees in organizations. The inclusion of additional factors not covered in this study could bring more insights into the relationship between employee retention practices and OCB because the factors used were not exhaustive. Future research could also consider a similar research in public institutions and hence add knowledge of the quality of employee retention practices and OCB in the public sector. Such would lead to researchers being able to compare private and public organizations and establish if there is significance difference or similarities in these institutions in terms of the variables and relationships in this study. The replication of this study in other contexts such as other public institutions, private sector and non-government organization can also give a more detailed view of the nature of the relationships identified in the study. We therefore recommend that similar research should be done in the public sector and the NGOs as well to compare the similarities of findings so that an affirmative policy may be developed around the relationship between employee retention practices and OCB in organizations.

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APPENDIX 1: QUESTIONNAIRES.

My name is Paul Olendo. I am finalizing my MSC course in HRM at the University of Nairobi. I am conducting a research on perceived relationship between employee retention practices and organization citizenship behaviour at D.T.Dobie Company. The research will be used strictly for academic purposes and as a requirement for the partial fulfillment of the post graduate degree course.

Please be advised that your responses will be treated with confidentiality for the purposes of this study. It will take you just 30 minutes to feel to fill it up. Please tick your options as necessary and be honest. Remember you need not add your name or initials. To be collected by 4.00pm.

SECTION A: DEMOGRAPHIC INFORMATION

1. What is your gender? Male () female ()
2. What is your job category (please tick one)
 - a) Executive staff ()
 - b) Senior Manager ()
 - c) Junior manager/Supervisor ()
 - d) Administration staff ()
 - e) Unionized staff ()
3. Please tick your age bracket;
20 - 29 (), 30 - 39 (), 40 – 49 (), 50 and above ()
4. How long have you worked here?
1 - 10 years (), 11 – 20 years (), 21 – 30 years (), Over 31 years ()
5. Please tick your highest level of education.
O – Level (), Certificate (), Diploma (), First Degree (), Masters Degree (), PhD ()

SECTION B: EMPLOYEE RETENTION PRACTICES

Please kindly indicate your level of agreement with the following practices at D.T.Dobie Company. Use the scale for all questions:

5= Strongly Agree; 4= Agree; 3= Neutral; 2 = Disagree; 1= Strongly Disagree.

No	Practices	Rating				
		1	2	3	4	5
	Recruitment and Selection					
1	Do you feel you were competitively recruited?					
2	Were your job responsibilities clearly explained to you?					
3	Are you satisfied with your position and role at D.T.Dobie?					
	Realistic Job Preview					
1	Do you feel the position’s responsibilities and requirements and expectations were effectively communicated to you?					
2	Based on your experience, would you refer someone for a position with D.T.Dobie company?					
3	Do you feel there was some information had you known earlier about your job you could have considered not taking up the job?					
	Corporate Image					
1	Are you proud to tell others that you are part of this organization					
2	Do you believe that there is a superior brand that makes D.T.Dobie popular?					
3	Do you think the company attracts more people who would wish to work for it?					
	Organizational Culture					
1	Do you believe you can influence your work place through your ideas and participation?					
2	Do individuals and teams have clear defined goals that relate to the objectives and mission of the organization?					
3	Do people in this organization believe in working together collaboratively, preferring corporation over completion?					
	Leadership Style					
1	Does your boss ask for team ideas and input and have decisions made by					

	team consensus?					
2	Does your supervisor tell you what to do, how to do it and when to have it completed?					
3	Does your leader use his powers to help you grow both on the job and mentally?					
No						
	Employee Relations	1	2	3	4	5
1	If you had the opportunity to get a similar job with another company, would you stay with this company?					
2	Do you feel your supervisor provides you with feedback, guidance and encourages you to develop?					
3	Do you feel you work with people who are pleasant and co-operative enough?					
No						
	Communication	1	2	3	4	5
1	Do you have access to timely information about what is happening in the organization?					
2	Is positive and productive feedback clearly given to you to help you improve/achieve success in your work?					
3	Do you agree that lack of effective communication frustrates your efforts to perform well?					
No						
	Reward and Recognition	1	2	3	4	5
1	Do you get recognition and praise for a work well done?					
2	Are you satisfied with your pay and how it is determined?					
3	Do you feel satisfied that the rewards you earn are as a result of your pay negotiations?					
No						
	Training and Development	1	2	3	4	5
1	Do you feel you have opportunities for career growth through training and development and upward mobility at D.T.Dobie?					
2	Is it agreeable that all employees have attended any company sponsored training for the last one year of service in this company?					
3	Do you feel training is given to a few employees only most of the times?					
No						
	Work Life Balance	1	2	3	4	5
1	Are you satisfied with the working hours of the organization?					
2	Does after working hours get you enough time for your family?					
3	Do feel that you often need some time off to attend to personal /domestic matters?					
No						
	Geographical Location	1	2	3	4	5
1	If you were to be transferred to a smaller town office, would you prefer to be transferred to a location that is not your home area?					
2	If a vacancy for promotion occurs in an office in the remote geographical location, would you easily take it up?					
3	Do you agree that in the event of a transfer, you would consider other factors other than the salary?					

SECTION C: OCB DIMENSIONS

Kindly indicate your level of agreement with the following practices at D.T.Dobie Company. Use the scale:

5= Strongly Agree; 4= Agree; 3= Neutral; 2 = Disagree; 1= Strongly Disagree.

No	Practices	Rating				
	Helping Behaviour/altruism	1	2	3	4	5

1	Do you feel compelled to help your colleagues accomplish their tasks?					
2	Do you feel satisfied when you assist your workmates go through a problem whether personal or work related?					
3	Would you assist your colleagues finish up work they are given past working hours?					
No						
	Sportsmanship	1	2	3	4	5
1	Do you agree that you can tolerate a decision that no more bonuses are given in spite for it being routine?					
2	Is it agreeable that you would complain bitterly if your team members were rewarded and you left out?					
3	Do you agree that you would go to deliver goods on a Sunday without pay to a customer who can't wait for Monday because he/she must fly out same Sunday evening with the goods?					
No						
	Loyalty/general compliance	1	2	3	4	5
1	Do you sometimes voluntarily fail to report to work for no good reason at all?					
2	Do you feel comfortable to walk around outside the company in a company branded out fit or clothing?					
3	Do you agree that if you are given chance to continue working in this company till retirement, you would quickly take up the chance?					
No						
	Individual Initiative/conscientiousness	1	2	3	4	5
1	Would you do a duty that is not within your job description when called to so?					
2	Do you agree that when in a senior position would you punish an employee simply because your boss has asked you to do so?					
3	Is it agreeable that before you assist your colleague in work related or personal issues you put in a lot of considerations?					
No						
	Civic Virtue	1	2	3	4	5
1	Do you agree that sometimes you deliberately miss company functions like general meetings for no reason?					
2	Would you defend the current company policies and regulations as the most fair?					
3	Do you agree that you are always aware of the future plans, undertakings or even planned changes?					
No						
	Courtesy	1	2	3	4	5
1	Do you feel enthused to train a newly recruited /transferred staff in your department?					
2	Would you serve your immediate workmate a cup of tea when you are serving yourself at urn?					
3	Would agree to carry extra copies of the meeting minutes when they did not attend?					

Thank you so much for your corporation and time.

The Functions and Objectives of Economic Diplomacy

NawalElgadiry , IsmaeilHammuda

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I. INTRODUCTION

Term economic diplomacy, then, is of French origin (La diplomatieeconomique). Bearing in mind the traditional ties of French and Russian school of diplomacy, the term has been established, and in the Russian terminology (ekonomicheskajaDiplomacy). Unlike them, the American or Anglo-Saxon terminology uses the term international business and trade diplomacy (International business trade or diplomacy). Although the economic diplomacy an integral part of modern diplomacy, and the trend is evident in developed and developing countries is that the economy became the center of diplomacy. In the context of economic globalization, with expressed problems of economic crisis, comparative solutions indicate that economic diplomacy becomes a "raison d'etre" of traditional diplomacy, which is to mobilize the investment and support export activities. In this regard was identified need for coordination of activities, the internationalization and promotion of economic interests and attracting business and investments at the level of Ministries of Foreign Affairs, in order to achieve synergy effects. Strong diplomatic economic engagement has become an essential feature of many ministers of state. Their main concern is how and in what manner to provide a more favorable position in world markets, where the laws of ruthless competition, not only economic but also non-economic nature, to protect their national interests, to achieve the highest possible share in the distribution of the world's gross national product. In order to achieve such goals all countries are subordinate and subordinate mechanisms, including diplomacy.

Diplomatic and economic engagement economic diplomacy has become the most important activity in the diplomacy of nation states, international organizations and integration, moreover it could be said that economic diplomacy has become the primary means of penetrating the world market. In today's world where international and economic relations are a system of power relations, political and economic.

II. KEY AREAS OF ECONOMIC DIPLOMACY

- 1International Economics,
- 2Increased mobilization of networks of Foreign Affairs,
- 3.The economic dimension,
- 4.Promotion Libyan innovation,
- 5Attracting foreign investment,
6. Better communication with foreign partners

The theoretical definition of the subject means to isolate and define the basic research concepts, which are: 1. economics, 2. diplomacy and 3. economic diplomacy. The process of globalization - is necessary to consider an integrated economic diplomacy in the process of globalization;

Key areas of economic diplomacy, such as attracting foreign investment and promoting innovation;

The role of planning in achieving economic diplomacy - planning in economic diplomacy should: 1) facilitate networking of different initiatives and plans under a single strategic framework; 2) to support the Government's policy and actions determine the implications of international economic integration; 3) to facilitate the training of government officials in the context of achieving the results of economic diplomacy through the planning, organization and implementation of the business policy of the country.

III. EXPECTED RESULTS AND SCIENTIFIC CONTRIBUTIONS

Scientific contributions will have a double significance. On one side will be reflected in confirming and expanding the current scientific knowledge on the role of planning in economic diplomacy. This will be achieved through:

- Description and analysis of concepts, phenomena and processes related to economic diplomacy,
 - Thereafter shall be the classification of concepts, phenomena and processes related to economic diplomacy.
- Social contributions will be reflected in a realistic assessment of the impact of planning on the exercise of economic diplomacy.

IV. CONCLUSION

The role of state and foreign ministers, as well as instruments to promote and protect the interests of the state remains very important, particularly in the areas of economic relations, the so-called. economic diplomacy.

Today, the so-called.classical diplomacy, which for centuries has profiled and organized, well-known tasks and worked out the mechanisms at bilateral and multilateral level. Red or other phones for urgent consultations, official emissaries of the visit, the shuttle diplomacy and international forums, round tables and conferences are common modes of operation. But the new, productive and efficient economic diplomacy, protecting the economic interests of the country from which the diplomat encouraged, promoting a modern way of its economic opportunities and offers, inviting foreign investors and partnerships, using even the economic obaveštajnost directly contributes to the economic development of the country and full budget from which financed and classical or courteous diplomacy.

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A discussion and comparison between Circular and Schrödinger Waves

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Abstract- This study presents the comparison between circular and Schrödinger waves. The Hankel functions $H_0^{(1)}(mr)$ and $H_0^{(2)}(mr)$ which are the solution of circular waves (sink) when combined with e^{-ikt} and diverging wave (source) when combined with e^{ikt} respectively. Moreover the functions $J_0(mr)$ and $Y_0(mr)$ of $x = mr$ suggest that each have a damped oscillatory behavior as $x \rightarrow \infty$ and that the positive and zeros of J_0 and Y_0 separate each other. On the other hand the Schrödinger wave equation represent that the positive (+) sign is a wave traveling in the +x direction and the negative (-) sign for traveling in the -x direction. In this study the authors have tried to find out the comparison between the circular wave and Schrödinger wave on the basis of monochromatic plane wave.

Index Terms- Bessel function, Circular wave, Hankel function and Schrödinger wave

I. INTRODUCTION

The Laplace equation is often used for nonlinear wave propagation both in shallow and deep water. This equation has been treated in circular wave motion. Several investigators have previously worked on the mathematical equation, which describes the motion of water waves (e.g. Dean and Dalrymple; Hoque; Parvin) [1, 2, 3]. Keller [4] developed a set of equations describing the evolution of two interacting wave components. He demonstrated that, in the non-dispersive limit, this same set of evolution equations could be derived from the exact Euler equations, the nonlinear shallow water equations, and the Boussinesq equations (J. M. Kaihatu and J. T. Kirby.) [5].

In physics, a field is a physical quantity associated to each point of space-time. The concept of a quantum field is very wide, embracing all physical quantities which depend on space and time. A free field is a field whose equations of motion are given by linear partial differential equations. The actual formalism of quantum field theory is partly based on a suitable generalization of the one already used for systems of point particles (Mukul Agrawal)[6]. Laws of thermodynamics and classical laws of electricity and magnetism provide the basis for explanation of all phenomena in classical physics (W.Thirring) [7]. In 1926, Austrian physicist [Erwin Schrödinger](#) reasoned that if [electrons behave as waves](#), then it should be possible to describe them using a wave equation, like the equation that describes the [vibrations of strings](#), or [Maxwell's equation](#) for electromagnetic waves. The time-dependent Schrödinger equation or wave equation for a single non-relativistic charged particle moving in

an electric field describes all the features of the electron that we can measure, and can be extended to include [any other object](#) under [almost any other force](#). Many physicists preferred Schrödinger's approach because it was easier to visualize and used more familiar mathematics. Erwin Schrödinger (Austrian) constructs a wave equation for de Broglie's matter waves. Schrödinger's works with a wave function Ψ purely for mathematical convenience. He expects that, in the end, he will take the real part of Ψ to get the physically "real" matter wave. The concept of a monochromatic plane wave is an idealization and does not represent a real physical situation. Schrödinger wave equation represent that the positive sign is a wave traveling in the positive x direction and the negative sign for traveling in the negative x direction.

II. RESEARCH ELABORATIONS

Circular wave's equation

The fluid motion can be described by a velocity potential, which is governed by the Laplace equation in terms of cylindrical coordinates (r, θ, z) :

$$\phi_{rr} + \frac{1}{r} \phi_r + \frac{1}{r^2} \phi_{\theta\theta} + \phi_{zz} = 0 \quad (1)$$

In the case of a motion with an axis of symmetry so that

$$\phi_{\theta\theta} = 0, \text{ equation (1) becomes}$$

$$\phi_{rr} + \frac{1}{r} \phi_r + \phi_{zz} = 0 \quad (2)$$

Solution of the Circular wave equation

Let $\phi(r, z, t) = U(r).P(z).f(t)$ be the trial solution of equation (2), the cylindrical wave becomes

$$U_{rr} + \frac{1}{r} U_r + m^2 U = 0 \quad (3)$$

$$U = A J_0(mr) + B Y_0(mr); m \neq 0 \quad (4)$$

Again, the Bessel's differential equation in Cartesian coordinates of n order is

$$x^2 y_{xx} + x y_x + (x^2 - n^2) y = 0 \quad (5)$$

If we consider x is very large and $y = \frac{U}{\sqrt{x}}$, then the above equation becomes

$$U_{xx} + U = 0 \quad (6)$$

This is the second order differential equation.

Substituting the value of U and putting $x = mr$, the general solution of equation (6) can be written as

$$y = A_1 \frac{\cos mr}{\sqrt{mr}} + B_1 \frac{\sin mr}{\sqrt{mr}} \quad (7)$$

Again the general solution of equation (5) can be found as

$$y = C_1 J_n(x) + C_2 J_{-n}(x) \quad (8)$$

For non-integral values of n, we have $J_n(x)$ from above equation as

$$J_n(x) = \frac{x^n}{2^n \Gamma(n+1)} \left[1 - \frac{x^2}{2.2(n+1)} + \frac{x^4}{2.4.2^2(n+1)(n+2)} - \dots \right]$$

Using these values in equation (8) with the help of $n = \pm(1/2)$ and $x = mr$,

Finally we have,

$$y = C_1 \sqrt{\frac{2}{\pi mr}} \sin(mr) + C_2 \sqrt{\frac{2}{\pi mr}} \cos(mr) \quad (9)$$

Now comparing equations (7) and (9), we obtain

$$A_1 \approx \sqrt{2/\pi} \quad \text{and} \quad B_1 \approx \sqrt{2/\pi}.$$

Using these values in equation (7), it can be written as

$$y = \sqrt{\frac{2}{\pi mr}} \cos mr + \sqrt{\frac{2}{\pi mr}} \sin mr \quad (10)$$

For large value of mr and putting $n = 0$, the above relations reduce to

$$J_0(mr) = A \cos B \quad (11a)$$

$$\text{and } Y_0(mr) = A \sin B \quad (11b)$$

Where $A = \sqrt{2/\pi mr}$ and $B = (mr - \pi/4)$.

Solutions of peculiar interest are given by Hankel functions $H_0^{(1)}(mr)$ and $H_0^{(2)}(mr)$ which are defined as

$$H_0^{(1)}(mr) = J_0(mr) + iY_0(mr) \quad (12a)$$

$$\text{and } H_0^{(2)}(mr) = J_0(mr) - iY_0(mr) \quad (12b)$$

These implies with the help of equations (11) and (12), respectively

$$H_0^{(1)}(mr) \approx A \cos B + i \sin B \approx Ae^{iB} \quad (13a)$$

$$\text{and } H_0^{(2)}(mr) \approx A \cos B - i \sin B \approx Ae^{-iB} \quad (13b)$$

Schrödinger Wave Equation

The Schrödinger equation is the fundamental equation of physics for describing quantum mechanical behavior. It is also often called the Schrödinger wave equation, and is a partial differential equation that describes how the wave function of a physical system evolves over time. Viewing quantum mechanical systems as solutions to the Schrödinger equation is sometimes known as Schrödinger picture.

$$i\hbar \frac{\partial \Psi}{\partial t} = -\frac{\hbar^2}{2m} \nabla^2 \Psi + V\Psi$$

Solution of the Schrödinger wave equation

We know the time dependent Schrodinger wave equation is

$$i\hbar \frac{\partial}{\partial t} \Psi(\vec{r}, t) = H\Psi(\vec{r}, t) \quad (14)$$

Where H is a differential operator called the Hamiltonian. For a single particle of mass m moving in a scalar potential energy field $U(\vec{r}, t)$, the Hamiltonian is

$$H = -\frac{\hbar^2}{2m} \left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2} \right) + U(\vec{r}, t) = -\frac{\hbar^2}{2m} \nabla^2 + U(\vec{r}, t) \quad (15)$$

and the normalization condition (probability of finding the particle is one) is

$$\int_V \Psi(\vec{r}, t)^* \Psi(\vec{r}, t) dV = 1 \quad (16)$$

The probability density ρ associated with the single particle is

$$\rho(\vec{r}, t) = \Psi(\vec{r}, t)^* \Psi(\vec{r}, t) \quad (17)$$

and using equations (16) and (17), the time rate of change of the probability density gives an equation of continuity

$$\frac{\partial \rho}{\partial t} = \frac{\partial \Psi^*}{\partial t} \Psi + \Psi^* \frac{\partial \Psi}{\partial t} = \frac{i\hbar}{2m} \nabla^2 (\Psi^* \nabla \Psi) - \Psi \nabla \Psi^* \frac{\partial \rho}{\partial t} + \nabla^2 \bar{J} = 0 \quad (18)$$

Where \bar{J} is the probability current density.

$$\bar{J} = \frac{i\hbar}{2m} \nabla^2 (\Psi^* \nabla \Psi) - \Psi \nabla \Psi^* \quad (19)$$

If $\Psi(\vec{r}, t)$ defines a pure energy or stationary state where the total energy of the particle is E then

$$\Psi(\vec{r}, t) = \psi(\vec{r}) e^{-iEt/\hbar} \quad (20)$$

and the time dependent Schrödinger equation (14) reduces to the time independent Schrödinger equation

$$H\psi(\vec{r}) = E\psi(\vec{r}) \quad (21)$$

Again, for a single particle moving along the x -axis as a free particle with total energy E and zero potential energy, $U(x) = 0$, the time dependent Schrödinger equation is

$$i\hbar \frac{\partial}{\partial t} \Psi(x, t) = -\frac{\hbar^2}{2m} \frac{\partial^2}{\partial x^2} \Psi(x, t) \quad (22)$$

The time operator $i\hbar \frac{\partial}{\partial t}$ defines the total energy of the particle E

(energy Eigen state) and the spatial operator $-\frac{\hbar^2}{2m} \frac{\partial^2}{\partial x^2}$ defines the momentum of the particle $p = \sqrt{2mE}$ (momentum Eigen state).

The solution of equation (22) can be expressed as a monochromatic plane wave by

$$\Psi(x, t) = Ae^{i(\pm kx - \omega t)} = A[\cos(kx - \omega t) \pm i \sin(kx - \omega t)] \quad (23)$$

III. RESULTS

We have found the relationships between J_0 , Y_0 and the Hankel functions $H_0^{(1)}(mr)$ and $H_0^{(2)}(mr)$ as well as their physical meanings and their analogy with sinusoidal functions. The appropriate solution and its physical significance is obtained by combining the solution with e^{-ikt} or e^{ikt} and examining its asymptotic form at large distance from the origin [Fig.1(c)]. The Hankel functions $H_0^{(1)}(mr)$ and $H_0^{(2)}(mr)$ solutions of circular waves show the converging wave (sink) when combined with e^{-ikt} and diverging wave (source) when combined with e^{ikt} , respectively. On the other hand the Schrödinger wave equation [Fig.2] represent the positive (+) sign is a wave traveling in the + x direction and the negative (-) sign for traveling in the - x direction.

FIGURE CAPTIONS and Program with MATLAB

Fig. 1(a): The graph of functions J_i ($i = 0, 1, 2, 3, 4$)

Fig. 1(b): The graph of functions Y_i ($i = 0, 1, 2, 3, 4$)

Fig. 1(c): The combined graphs of functions J_0 and Y_0 .

Fig. 2: The graphs of Schrödinger wave function.

Fig. 3: Comparison the graphs between Circular wave and Schrödinger wave function.

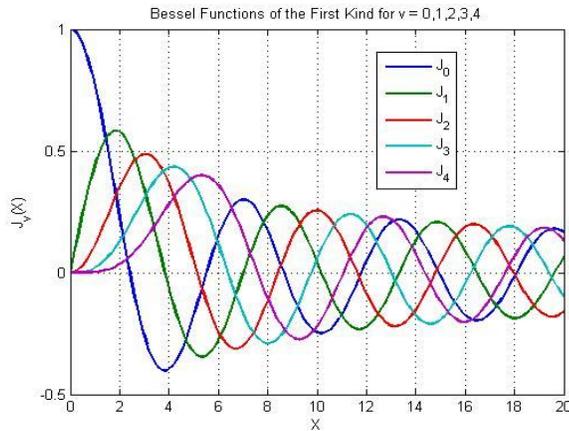


Fig. 1(a): The graph of functions J_i ($i = 0, 1, 2, 3, 4$)

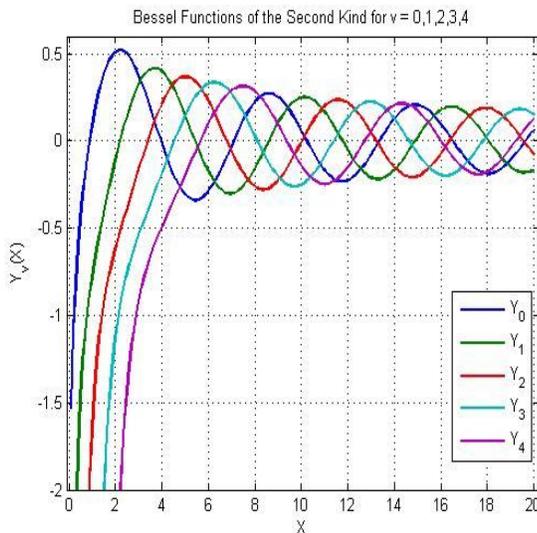


Fig. 1(b): The graph of functions Y_i ($i = 0, 1, 2, 3, 4$)

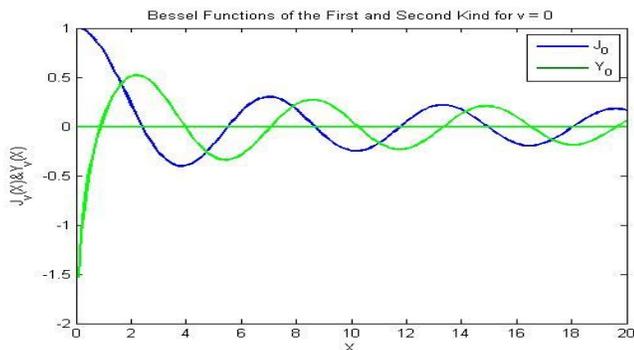


Fig. 1(c): The combined graphs of functions J_0 and Y_0 .

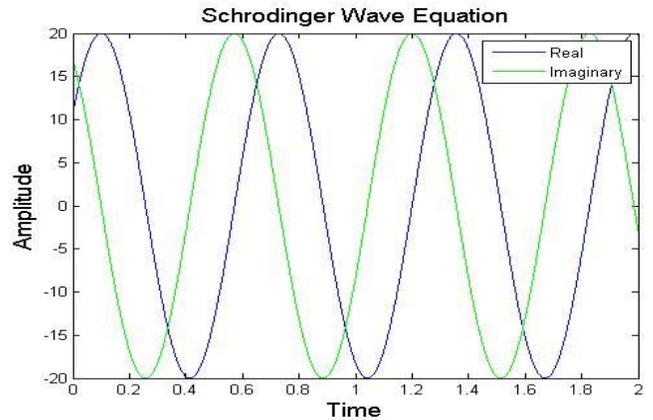


Fig. 2: The graphs of Schrödinger wave equation.

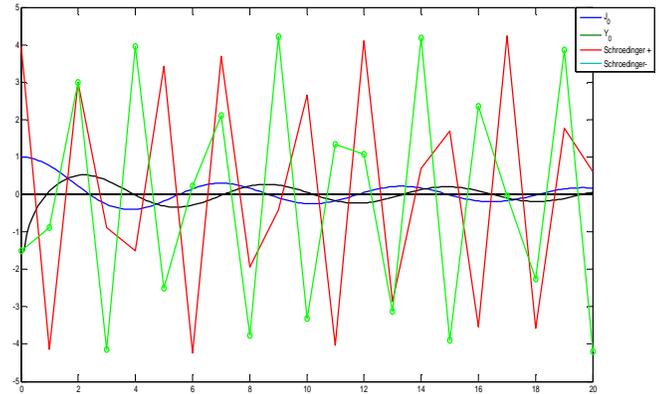


Fig. 3: Comparison the graphs between Circular wave and Schrödinger wave function.

IV. CONCLUSIONS

The standard solutions of Bessel equation of order zero are denoted by $J_0(mr)$ and $Y_0(mr)$, the first being regular at the origin, the second singular at the origin. The functions J_0 and Y_0 have been studied extensively. Many of the interesting properties of these functions are indicated by their graph, which are shown in [Fig.1(a, b, c)]. For one thing, they suggest that J_0 and Y_0 each have a damped oscillatory behavior as $x \rightarrow \infty$ and that the positive and negative zeros of J_0 and Y_0 separate each other. Any linear combination of these standards solution is itself obviously a solution of the equation. The combination of the Schrödinger wave and circular wave [Fig.3] of a monochromatic plane wave is an idealization and does not represent a real physical situation.

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Mathematical Model for Blood Flow Restriction Exercise Stimulates mtorc1 Signaling in Older Men

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Abstract- The loss of skeletal muscle mass during aging, sarcopenia, increases the risk for falls and dependence. Resistance exercise (RE) is an effective rehabilitation technique that can improve muscle mass and strength however older individuals are resistant to the stimulation of muscle protein synthesis (MPS) with traditional high-intensity RE.

We use the stochastic model we found the effect of an acute bout of low-intensity resistance exercise with BFR o mTORC1 signaling and muscle protein synthesis in older men. We hypothesized that a single bout of low-intensity resistance exercise with reduced muscle blood flow would enhance mTORC1 signaling and stimulate muscle protein synthesis in older men.

Index Terms- chrf,cortisol,GH,BFR,mTORC1,MPS

I. INTRODUCTION

Generalized continuous univariate distributions which have been extensively used for analyzing and modeling data in many applied areas such as lifetime analysis, engineering, economics, insurance and environmental sciences. Resistance exercise training has been shown to be a beneficial intervention to protect against the effects of sarcopenia, with training studies showing increases in muscle protein synthesis and mass in both the old and young (24, 33). However, the training studies often show a more robust muscle protein synthetic and strength response in the young than in the elderly. This may be due to an inability of older individuals to lift an amount of weight sufficient to induce hypertrophy or an inability of aging muscle to respond to resistance exercise. The mechanisms responsible for how resistance exercise induces muscle hypertrophy are not completely understood; however, it does appear that activation of

a key cell growth pathway, the mammalian target of rapamycin complex 1, is an important regulatory mechanism of muscle hypertrophy.

II. APPLICATION

There were no significant differences in plasma glucose or lactate between groups at baseline (Table 1). Plasma lactate increased significantly ($P < 0.05$, Table 1) in both groups in during the exercise bout ($P < 0.05$), remained elevated in the BFR group for 45 min after exercise, and was also higher compared with Ctrl for 30 min after exercise. Plasma lactate values returned to baseline in the Ctrl group after exercise. Plasma glucose increased significantly after exercise for 45 min in the BFR group compared with baseline and was higher than the Ctrl group ($P < 0.05$; Table 1), which did not change after exercise.

Cortisol concentrations were elevated only in the BFR group for 2 h after exercise from baseline values ($P < 0.05$; Fig. 2) and then returned to near-resting values ($P > 0.05$). After exercise, cortisol values were significantly higher than those in the Ctrl group during the first 90 min after exercise in the BFR group ($P < 0.05$). Serum cortisol concentrations did not change during or after exercise in the Ctrl group ($P < 0.05$).

Serum GH concentrations increased significantly 15 min after exercise and remained elevated for 30 min after exercise in the BFR group compared with baseline ($P < 0.05$; Fig. 2). Serum GH concentration in the BFR group was also higher than the Ctrl group for 30 min after exercise ($P < 0.05$; Fig. 2). GH concentration did not change after exercise in the Ctrl group ($P > 0.05$).

Table. 1 Plasma lactate and glucose measurements before and after resistance exercise

	Baseline	Exercise	Post exercise, Minutes					
			15	30	45	60	120	180
Lactate, mmol/l								
BFR	1.2±0.1	2.7±0.6*	3.3±0.4*#	2.4±0.4*#	1.8±0.3*	1.7±0.2	1.0±0.1	0.9±0.1
Ctrl	1.3±0.2	2.9±0.6*	1.7±0.2	1.3±0.2	1.2±0.1	1.1±0.1	0.9±0.1	0.9±0.1
Glucose, mmol/l								
BFR	5.3±3.2	5.3±3.2	6.0±3.6#	5.7±3.9#	5.6±3.7#	5.5±3.2	5.2±2.3	5.2±2.4
Ctrl	5.3±3.8	5.3±3.0	4.9±5.5	4.8±5.9	5.1±2.2	5.0±2.2	5.0±2.2	4.9±1.9

*Significantly different from baseline ($P < 0.05$); #Significantly different from Ctrl at same time point ($P < 0.05$).

III. MUSCLE BLOOD FLOW RESTRICTION EXERCISE IN AGING

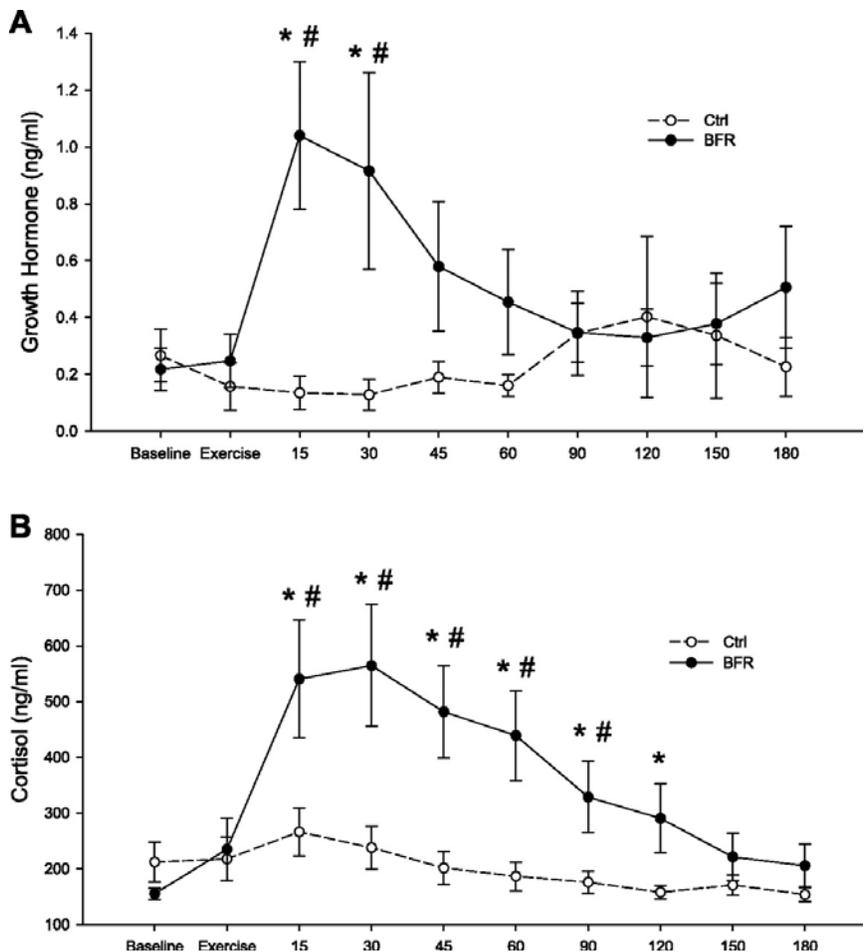


Fig. 2 Peripheral vein serum hormone concentrations. Samples were obtained from BFR and control (Ctrl; no BFR) subjects before and during exercise and for 3 h after exercise. A: serum growth hormone (ng/ml) B: serum cortisol (ng/ml). *Significantly different from baseline (P < 0.05); # Significantly different from Ctrl subjects at corresponding time point (P < 0.05).

IV. MATHEMATICAL MODEL

The cdf of the MOFr is given (for x > 0) by

$$G(x, \alpha, \beta, \sigma) = \frac{e^{-\left(\frac{\sigma}{x}\right)^\beta}}{\alpha + (1-\alpha)e^{-\left(\frac{\sigma}{x}\right)^\beta}}, \tag{1}$$

where $\sigma > 0$ is a scale parameter and α and β are positive shape parameters.

The corresponding probability density function (pdf) is given by

$$g(x, \alpha, \beta, \sigma) = \frac{\alpha\beta\sigma^\beta x^{-(\beta+1)} e^{-\left(\frac{\sigma}{x}\right)^\beta}}{\left(\alpha + (1-\alpha)e^{-\left(\frac{\sigma}{x}\right)^\beta}\right)^2}, \tag{2}$$

Consider a baseline cdf G(x) and pdf g(x). Then, the cdf and pdf of the T-G family of distributions are respectively, defined by

$$F(x; \lambda) = G(x) [1 + \lambda - \lambda G(x)] \tag{3}$$

and

$$f(x; \lambda) = g(x) [1 + \lambda - 2\lambda G(x)], \tag{4}$$

where $|\lambda| \leq 1$

The cdf of TMOFr (for x > 0)

$$F(x) = \frac{e^{-\left(\frac{\sigma}{x}\right)^\beta}}{\alpha + (1-\alpha)e^{-\left(\frac{\sigma}{x}\right)^\beta}} \left[1 + \lambda - \frac{\lambda e^{-\left(\frac{\sigma}{x}\right)^\beta}}{\alpha + (1-\alpha)e^{-\left(\frac{\sigma}{x}\right)^\beta}}\right], \tag{5}$$

Whereas its pdf can be expressed, from (1), (2) and (4) as

$$f(x) = \frac{\alpha\beta\sigma^\beta x^{-(\beta+1)} e^{-\left(\frac{\sigma}{x}\right)^\beta}}{\left(\alpha + (1-\alpha)e^{-\left(\frac{\sigma}{x}\right)^\beta}\right)^2} \left[1 + \lambda - \frac{2\lambda e^{-\left(\frac{\sigma}{x}\right)^\beta}}{\alpha + (1-\alpha)e^{-\left(\frac{\sigma}{x}\right)^\beta}}\right] \tag{6}$$

Where $\sigma > 0$ is a scale parameter, α and β are positive shape parameters and $|\lambda| \leq 1$.

A physical interpretation of the cdf of TMOFr is possible if we take a system consisting of two independent components functioning independently at a given time. So, if the two components are connected in parallel, the overall system will have the TMOFr cdf with

$$\lambda = -1.$$

The rf, hrf, reversed hazard rate function (rhrf) and Cumulative hazard rate function (chrf) are, respectively given by

$$R(x) = \frac{\alpha^2 + (\alpha - \lambda - 2\alpha^2) e^{-\left(\frac{\sigma}{x}\right)^\beta} + (\alpha^2 + \alpha \lambda - \alpha) e^{-2\left(\frac{\sigma}{x}\right)^\beta}}{\left[\alpha + (1 - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta}\right]^2}$$

$$h(x) = \frac{\alpha \beta \sigma^\beta x^{-(\beta+1)} e^{-\left(\frac{\sigma}{x}\right)^\beta}}{\left[\alpha + (1 - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta}\right]} \{ \alpha(1 + \lambda) - [\lambda(\alpha + 1) + \alpha - 1] e^{-\left(\frac{\sigma}{x}\right)^\beta} \}$$

$$X \{ \alpha^2 + [\alpha(1 - \lambda - 2\alpha) + (\alpha^2 - \alpha \lambda - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta}] e^{-\left(\frac{\sigma}{x}\right)^\beta} \}^{-1}$$

$$r(x) = \frac{\alpha \beta \sigma^\beta x^{-(\beta+1)} \{ \alpha(1 + \lambda) - [\lambda(\alpha + 1) + \alpha - 1] e^{-\left(\frac{\sigma}{x}\right)^\beta} \}}{\left[\alpha(1 + \lambda) - (\alpha \lambda + \alpha - 1) e^{-\left(\frac{\sigma}{x}\right)^\beta} \right] \left[\alpha + (1 - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta} \right]}$$

and

$$\left[\alpha + (1 - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta} \right]^2$$

$$H(x) = \ln \left\{ \frac{\alpha^2 + (\alpha - \lambda - 2\alpha^2) e^{-\left(\frac{\sigma}{x}\right)^\beta} + (\alpha^2 - \alpha \lambda - \alpha) e^{-2\left(\frac{\sigma}{x}\right)^\beta}}{\alpha + (1 - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta}} \right\}$$

Theorem : 1

Let $X : \Omega \rightarrow (0, \infty)$ be a continuous random variable and

let

$$h(x) = \left[1 + \lambda - \frac{\lambda e^{-\left(\frac{\sigma}{x}\right)^\beta}}{\alpha + (1 - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta}} \right]^{1-b}$$

and $g(x) = h(x) [\alpha + (1 - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta}]^{-1}$ for $x > 0$. The random variable X belongs to TMOFr family (6) if and only if the function η defined in Theorem A has the form

$$\eta(x) = \frac{1}{2} \{ 1 + [\alpha + (1 - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta}]^{-1} \}, x > 0.$$

Proof. Let X be a random variable with density (6), then

$$(1-F(x)) E[h(x)|X \geq x] = \frac{1}{1-\alpha} \{ [\alpha + (1 - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta}]^{-1} - 1 \}, x > 0$$

and

and

GRAPH : 1

x	0.9	1.8	2.6	3.5	4.3	5.2	6	6.9	7.8	8.7
$h_F(x)$	0.0188	0.0332	0.0316	0.0216	0.0155	0.0115	0.0088	0.0068	0.0052	0.0045

x	0.9	1.8	2.6	3.5	4.3	5.2	6	6.9	7.8	8.7
s(x)	0.2538	0.2667	0.2941	0.3231	0.3491	0.3774	0.4016	0.4276	0.4523	0.4759

GRAPH : 2

x	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9
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$$(1-F(x)) E[g(x)|X \geq x] = \frac{1}{2(1-\alpha)} \{ [\alpha + (1 - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta}]^{-2} - 1 \}, x > 0$$

and finally

$$\eta(x) h(x) - g(x) = \frac{1}{2} h(x) \{ 1 - [\alpha + (1 - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta}]^{-1} \} > 0$$

for $x > 0$.

Conversely, if η is given as above, then

$$S'(x) = \frac{\eta'(x)h(x)}{\eta(x)h(x)-g(x)} = \frac{-(1-\alpha)\beta\sigma^\beta e^{-\left(\frac{\sigma}{x}\right)^\beta} [\alpha + (1-\alpha)e^{-\left(\frac{\sigma}{x}\right)^\beta}]^{-2}}{x^{\beta+1} \{ 1 - [\alpha + (1-\alpha)e^{-\left(\frac{\sigma}{x}\right)^\beta}]^{-1} \}},$$

$x > 0$

and hence

$$s(x) = -\ln \{ 1 - [\alpha + (1 - \alpha) e^{-\left(\frac{\sigma}{x}\right)^\beta}]^{-1} \}, x > 0.$$

Theorem : 2

Let $X : \Omega \rightarrow (0, \infty)$ be a continuous random variable. Then for $\alpha = 1$, the pdf of X is (6) if and only if its hazard function $h_f(x)$ satisfies the differential equation.

$$h'_F(x) + x^{-1} h_F(x) = \beta x^{-(\beta+1)} \frac{d}{dx} \left\{ \frac{e^{-\left(\frac{\sigma}{x}\right)^\beta} [1 + \lambda - 2\lambda e^{-\left(\frac{\sigma}{x}\right)^\beta}]}{1 + [\lambda e^{-\left(\frac{\sigma}{x}\right)^\beta} - (1 + \lambda)] e^{-\left(\frac{\sigma}{x}\right)^\beta}} \right\}, \quad (\beta + 1) \quad (7)$$

with the boundary condition $\lim_{x \rightarrow \infty} h_F(x) = 0$.

Proof. If X has pdf(6), then clearly (7) holds, Now, if (7) holds, then

$$\frac{d}{dx} \{ x^{\beta+1} h_F(x) \} = \frac{d}{dx} \left\{ \frac{\beta e^{-\left(\frac{\sigma}{x}\right)^\beta} [1 + \lambda - 2\lambda e^{-\left(\frac{\sigma}{x}\right)^\beta}]}{1 + [\lambda e^{-\left(\frac{\sigma}{x}\right)^\beta} - (1 + \lambda)] e^{-\left(\frac{\sigma}{x}\right)^\beta}} \right\},$$

or, equivalently,

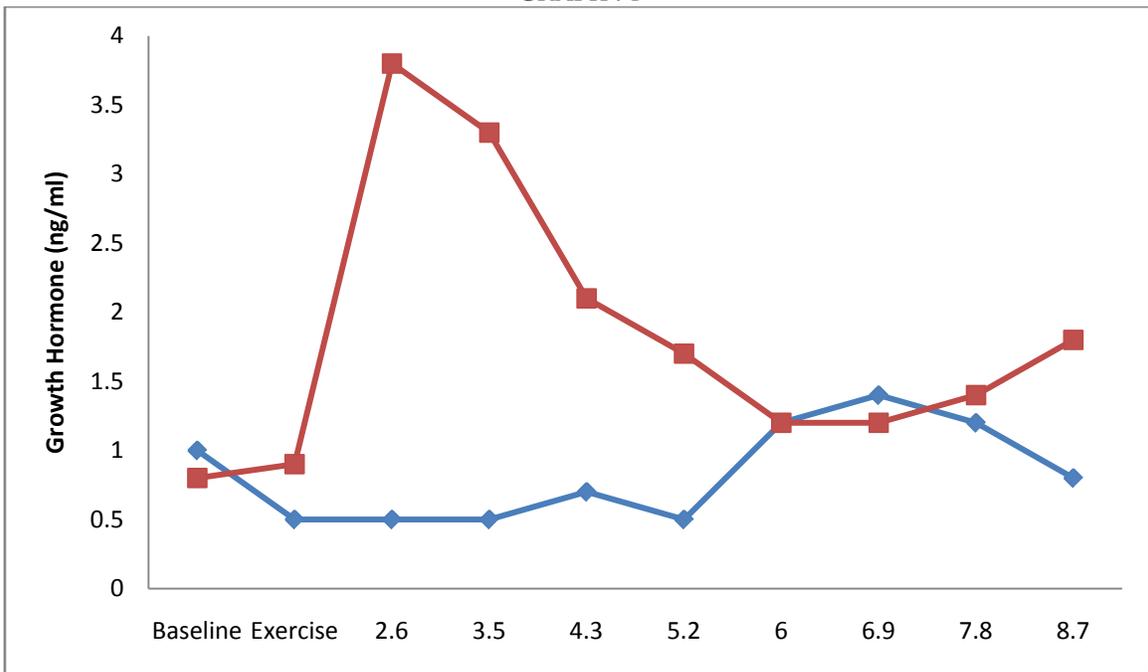
$$h_F(x) = \left\{ \frac{\beta x^{-(\beta+1)} e^{-\left(\frac{\sigma}{x}\right)^\beta} [1 + \lambda - 2\lambda e^{-\left(\frac{\sigma}{x}\right)^\beta}]}{1 + [\lambda e^{-\left(\frac{\sigma}{x}\right)^\beta} - (1 + \lambda)] e^{-\left(\frac{\sigma}{x}\right)^\beta}} \right\},$$

$h_F(x)$	0.0776	0.0850	0.0621	0.0453	0.0342	0.0268	0.0217	0.0177	0.0150	0.0128
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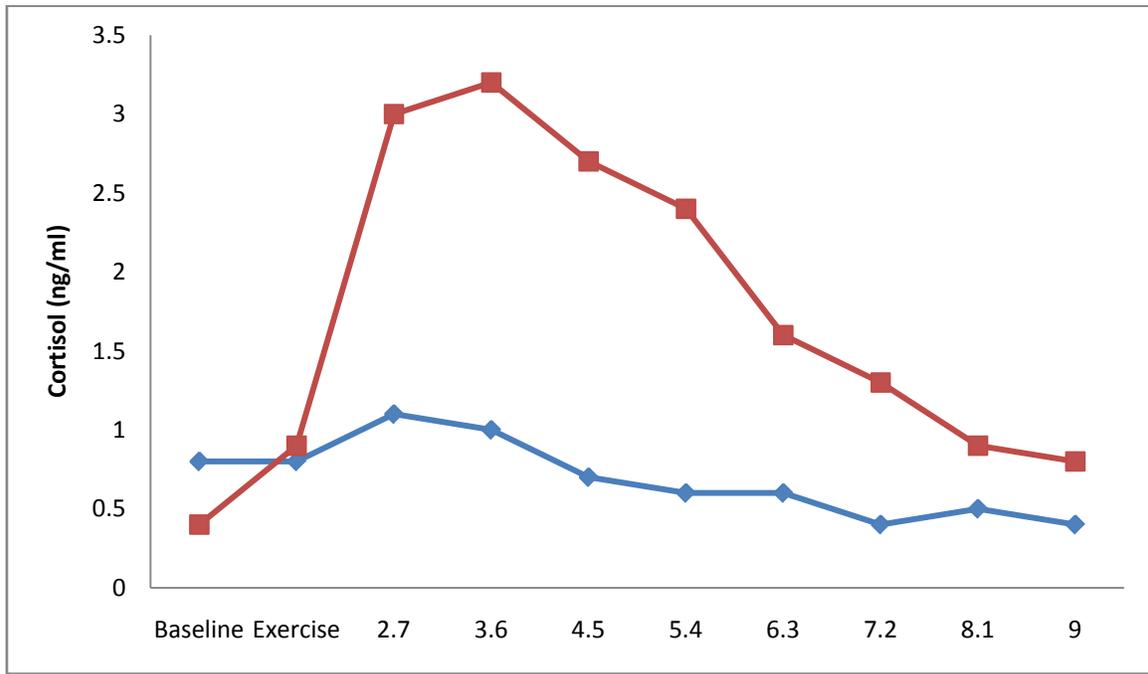
A

x	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9
s(x)	0.1751	0.1987	0.2291	0.2598	0.2895	0.3178	0.3445	0.3699	0.3940	0.4168

GRAPH : 1



GRAPH : 2



Graph : 1

x	0.9	1.8	2.6	3.5	4.3	5.2	6	6.9	7.8	8.7
y1	1	0.5	0.5	0.5	0.7	0.5	1.2	1.4	1.2	0.8
y2	0.8	0.9	3.8	3.3	2.1	1.7	1.2	1.2	1.4	1.8

Graph: 2

x	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9
y1	0.8	0.8	1.1	1	0.7	0.6	0.6	0.4	0.5	0.4
y2	0.4	0.9	3	3.2	2.7	2.4	1.6	1.3	0.9	0.8

V. CONCLUSION

Low-intensity RE in combination with BFR enhances mTORC1 signaling and MPS in older men. BFR exercise is a novel intervention that may enhance muscle rehabilitation to counteract sarcopenia.

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Inter-Firm Knowledge Sharing Strategies To Ensure Successful Public Outsourcing In Kenyan County Governments

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Abstract- The concept of inter-firm knowledge sharing in public service delivery outsourcing has not been fully realized in Kenya's county governments' public service outsourcing strategies. Studies show that outsourcing strategies do not always work successfully unless the client and vendor align their interests and establish collaborative partnerships. The effective management of relationships in these partnerships is key to their success. Knowledge sharing is one of the strategies that firms are adopting to foster and build a reliable long lasting mutual relationship. In the long run, inter-firm knowledge sharing is likely to promote products and services that provide more value and are superior in solving problems for their users. Recent studies conducted on county governments and by extension, other public institutions in Kenya show that knowledge management and by extension knowledge sharing has not fully taken root in most public organizations. The study adopted an exploratory study approach. This research approach was motivated by the scanty number of studies on public outsourcing and especially outsourcing relationship management in Kenyan public organizations. The study therefore reviewed other scholarly works to recommend strategies that can be adopted to achieve two main objectives: The first objective was recommend steps that county governments can initiate in order to transform them into learning organizations that can manage their knowledge capital resources. The second objective was to advocate strategies that the county governments can initiate in their organizations to encourage knowledge sharing with their strategic partners. The study recommended a seven-step knowledge management strategy to enable county governments develops their knowledge management

capabilities. For knowledge sharing to thrive, the study recommends that organizations need to develop two very different types of capacity— *the enabling environment* and *technical skills*. The enabling environment is created largely by strategic decisions made by management of the organization. The technical skills operationalize effective knowledge capturing and sharing.

Index Terms- Knowledge Management, Knowledge Sharing, and Public Service Outsourcing

I. INTRODUCTION

1.1 Background of the study

Due to the increasing complexity of technology and the inability of an organization to perform processes of logistics, manufacturing and distribution, every organization needs to focus on a specialized field of its activities and to outsource several activities to another companies or organizations (Mehregan et al, 2010). As quoted in (PricewaterhouseCoopers, 2007), "The exceptional corporations have come to grips with the tension between outsourcing and what they do in-house – as General Electric's Jack Welch put it: 'You shouldn't have in your back office what's in somebody's else's front office.' Public sector organizations need to bear this in mind as they contemplate the introduction of new models for service delivery. One of outsourcing's most significant benefits is the fact that it can help public sector organizations to intensify their focus on core competencies (their sovereign functions), while allowing other providers to carry out functions in which they have proven in -depth capabilities. Other

benefits can include reduced cost, improved performance, enhanced flexibility (making fixed costs variable, for example), the avoidance of capital expenditure and providing access to best practice (PricewaterhouseCoopers, 2007).

However, as Han, et al, (2006) argue, despite the growing trend to outsource, few organizations report success. Thus providers and client organizations are under increasing pressure to exhibit the value of their outsourcing. Improving the quality of the relationship between the organizations has been suggested as the best way to meet this challenge. This is also shared by a study by PricewaterhouseCoopers, 2007 that contends that there is an overwhelming consensus in favor of the fact that, provided they are properly managed, outsourcing/strategic partnerships do help organizations to achieve targeted benefits. The effective management of relationships in these partnerships is key to their success. Knowledge sharing is one of the strategies that firms are adopting to foster and build a reliable long lasting mutual relationship. The development of a partnership has also been studied extensively and a number of models have been proposed for building and sustaining the relationships (Lee, (2001), Lee et. al., 2003). Numerous other studies have found that the success of an outsourcing arrangement depends greatly on the success of the client-vendor relationship (Blumenberg et al. 2008; Goles and Chin 2005; Grover et al. 1996; Kishore et al. 2003; Qi and Chau 2012; Swar et al. 2012; Webb and Laborde 2005). As (IBM, 2003) put it, Outsourcing relationships are too important to be left to chance. The IBM study demonstrates that outsourcing is much more likely to succeed when the parties work together to build a solid framework on which to manage the relationship. A value-based relationship framework can serve as the cornerstone for a partnership that is: Built on trust, Sustained by the open exchange of knowledge and information, Open-ended and flexible, Equipped to overcome complexity and ambiguity, Dynamic vs. static, Able to identify and optimize opportunities for both partners, and Forged by a mutual commitment to sharing risks and rewards (IBM, 2003)

In recent studies, there has been much interest in knowledge sharing through outsourcing partnership and its effect on outsourcing success (Gallivan and

Oh, (1999); (Willcocks and Kern, (1998). Nonaka and Takeuchi (1995) said that knowledge sharing is based on organizational context, and thus that knowledge cannot easily be transferred among organizations with different cultures, structures, and goals. Therefore, for successful knowledge sharing in an outsourcing partnership, both the service receiver and provider should have a clear common vision and goals for partnership as well as a belief that their partners will not act opportunistically; this may be termed partnership quality (Lee and Kim, 1999). Another key source of successful knowledge sharing is an organizational ability to learn or acquire the needed knowledge from other organizations. Cohen and Levinthal (1990) described an absorptive capability as an organization's ability to recognize the value of new, internal information, assimilate it, and apply it to commercial ends for an organization's innovative capability. To evaluate and utilize outside knowledge, an organization should have the ability to exploit external knowledge that is largely a function of the level of prior related knowledge (Badaracco, (1991); Grant, (1996).

Following Selnes and Sallis (2003), this study defines inter-firm knowledge sharing as *"a joint activity between a supplier and a customer in which the two parties share information, which is then jointly interpreted and integrated into a shared relationship-domain-specific memory that changes the range or likelihood of potential relationship-domain-specific behavior"* (p.80). In today's knowledge-based economy, one of the major sources of competitive advantage has been the ability of the firm to transfer external knowledge efficiently and effectively (Argote and Ingram, 2000; Sambamurthy and Subramani, 2005; Pérez- Nordtvedt et al., 2008). As Joshi et al., (2007) argue, the agents could be an individual, team/department or an organization. The success of knowledge transfer not only depends on the capability of the source to provide the necessary knowledge, but also on the characteristic of the knowledge (Argote et al., 2000; McEvily and Chakravarthy, 2002) and the intention and the ability of the receiver to absorb and utilize the transferred knowledge (Steensma and Lyles, 2000; Tsang, 2002; Zahra and George, 2002). Besides, differences in cultures, structures and goals between the source and the recipient of knowledge may impede collaboration and consequently hinder

knowledge transfer (Lee, 2001; Levina and Vaast, 2008; Salmi and Torkkeli, 2009).

Various scholars have recognized that inter-firm knowledge sharing is critical to competitive success, noting that organizations learn by collaborating with other firms as well as by observing and importing their practices (Levinson and Asahi 1996; Powell, Koput and Smith-Doerr 1996). If the network can create a strong identity and coordinating rules, then it will be superior to a firm as an organizational form at creating and recombining knowledge due to the diversity of knowledge that resides within a network. In the long run, inter-firm knowledge sharing is likely to foster products and services that provide more value and are superior in solving problems for their users (von Hippel, 1998). Powell, Koput and Smith-Doerr (1996) argue that "when the knowledge base of an industry is both complex and expanding, and the sources of expertise are widely dispersed, the locus of innovation will be found in networks of learning (Le. inter-firm knowledge sharing), rather than in individual firms" (p. 116). It has been found that inter-firm knowledge sharing is most strongly related to superior product quality, an antecedent of superior customer value (Slater and Narver 2000).

Partnering firms develop their collective knowledge by constructing and modifying their inter-organizational environment, working rules, and options. This inter-organizational learning can be further specified as distinct from organizational learning by including the learning synergy or interaction effect between the organizations that would not have occurred if there had not been any interaction (Larsson, Bengtsson, Kenriksson and Sparks 1998). Hernandez- Espallardo et al (2010) argues that the capability for timely knowledge sharing and the ability to make use of the learning from external partners are critical factors in attaining benefits from partnership arrangements. These key resources, including people and knowledge should flow into and out of the collaborative venture and mechanisms should exist to facilitate the flows. Results of their study indicated that the supply chain's competitiveness lies in the adequate governance of the inter-firm relationships.

1.2 Background of Knowledge Management and Sharing in Kenya's Public Service

Kenya like other African countries lags behind as far as knowledge management (KM) initiatives are concerned (Wamitu, 2016). Mosoti and Masheka (2010) argue that despite the existing literature on knowledge management, no research on the KM practices in organizations in Nairobi, Kenya had been done. Furthermore, the study findings reveal that no research on knowledge management practices has been done within Kenyan counties. A study by Mosoti, and Masheka, (2010) also found that knowledge management though practiced is not well understood by most public organizations within Nairobi. In fact most of the challenges faced by organizations in Nairobi are how to create and implement KM practice as part of organizational culture, organizational strategy and organizational leadership. In fact, although most organizations said that they used technology (web, internet, telephone) there is need for a synergy with other enabling factors (organizational culture, organizational strategy and organizational leadership). The study further revealed that organizational politics, ethnicity diversity, emotions, values do not favor organizations in Nairobi to capture tacit knowledge and transform it to explicit knowledge. Mosoti (2007) argues that while state corporations ascend to the benefits of knowledge management, lack of effective training, communication, information technology and leadership, has slowed down the adoption of knowledge management in state corporations. According to Ondari and Minishi (2007) the management of state corporations in Kenya rarely offer training to their employees on new innovations and management processes. Additionally, the performance evaluation process for state corporations and Civil service (Ministries /Departments) that was undertaken in August – September 2010 and made public in December, 2010 revealed that 50% of state corporations perform poorly in meeting their performance contracts due to lack of effective communication and leadership (Nyongesa et al., 2012). This coupled with slow adoption of new technologies in the public sector (Nyongesa et al., 2012) has led to slow adoption of human resource management solutions such as Knowledge Management. A study by Wamitu, (2016) argued that rigid bureaucracy and hierarchical chains that dictated the organizational structure and modes of operation characterized the Kenyan public service.

Bureaucracies are a precursor to a culture of mistrust and impersonal interactions, which inhibit tacit knowledge sharing. Most of the challenges faced by organizations particularly in Nairobi are how to create and implement knowledge management practices as part of organizational culture, organizational strategy and organizational leadership (Nyaga, 2014). Cultural and language barriers add challenges to the already difficult process of transferring tacit knowledge and are of particular concern in cases of cross-border outsourcing. Accordingly, most counties and organizations at large don't adequately leverage on their knowledge due to lack of a systematic and well coordinated approach to managing their knowledge management practices (Nyaga, 2014). A study by Ondari & Minishi-Majanja; (2007) indicated that Governments needed to continually learn in order to remain relevant to the constituents they serve. Different knowledge management learning programs have to be put in place. Top managers and sponsors would require basic understanding on how KM can improve the government processes, its integration with the broader goals of e-Government implementation; and implementation requirements including technical and legislative changes. Programs for educating the civil servants on how to use KM effectively and incorporate its usage into existing government functions are also required.

1.3 Study Objectives

The objectives of the study are twofold:

- i. To synthesize and recommend strategies that county governments can adopt to develop knowledge management capabilities and henceforth allow them to establish successful strategic outsourcing relationships that benefit from knowledge sharing
- ii. To recommend strategies that can be adopted to both promote successful knowledge management as well as inter-firm knowledge sharing to ensure successful outsourcing relationships

2.0 Literature Review

2.1 Knowledge Management

The term 'knowledge' as advanced by both Nonaka and Takeuchi (1995), originates from the human brain in the form of 'tacit' - personal and context-specific knowledge needs to be expressed by explicit measures

to achieve its 'explicit' - formal and systematic form. It is therefore essential to inculcate the sharing of both tacit and explicit knowledge among workers within the organization itself (Syed-Ikhsan & Rowland 2004). Polanyi (1966) differentiated knowledge into tacit and explicit knowledge. Explicit knowledge is cognitive, can be expressed in formal speech and exchanged by data. Explicit knowledge is easily articulated or reduced to writing, is often impersonal and formal in nature, and frequently takes the form of documents, reports, "white papers", catalogues, presentations, patents, formulas, etc. (Nonaka, 1991, 1994; Nonaka and Konno, 1998; Nonaka and Nishiguchi, 2001; Nonaka and Takeuchi, 1995; Nonaka and Teece, 2001; Zack, 1999b). In contrast, tacit knowledge (e.g. abilities, developed skills, experience, undocumented processes, "gut-feelings", etc.) is highly personal and difficult to reduce to writing. Tacit knowledge is rooted in an individual's experience and values (Nonaka and Konno, 1998). This type of knowledge may play an important role in the strategic planning performance of managers and professional staff (Bennett, 1998; Blattberg and Hoch, 1990; Brockmann and Anthony, 1998). Tacit knowledge is individual, context related, analogous, and practice related knowledge. Tacit knowledge can be exchanged only in face-to-face situations. Tacit knowledge is more valuable because it provides contexts for people, places, ideas and experiences; and it requires extensive personal contact and trust to share effectively (Polanyi, 1966).

While knowledge is increasingly being viewed as a commodity or intellectual asset, there are some paradoxical characteristics of knowledge that are radically different from other valuable commodities. These knowledge characteristics include the following: Using knowledge does not consume it; Transferring knowledge does not result in losing it; Knowledge is abundant, but the ability to use it is scarce; Much of an organization's valuable knowledge walks out the door at the end of the day. This leads us to Peter Drucker, (1993) argument that, "Knowledge is the only meaningful resource today." Therefore if an organization has to realize any benefits from knowledge, it has to exploit it today. Organizations have to come up with better knowledge management strategies to fully tap into their existing knowledge bases. As Grey, (1996) posits, Knowledge management is a collaborative and integrated

approach to the creation, capture, organization, access, and use of an enterprise's intellectual assets. Stankosky, (2008) shares this closely, by proposing that Knowledge management consists of "leveraging intellectual assets to enhance organizational performance."

A fundamental part in knowledge management is to spread and make knowledge accessible and usable within or between chosen organizations. As Ghosal and Moran 1996 (in Sambamurthy and Subramani (2005) argue, knowledge-based firms create competitive advantages through creation, coordination, transfer, and integration of knowledge. Knowledge transfer (KT) is sometimes used interchangeably with knowledge sharing (Jonsson 2008), so in order to explore knowledge transfer, knowledge sharing (KS) should not be ignored. Knowledge sharing is "The exchange of knowledge between and among individuals, and within and among teams, organizational units, and organizations. This exchange may be focused or unfocused, but it usually does not have a clear a priori objective," (Schwartz, 2006). Knowledge transfer on the other hand is "The focused, unidirectional communication of knowledge between individuals, groups, or organizations such that the recipient of knowledge (a) has a cognitive understanding, (b) has the ability to apply the knowledge, or (c) applies the knowledge," (Schwartz, 2006). Nahapiet & Ghoshal (2010) state that organizational knowledge is created as a result of the exchange of existing knowledge among current employees. Knowledge sharing within employees is important in building intellectual capital of an organization. Knowledge sharing between teams has become vital for organizations. Von Krogh, Ichijo & Nonaka (2000) stated that knowledge sharing is important in the creation of knowledge and in leveraging knowledge for improved organizational performance. Knowledge sharing is the critical means through which employees can contribute to knowledge application, innovation, and ultimately the competitiveness of the organization (Jackson, Chuang, Harden, Jiang & Joseph, 2006).

It is extremely important for organizations to create a culture of knowledge sharing so that they will not depend on the knowledge of a few and everyone in the organization would benefit from the knowledge the

firm has enabled (Ramirez 2011). Organizational knowledge sharing therefore can be the backbone of organizational learning and can bring enormous benefits to an organization (Argote, 2011; Liebowitz and Chen, 2001). When individuals share organizationally relevant experiences and information with one another, it significantly increases the resources of an organization and decreases time wasted in trial-and error (Lin, 2007). On the other hand, the unwillingness of knowledge sharing causes fatalities for organizational survival (Lin, 2007). Therefore, determining which factors contribute to effective knowledge sharing in an organization constitutes an important area of research (Hooff and Ridder, 2004).

2.2 Theoretical framework of knowledge sharing between organizations

Two of the most common theories of knowledge sharing are social exchange theory (Kern and Willcocks 2002; Lee and Kim 1999; Mao et al. 2008) and relational exchange theory (Kern and Blois 2002; Olsson et al. 2008). Many of the social exchange theory propositions are well suited for analyzing the inter-organizational exchange relationship (Son et al. 2005). Relational exchange theory is also considered appropriate to examine client-vendor relationships as it looks at the factors that influence the quality of the relationship factors between the parties in an exchange relationship (Swar et al. 2012).

Social exchange theory is a broad conceptual paradigm that spans a number of social scientific disciplines, such as management, social psychology, and anthropology. Despite its name, it is not a single theory but is better understood as a family of conceptual models (Cropanzano & Mitchell, 2005). All social exchange theories treat social life as involving a series of sequential transactions between two or more parties (Mitchell, Cropanzano, & Quisenberry, 2012). Resources are exchanged through a process of reciprocity, whereby one party tends to repay the good (or sometimes bad) deeds of another party (Gergen, 1969; Gouldner, 1960). The underlying assumption of social exchange theory is that parties enter into and maintain relationships with each other, expecting that such behavior will be rewarding (Lambe et al. 2001). Social exchange theory emphasizes the concept of a longitudinal exchange relation between parties, focusing on the

social process of give-and-take in relations, with the aim to understand the behavior of each party contributing to the exchange (Kern 1997). Trust and commitment are viewed as central elements in social exchange theory (Lambe et al. 2001; Qi and Chau 2012). The quality of these exchanges is sometimes influenced by the relationship between the actor and the target (Blau, 1964). Economic exchanges tend to be *quid pro quo* and involve less trust and more active monitoring, whereas social exchange tend to be open-ended and involve greater trust and flexibility (Organ, 1988; 1990). Further, social exchange theory assumes the cooperative intention of both parties and such cooperation is a key attribute of social exchange theory (Das and Teng 2002; Lin et al. 2004).

Relational exchange theory on the other side is based on the concept that parties in an exchange are in mutual agreement that the resulting value of the exchange is greater than the value that can be obtained from other forms of exchange, or from exchange with a different partner (Goles and Chin 2005). Since both parties believe in the value created from the exchange, this motivates them to consider the relationship important, and to dedicate resources towards preserving and enhancing the relationship (Lambe et al. 2001). Relational exchange theory holds the view that contracts are unable to cover all possible contingencies that might arise during the life of the contract (McNeil 1980). Therefore, the key to determine how effective a contract is depends on the relational norms established between the two parties (Artz and Brush 2000). These relational norms are defined as a higher order construct, which determines the quality of a relationship (Kern and Blois 2002). Goles and Chin (2005) suggest that the most important relational norms are interdependence, consensus, commitment, cultural compatibility, flexibility, communication, coordination, conflict

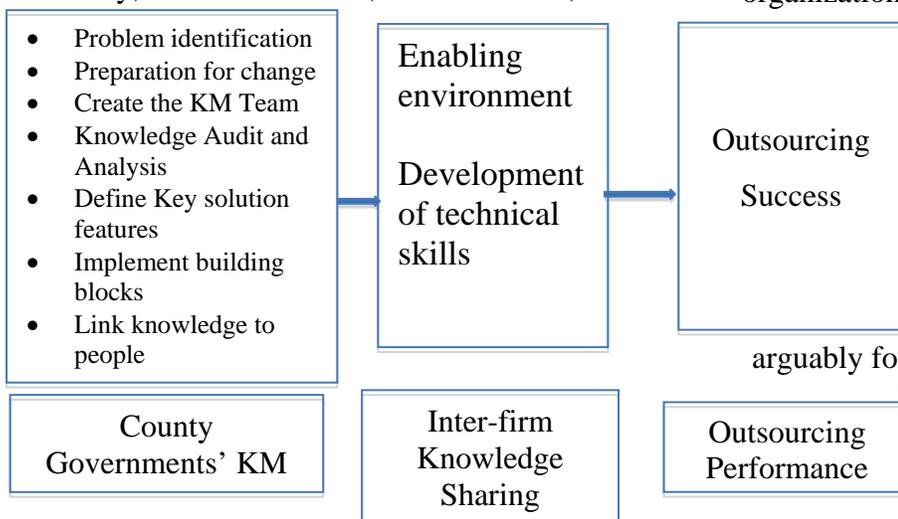
resolution and integration (Goles and Chin 2005)

Figure 2.0 Proposed Knowledge Sharing Model
2.3. Knowledge Management in the Public Sector

Knowledge Management (KM) is seen as an effective solution that can support public administrative activities of modernizing government (Mbhalati, 2014). From the institutional point of view, the benefits of KM implementation are the cost reduction, whilst promoting economic development, increasing transparency in government, improving service delivery and facilitating the advancement of an information society (The World Bank 2011; United Nations 2014). KM programs in Public Organizations focus on ways to manage and government institutions know internally and among other Public Organizations, with the purpose of taking collaborative decisions (Jennex&Smolnik 2011). From a cultural approach KM in Public Organizations can be seen as a strategy for recover trust in government (United Nations 2007), its adoption involves innovation and sometimes implies reforming institutions. As we said before, KM can contribute to fight against corruption practices (Elkadi 2013; Tung &Rieck 2005), for that reason a major public aware of KM benefits is needed (Tung &Rieck 2005, p.437). Sharing plays an important role on implementing and executing KM system, knowledge sharing between employees needs a strong culture, trust and also transparency in all over the organization (Akhavan et al. 2006), leadership, time allocation, and trust encourage knowledge sharing (Mas-Machuca, &Martínez Costa, 2012)and social interaction, rewards, and organizational support had a significant effect on sharing knowledge (Amayah 2013). Without sharing, it is almost impossible for knowledge to be transferred to another person (Syed-Ikhsan& Rowland 2004). Knowledge Management denotes organizational practices aimed at harnessing available

knowledge assets to steer value creation (Wangare, 2015). The idea behind knowledge management, according to Servin (2005), is to establish an environment in which people are encouraged to create, learn, share and use knowledge together for the benefit of the organization and its various stakeholders. This argument is

arguably founded on the premise that



each one of us is a store of knowledge- with training, experience and informal networks of friends and colleagues, whom we seek out when we want to solve a problem or explore an opportunity (Sveiby, 2005) and that no activity whatsoever can be carried out without suitably managing all the facets of the relevant knowledge (Hislop, 2013). Consequently, creating, sharing and using knowledge are primary functions of management. Technological infrastructure provides a control base for assessing KM initiatives success in order to detect opportunities for realignment organizational KM strategy (Akhavan et al. 2006).

The adoption of knowledge management practice in the public sector can benefit from the following recommendations: One, a main driver for the adoption of diverse KM initiatives in public services is the change of organizational culture. Second, develop new or consolidating outdated systems to improve the overall performance, and capitalize on a broader, more integrated and easier accessible knowledge base. Third, improve accountability and mitigating risk by making informed decisions and resolve issues faster, supported by access to integrated, transparent information across all organizational boundaries. Fourth, deliver better and more cost-effective constituent services such as enhancing partnerships with, and responsiveness to, the public, thereby clearly demonstrating a higher return on taxpayers' money (Riege and Lindsay, (2006).

2.3.2 Steps used to implementing Knowledge Management in County Governments

Knowledge management is the planning, organizing, motivating, and controlling of people, processes and systems in the organization to ensure that its knowledge-related assets are improved and effectively employed (King, 2009). Knowledge-related assets include knowledge in the form of printed documents such as patents and manuals, knowledge stored in electronic repositories such as a "best-practices" database, employees' knowledge about the best way to do their jobs, knowledge that is held by teams who have been working on focused problems and knowledge that is embedded in the organization's products, processes and relationships (King, 2009). The proposed model in figure 2.0 above will guide knowledge management adoption in

County governments in Kenya. The study proposes the following seven steps as a starting block in implementing knowledge management in county governments. Of course there are other strategies that can be used. The following only serves as a guide: These steps are:

Step 1: Identify the organizational Problem: Successful implementation of knowledge management requires a clear identification of the business problem to be solved and an alignment of the knowledge management project with overall organizational objectives. It is essential that companies align knowledge management projects with business objectives. Dave Ledet, director of shared learning at Amoco Corp., found that if business objectives are not stated or are not clear for the knowledge management effort, it "tends to become just another activity imposed on people for no apparent reason." He lists the following areas of focus: financial objectives, quality, customer satisfaction, and innovation (Elliot, 1996).

2: Prepare for Change: Knowledge management is more than just an application of technology. It involves cultural changes in the way employees perceive the knowledge they develop. A successful implementation of knowledge management also requires endorsement from corporate management. Only a fraction of the corporate changes required for successful knowledge management are technical. A common problem for those undertaking a knowledge management project is placing technology ahead of the ability or the desire of people to use it. Tom Davenport believes that two-thirds of a knowledge management effort needs to focus on non-technical issues: "If you're spending more than one-third of your time on technologies for knowledge management, you're neglecting the content, organizational culture and motivational approaches that will make a knowledge management system actually useful" (Davenport, 1997). The good news is that most workers, if given the required time, training and incentives, will begin to capture, manage and share knowledge with enthusiasm. Carla O'Dell and C. Jackson Grayson of the American Productivity and Quality Center (APQC) credit basic human nature: "We believe that most people have a natural desire to learn, to share what they know, and to make things better. This natural desire is thwarted by a variety of

logistical, structural, and cultural hurdles ... we erect in our organizations” (O’Dell and Grayson, 1998). As (Stuart, 1996) posits, “Effective knowledge management requires creating a supportive, collaborative culture and eliminating traditional rivalries. For some employees, that may mean painfully ‘unlearning’ long-standing lessons. Someone who interprets the old axiom ‘Knowledge is power’ to mean ‘To stay strong, I’ve got to hide and protect what I know’ isn’t likely to embrace the concept of sharing resources.” Leaders need to preach the gospel of sharing information. Managers need to rate performance based on employees’ cooperative efforts. Rewards, whether they’re key chains, peer esteem, or promotions, need to recognize knowledge sharing.

3: Create the KM Team : A well staffed team with a strong team leader and “cross departmental” expertise is essential for successful implementation of knowledge management. Also essential to the team are individuals familiar with the business problem to be solved, including the content and processes involved. Dan Holtshouse, director of business strategy at Xerox Corp., emphasizes the relationship between knowledge management and its knowledge workers: “Knowledge is largely about people and the work. The [knowledge management] technology should be designed at the start for supporting the character of the knowledge work itself”(Elliot, 1996). Departmental subject-matter experts who, in Holtshouse’s terms, understand “the character of the knowledge work” are essential to define the knowledge the system needs to map.

4: Perform the Knowledge Audit and Analysis
A Knowledge Audit starts by working with employees to locate the knowledge they need to solve the business problem identified in step 1. The audit begins by breaking that information into two categories: what knowledge currently exists and what knowledge is missing. In addition to capturing explicit information assets, knowledge management systems must be structured to capture tacit knowledge. Tacit knowledge is the hand-on skills and experiences of individuals and it is most often the key to the effective solution of many critical business problems. The value of capturing tacit knowledge should not be underestimated. Davenport and Prusak have stated

that “having access to knowledge only when its ‘owner’ has time to share it or losing it entirely if she leaves the company are significant problems that threaten the value of the organization’s knowledge capital” (Davenport, 1997). Once the knowledge has been captured, it must be organized in knowledge maps. Knowledge maps present users with the big picture of an organization’s intellectual capital. They allow individuals to navigate a company’s vast resources so they can quickly find relevant information.

5: Define the Key Features of the Solution : Creating a checklist of required key features will ensure that knowledge management technology you acquire will help solve your key business problems while enhancing your overall IT infrastructure. Although individual knowledge management systems are as different as each individual organization, they share many basic features. Such features, which typically address system openness, measurability, customizability and security, guide IS as it decides what products and technologies to buy or build internally.

6: Implement the Building Blocks for Knowledge Management: Implement knowledge management systems using a phased approach and a smooth “on-ramp”. Each phase of the implementation addresses a specific part of the knowledge management solution, lays the foundation for the next phase, provides immediate benefits and provides a measurable ROI. An organization’s knowledge management system is the collection of information technologies used to facilitate the collection, organization, transfer and distribution of knowledge between employees.

7: Link Knowledge to People: Finding “who knows what” in an organization has always been a time-consuming process and relying on serendipity is no solution to find the person with the right knowledge. The need to locate subject-matter experts is not new — and many enterprises have implemented “skills databases” to try to solve this problem. The link between knowledge and people distinguishes knowledge management systems from applications that manage explicit knowledge. According to Davenport, “Even the most user-friendly tools won’t help much with managing information unless they’re

strongly linked to people and processes. Knowledge dies when it is disembodied” (Stuart, 1996)

2.4 Strategies to promote Knowledge Sharing

For an organization to share its knowledge, it must first transform itself into a learning organization that can manage its knowledge. A learning organization is “an organization that is skilled at creating, acquiring, and transferring knowledge and at modifying behavior to reflect new knowledge and insights” (Dubrin 2005). As defined by Peter Senge, learning organizations exhibit five main characteristics: personal mastery, mental models, a shared vision, team learning, and the fifth, integrative characteristic, systems thinking (Senge, 2006).

As Janus, (2016) contends, organizations in developing countries that make policy or deliver services heavily influence the quality of life throughout the country. These organizations—for agriculture, health care, disaster relief, and other sectors—have accumulated a wealth of experience with policies and development pathways, but typically they have not been able to retain their experience in ways that allow it to be shared and built upon.

Important lessons learned are not documented and get lost along the way. They want to strengthen their abilities for capturing, learning from, and sharing their knowledge and experiences and reap the benefits. In particular, they typically want to accomplish three goals: 1. Become more effective. With access to critical knowledge when and where needed, they accelerate operational processes and avoid mistakes; 2. Maintain a high level of institutional knowledge even when key staff members depart; and 3. Solve operational problems by continually evaluating and taking to scale what worked in isolated instances and avoiding what didn't.

For knowledge sharing to thrive, organizations need to develop two very different types of capacity— *the enabling environment* and *technical skills*. The enabling environment is created largely by strategic decisions made by management of the organization. The technical skills operationalize effective knowledge capturing and sharing (Janus, (2016).

Enabling environment

A positive enabling environment consists of (1) leadership and an organizational culture conducive to

knowledge sharing. The environment builds on strong leadership by senior management that treats knowledge and learning as part of everyday operations and includes attractive recognition mechanisms that reward staff for sharing. It includes (2) effective governance mechanisms for knowledge- and learning-related issues and a set of policies that guide the institution on its journey to becoming a learning organization. The environment is supported by (3) financing and by (4) partnerships, both domestic and international (Janus, (2016).

Technical skills

Technical capabilities for effective knowledge operations consist of systematically (5) identifying and capturing the organization's operational experiences and lessons, (6) packaging them into knowledge and learning products, (7) sharing them within and outside the institution, and (8) monitoring and evaluating these efforts (Janus, (2016).

2.4.1 Role of Leadership and Organizational Culture in promoting Knowledge Sharing Environment

Leadership was found to have a positive and significant relationship with knowledge sharing in this study. The role of leadership in improving knowledge sharing culture in organizations was also supported by other studies (Oliver and Kandadi, 2006; Kreiner, 2002; Kerr and Clegg, 2007; Kluge et al., 2001; Marsh and Satyadas, 2003; Welch and Welch, 2005; Nonaka, 1987). Kreiner (2002) found that leaders can influence employees to create the necessary knowledge locally. Kerr and Clegg (2007) also showed in their study that leadership is important to facilitate knowledge sharing within and across boundaries. Actually, leadership at all managerial level is required to develop a desired culture in order to enhance knowledge sharing in organizations (Kluge et al., 2001, Marsh and Satyadas, 2003; Welch and Welch, 2005). Positive initiative should be taken by the top management to give proper work environment through ensuring that the necessary support and proper organizational structure are in place to facilitate knowledge sharing among different functional groups.

Organizational culture can be defined as the shared, basic assumptions that an organization learnt while coping with the environment and solving problems of

external adaptation and internal integration that are taught to new employees as the correct way to solve those problems (Park, Ribiere and Schulte, 2004). An organizational culture that supports knowledge sharing can lead to more effective achievement because instilling a culture of standardizing and maintaining information is critical to achievement (Lai and Lee, 2007; McManus and Loughridge, 2002).

Each organization has its own culture, which gradually develops overtime to reflect the organization's identity in two dimensions: visible and invisible (Al-Alawi et al., 2007). The visible dimension of culture is reflected in the espoused values, philosophy and mission of the firm while the invisible dimension lies in the unspoken set of values that guides employees' actions and perceptions in the organization (McDermott and O'Dell, 2001). Al-Alawi et al (2007), found that cultural elements such as trust between co-workers, communication, reward system, and organizational structure are positively related to knowledge sharing in organizations. Issa and Hadda (2008), also found that trust among co-workers is an important cultural element for successful knowledge management. Employees are willing to share knowledge in situations where they can trust the recipient of this knowledge (Connelly and Kelloway, 2002). Some other cultural elements, such as, leadership, organizational, and individual factors are also essential for successful knowledge sharing (Kerr and Clegg, 2007). Previous studies found that leadership and reward system have positive impact on knowledge sharing (Oliver and Kandadi, 2006).

2.4.2 Role of Trust in promoting Knowledge Sharing Environment

Al-Alawi et al. (2007), found that trust is positively related to knowledge sharing in organizations. Some other authors also found positive relationship between trust and knowledge sharing (Andrews and Delahay, 2000; Levin, 1999; Mayer et al., 1995; Tsai and Ghoshal, 1998; Connelly and Kelloway, 2002; Issa and Haddad, 2008; De Long and Fahey, 2000). Some other authors also claim that the amount of knowledge that flows freely both between the employees and from employees into the firm's main databases is highly influenced by the level of trust that exists

between the firm, its different functions and its employees (De Long and Fahey, 2000).

The willingness of organizational members to share and use tacit knowledge may depend on the extent that co-workers are trusted recipients and sources (Adler, 2002; De Long and Fahey, 2000; Gruber, 2000; Lucas, 2005; McAllister, 1995; Nahapiet and Ghoshal, 1998; Scott, 2000; Tsai and Ghoshal, 1998). For example, Lucas (2005) found that interpersonal trust between co-workers and reputation of co-workers had separate effects on employee experiences in transferring knowledge within an organization. In a related study, Smedlund (2008) has suggested that tacit knowledge transfer (sharing and use); is facilitated by a social network within organizations characterized by ties based both on interpersonal relationships and long-standing working relationships where reciprocity among co-workers is the norm.

To create an environment where trust exists, a worker need to believe that his or her knowledge will not to be misused and that he or she will obtain significant value in the near future coming from reciprocal knowledge-sharing (Mackay 2001). As established by Ribi re, Arntzen, and Worasinchai (2007), workers are not likely to share knowledge if they are reluctant to trust each other. For this reason, these individuals need to comprehend the benefits of knowledge-sharing, i.e. assists them in doing their jobs more effectively; helps them in retaining their jobs; facilitates their personal development and career progression; rewards them by getting things done; and gives them personal recognition; hence sharing will without a doubt turn into a reality.

Businesses must create a desire to share as a guiding principle in organizational survival. In doing so, there is still the unresolved issue of 'trust' (Riege 2005), which is arguably one of the most crucial success factors for creating a culture that shares knowledge (Tan, Lim & Ng 2009). Apparently, the 'lack of trust' syndrome, according to Riege (2005), originates from either the trustor or the trustee (knowledge participants). In addition, Riege further exclaimed that lack of trust exists in two separate forms: (1) trustee as a result of misuse knowledge or taking undeserved recognition for it; or (2) accuracy and credibility of knowledge that comes from the trustor. Therefore, the

value and encouragement for knowledge-sharing for organizations does indeed require the creation of a culture of trust (Lengnick-Hall & Lengnick-Hall 2003), in which workers will be more willing to share what they know in a trusting culture (Davenport & Prusak 2000; Fairholm & Fairholm 2000; Faraj & Wasko 2001; Leana & van Buren 1999; Robertson & Hammersley 2000; Settoon & Mossholder 2002).

McAllister (1995) developed and tested empirically the distinctiveness of two forms of trust: affect-based trust, which is grounded in mutual care and concern between workers; and cognition-based trust, which is grounded in co-worker reliability and competence. Face-to-face interaction often is the primary method for transferring tacit knowledge (Nonaka and Takeuchi, 1995; Spender and Grant, 1996; Sweeney, 1996; Teece, 2000; Teece et al., 1997). The levels of risk and uncertainty that are associated with tacit knowledge transfer are reduced through trusting relationships (Foos et al., 2006). Some transfers of tacit knowledge are formal, resulting from training events, or conferences, while others are more informal, resulting from interdepartmental task forces, informal social networks and employee interactions (Marquardt, 1996). Key to both formal and informal tacit knowledge transfer is the willingness and capacity of individuals to share what they know and to use what they learn (Foos et al., 2006; O'Dell et al., 1998). Barriers may arise that limit the transfer of tacit knowledge (Lucas, 2005). These include coworker willingness to share and/or use tacit knowledge, limited awareness of the tacit knowledge an individual possesses, difficulty in expressing tacit knowledge that is tied to mental and/or physical action, and difficulty of applying context-specific tacit knowledge in other contexts (Argote, 1999; Fahey and Prusak, 1998; Nidumolu et al., 2001; Nonaka and Takeuchi, 1995).

As Nonaka and Takeuchi (1995) found in their study of Japanese companies, personal relationships developed in the context of organizational retreats often resulted in the sharing of tacit knowledge. In a separate study, Foos et al. (2006) found that personal relationships had the greatest impact on the sharing of tacit knowledge between individuals. Foos et al. (2006) also found that interpersonal trust among

project team members was a significant predictor of tacit knowledge transfer.

2.4.3 Role of Communication in promoting Knowledge Sharing Environment

Communication (interaction between staff) has a positive and significant relationship with knowledge sharing. Al-Alawi et al. (2007) also found a positive relationship between communication and knowledge sharing. Previous studies also found that communication between co-workers is an important aspect in encouraging knowledge sharing (Smith and Rupp, 2002; Davenport and Prusak, 1997). Knowledge management process is about sharing, collaboration and making the best possible use of a strategic resource (Bollinger & Smith, 2001). Knowledge sharing is the process where individuals mutually exchange their implicit and explicit knowledge and jointly create new knowledge (Van den Hooff & de Ridder 2004). Knowledge sharing is also the most important ingredient of innovation (Bhirud et al, 2005). Any knowledge sharing process consists of two parts: donating and collecting. Knowledge donating can be defined as "communicating to others what one's personal intellectual capital", whereas knowledge collecting is defined as "consulting colleagues in order to get them to share their intellectual capital" (Van den Hooff & de Ridder, 2004).

Communication on the other hand, is at the center of any complex, modern organizations (Thomas et al, 2001). It is accepted that communication has effects on individuals' attitudes toward the organization. Organizational communication is considered as the social glue (Greenberg & Baron, 2003). Communication helps create shared meaning, the norms, values and culture of the organization (Wiesenfeld et al, 1998). In a culture where knowledge value is recognized, availability of information, sharing of that information, information flows, IT infrastructure, personal networking, system thinking, leadership, communication climate, problem solving, training and many other factors can be *supportive factors* for successful learning (Warne et al, 2003). Knowledge sharing depends on the quality of conversations, formally or informally (Davenport & Prusak, 1998). Knowledge sharing is a form of communication (Van den Hooff & de Ridder, 2004:

120). Knowledge transferring between individuals in organizations requires communication (Sveiby, 2000). Communication climate includes communicative elements of a work environment, such as judgments about the receptivity of management to employee communication, or the trust on information being disseminated in the organization (Guzley, 1992).

Without an environment that encourages sharing, knowledge sharing expectations fail or fades (DeTienne & Jackson, 2001). It is reasonable to distinguish communication climates as supportive and defensive (Larsen & Folgero, 1993). "open exchange of information, accessibility of coworkers, confirming and cooperative interactions and an overall culture of sharing knowledge can characterize supportive communication climates" (Van den Hooff & de Ridder, 2004). Supportive communication climate was found necessary for the generation, sharing and continual existence of organizational knowledge (Ali et al., 2002). Briefly, communication climate is a crucial variable in explaining knowledge sharing. Supportive communication has positive impact on knowledge donating and knowledge collecting. It's a central condition for successful knowledge sharing (Van den Hooff & de Ridder, 2004).

II. CONCLUSION

The study proposes the following seven steps as preliminary blocks in implementing knowledge management in county governments. These include: Identifying the organizational problem that needs to be addressed; secondly, the organizations need to prepare for change. This is through culture change, aligning the recruitment and employee training programs to ensure that the organizations have the right people needed to ensure successful takeoff of knowledge management, and acquire the right technology that will support the knowledge management and sharing platform. The third step is creation of the knowledge management team comprising of departmental heads and specialists from all the key sections of the organization. The fourth step is to perform knowledge audit and analysis to establish the starting point, based on what is available and what needs to be accomplished. The fifth step will be to define the key features of the solution i.e. ensure that knowledge management technology you acquire will help solve your key business problems. The next step is to

implement the building blocks for knowledge management, and finally to link knowledge to people. For knowledge sharing to thrive, organizations need to develop two very different types of capacity— *the enabling environment* and *technical skills*. The enabling environment is created largely by strategic decisions made by management of the organization. The technical skills operationalize effective knowledge capturing and sharing.

APPENDIX

Appendixes, if needed, appear before the acknowledgment.

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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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Vanet: A Future Technology

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Abstract- a Vehicular Ad-Hoc Network or **VANET** is a technology that has moving vehicles as nodes in a network for creating a mobile network. Vehicular networks are very fast emerging for deploying and developing new and traditional applications. It is characterized by rapidly changing topology, high mobility, and ephemeral, one-time interactions. Our goal is to provide the better algorithm for solution to the inaccurate positioning due to signal loss in GPS locators. We propose our novel work technique in the domain of Navigation in VANET. Recently, GPS handsets have been widely adopted by drivers for navigation. People rely more and more on GPS, and many of them stop checking and printing maps before they depart with a full confidence in GPS. However, due to the sensibility of GPS signals to terrain, vehicles cannot get their locations. To address the issue, we propose a novel Grid-based On-road localization system, where vehicles with and without accurate GPS signals self-organize into a VANET, exchange location and distance information and help each other to calculate an accurate position for all the vehicles inside the network. And we propose the novel technique to improve our base work, in our technique; the vehicle can find the location even its available inside the tunnel by using Road side unit model (RSU). We aim to create the Street road and simulate the vehicles created on that road considering the traffic using the traffic lights. It gives us idea how the movement of vehicles in a network take place to show the affect traffic on the vehicle and how to tackle with the heavy traffic and ways to ignore the on-going traffic by taking different routes. It a very good application of VANET which helps to analyses that which route should be taken by the vehicle and how we should complete the journey in minimal time and what will be the optimal path with less traffic in it. Network Simulator 2 (NS2) for short is an open source, Ns2 is a discrete event simulator targeted at networking research. Ns2 provides substantial support for simulation of TCP, routing, and multicast protocols over wired and wireless (local and satellite) networks, microscopic, multi-model traffic simulation. It allows to simulate how the given traffic demand that is consists of single vehicles moves through a given roadmap.

Index Terms- GPS, VANET, RSU, NS2.

I. INTRODUCTION

A 1.1 What is VANET?

A Vehicular Ad-Hoc Network or **VANET** is a technology that has moving vehicles as nodes in a network for creating a mobile network. We can say that VANET turns each and every vehicle into a wireless node, allowing cars to connect to each other which are 100-300 meters apart and, in turn, create a wide range of network. As cars fall out due to signal range and drop out of the present network, other cars can join in to connect vehicles to one another so a mobile Internet can be created. It is assumed that the first systems in which it is integrated are police and fire vehicles to communicate with one another to provide safety. It is a term which is used to describe the spontaneous ad hoc network that is formed over vehicles moving on the roads. Vehicular networks are very fast emerging for deploying and developing new and traditional applications. It is characterized by rapidly changing topology, high mobility, and ephemeral, one-time interactions. Both MANETs and VANETs are characterized from the movement and self-organization of the nodes (*i.e.*, in the case of VANETs it is Vehicles).

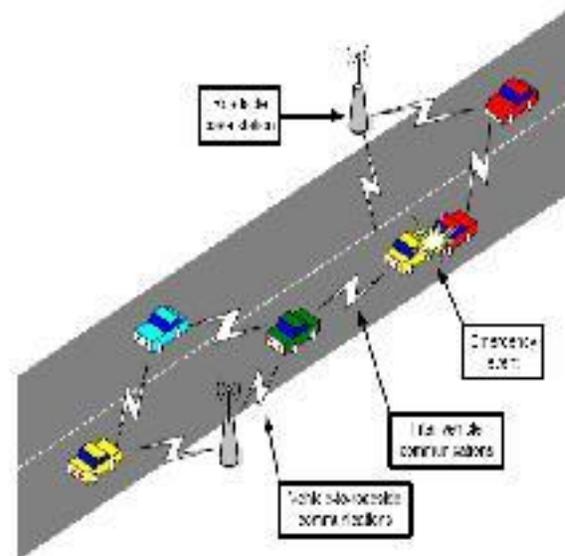


Fig 1.1: Vehicular Ad-Hoc Network

Fig 1.2.2: - Safety application (*i.e.*, brake messaging) by the use of Visible Lighting Communications.

1.3 VANET APPLICATION

Vehicular applications are classified in

- (i) Road safety applications,

Traffic management and efficiency applications

- (iii) Infotainment and Comfort applications.

Road safety applications aims to avoid the risk of car accidents and it make the driving safer by distributing information about obstacles and hazards The basic idea behind it is to broaden the range of perception of driver , allowing him/her to react much faster, thanks to alerts reception through the wireless communications. Traffic efficiency and management applications focus on optimizing the flows of vehicles by reducing the time taken by vehicle and situation of avoiding traffic jam. Applications like enhanced route navigation/ guidance, lane merging assistance and traffic light optimal scheduling, are intended to optimize the routes, while also providing a reduction of fuel consumption and gas emission.

Although the primary purpose of VANETs is to provide safety applications and the non-safety. Applications are there expected to create commercial opportunities by increasing number of vehicles which are equipped with on-board wireless devices. Comfort and infotainment applications has goal to provide the driver with information support and entertainment to make their journey more pleasant. The collisions of cars are currently one of the major dead causes. Safety applications are always used to significantly reduce the number of accidents, with the main focus to avoid accidents from happening in the very first place. Take example, Street-smart and Traffic View inform drivers with the help of vehicular communications of the traffic conditions. Vehicle platooning is the other way to improve the safety of road. By removing the hassle of adjusting speed and changing lane, vehicle platooning allows vehicles to travel closely yet safely together. Fuel economy is also get benefitted from the reduced aerodynamic as a vehicle headway is very much tightened (e.g., the spacing can be less than 2 m). Together with the adaptive cruise control used by V2V communications, the problem of the crashes of the vehicles due to error done by driver can be alleviated. Some of the most requested applications that is by polls, currently under investigation by several car

manufacturers are Congestion Road Notification (CRN), Lane Change Assistance (LCA), Post-Crash Notification (PCN) and Cooperative Collision Warning (CCW). In Post-Crash Notification, the vehicle which is involved in an accident would broadcast the warning messages about their position to the other trailing vehicles so that it can take decision with time remaining in hand. The PCN application may be implemented both on V2I and V2V network configurations. In fact the V2V gives the advantage of giving quickly the information needed through a discover-and-share policy. By using the specific sensors, it helps in measuring possible changes in the rational behavior of the driver (e.g., rapid direction changes, quick brake use and so on), that are then communicated back with directional antennas to the other vehicles that is in the same direction. Once the message is received, the closest vehicle can share this information with the other nodes present with a flooding routing. In some particular case of false alarm by the very first vehicle experiencing the irrational behavior of the driver, this type of information floods on the VANET. It is then very important to fix the issue of false alarms. Let us assume a driver has been distracted by something on the panorama and moves the Steering wheel, because of that the direction of the vehicle changes accidentally. Once the error is recognized, the driver will react very quickly by changing direction or by using a quick and strong brake. If the very first following driver does not experience accidents, then the vehicle does not forward this type of information and false alarm probability is much reduced. With the use of V2I architecture, the access points must gather information (e.g. Alarms for quick changes in speed), coming from different vehicles and the data is merged that reducing the signaling from the vehicles.



Fig 1.3.1: Congestion Detection

Traffic monitoring and management are very essential to avoid traffic Congestion and maximize

road capacity. Crossing intersections in the streets of city can be dangerous and tricky at times. Traffic light scheduling can be used by the drivers to cross intersections. Allowing a very smooth flow of traffic can mainly reduce travel time and increase vehicle throughput. A token-based intersection traffic management scheme is a scheme in which each vehicle waits to take a token before entering in an intersection. On the other side, with knowledge of traffic conditions, drivers should optimize their driving routes, thereby the problem of (highway) traffic congestion can be minimized. Congestion Road Notification detects and notifies about road congestions that can be used for route and trip planning. This kind of use is partially implemented in the recent GPS-based applications where a new route is evaluated when heavy congestion has been detected on the present route or in a portion of it. Till now several commercial tools are available for the smart-phones and special purpose devices.

TMC messages have a considerable amount of information's:

- Location: the road, area or specific location affected;
- Identification: what is the cause of the traffic problem and its seriousness?
- Extent: how far the problem stretches in each direction;
- Direction: the directions of the traffic are affected;
- Diversion advice: use alternative routes to avoid the congestion.
- Duration: how long the traffic flow problem is affected;

The service provider (SP) encodes the message and sends it to FM radio broadcasters, who transmit messages as an RDS (Radio Data System) signal within the normal FM radio transmissions. There is usually only about 30 seconds gap between the first report of an incident to the traffic information center (TIC) and the RDS-TMC receiver getting the message. This application may be implemented according to a V2I configuration or a V2V one. In fact, it is very possible to encapsulate information about the direction, the position and the average speed, that are then communicated back to the vehicle following on the street. As it appears very clearly, this solution suffers for a much large amount of data to be processed by the vehicles themselves. The worth in this environment is the use of V2I since access points can process information coming to it and communicate to the

incoming vehicles the new route after processing request information about their destination.

Finally, Cooperative Collision Warning the system works with a cut-out revealing a stopped car or slow-moving car before its arrival at the curve or downhill. All these type of applications require radio transceivers for the exchange of messages sensor and GPS on board car and road side units. Even in this case the dualism between V2I and V2V is renovated.

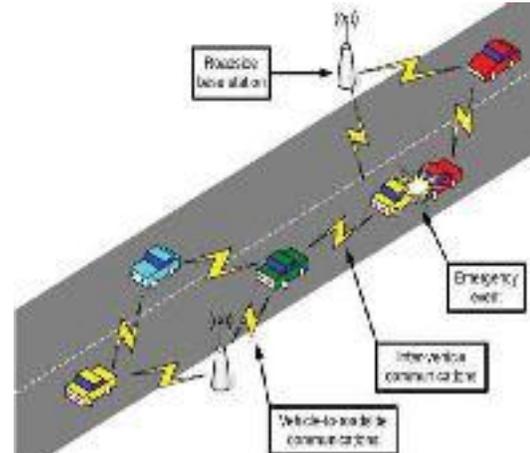


Fig 1.3.2: - Intelligent Transportation

In general, these applications is motivated by the desire of the passengers to Communicate either with ground-based destinations or other vehicles(e.g., Internet hosts or the Public Service Telephone Network).As an instance, the driver could receive local information about the hotels and restaurants etc.

The main aim of infotainment applications is to offer comfort and convenience to drivers and/or passengers. For example, Fleet net provides a platform for gaming and peer-to-peer file transfer on the road. A real-time parking navigation system is proposed to inform drivers of any available parking space. Digital billboards for the vehicular networks are proposed for advertisement. Internet access can be provided to the vehicle through V2I communications; therefore, the business activities can be performed as usual in a vanet environment, realizing the notion of mobile office. On-the-road media streaming between the vehicles can be available making long travel more pleasant. An envisioned goal is to have human-vehicle-interfaces, such as color reconfigurable head-up and head-down displays, and very large touch screen active matrix Liquid Crystal Displays, for the high-quality video-streaming services. Driver can enjoy their traveling time by the means of real-time applications e.g., online gaming and video streaming, using individual terminals next to their seats.



Fig 1.3.3: - MP3- Download and message passing

Message passing is continuous between the vehicles to show their latest location and activity that is very essential for the nearby vehicles to avoid any chances of collision.

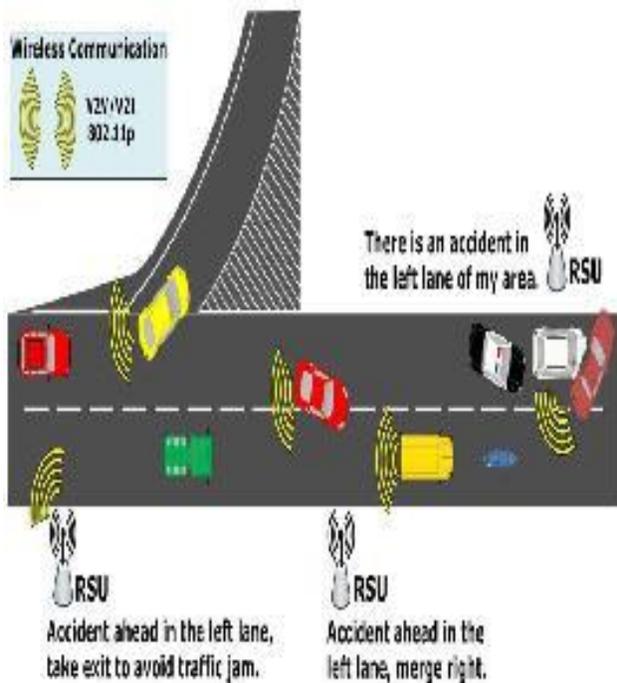


Fig 1.3.4 :- Communication between vehicle at the time of Accident

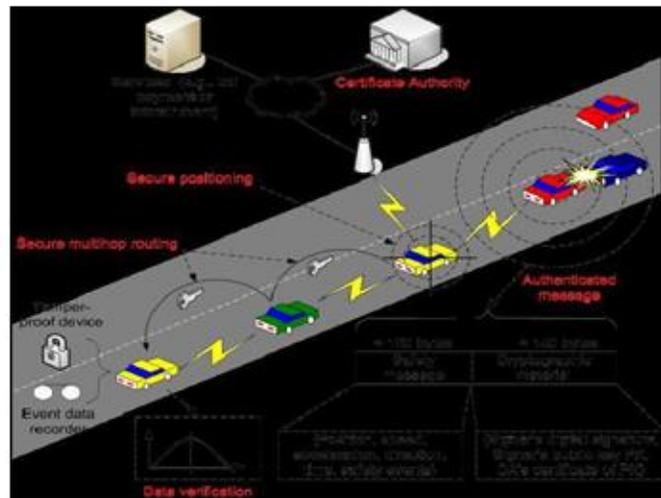


Fig 1.4.1: Security Architecture of Vanet

Tamper Proof Device

- ☑ Every smart vehicle carries a tamper-proof device
- ☑ Contains the secrets of every vehicle itself
- ☑ Has its own battery
- ☑ Has its own clock.
- ☑ Is incharge of all the security operations
- ☑ Is accessible or used only by authorized users

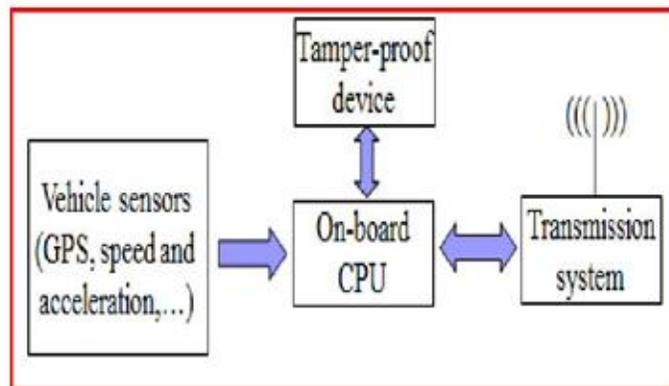


Fig 1.4.2:- Tamper Proof Device

DIGITAL SIGNATURE

messages are of large scale, non-repudiation requirement and standalone.

Each message that to be send should be signed with a Digital signature (DS).

Liability messages must be stored in the EDR.

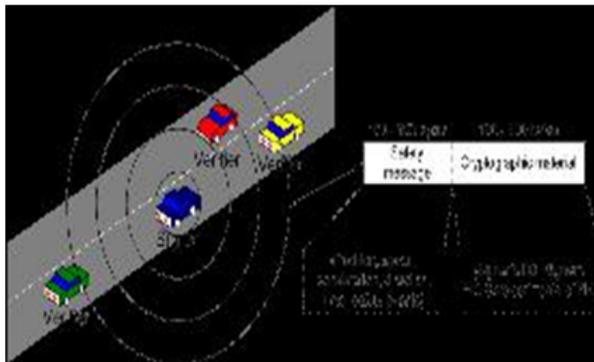


Fig 1.4.3: Application of Digital signature VPKI (Vehicular PKI)

Each smart vehicle carries in its Tamper-Proof Device (TPD):

A certified and unique identity: Electronic License Plate (ELP)

The set of certified anonymous public or private key pairs

Before a smart vehicle sends a safety message, it signs the message with its private key and includes the essential CA's certificate.

Mutual authentication can be done without using a server

1.5 Types of Communications in Vanet:

Vehicle to vehicle communication

Using multi-hop/multi cast technique.

It uses two types of broadcasting i.e.

1. Naive broadcasting
2. Intelligent broadcasting

Vehicle to infrastructure communication

Have a high bandwidth link with vehicle and roadside equipment.

Roadside units broadcast messages for communications.



Fig 1.5:- Different Types of Communication

Routing based communication

Uses multi hop unicast

1.6 MOTIVATION

The original impetus for the interest in VANET was provided by the need to inform fellow drivers of actual or imminent road conditions, delays, congestion, hazardous driving conditions and other similar concerns. Now day's accidents are the major cause of death in many cities or countries. So it is very necessary to have a technology which can be used to minimised the road accidents and provide security to the peoples. To avoid the accidents the driver should

be well aware of the traffic movements and congestion so that he can easily take the best optimal path to reach its destination.

1.7 PROPOSED WORK

Avoiding Collision by the proper use of the traffic signaling in VANET

☒ To minimize t

The accidents cases the knowledge of the on-going traffic is very much necessary. Hereby a Road Map is first created to define the path for the vehicles and after that the vehicle movement is verified by seeing whether the vehicles are coming from both directions or not.

☒ By implementing the traffic light signal we want

to assure that no two or more vehicles coming from opposite side are on the same Lane causing accident scenario.

☒ Whenever a vehicle is going in one lane then no

other vehicle coming from opposite direction are allowed to use that lane.

Purpose:

The application of inter-vehicular communication over a MANET are raises several interesting issues in regard to data forwarding. One such issue is in which an unpredictable traffic has both a limited area of the relevance and a limited time of relevance. For example, carriers should not be forward information about road closures after the road has re-opened. This requires carriers to not only forward received messages, but also to analyze the semantics of the messages to first determine if they must be forwarded. As another example, carriers may be traveling to destinations hundreds of miles away from the traffic slowdown. VETRAC proposes to introduce relevance filtering at the carriers before forwarding event messages. VETRAC system works on the principle identify of a vehicle, which is assigned as Mobile-IP address to a vehicle. The system tracks the vehicle information through Wi-Fi access points, which are established at various locations in lane or parks or in large campus. The carrier is a navigation server that connects with multiple clients (vehicle) and is also responsible for the client's request data. The client control panel system (provider / consumer) running on client side helps the user for identifying current location, destination client location, and landmark, the distance to be travelled. Traffic intensity of each Lane at an instant is notified though carrier access points. A. Functionality of VETRAC The architectural and functionality overview of Vehicle Tracking System (VETRAC), which has complex modules classified based on functionality. The core functionality of VETRAC focuses on vehicle tracking and controlling the lane (route) selection process tracking system. System establishes connection with the client,

updates the client location in the database, gathers the traffic

Information and controls the streaming traffic video during conference process. The system has various modules

a. Connection establish server

b. Location Management Server and c. Traffic server

2) Vehicle Tracking System:

System gets connected with Wi-Fi access point and tracking the client with in the access point range. The system detects the clients in its range and automatically pass the client current location to the navigation server.

3) Client Control Panel:

The user should know about current location, destination location, landmark of the said campus, traffic information in a campus, traffic video information about the junction in campus. The registered users can only have access to this navigation system.

4) Display Map System:

The system which runs in the client device and it indicates the client's current location, destination client location, landmark identification and traffic information by the map.

II. LITERATURE SURVEY

2.1 Overview of security issues in Vehicular Ad-hoc Networks

VANETs are a subset of MANETs (Mobile Ad-hoc Networks) in which communication nodes are mainly vehicles. As such, this kind of network should deal with a great number of highly mobile nodes, eventually dispersed in different roads. In VANETs, vehicles can communicate each other (V2V, Vehicle-to-Vehicle communications). Moreover, they can connect to an infrastructure (V2I, Vehicle-to-Infrastructure) to get some service. This infrastructure is assumed to be located along the roads.

VANET MODEL OVERVIEW

There are many entities involved in a VANET settlement and deployment. Although the vast majority of VANET nodes are vehicles, there are other entities that perform basic operations in these networks.

Common VANET entities

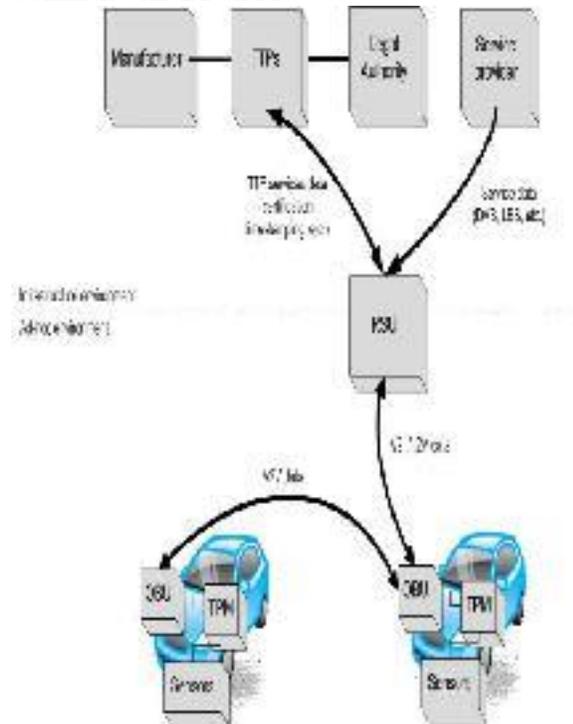


Fig 2.1.1:- VANET Entities Infrastructure environment

It is mainly composed by those entities that manage the traffic or offer an external service. Vehicle registration and offence reporting are two important tasks.

Ad-hoc environment

From the VANET point of view, they are equipped with three different devices. Firstly, they are equipped with a communication unit (**OBU**, On-Board Unit) that enables Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I, I2V) communications. On the other hand, they have a set of **sensors** to measure their own status (e.g. fuel consumption) and its environment (e.g. slippery road, safety distance). These sensorial data can be shared with other vehicles to increase their awareness and improve road safety. Finally, a Trusted Platform Module (**TPM**) is often mounted on vehicles.

VANET settings

1. V2V warning propagation
2. V2V group communication
3. V2V beaconing
4. I2V/V2I warning

2.2 A framework to simulate VANET scenarios with SUMO

□ Framework that enhances OPNET simulation scenario using realistic vehicular mobility models. This framework makes use of the open source software called "Simulation of Urban Mobility" (SUMO) and the "input trajectory files" feature of OPNET.

□ OPNET Modeller enables both *random mobility*

and *trajectory mobility*. The last-mentioned is setting with one trajectory file per node. This

method allows elaborating complex node

movements. Unfortunately, interactions between nodes are not taken in account, so realistic mobility is limited.

□ To avoid flooding, we define a forwarding scheme to limit the number of packet sent.

□ On message reception, a vehicle starts a timer T

inversely proportional to the distance from

previous sender :

$$T = tmax. (1- d/R)$$

With $tmax$ the maximum contention time, d the distance from previous sender, R the radio range. When the timer reaching zero the node forward the packet. Other waiting nodes receive this packet and cancel their timer. Thus, we reduce the number of packet sent in the network.

□ Integrate a direct and bidirectional communication with SUMO allowing us to define more complex simulation scenarios in OPNET modeler.

2.3 Vehicle tracking using VANET (VETRAC)

❑ Vehicle tracking systems can be used in theft

prevention, retrieval of lost vehicles, providing traffic oriented services on lanes. The Vehicle tracking systems VETRAC enables vehicle drivers or any third party to track the location of any moving vehicle.

❑ The goal is to create a system whereby vehicles

can exchange information about traffic conditions in an effort to provide drivers with an early warning of traffic hazards and congestion. For example, when an accident occurs, emergency responders could provide information about road or lane closures and the estimated time of re-openings to oncoming traffic. The oncoming traffic could then carry the information to vehicles that have not yet reached the traffic slowdown.

❑ VETRAC system works on the principle identify

of a vehicle, which is assigned as Mobile-IP address to a vehicle. The system tracks the vehicle information through Wi-Fi access points, which are established at various locations in lane or parks or in large campus. The carrier is a navigation server that connects with multiple clients (vehicle) and is also responsible for the client's request data. The client control panel system (provider / consumer) running on client side helps the user for identifying current location, destination client location, and landmark, the distance to be travelled. Traffic intensity of each lane at an instant is notified through carrier access points.

Model GPS Satellite:

In this module we have studied the details about GPS satellite and we have implemented the model of GPS satellite for getting the position details. There are 2 kinds of manmade satellites in the heavens above: One kind of satellite ORBITS the earth once or twice a day, and the other kind is called a communications satellite and it is PARKED in a STATIONARY position 22,300 miles (35,900 km) above the equator of the STATIONARY earth. The most prominent satellites in medium earth orbit (MEO) are the satellites which comprise the GLOBAL POSITIONING SYSTEM or GPS as it is called. GPS satellites fly in medium Earth orbit (MEO) at an altitude of approximately 20,200 km (12,550 miles). Expandable 24-Slot satellite constellation, as defined in the SPS Performance Standard. The satellites in the GPS constellation are arranged into six equally-spaced orbital planes surrounding the Earth. Each plane contains four "slots" occupied by baseline satellites. This 24-slot arrangement ensures users can view at least four satellites from virtually any point on the planet. The Air Force normally flies more than 24 GPS satellites to maintain coverage whenever the baseline satellites are serviced or decommissioned. The extra satellites may increase GPS performance but are not considered part of the core constellation.

- 1) Fixed in specific area.
- 2) Provide signals strength in (Good SS (receiver near to the Centre of the coverage area), Bad SS (receiver near to the border of the coverage area), and Vehicle with GPS receiver).
- 3) Can make the communication to other vehicle.
- 4) Can get the current position by receiving the signal from GPS satellite.
- 5) Can Share the current position to the other vehicle.
- 6) Can calculate distance with neighbor vehicle.

Road Map Design:

We have defined the some properties for Road map designing process.

- 1) Two-way vehicle movement.
- 2) Road intersections.
- 3) GPS signaling.

(Less number of GPS connectivity areas. More number of GPS connectivity area).

Locating the Position:

The following processes used to find the position.

- 1) Receive the signal from GPS satellite.
- 2) Get the location of GPS satellite.
- 3) Based on the number of satellite availability position will be fix.
- 4) Based on accuracy, fix the road map and grid information.
- 5) Share the current position to neighbor.

Comparing the Position:

If less GPS count then vehicle need to use the following processes.

- 1) Collect the neighbor position.
- 2) Calculate the distance with neighbor.
- 3) Calculate the estimated next grid location.

- 4) Check the estimated new position from history position.
- 5) Compare the grid value, estimated position and neighbor distance and fix current position.

DESIGN& IMPLEMENTATION

We have proposed the technique for find the position and as well as to improve the vehicular communication. For ease of implementation, we have divided our proposed work into small modules.

- ☒ Design network
- ☒ GPS satellite model
- ☒ VANET with GPS receiver model
- ☒ Road map design
- ☒ Locating the position
- ☒ Received GPS values
- ☒ Locating with Digital map
- ☒ Comparing the position
- ☒ Number of GPS satellite count
- ☒ Grid values
- ☒ Neighbour vehicle availability

3. Network Simulator

NS2 is discrete event simulator used to simulate real time network traffic and topology for analysis. For researcher it is proven to be great tool. NS2 has been developed in C++ and TCL. Otcl which is object oriented TCL, also used in NS2. For simulation purpose TCL programming is used and for adding new module C++ is used. This tutorial is targeted for students who want to learn NS2 but don't have much knowledge.

- 1.) TCL Programming
- 2.) OTCL Programming
- 3.) NS2 Commands

In NS2 there are two types of applications are available one is tragic generator, second is simulated application. These applications are attached to agent who is attached to node. New application can be added in NS2. Traffic generator generates traffic and there are four types of traffic generator.

3.1 SUMO

Simulator: - Device or system that simulates specific conditions or the characteristics of a real process or machine for the purposes of research or operator training. "Simulation of Urban Mobility",(SUMO) is an open source, microscopic,

multi-model traffic simulation. It allows us to simulate how a given traffic demands or network which consists of single vehicle moves through a given road map. This simulator allows addressing a large set number of traffic management topics. It is purely microscopic in nature: each vehicle is modelled explicitly, has its own route, and moves individually through the given network. To build a network in SUMO a street network consists of nodes i.e junctions and edges (streets connecting the given junctions) are necessary. A **SUMO** network file describes the traffic-related part of a map. It mainly contains the network of roads/ways, intersections/junctions, and traffic lights in a map

Network Format-:

A SUMO network is a directed graph. "Nodes" represent intersections/junctions, and "edges" roads/streets.

A SUMO network contains further traffic related information:

Every street (edge) as a collection of lanes, The position, shape and speed limit of every lane, The right of way regulation, The connections between lanes at junctions (nodes), and The position and logic of the traffic lights.

4. ALGORITHM

Vehicle: Collects the GPS and Map info Check whether Root node is found

If yes

Share the own speed and direction movement to Root node.

If no

Ignore.

Check whether node has data (it may be own or receivers from others)

If yes

If route is found

Send the data to destination If no route

If Root node found

Check with Root node

If no Root node

Checks through neighbor node

Root Node: Root collects the info I f info is route

Request Destination detail is found in history then make it as route for source.

If no detail found and check with the other Root nodes.

If info is vehicle details (speed direction) If info has emergency situation

Update the details into history.
Inform to particular grid vehicles.
If no emergency

Update the details into history

III. RESULT

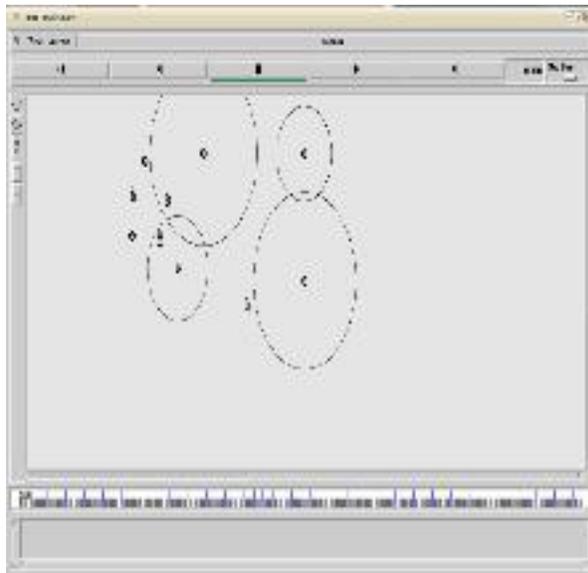


Fig. GPS Satellite signal sharing model.

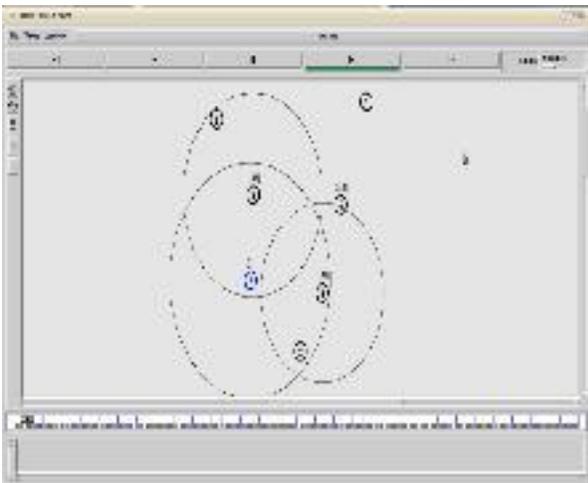


Fig. Sharing the Request for finding position.



Fig. Vehicle movement and positioning model.

IV. CONCLUSION

The goal is achieved, such as providing the solution to the inaccurate positioning due to signal loss of GPS locators. We proposed our novel technique in the domain of Navigation in VANET. To address the issue, we proposed a novel Grid-based On-road localization system with the help of RSU's, where vehicles with and without accurate GPS signals self-organize into a VANET, exchange location and distance information and help each other to calculate an accurate position for all the vehicles inside the network. We have evaluated our enhanced RSU based G3 model to get accurate position and as well as seamless connectivity model for VANET.

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Descriptive analysis of histological findings of Trans Urethral Resection of Prostrate (TURP): experience of a single tertiary care unit

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Abstract- Transurethral resection of the prostate (TURP) represents the gold standard of surgical therapy for the management of symptomatic bladder outlet obstruction due to the prostate. This is a major operative procedure. The objective of this study was to analyze histological findings of Trans Urethral Resection of Prostrate (TURP). The study sample included the patients with lower urinary tract symptoms and prostatomegaly who came to the genitourinary clinic. There were 444 males who underwent TURP as the surgical treatment for BPH. According to the results, out of the sample 14.9 % (n=66) found to have prostate carcinoma, 83.8 % (n=372) were Benign Prostatic Hyperplasia, 61.5 % (n=273) exhibits intra prostatic inflammation, 1.6 % (n=7) were Prostatic Intraepithelial Neoplasia (PIN) and 10.4% (n=46) had squamous metaplasia. In the cancer group with a mean age of 66.3(SD=8.9) years, 16.7% coexisted with chronic prostatitis, 4.5% and 3.1% coexisted with PIN and squamous metaplasia respectively. Of the prostate cancer the Gleason grading was favorable (2-6) in 66.7% cases, 19.7% had intermediate (7) and 13.7% had unfavorable Gleason grade (8-9). As the conclusion, chronic prostatitis is more prominent than the acute prostatitis. However, chronic prostatitis is less with dysplasia and compare to total population dysplasia present is lower than the hyperplasia in our study.

Index terms- Transurethral resection of the prostate (TURP), lower urinary tract symptoms, prostatomegaly, prostate carcinoma, Benign Prostatic Hyperplasia, intra prostatic inflammation, Prostatic Intraepithelial Neoplasia, squamous metaplasia, Gleason grade

I. INTRODUCTION

Transurethral resection of the prostate (TURP) represents the accepted standard of surgical therapy for the management of symptomatic bladder outlet obstruction due to benign prostatic hyperplasia (BPH). However, this is a major operative procedure associated with significant perioperative morbidity.⁽¹⁾ Obstructive voiding symptoms are frequent complaints in men with prostate cancer. Some men with prostate cancer require transurethral resection of the prostate (TURP) for relief of these symptoms.⁽¹⁾ When the pathological stage is known, progression and mortality outcomes are similar in TURP and non-TURP treated patients with prostate cancer.⁽⁴⁾

For decades TURP was the undisputed gold standard of therapy for patients with LUTS due to BPH; The main driving forces behind this development were the high prevalence of the disease, with increase in the longevity. Surgery is indicated in only 5–10% of patients with symptomatic BPH.⁽⁵⁾

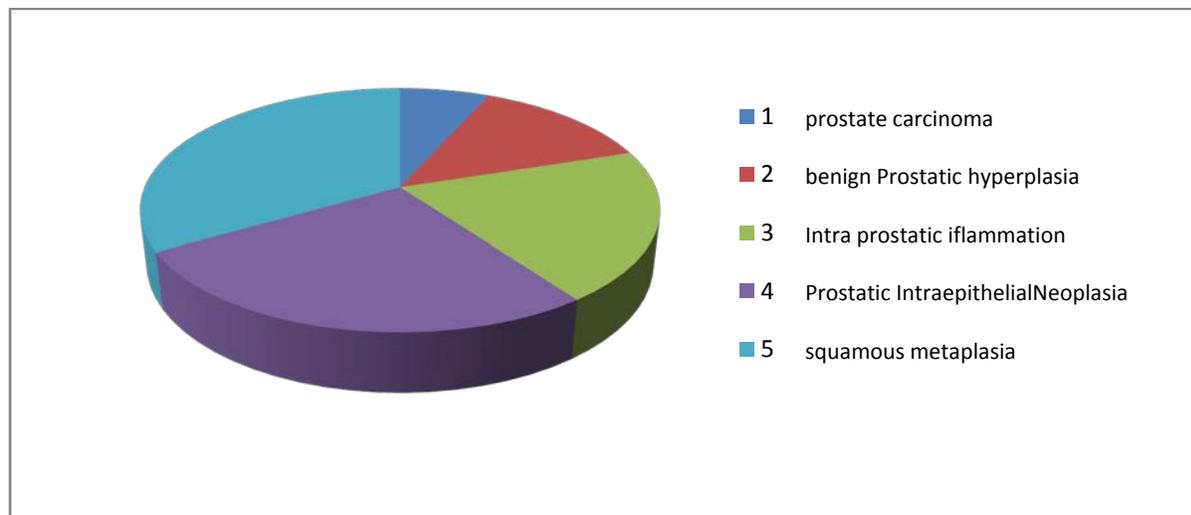
In Sri Lanka, carcinoma of the prostate is the 8th leading cancer in male⁽²⁾ Since PSA (prostate specific antigen) testing is not done routinely in Sri Lanka to aid diagnosis.⁽²⁾ carcinoma prostate is diagnosed mainly on clinical findings and the majority proceed to have a histological diagnosis via trans rectal prostate (TRUS) biopsies. In the West, owing to the availability of other treatment options e.g. pharmacological management for BPH, the frequency of transurethral resection (TUR) or open prostatectomy (enucleation) specimens has greatly reduced⁽³⁾ There are twenty three Urological surgeons serving in Sri Lanka which has a population of 20 million, therefore a significant proportion of Urological surgical work in Sri Lanka is handled by general surgeons too⁽²⁾ The objective of this study was to analysis histological findings of Trans Urethral Resection of Prostrate (TURP).

II. MATERIALS AND METHODS.

Retrospective observational study was conducted in histopathological examinations performed on biopsy specimens of TURPs from January 2005 to January 2010 in Teaching Hospital Peradeniya. The study sample included the patients with lower urinary tract symptoms and prostatomegaly who came to the genitourinary clinic. There were 444 males who underwent TURP as the surgical treatment for BPH. Their histopathology records were collected from the Department of Pathology, Faculty of Medicine University of Peradeniya.

III. RESULTS

The study sample composed of 444 patients with mean age of 64 (SD=6.3) years. Out of the sample 14.9% (n=66) found to have prostate carcinoma, 83.8% (n=372) were Benign Prostatic Hyperplasia, 61.5% (n=273) exhibits intra prostatic inflammation, 1.6% (n=7) were Prostatic Intraepithelial Neoplasia (PIN) and 10.4% (n=46) had squamous metaplasia.



In the cancer group with a mean age of 66.3(SD=8.9) years, 16.7% coexisted with chronic prostatitis, 4.5% and 3.1% coexisted with PIN and squamous metaplasia respectively. Of the prostate cancer the Gleason grading was favorable (2-6) in 66.7% cases, 19.7% had intermediate Gleason grade (7) and 13.7% had unfavorable Gleason grade (8-9).

IV.DISCUSSION

In a study done by Anna Pacelli and David G. Bostwick between 1989 and 1990 using 698 TURP specimens, they found out that 570 (81.7%) contained BPH and 128 (18.3%) contained adenocarcinoma and BPH high-grade PIN was identified in 29 cases (4.2%), including 16 (2.8%) of those with BPH and 13 (10.2%) of those with cancer and BPH.[1]

Also another study which was done by Paul B. Gaudin et al between 1984 and 1987 using TURP specimens that did not contain adenocarcinoma of the prostate, they found out that the incidence of high-grade PIN was 2.3%.[2]

Kien T. Mai et al conducted a study using 533 and 449 TURP specimens in the time periods of 1989–1990 and 1997–1999 respectively. In their study out of 533 specimens 464 showed BPH, and in those specimens 62 showed atypical adenomatous hyperplasia while 6 showed prostatic intraepithelial neoplasia. 69 specimens showed BPH with prostatic adenocarcinoma of them 22 showed atypical adenomatous hyperplasia while 9 showed prostatic intraepithelial neoplasia. Out of 464 specimens 413 showed BPH 36 Showed BPH with prostatic adenocarcinoma. Out of the specimens of BPH [3]

In a study conducted by Zeenath Begum et al using 50 TURP specimens, they found out that 48(96%) were BPH with co-existing chronic prostatitis 12(24%) granulomatous prostatitis 1(2%) and acute prostatitis 2(8%). Papillary hyperplasia was predominant finding 17(34%). Less frequent finding was basal cell hyperplasia, 6(12%) atypical adenomatous hyperplasia 4(8%) and cribriform hyperplasia 1 (2%). Proliferative inflammatory atrophy constituted 3 cases(6%). Scattered necrotic glands were present in 20(40%) cases, periglandular lymphoid aggregation was a frequent finding in these necrotic glands. they reported two cases of adenocarcinoma prostate with modified Gleason score of one (5+4=9) and another score of (5+3=8).[4] (Begum et al., 2015)

Josephine conducted a study using 44 needle biopsies and 62 TURP specimens. She found out that Among the 106 biopsies received, 79 (74.52%) cases were of Benign prostatic hyperplasia, two cases (1.89%) were Prostatic intraepithelial neoplasia and 25 cases (23.58%) were Carcinoma of Prostate. Prostatitis was the most common associated lesion in cases of benign prostatic hyperplasia presenting in 25.31% patients. Among the Carcinoma patients, 20 cases (80%) were of Adenocarcinoma of prostate and 5 cases (20%) were Small cell carcinoma of prostate[5] (Josephine, 2014)

Mortality after TURP has decreased substantially during the past 30 years and is <0.25% in contemporary TURP series.⁽¹⁵⁾ Horninger *et al.* reported no postoperative deaths in a consecutive series of 1211 patients undergoing TURP between 1988 and 1991.⁽¹⁰⁾

TURP may have adverse effects on morbidity and mortality in patients with prostate cancer. The most frequent early complications after TURP (within the first 4–6 weeks) are prolonged urinary retention, postoperative bleeding with clot retention and urinary tract infection. However, the predominant cause for prolonged urinary retention after TURP is primary detrusor failure, which cannot be attributed to an insufficient TURP.⁽⁸⁾

One of the other study evaluated whether failure after TURP can be predicted in patients with acute urinary retention and found that those with prolonged retention after TURP were older (mean 83.5 years, SD 8), had larger preoperative retention volumes (1780 vs 1080 mL) and a significantly lower maximum detrusor pressure (24.4 vs 73.5 cmH₂O) at the preoperative urodynamic evaluation.⁽⁸⁾ These data indicate that proper patient selection substantially reduces morbidity after TURP by avoiding surgery in patients that will not benefit from the procedure.⁽⁸⁾

The major intraoperative complication of TURP is bleeding requiring a blood transfusion, and future technical developments should be directed at improving intraoperative haemostasis. Finally, the current morbidity of TURP is lower than previously reported and is expected to decrease further by (i) advances in technology, (ii) improved surgical technique and (iii) better patient selection.⁽⁹⁾

Several increases in dietary substances such as tomatoes, nutrients such as selenium and vitamin E are shown to lower the rates of CaP.⁽⁶⁾ Phyto-oestrogens are shown to be protective for CaP, as seen in Japanese men with a high intake of soy products.⁽⁷⁾ Phyto-oestrogens, isoflavonoids and lignans, are also found in legumes, especially lentils and beans, which are often eaten along with rice, which is the staple diet in Sri Lanka. The typical Sri Lankan diet consists of a high intake of carbohydrates, comparatively low amounts of fat, vegetables and fruits, which also is a feature seen throughout South Asia. All the above features in the South Asian diet may have a protective effect for CaP.^(5,6) Despite an increasing age (55% of patients are older than 70), the associated morbidity of TURP maintained at a low level (<1%) with a mortality rate of 0–0.25%. The major late complications are urethral strictures (2.2–9.8%) and bladder neck contractures (0.3–9.2%). The retreatment rate range is 3–14.5% after five years.

V. CONCLUSION

Chronic prostatitis more prominent than the acute prostatitis. But chronic prostatitis is less with dysplasia and compare to total population dysplasia present is lower than the hyperplasia in our study.

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Isolation and Characterization of Multi drug Resistant Super Pathogens from soil Samples Collected from Hospitals

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Abstract- Soil samples from two different city hospitals were collected pre-treated along with several antibiotics for primary screening of numerous microbes were cultured after serial dilution over sterile nutrient agar plates. A total of three isolated were identified and purified from the samples, further screened for individual antibiotics at their respective varying concentrations and found that isolates 2nd is strong resistant against antibiotics selected in the study. Morphological, biochemical and physiological properties were analysed for all the isolates.

Index Terms- MDR pathogens, Hospital samples, Antibiotic Drug resistance.

I. INTRODUCTION

A multi-drug resistant organism (MDRO) is a bacteria that is resistant to many antibiotics. If bacteria are “resistant” to an antibiotic it means that certain drug treatments will not work. It is important to prevent the spread of an MDRO. Infections caused by MDROs can be more difficult to treat, since there are fewer antibiotics that work against them.

Antibiotic-resistant pathogens constitute an important and growing threat to the public health. More than 70% of the bacteria that cause hospital-acquired infections are resistant to at least one of the drugs most commonly used to treat these infections. In the past decade, there has been an increasing focus on the costs of medical care and it also has become clear that prolonged hospital stay and higher costs result from infections caused by antibiotic-resistant pathogens as compared with infections due to antibiotic-susceptible strains of the same species.

The World Health Organization (WHO) estimates that 32% of the world population is infected with *Mycobacterium tuberculosis*, the causative agent of tuberculosis, with 9.2 million new TB cases and 1.7 million deaths from TB reported in 2007. Drug resistance to isoniazid and rifampicin (the definition for multidrug-resistant (MDR) TB), the two most potent first-line antimicrobial drugs for the treatment of TB, is a persisting global problem with surveillance data indicating increasing trends in several countries. In 2007, the WHO reported the highest rates of MDR TB ever recorded, with up to 22% of new TB cases being

resistant to both isoniazid and rifampicin in some areas of the former Soviet Union.

Despite the existence of effective drug treatments, tuberculosis (TB) causes 2 million deaths annually worldwide. Effective treatment is complicated by multidrug-resistant TB (MDR TB) strains that respond only to second-line drugs. We projected the health benefits and cost effectiveness of using drug susceptibility testing and second-line drugs in a lower-middle income setting with high levels of MDR TB. Antimicrobial resistance is not new, but the number of resistant organisms, the geographic locations affected by drug resistance, and the breadth of resistance in single organisms are unprecedented and mounting. Diseases and disease agents that were once thought to be controlled by antibiotics are returning in new leagues resistant to these therapies^{1,2}. Drug-resistant strains initially appeared in hospitals, where most antibiotics were being used. Sulfonamide-resistant *Streptococcus pyogenes* emerged in military hospitals in the 1930s. Penicillin resistant *Staphylococcus aureus* confronted London civilian hospitals very soon after the introduction of penicillin in the 1940. Similarly, *Mycobacterium tuberculosis* with resistance to streptomycin emerged in the community soon after the discovery of this antibiotic^{3,4}. Resistance to multiple drugs was first detected among enteric bacteria-namely, *Escherichia coli*, *Shigella* and *Salmonella* in the late 1950s to early 1960s⁵. Such strains posed severe clinical problems and cost lives, particularly in developing countries⁶. Nevertheless, the resistance problem was perceived by some, most notably those in the industrialized world, as a curiosity of little health concern confined to gastrointestinal organisms in distant countries⁷⁻⁹. This attitude changed in the 1970s when *Haemophilus influenza* and *Neisseria gonorrhoeae*, organisms that cause respiratory and genitourinary disease, respectively, emerged with resistance to ampicillin and, in the case of *Haemophilus*, with resistance to chloramphenicol and tetracycline as well. Fuelled by increasing antimicrobial use, the frequency of resistance escalated in many different bacteria, especially in developing countries where antimicrobials were readily available without prescription. Poor sanitation conditions aided spread and small healthcare budgets prevented access to new effective but more expensive antibiotics. Individuals may succumb to MDR infections because all available drugs have failed, especially in the developing world. Notable global examples include hospital and community MDR strains of *Mycobacterium tuberculosis*, *Enterococcus faecium*,

Enterobacter cloacae, *Klebsiella pneumoniae*, *S. aureus*, *Acinetobacter baumannii* and *Pseudomonas aeruginosa* (World Health Organization website). In developing countries, MDR enteric disease agents such as *Salmonella Enteritidis*, *Shigella flexneri* and *Vibrio cholera* threaten and circumvent public health measures^{10, 11}. Overall, in the United States and the United Kingdom, 40-60% of nosocomial *S. aureus* strains are methicillin-resistant (MRSA) and usually MDR. More deaths are associated with MRSA than with methicillin-sensitive strains. A steadily increasing, small proportion of MRSA also now shows low-level resistance to Vancomycin (the Drug of choice), leading to treatment failure. For the increase cause of such infection in hospitals, at least two mechanisms have been documented¹². First, antimicrobial-resistant flora may be endemic within the institution and may be transferred to the patient within the hospital setting. Second, a small population of antimicrobial-resistant bacteria that are a part of patient's endogenous flora at the time of hospitalization may emerge under the selective pressure of antibiotics and become the dominant flora.

II. MATERIAL AND METHODS

The soil sample was taken from hospital wastages dumping site. Soil sample was chosen because of higher probability of finding bacterial stains of localized zone mainly obtained from dump hospital wastages which may include medicines, edibles, patient's dressings *etc*, so there might be probability of finding large amount of pathogenic bacteria. The soil sample was taken from Vivekanand Polyclinic and Ram Manohar Lohia hospital, Lucknow, Uttar Pradesh.

The samples were pre-incubated in two flasks-one containing 10.0% antibiotic supplemented with nutrient broth media and other containing only 10.0% antibiotic. Both flasks were incubated for one week at 37°C. After one week prepared inoculums were serially diluted and spread on NA plates and incubated overnight.

For further characterisation Glucose, maltose, dextrose and mannitol fermentation tests were performed on their respective broth followed by glucose oxidase, nitrate reductase, urease and MRVP tests.

To check their growth potential all the isolates were selected for antibiotic sensitivity tests. Antibiotic sensitivity test was performed by gel diffusion method by taking different concentrations of antibiotics. Antibiotics used were Ofloxacin, Ciprofloxacin, Tetracycline, Norflox, Amoxicillin, Ampicillin, Ceftriaxim, Mahacef, Roxithromycine, Odoxyl, Amoxyclave, Uricomycin, zone of inhibition was calculated for different concentrations¹³. Growth optimization tests were performed to check for the growth enhancement and growth inhibitory materials (other than antibiotics).

In test tubes containing distilled water 1% of yeast, beef extract, maltose, lemon juice, blood, peptone, blood, starch and grape juice were taken and optical density was measured after a week.

Then pH optimization tests was performed at 0.2% beef extract with the pH of 4.0, 5.0, 6.0, 7.0, 8.0, 9.0 and, 10.0 in separate test tubes. After this inoculated the culture in each test tube and incubated at 37 °C for overnight. To get the more defined pH values suitable for growth, growth of the microbe

was further recorded at different pH. We prepared 0.2% Beef extract media with the pH of 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, & 8.5 in separate test tubes.

Microbial growth kinetics analysis was performed in nutrient broth media by measuring the optical density. The effects of metals are both stimulatory and inhibitory on microorganisms. This test was performed to check the growth of microbes. 0.1% Cu⁺², Pb⁺², Mg⁺², Ca⁺² and Fe⁺² ions in each test tubes was added in 0.2% beef extract and optical density was measured.

Effect of different concentration of metal (Ca⁺²) ions on growth:

This test was performed for optimization of metal (Ca⁺²). We prepared 0.2% of Beef extract media in separate test tubes and added 0.01%, 0.02%, 0.05%, 0.1%, 0.2%, 0.5%, 1.0% in each test tube and inoculated culture MRSRA1102 MH then all test tube were incubated at 37 °C for overnight. The isolates were also grown on different growth elicitors for studying their growth optimization study conditions. 0.2% Beef extract media in separate test tubes Growth elicitors included 0.1% Maltose, Starch, Dextrose, Sucrose and Glycine.

Isolation of microbes:

When microbes are isolated by serial dilution, we observed more number of colonies when inoculum is supplemented with culture media & less number of colonies obtained when inoculum is supplemented with antibiotics only, but morphology almost similar *i.e.* circular, elevated, whitish yellow or whitish opaque, shown below in figure-1

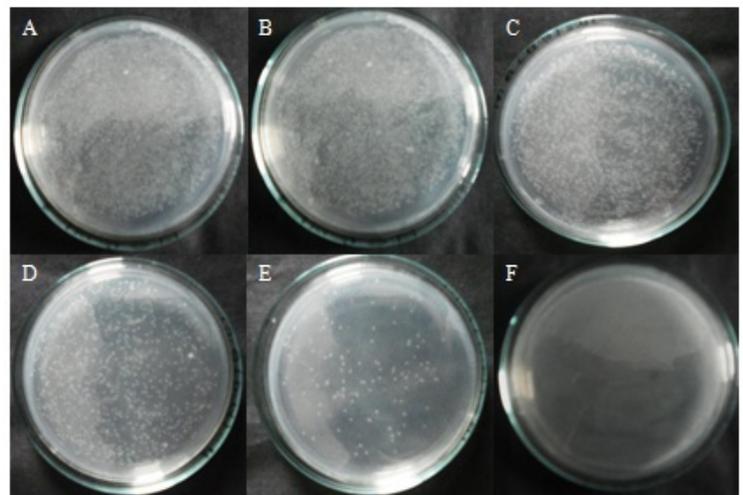


Figure 1: Isolation of microbes. A), B) & C) denoted growth of microbes in culture media supplemented antibiotic solution; D), E) & F) denoted growth of microbes in antibiotic solution only.

Selection of pathogens:

When subculture by streaking method, obtained three types of bacteria and labelled as MRSRA 1101 MH, MRSRA 1102 MH, MRSRA 1103 MH, shown in figure- 2 and were maintained throughout the study.

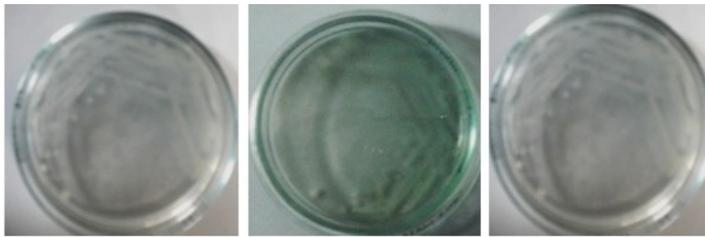


Fig. 2: Pure colonies MRSRA 1101 MH, 1102 MH, 1103 MH

Antibiotic sensitivity test against different antibiotics:

Screening of all the three isolates against various drugs were performed and among all culture, MRSRA1102 was sensitive against Ofloxacin, Ciprofloxacin and Tetracycline, showing the zone of inhibition 2.3, 2.8 and 1.3 cm. respectively (Data shown in Table-1 & figure-3), but this type of culture were resistant against all the antibiotics selected.

Table (1): Antibiotic sensitivity against various antibiotics.

Antibiotics(50µg/ml)	Zone of inhibition(cm)
Ofloxacin,	2.30
Ciprofloxacin,	2.80
Tetracycline	1.3
Norflox	0.0
Amoxycillin	0.0
Ampicilin	0.0
Cefitraxim	0.0
Rexi	0.0
Roxithromycine	0.0
Odoxyl	0.0
Amoxyclave	0.0
Uricomycin	0.0

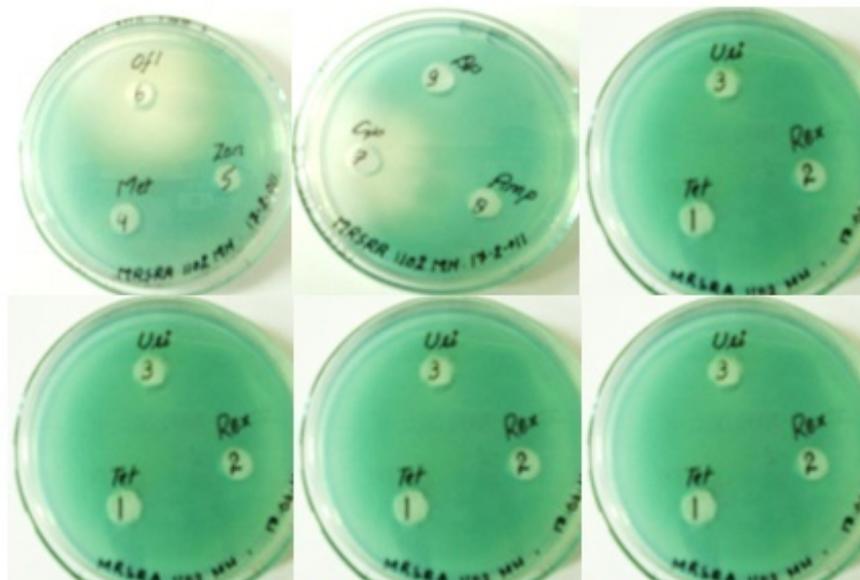


Figure 3: Antibiotic sensitivity against various antibiotics.

Antibiotic sensitivity test against different concentration of antibiotics:

When different concentrations of different antibiotics were screened against isolate MRSRA 1102 MH, growth was inhibited by three antibiotics while other nine antibiotics were unable to check the growth of the microorganism. Data shown below in table-2 & figure-4& 5

Table-(2): Antibiotic sensitivity of MRSRA1102 against various concentrations of antibiotics

Antibiotics	Concentration ($\mu\text{g/ml}$)/ Zone of inhibition (in cm.)						
	50	100	250	500	750	1000	1500
Amoxycilin	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ampicilin	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rexi	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ceftriaxime	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Amoxyclave	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ofloxacin	1.2	1.4	1.5	1.7	2.0	2.3	2.5
Tetracyclin	1.3	1.5	1.8	2.2	2.5	2.7	2.9
Ciprofloxacin	2.0	2.8	3.0	3.4	4.1	4.3	4.6
Norfloxx	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Odoxyl	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Roxithromycin	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Uricomycin	0.0	0.0	0.0	0.0	0.0	0.0	0.0

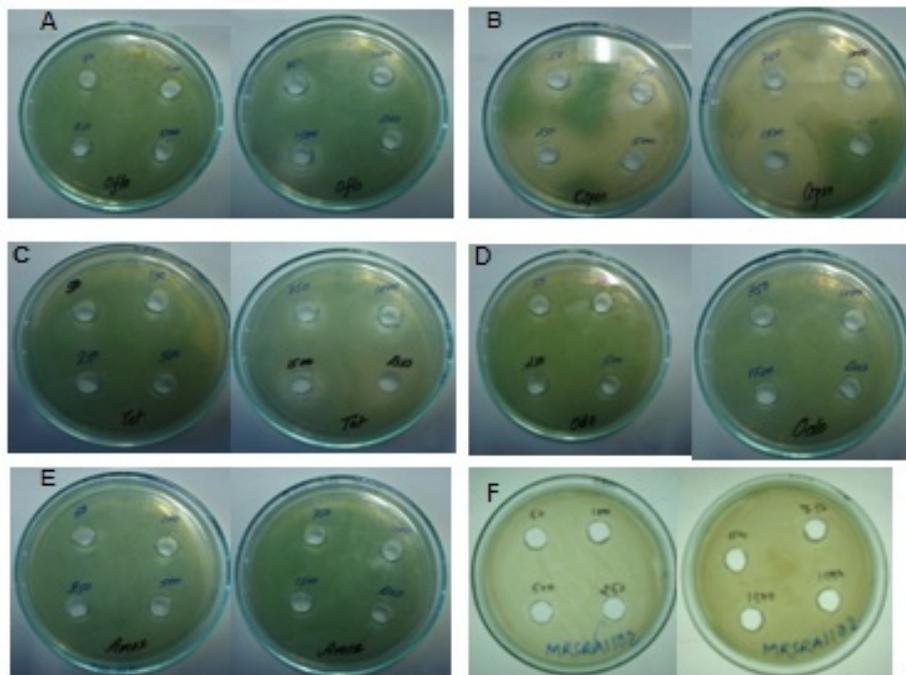


Figure 4: Effect of different antibiotics at various concentrations against isolate MRSRA 1102 MH. A) Ofloxacin, B) Ciproxacin, C) Tetracyclin, D) Metrozyl, E) Amoxyclave, F) Rexi

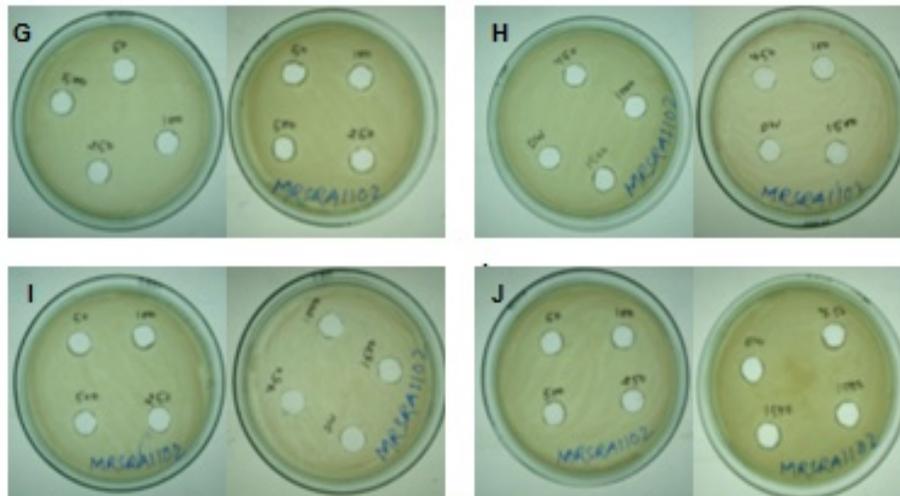


Figure 5: Effect of different antibiotics at various concentrations against isolate MRSRA 1102 MH G) Cefixime, H) Ampicillin, I) Odoxyl, J) Amoxycillin

Identification and Morphological Characterisation of Pathogens:

We observed colony morphology on the basis of margin, surface texture, elevation, optical feature & pigmentation showing shown below in table-3.

Table-(3): Identification and Characterisation of Pathogens.

Colony morphology	MRSRA1101	MRSRA1102	MRSRA1103
Margin	Entire	Entire	Entire
Surface texture	Smooth	Smooth	Rough
Elevation	Elevated	Elevated	Elevated
Optical feature	Slightly convex	Slightly convex	Convex
Pigmentation	Dim light	Greenish	Dim light

Biochemical Tests:

Gram’s staining:

After Gram’s staining, observed under microscope that MRSRA1102 MH appear purple are referred to as gram positive, *coccus* (on the basis of shape).

Table-(4): Biochemical tests of MRSRA1102

Biochemical test	Result
Catalase test	+
Glucose fermentation test	+
Sucrose fermentation test	+
Lactose fermentation test	+
Mannitol fermentation test	-
Endospore staining	-
Gram’s staining	+

Study of growth kinetics:

Optical density (O.D) of broth culture of isolate was recorded at the difference of 1hr incubation time and data has been shown in table-5 & figure-6. We plotted a graph between time & O.D, obtained sigmoidal growth curve, showing the four typical phases of growth i.e. A) Lag phage, B) Exponential phase, C) Stationary phase & D) Death phase.

Table-(5): optical density of broth culture of MRSRA1102 MH.

Culture Incubation time(hr)	Optical density at 600nm
1	0.001
2	0.002
3	0.003
4	0.021
5	0.115
6	0.421
7	0.912
8	1.241
9	1.134
10	1.115
11	1.110

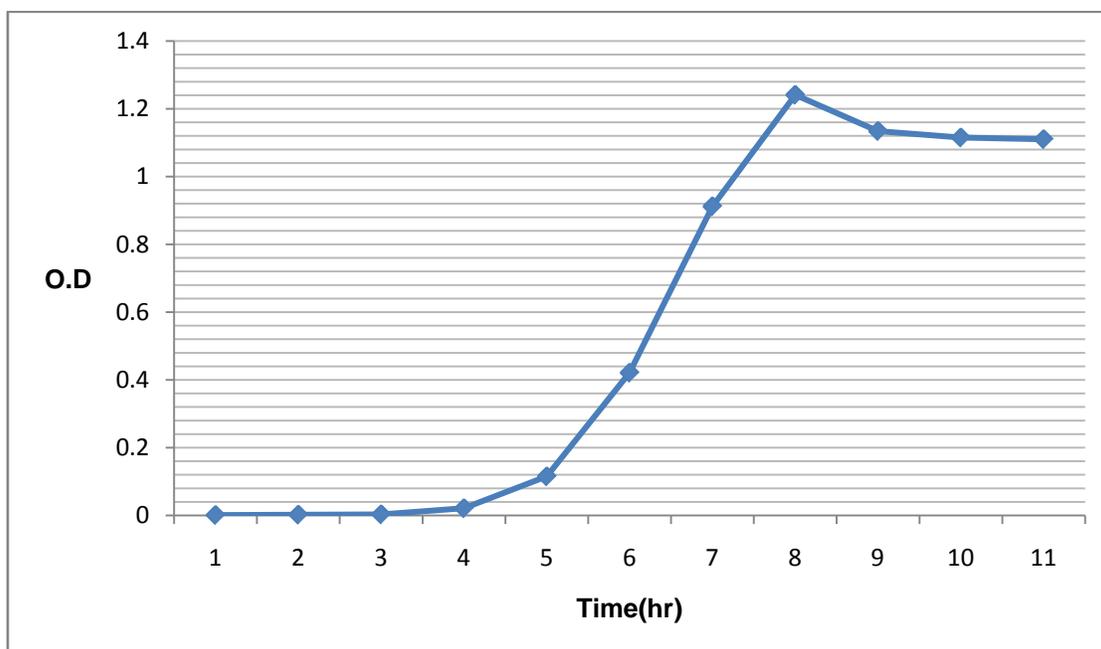


Figure 6: Growth curve of MRSRA1102 MH between O.D & time.

Effect of different media components on growth:

We evaluated nutritional requirement for MRSRA1102 MH & observed that maximum growth occurred in yeast extract but maximum pigmentation occurred in Beef extract media shown in table-6.

Table-(6): Evaluation of nutritional requirement:

Media components (1%)	Growth	Pigment
Starch	+	+
Yeast extract	++++	++
Beef extract	+++	++++
Trypton	++	+

Maltose	--	--
Grape juice	--	--
Blood	--	--

Effect at different concentration of media component on growth:

We evaluated media optimisation at different concentration, observed that maximum growth occurred at 2%, of yeast extract while in beef extract maximum growth occurred at 5%, but maximum pigmentation occurred at 0.2% of yeast extract & 0.1% of beef extract media shown in table-7 & figure-7.

Table-(7): Effect at different concentration of media component:

% of media component	O.D. at 600 nm.		pigment	
	Yeast extract	Beef extract	Yeast extract	Beef extract
0.1	0.545	0.268	++	+++
0.2	0.976	0.442	++++	++
0.5	1.141	0.508	++	--
1.0	1.326	0.821	+	--
2.0	1.516	1.165	--	--
5.0	1.378	1.846	--	--
10.0	0.590	1.578	--	--

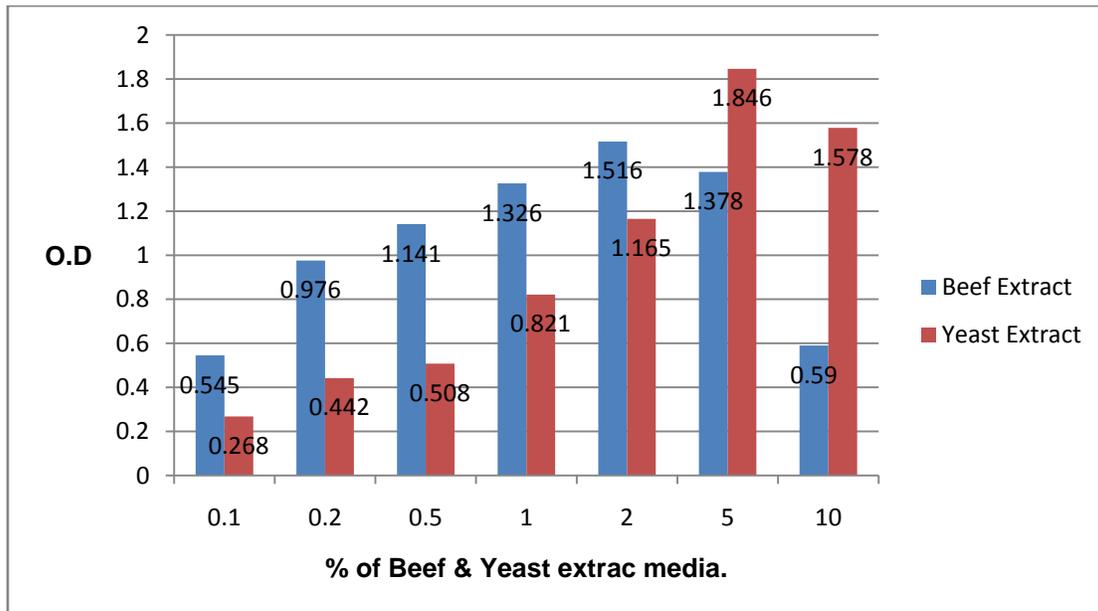


Figure 7: Growth pattern of MRSRA1102 MH between O.D & different % of Beef & extract media

Effect of pH on growth:

We recorded the effect of pH on growth of microbes & observed that maximum growth occurred at pH 8(O.D=0.393) Shown in table-8 & figure-8.

Table-(8): Growth of MRSRA1102 at different PH.

PH of media(0.2% Beef extract)	O.D at 600 nm
4.0	0.150
5.0	0.172
6.0	0.310
7.0	0.359
8.0	0.393
9.0	0.295
10.0	0.125

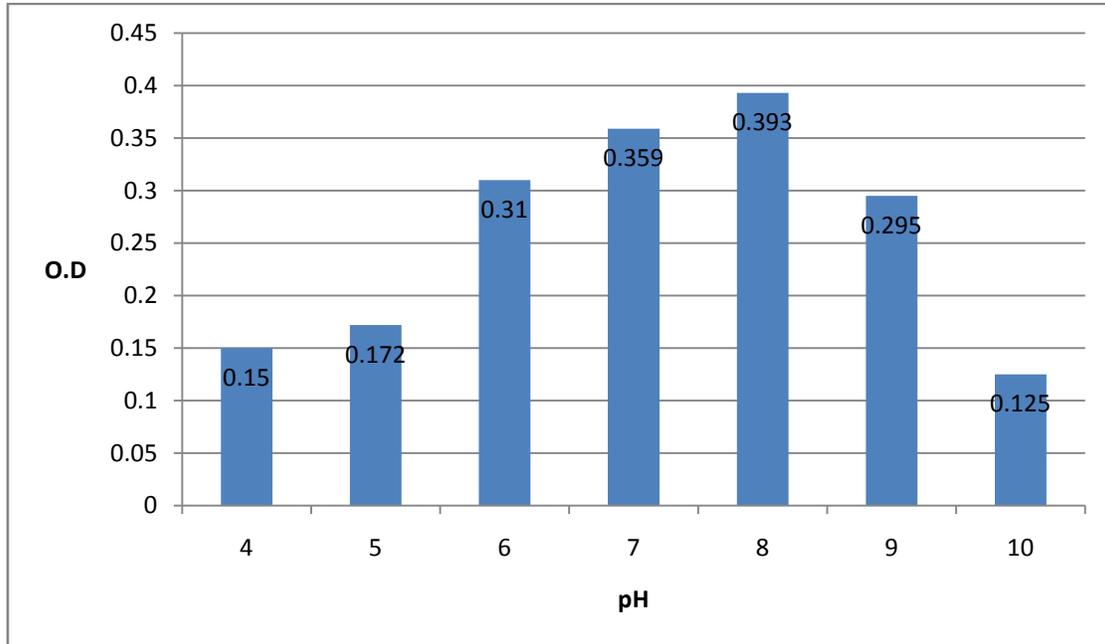


Figure. 8: Growth pattern of MRSRA1102 MH between O.D & pH.

To get the more defined pH value, suitable for growth, growth of the microbe was further recorded at different pH, maximum optical density was observed at pH 7.5, shown below in table-9 & figure-9.

Table-(9): Optical density at different pH.

PH of media(0.2% Beef extract)	O.D at 600 nm.
5.5	0.125
6.0	0.350
6.5	0.362
7.0	0.369
7.5	0.373
8.0	0.329
8.5	0.191

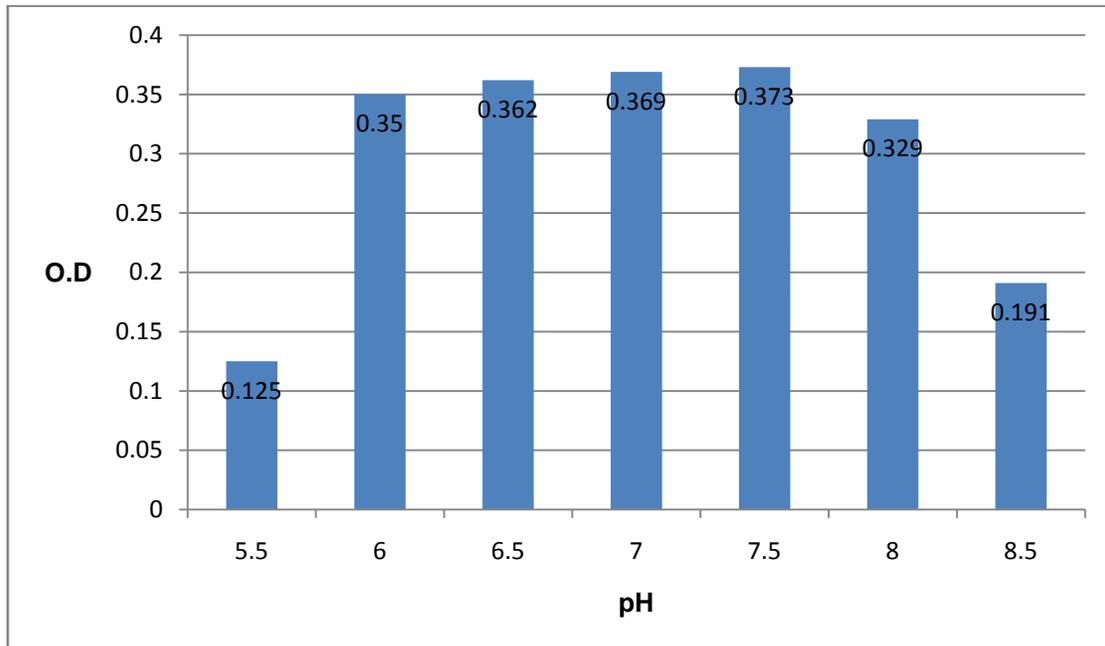


Figure. 9: Growth pattern of MRSRA1102 MH between O.D & pH

Effect of metal ions on growth:

In presence of different metal ions, maximum growth occurred in iron & no growth occurred in copper but maximum pigmentation occurred in calcium ions shown in table-10.

Table-(10): Effect of metal ions:

Metal ions(0.1%)	Growth	Pigment
Cu ⁺²	=	+
Pb ⁺²	+	=
Mg ⁺²	++	++
Ca ⁺²	+++	+++
Fe ⁺²	++++	=
Zn ⁺²	+	=

Effect at different concentrations of metal (Ca⁺²) ions on growth:

The effect of calcium ions at different concentration, we observed maximum pigmentation occurred at 0.02% as shown below in table-11.

Table-(11): Change in pigment at different concentration of Ca⁺².

Concentration of Ca ⁺² (%)	Pigment
0.01	++
0.02	++++
0.05	+++
0.1	+++
0.2	++
0.5	++
1.0	+

Effect of elicitors on growth:

The Effect of elicitors on growth of MRSRA1101 was observed that maximum growth occurred in starch & least growth occurred in Glycine, as shown below in table-12.

Table-(12): Effect of elicitors on growth of MRSRA1102.

Elicitors	Growth
Maltose	++
Starch	++++
Dextrose	++
Sucrose	++
Glycine	-

Designing new minimal media for organism:

After one week of incubation in minimal culture media, we observed sufficient growth of MRSRA1102 MH; this broth culture was taken for further proceeds to extraction & purification of intracellular & extracellular bioactive compounds

Extraction and purification of intracellular & extracellular bioactive compound:

We obtained bioactive compound that maintain their growth and susceptibility in the changing environmental conditions. some secrete antibiotics, some secrete growth signals and some mineral degrading enzyme in order to opt for proper nutrition and growth.

Effect of extracellular bioactive compound against various pathogens:

Screening of extracellular bioactive was sensitive against various pathogens & zone of inhibition shown below in table-13 & figure-10.

Table-(13): Effect of extracellular bioactive compound against various pathogens:

Test of organisms.	Zone of inhibition(cm)
<i>E. coli</i>	0.8
<i>Pseudomonas aeruginosa</i>	1.0
<i>Staphylococcus aureus</i>	1.6



Figure. 10: Effect of extracellular bioactive compound against various pathogens .

Effect of Intracellular bioactive compound against various pathogens:

Screening of extracellular bioactive was sensitive against various pathogens & zone of inhibition shown below in table-14 & figure-11.

Table-(14): Effect of Intracellular bioactive compound against various pathogens.

Test of organisms	Zone of inhibition (cm)
<i>E. coli</i>	1.6
<i>Pseudomonas aeruginosa</i>	1.4
<i>Staphylococcus aureus</i>	1.6



Figure. 11: Effect of Intracellular bioactive compound against various pathogens

III. RESULTS AND DISCUSSIONS

While pre-treatment of soil sample data shows an increase number of colonies for every dilution recorded, when solution was supplemented with nutrient broth, while less number of colonies in antibiotic solution. The shape of colonies, texture, colour was found uniform for both the solution. The three isolates purified are having different characteristics respect of rate of growth, pigmentation & fluorescence respectively.

MRSRA1102 MH was resistant among all the antibiotics screened except Ofloxacin, Ciprofloxacin & Tetracycline respectively at every concentration from 50 to 1500µg/ml, thus having a strong property of multidrug resistant.

Morphological & Biochemical test performed to identify the microbes, the isolates possess varying properties (Table-3,4,5). When growth kinetics was performed, a sharp increase in growth was recorded after 5 hrs inoculation & stabilised in next three hrs. Among several media components tried, yeast extract was best for growth while pigmentation was maximum in beef extract (Table-6). Yeast extract proved direct relation for growth & pigmentation at lower concentration while vice versa in beef extract at same concentration (Table-8).

The growth of microorganism was optimum at pH 7.5, 0.02% calcium ions & 1% starch (Table-9,11&12). All the three isolates possess very high level of drug resistivity (upto 1500µg/ml) against various drug (12 drugs). MRSRA 1102 MH having too much inhibitory property for different bacteria (*E. coli*, *S. aureus*, *P. aeruginosa*) and fungi (*A. niger*, *Microsporum*, *C. albicans*, *T. rubrum*) (Table-13,14). MRSRA 1102MH have the capability to produce bluish greenish pigmentation

Characterization of all isolates gave surprising results showing the emergence of *Nisseria* and *Alkaligenes* spp. as MDR pathogens which are generally not. The cause of increasing resistance among the bacteria might be due to development of MDR efflux pump against that drug due to its prolonged exposure at contaminated hospital dumping sites, due to mixing of both MDR and non MDR strains of pathogens at hospital waste disposal site resulting in genetic recombination of plasmids between two bacteria thriving at same place one of which might be MDR or induction of multi drug resistance by proteins secreted by MDR bacteria¹⁴⁻¹⁷. Antibiotic such as Ciprofloxacin, Ofloxacin belonging to Quinolone family are considered to be best medicines in case of MDR infections and have broad spectrum effects¹⁸⁻¹⁹. As per the working mechanism it was observed that drug directly dealing with DNA replication *i.e.* DNA Gyrase inhibition by ciprofloxacin are more potent and

effective and are less prone to development of resistance by bacteria unless there is development of MDR efflux pump to that drug unlike inhibition of protein synthesis as done by tetracycline or cell membrane disruption by penicillin family of drugs²⁰⁻²¹. Protein source supplement like beef extract, yeast extract are the best source required for bacterial growth and proliferation, even they can support growth without any other additional nutrient supplement required. Bacteria usually produce its secondary metabolite in stress conditions in order to survive²²⁻²³. Carbohydrate, amino acids, multivitamin capsules *etc* and metal ions acts as growth elicitors in case of many bacterial strains. The place of emergence of new and pathogenic strains of MDR bacteria can be hospital itself if not taken care of hospital dumped wastages.

IV. CONCLUSION

Hospitals including patient ward, operation theatre and ICU are a potent platform for spreading of pathogens among individuals either healthy or unhealthy persons also there is a maximum exposure of pathogens against various drugs. The bacterial isolates purified from those hospital samples showed more resistance against drugs in comparison to microbes isolated from normal soil samples. Also, bacteria group such as *Nisseria* and *Alkaligenes* spp. were found to exhibit drug resistance isolated from hospital samples redirects the attention of being drug resistant gradually and more vulnerable and pathogenic while growing along with drug resistant microbes, opening a fresh debate of possibility of horizontal transmission of drug resistant characters among organisms. The detailed study of horizontal inheritance of transfer of gene responsible for drug resistance will help us to find a right way in the direction of preventing any microbe not to become drug resistant against any drug.

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Succession Planning and Survival of Small Scale Businesses in Benue State

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Abstract- It is an established fact that small businesses are adjudged critical to the development of any nation's economy. They remain excellent sources of wealth creation, poverty reduction and development of indigenous entrepreneurs. Unfortunately, small scale businesses in Nigeria, particularly in Makurdi metropolis have high rate of collapse. In recognition of the increasing failure of small businesses in Nigeria, the study sets to examine the influence of succession planning on survival of Small Scale Businesses in Makurdi metropolis. Descriptive survey design was adopted in the study with a sample size of 120 persons drawn from the population of 560 small business owners. A structured questionnaire was used for data collection. Data collected were analyzed using mean and standard deviation and hypothesis was tested using Analysis of Variance. The study revealed that manpower training influences longevity of small scale businesses and there was no significant difference in the mean responses of male and female entrepreneurs on influence of manpower training on the longevity of small scale businesses in Makurdi metropolis. The implication is that business owners should have a succession plan in place to ensure continuity and sustainability. On the strength of the above, it was recommended among others that owners of companies should propose successors for their business in good time so as to allow enough time for training that could see their business survive through several generations.

Index Terms- Succession Planning, Small Scale Business, Business Survival, Manpower Training

I. INTRODUCTION

One of the major problems confronting small scale businesses in Nigeria has been the transfer of ownership and management to the next generation. It is widely accepted that the possession of a succession plan is crucial for the success and by extension the longevity of a business (Fahed-Sreih&Djoundourian, 2008). Rothwell (2007) explained that succession planning is a deliberate and systematic effort by an organization to ensure leadership continuity in key positions, retain and develop intellectual and knowledge capital for the future, and encourage individual advancement.

In essence, succession planning is a proactive attempt to ensure smooth transition of business from owner to a successor through effective manpower training. It involves formulating a forward looking plan to ensure the necessary human effort to make it possible for the survival and growth of the organization. Thus Basil (2005) maintained that lack of proper succession planning can have the direct effect of causing the collapse of

these businesses especially when owners leave the business upon retirement or by death. As Seymour (2008) puts it, the future performance of any company is reliant on the thoroughness and vigour of today's succession planning.

Ayyagari et al (2007) opined that the small scale enterprises that continue to succeed despite the departure of strategic leaders are those that prepare in advance. They have key players in place and they have implemented well-defined, comprehensive development programs, formal management training programs, and succession plans. Developing a comprehensive, long-term succession plan is a critical element for survival of the small scale enterprises. Having the best people in pivotal leadership roles, prepared to step in at any time, is essential for future success.

Unfortunately, many business owners have founded and built their businesses without giving much thought to what will happen when it is time to retire or when they are incapacitated. They fail in the long run because they allow themselves to be destroyed slower by the inaction of their owners. Study carried out by Grote (2003), revealed that about 30% of businesses fail due to matters related to succession planning and about 50% of small scale businesses do not have adequate succession plans in place, hence, small businesses are exposed to significant risk in sustainability due to insufficient succession planning.

For a developing economy like Nigeria, planning for the survival of enterprises is of paramount importance since they contribute greatly to the economic development of the nation. Considering the proven economic and social benefits of small scale businesses to our country, Aremu (2004) suggests that every organization should see survival as an absolute prerequisite for its serving any interest whatsoever. Thus Gorgievski et al (2011) define longevity as having to continue in business for an indefinite period. Longevity is related to the survival and continuity of an enterprise and is one of the measures of firm success other than profit, growth, innovation, social and environmental performance. William and Jones (2009) describe business longevity as the duration (age) of the business, that is, time elapsed since the firm started operation. According to Lubinski et al (2011) longevity can be interpreted as a measure of success and can be used synonymously with business survival. Business longevity is a measure of organization's ability to sustain its continuity. Business longevity is associated with a firm's life cycle. For a business to be in existence for a long time, it must have passed through the initial stages of the firm's life cycle. The longer a business can survive and prevent involuntary exit, the more successful the business is.

Furthermore, a fundamental factor influencing succession planning is the role of human resource development, which includes organisational development, career development and

training of potential successors. Givannoni et al (2011) explained that strategy and transfer of vision of small scale business to the successor is central to effective succession planning. Developing the successor in the planning of the strategy of the business has the potential to improve tacit knowledge and skill of the business thereby further enhancing the realisation of succession. Generally, the major purpose of manpower training is to ensure that the right person is available for the right job at the right time. This involves formulating a forward looking plan that ensures the necessary human effort that makes it possible for the survival and growth of the organization. It becomes imperative to develop the successor for smooth transition to next generation.

David and Terence (2003) identified the need for manpower planning to include:

- It helps to identify the available talents in a concern and accordingly training programmes can be organized to develop them.
- It helps in growth and diversification of business. Through manpower planning, human resources can be readily available and they can be utilized in best manner.
- It helps the organization to realize the importance of manpower management which ultimately helps in the stability of a concern.
- It provides smooth working even after expansion of the organization.
-

II. SUCCESSION PLANNING AND SURVIVAL OF SMALL SCALE BUSINESSES

Succession planning in small scale business is associated with the transfer of ownership and management to the next generation. This has been found to contribute to firm growth, survival and to organizational success in general (Kellermanns&Eddleston, 2006). Ellis and Ibrahim (2006) noted that succession planning is important to an effective succession of small businesses. The practice of succession planning includes the quality of the successor, the gradual transfer of power and leadership to the next generation as well as the participation of family and non-family members in the succession process are critical to an effective succession process and to the continuity and survival of the small scale businesses from generation to generation (Ellis & Ibrahim, 2006).

However, (Kellermanns&Eddleston (2006) cited lack of succession planning as a major cause of the high mortality rate in small scale businesses and noted that succession planning does not take place in most small scale businesses. It is against this background that this study was conducted to determine the influence of manpower training on longevity of small scale businesses in Makurdi Metropolis.

III. OBJECTIVE OF THE STUDY

The main objective of this study is to determine the influence of succession planning on survival of small scale businesses in Makurdi metropolis. The specific objective is to determine the influence of manpower training on longevity of small scale businesses in Makurdi metropolis.

IV. RESEARCH QUESTION

What is the influence of manpower training on longevity of small scale businesses in MakurdiMetropolis?

V. HYPOTHESIS

There is no significant difference in the mean responses of male and female entrepreneurs on influence of manpower training on longevity of small scale businesses in Makurdi metropolis.

VI. METHODOLOGY

In the methodology, the study adopted survey design and the study was carried out in MakurdiMetropolis of Benue State Nigeria. Simple random technique was used for selecting sample of 120 business owners registered with Corporate Affairs Commission from a target population of 560. A structured validated 10-item questionnaire developed by the researcher called: Manpower Training of Successors Ensures Survival of Small Scale Business (MTSESSSB) questionnaire was used for data collection. The validated instrument was tested for reliability using Cronbach Coefficient alpha method which yielded a reliability index of 0.71. The MTSESSSB is a five-point Likert type questionnaire consisting of 10 items with Strongly Agreed (SA) rated 5, Agreed (A) rated 4, Undecided (UD) rated 3, Disagreed (D) rated 2 and Strongly Disagreed (SD) rated 1. This rating stands for positive statements while for negative statements the rating is reversed as 1, 2, 3, 4 and 5 for Strongly Agreed, Agreed, Undecided, Disagreed and Strongly Disagreed respectively. The respondents were asked to tick the options that apply to them (✓) and any mean weight above 3.0 is agreement while mean weight of 3.0 and above is disagreement.

VII. RESULTS

The research question was answered using mean and standard deviation while the hypothesis was tested at 0.05 level of significant using analysis of variance.

Research Question

What is the influence of manpower training on longevity of small scale businesses in Makurdi metropolis?

The result of the data analysis to answer this research question is presented in Table 1

Table 1 Mean Scores of Male and Female Entrepreneurs on Manpower Training of Successors Ensuring Survival of Small Scale Business

S/N	Items	MenStd.	Female Std.	Mean	Dev.	Decision
1	Formal education broadens the successors' skills and knowledge for effective control of business	3.85	.7308	3.63	.62788	Agreed
2	Entrepreneurial mentoring improves successors' innovation/creativity for survival of business	3.70	.71863	.55	.63851	Agreed
3	Training and developing ensures smooth transition and survival of small business	3.75	.70263	.60	.63246	Agreed
4.	On the job training increases the intellectual ability of successor for sustainable performance	3.75	.62643	.73	.59861	Agreed
5.	Small businesses thrive when successors are trained on effective resource management	3.70	.71863	.62	.66747	Agreed
6.	Involvement of would-be successors in decision making does not enhance their ability for positive results	4.00	.77943	.82	.74722	Agreed
7.	Acquisition of technical skills enhances successors' operational ability to manage small business	3.75	.77133	.65	.69982	Agreed
8.	Workshops and business conferences do not equip successors for challenging tasks	3.95	.59323	.82	.63599	Agreed
9.	Business owners must be educated to take proactive steps to plan for the future leadership needs of their business	3.75	.77133	.78	.76753	Agreed
10.	A well-developed successor is proactive and plans ahead for sustainable results	3.95	.59323	.85	.62224	Agreed
Cluster Mean				3.823	.71	

Source: Statistical Package for the Social Sciences (SPSS)

Results in table 1 showed that all the items have mean rating greater than the criterion mean of 3.0 indicating that manpower training ensures survival of small scale business in Makurdi metropolis.

To ascertain if the difference in mean response was significant, hypothesis was tested at 0.05 level of significance.

Testing of Hypothesis

There is no significant difference in the mean scores of male and female entrepreneurs on influence of manpower training on the longevity of small scale businesses in MakurdiMetropolis.

Table 2: ANOVA Test on Influence of Manpower Training on the Longevity of Small Scale Businesses

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.323	1	.323	2.775	.098
Within Groups	13.721	118	.116		
Total	14.044	119			

Source: Statistical Package for the Social Sciences (SPSS)

Table 2 shows that calculated F value 2.775 was not significant at 1 and 118 degrees of freedom. Since P value (0.098) as provided in SPSS output, is greater than alpha value of 0.05 (P=0.098 > 0.05), the result is not statistically significant. The null hypothesis was therefore not rejected. This implies that there is no significant difference in the mean responses of male and female entrepreneurs on influence of manpower training on the longevity of small scale businesses in Makurdi metropolis.

VIII. DISCUSSION OF FINDINGS

The research work focused on Succession Planning and Survival of Small Scale Businesses in Benue State with the aim of finding out influence of manpower training of successors on longevity of small scale businesses.

From the analysis of data collected in the course of the study, the following findings were made:

The study revealed that succession planning with regard to manpower training of successors ensures the longevity of small scale businesses. In other words, if prospective successors are properly trained, small businesses will transit beyond the generation of first entrepreneurs.

This finding is consistent with the view of Seymour (2008) who states that company that does not have a formal succession plan can invite detrimental effects to the business, if the necessary skills are not nurtured and developed.

The result of hypothesis tested showed that there was no significant difference in the perception of male and female entrepreneurs as evidenced by analysis of variance result.

All the respondents agreed that manpower training of successors ensures survival of small scales businesses. The finding here agreed with the view of Rothwell (2007) that deliberate and systematic efforts should be made by organizations to develop intellectual and knowledge capital to ensure continuity beyond the first generation of the owners.

IX. CONCLUSION

The study concludes that manpower training of successors influences the survival and growth of small scale businesses. When prospective successors are properly trained, small businesses will survive after retirement or death of first generation entrepreneurs. Since all human beings are mortal, it is imperative for any organization's long term stability, growth and survival, to always look beyond the incumbent leader and develop strategies and policies that will create conditions for smooth succession.

X. RECOMMENDATIONS

Based on the findings of this research work, the following recommendations are given:

1. The study recommends that since training and development affect the survival of small scale business after retirement or death of first generation entrepreneur, the owners of the companies should propose successors for their business in good time so as to allow enough time for training that could see their business survive through several generations.

2. There should be a government policy on frequent training for businessmen in such areas as financial management, strategic management and human resource management that are paramount in the survival of any business.

3. Since capability of successor affects the survival of small scale business after retirement/death of first generation entrepreneur, formal education should be emphasized that would broaden the successor's level of knowledge and skills. The successors should also be allowed to run the businesses some times to enable them acquire the required skills hands on.

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The Role of Organizational Communication on Employee Job Satisfaction in Telecommunication Industry in Kenya

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Abstract- This study seeks to appraise the role of organizational communication on employee job satisfaction in telecommunication industry in Kenya in a bid to improve its effectiveness and applicability in the industry. It aims to achieve this by (1) Examining the role of organizational flow of information on employee job satisfaction (2) evaluating the role of communication climate on employee job satisfaction (3) Assessing the role of nature of information on employee job satisfaction and (4) Evaluating the role of information load on employee job satisfaction in telecommunication industry in Kenya. In view of the background and literature review, it was found that, organizational communication plays a vital role in ensuring employee job satisfaction. Also, the attributes of organizational flow of information, communication climate, nature of information being shared with employees, and information load, all work together for the benefit of employees' productivity and satisfaction at work. The study concluded that, the interplay and harmony of these aspects ensure effective organizational communication that leads to job satisfaction. Therefore, there is need to ensure that proper communication strategies are employed in all organizations.

Index Terms- Organizational communication, employees, Job satisfaction.

I. INTRODUCTION

The current business world, Organizations' existence fully depends on effective communication. Employees communicate to each other and to the potential clients in order to build and develop services. They also communicate to the world at large to sell out their products and services. According to Goldhaber (2007), communication is the lifeblood of the organization; the glue that binds the organization; the oil that smoothens the organization's function; the thread that ties the system together and a binding agent that cements all relations. This statement clearly shows the magnitude played by organizational communication in the organizations today.

Scholars have shown that effective communication is vital to employee job satisfaction. According to Abugre (2011), Organizational communication takes on language that formulates various kinds of social structures that bring up teams and networks which ensure employees are committed and are satisfied with their jobs. Organizational communication ensures

that all employees are familiar with what is expected of them, through relevant and timely information disseminated. In turn, employees could seek clarifications where need be hence great satisfaction is achieved (De Ridder, Lixin 2014).

There is need to mend retention rates and decrease the associated costs of high turnover (Odemba, 2011). Voluntary turnover is a huge problem for many organizations (Mitchell et al., 2001). Communication between top management and supervisors plays a key role in ensuring that the precise employees are hired and retained in an organization. It also sustains productivity by keeping the workforce continually motivated. All these can only be possible if an organization maintains an efficient communication channel. This study seeks to investigate the role organizational communication plays in ensuring employee job satisfaction.

Telecommunication industry in Kenya

The telecoms industry in Kenya is one of the most vibrant industries in the country. One of the organizations under this industry – Safaricom limited has been rated as the best tax paying organization in Kenya for five years consecutively (Daily Nation, Tuesday, October 21, 2014). However, just like many other industries in the world, the industry has had to go through intense changes. In the past decade, technological development and regulatory reforms have seen the industry transform a great deal. Markets that were previously distinct and isolated, almost unique and monopolised have merged across their old boundaries with a huge investment of capital emanating from private sector practitioners. The end product of all this is an up surge of new markets, new players and new challenges which cuts across board. The biggest challenge has been the restructuring of staff which has caused a lot of job dissatisfaction and job insecurity (Odemba, 2011). To alleviate such challenges, it is essential to address employee engagement and their job satisfaction rates through organizational communication.

Therefore, it's quite evident from these studies and advisable that management should strive to communicate even though the responses to some questions may be unknown. The internal communications department should create and emphasize on two-way communication and feedback machineries always (Deloitte, 2007). Leaders require the feedback to quantify how well the organization is doing. This study is out to establish the attributes mentioned about organizational communication and how they affect job satisfaction in telecommunication industry in Kenya.

1.1 Statement of the Problem

An organization's most important employees are normally the most likely persons to look elsewhere for other opportunities. Talent will always be in high demand, and many talent groups will be attracted by the prospect of short periods of employment with a large number of employers (Armstrong 2006). Telecommunication industry in Kenya has been a victim of this. Since the mobile telecommunication industry is unique and having been introduced in Kenya less than two decades ago, it has a low supply of experts in that field creating competition among the four organizations that exist in this industry (IJARAI 2015). This has resulted to huge losses in terms of high turnover of staff such as telecom engineers, expert customer service, financial managers and technical officers who are persistently enticed by lucrative pay packages from rival organizations. Additionally, the growing number of changes in the industry including mergers and acquisitions (Telkom Kenya 2007, Airtel Kenya 2010, Essar communications 2012) have left employees feeling disconnected (Mukanzi 2011, Ochieno 2013). Success in the telecommunication industry squarely depends on human capital. This is because their products and services are identical hence competition to retain staff would be the only defining feature (Almansour 2012). It is against this background that this study seeks to investigate the various roles that organizational communication plays to ensure job satisfaction among employees in the telecommunication industry of Kenya. Therefore, the need of this study is to find out the role of organizational communication on employee job satisfaction in telecommunication industry in Kenya. How does organizational communication improve employees' job satisfaction hence maintain high levels of employee retention in Telecommunication industry in Kenya.

1.2 Objectives

The Study had five objectives;

- 1) To assess the role of organizational flow of information on employee job satisfaction
- 2) To examine the role of organizational communication climate on employee job satisfaction
- 3) To investigate the role of nature of organizational communication on employee job satisfaction
- 4) To evaluate the role of organizational communication load on employee job satisfaction
- 5) To investigate the role of demographic factors on employee job satisfaction

II. THEORETICAL BACKGROUND (LITERATURE REVIEW)

2.1 Organizational flow of information

One of the most important role of organizational communication is to generate a scenario where employees believe on the goals and strategies used by the executive management. Vertical communication happens among or between people who are on diverse levels of authority in the organisation. It happens between hierarchically placed persons and comprises both downward and upward, diagonal and horizontal communication flows. The communication atmosphere in any organisation commonly remains controlled by

downward communication flow. Moorcroft (2003) carried out a study from three telecommunication companies in Jordan, whose results indicated that, it does not matter how brilliant the business strategy sounds, what matters is if it reaches and wins employees' support so as to achieve its optimum effectiveness. Employees need a fundamental story that reliably links strategy into context of the mission and vision of the organization (Sanchez 2004). This helps them to feel as part of the organization. Their feedback to management on how the organization is performing also makes them feel respected and that they are contributing towards the success of the organization. Various studies have indicated that flow of information from top management downwards and the extent to which employees are informed have a direct link to employee job satisfaction (Abugre 2010, Goldhaber, 2008, Goris & Petit 2002). Therefore, vertical flow of information which entails top-down & down- top communication, horizontal and diagonal communication have their own distinct advantages when it comes to employee job satisfaction.

2.1.1 Downward communication

Downward communication happens when information flows down through an organization's official chain of command. Information starts at the higher levels of the organizational hierarchy then moves down toward the bottom levels. Any information in response to the messages move up the same path (Hannegan, 2004)). A study conducted by Candace (2004) on employees of large, diverse organizations in the United States indicate that the most crucial source of communication is direct from the head of the organization. Employees are always doubtful of trickle-down information. When they hear straight from top management, mainly the CEO, this gives them the sense that what they are receiving is true and hence makes them feel important. Communication coming directly from the top is quite important in that, if the reasons of the insufficiencies at workplace are clarified well through downward communication, then employees may read just their expectations hence perceive their working conditions as satisfactory (Bulutlar 2008, Giri & Kumar 2007, Abugre 2010). On the same breath, when the CEO mingles with the employees and feedback is given to him directly, this makes employees more satisfied.

2.1.2 Upward Communication

Upward communication is usually used by employees for providing feedback and asking questions. Other than that, it's also a perfect way of making suggestions. All these avenues when left open, more often than not, improves employee attitude towards their work and morale (Goldhaber, 2008, Bulutlar 2008). Upward communication could also entail reports, complaints, grievances and even rumours which flow from subordinate to superior management. Giri and Kumar (2009) indicate that, such communication flow inspire employees to take part in forming policies for the organization and eventually facilitates the acceptance of the same. This affords management a means to receive information concerning the organization from the lowest level. With time, job satisfaction increases. Upward communication may also concern problems and exclusions to repetitive work in order to create an awareness of difficulties being encountered at the place of work to the leaders. It mainly

entails recommendations for improving task-related processes, periodic reports concerning departments and individual performance and various kinds of Complaints (Verma et al 2013).

2.1.3 Horizontal communication

Horizontal communication flow mainly happens in order to enhance coordination. This horizontal channel allows a diagonal or lateral flow of messages, empowering departments to work with other departments without having to strictly follow the up and down channels. These communication styles are also informational, but in a dissimilar way from upward and downward communication. Here, information is essentially for coordination — to draw together activities across or within units. This could happen as intradepartmental or interdepartmental as various times, task achievement remains related to matters connected to other departments. This style of communication works best in decentralised power (Larkin and Larkin 2004). It is believed that when such horizontal communication happens frequently, job satisfaction also increases. Miller (2007) through a survey discovered that decentralization of some strategic decision making causes more interaction amongst employees yielding greater job satisfaction.

2.2 Communication Climate in the Organization

Communication climate is of supreme significance in an organization as it contributes to the success and effectiveness of an organization. The organization's communication climate may impact the atmosphere in and around the organization which could either boost or hamper upward, downward and horizontal communication among the employees (Azrai Abdullah et al 2013). Communication climate has been differentiated from other climates such as motivational climate and organizational climate in that, management has the sole responsibility of controlling the communication climate in an organization (Zaremba, 2003) Communication climate can be termed as the enduring quality of internal environment of an organization that is felt by employees and influences their behaviours. This is further defined as open or closed communication climate.

Organizations with open communication climate encourages workers to participate, be free and exchange information without fear of intimidation. It helps the employees to constructively contribute towards conflict resolution hence boosting job satisfaction. On the other hand, organizations with closed communication climates have employees who keep their opinions to themselves and make shielded statements which translate into reduced morale hence job dissatisfaction (Miller 2006).

2.2.1 Open communication

The concept of Open communication involves allowing "open door policy" in an organization whereby, employees are free and feel at ease in expressing honest feedback to their colleagues and management. The process needs to work from either side in that, both management and employees are considerate in the communication and applaud feedback that helps in achieving greater success (Trombetta 2008). Studies indicate that, employees who experience open communication in their organizations are led to increased performance and job

satisfaction (Neves & Eisenberger 2012). Abugre (2011) indicates that, open communication permits employees to be more involved in organizational matters and understand that their engagement is important in achieving the success of the organization. He further notes that, it ensures that employees conceive the bigger picture and the portion they contribute in the success of the organization. Therefore, if a decision is made, employees will be in a position to better understand and comprehend how it will affect them specifically. This will in turn reduce job dissatisfaction and uncertainty in cases such as retrenchments.

Effective open communication causes a bigger chunk of employees to be on the same page, moving towards the same direction to achieve the same goal. Lack of it creates devastation that can cause continued turnover, indifference in the ranks and bad customer service. All of this can translate into reduced sales and profits (Triveni, Rao & Prasad 2007). Therefore, experts indicate that, Generating an open communication climate leads to greater job satisfaction reduced stress, team building, increased loyalty and commitment by employees to the organization plus mutual respect all over the organization. Open communication assures a more industrious and productive work environment with a positive workplace. (Kumar BP 2008)

2.2.2 Closed communication

Closed communication on the other hand limits the kind of information that employees can part with. When employees do not feel free to communicate at work, particularly about negative information or bad news, then the climate is closed. An organization with closed communication doors always results to poor feedback from employees for fear of reprisal. The organization then loses treasured information about how it functions (Petit & Vaught 2002) such communication climates often lead to high turn overs due to job dissatisfaction. Employees feel that in closed communication climates, major decisions are made at the top level and pushed down the line hence this leads to poor relations across the organizations. Therefore, open communication should be embraced at all times if an organization is to succeed in maintaining employees commitment and loyalty.

2.3 Nature of information being shared with employees

Creating clear guidelines of what needs to be communicated, and by whom in an organization is the most important value that will foster trust and perceived influence in organizational communication. If management assume that employees must not know everything, the information being guarded might leak out and come through unexpected means such as grapevine hence creating an untrustworthy atmosphere in the organization. Goldhaber (2008) indicates that, Successful organizations and enterprises give prominence to a few key messages. Management in such organizations are always accurate and consistent in their messages and certify that everyone involved comprehends the goals and how to attain them.

2.3.1 Trust and Accuracy of information

The level of trust and accuracy in various significant activities is also key for success. Employees at all ranks can enquire for information and obtain useful, honest responses (Finch and Hansen 2010). Scholars advise that, Leaders must ensure that they are good communicators in that, they strive to convey their ideas persuasively. Their behaviour must be dependable at all times and be consistent with what they are communicating, both officially and unofficially. This will ensure that employees are easily convinced with the kind of information they put across at any given time. Hansen and Alexander (2010) advise that, ideally, the more difficult or the more crucial the message is, the more probable that a face-to-face communication is necessary. This should then be accompanied by an electronic or printed version for accuracy and uniformity of message. It is also advised that, for the purposes of trust and influence of the information being shared, Employees usually prefer to receive from their direct supervisor, nevertheless "big picture" news may be more suitable coming from senior management or the chief executive office himself. Information such as take-overs, mergers and acquisitions, layoffs or retrenchments need to be relayed directly from the governing body of the organization (Harris 2002).

The basic rule on timing is that employees must know about anything that touches on them before anyone else knows. This makes employees to feel more respected and valued if they become cognizant of information before it is relayed to the public. It will ensure that they trust the organization at all times, which ensures high productivity and job satisfaction. Any information that is found inaccurate by employees leads to loss of credibility which culminate into management losing credibility. Therefore, scholars 'advise that all information being sent to employees must be accurate at all times in terms of the content and other simple things like grammar, punctuation and spelling. Pettit et al., (2002:81) explain that an employee's perception of a supervisor's communication pattern, content and credibility plus the organization's communication structure will to some degree influence the amount of satisfaction he or she gets from the job.

Over and above the trustworthiness and accuracy of information from the management, Barnard (2008) indicates that, the official structures of the organization has failed in covering some significant aspects of communication in an organization. He explains that, leaders should be bold enough to listen to grapevine in the organization. This kind of communication serves as a means of staff to release their emotions. It will provide a way for the management to grasp what the climate is like in the organization. This way, management is able to react with feedback that is trustworthy and accurate so as to clear the air within the organization (Stevenson and Gilly 2006). Pincus (2003) found out that, accuracy of information in an organization proved to be a predictor of quality and productivity in the organization hence job satisfaction.

2.4 Information load on employees

Most often than not, attention has been concentrated on the trend of communication flow, and quite little has been put on the quantity. Most organizations assume that, if information flow is high, that's good enough, so long as they are communicating continuously. Studies conducted by O'Reilly (2006) indicate

that, unrestricted flow of information within the organization is perfect. However, when the information received by employees exceeds the optimum amounts, the recipients may not give the attention required to this information. This will then lead to lose of information. The study further indicate that, communication overload is likely to have an inverse relationship to job satisfaction and Underload a direct relationship with job satisfaction. One of the greatest issues of information repetition to curtail breakdown in the communication method is possible overload. Therefore, management needs to be quite careful in order to capture the attention of the employees without possibility of ruining the worthwhile course of communication (Pettit and Vaught 2000).

One of the most essential aspects of an employees work in today's organization is the control of communication loads that he or she receives on the job (Wheless \$ Wheless 2003). Communication received can be considered as a communication load, which denotes to the frequency and complexity of communication involvement an employee must process in a specific time frame. Therefore, Goris & Vaught (2007) explain that employees in an organization can experience communication under-load or communication over-load which could have a negative effect on their job satisfaction.

2.4.1 Communication overload and Underload

When an employee receives too much information in a short time which causes them to slow down on their productivity in order to respond to such information, this could result to low performance hence further repercussions. Information that is difficult to process and requires more time to unravel the meaning could also lead to overload. Due to this loads, taking into consideration an employee's motivation to finish a task, they may take such as excess work, which can be negative to job satisfaction rates. On the other hand, when communication is strangled and given below the employee's capability to process them, this is called under-load (Goris & Vaught 2007). Scholars indicate that communication Underload usually results to grapevine. Grapevine is an unofficial way of communication in an organization. It is referred to in that manner because it spreads all through the organization in various directions regardless of the authority levels. It exists more at lower ranks of the organization. Communication Underload which leads to grapevine is quite dangerous as it carries partial information most of the time hence leading to uncertainty that results into job dissatisfaction. Since this kind of information is based on unconfirmed reports, most often than not, it lowers employee productivity as much time is spent on trying to confirm if what they have heard is true or false (Harris 2002).

It is also wise to avoid communication Underload as grapevine which fills that gap usually leads to hostility between management and employees. This then impedes the goodwill of the organization as it carries false and negative information concerning the top rank management of the organization (Giri & Kumar 2007, Callan & Monaghan 2001, Kumar BP 2008). According studies conducted, the ideas of communication under-load and over-load, results into an employee not receiving sufficient input on the job or is ineffective in processing these information, hence they are more likely to be disgruntled, aggravated, and discontent with their work which results to a low

level of job satisfaction. Therefore, experts advise that, for an organization to be successful in managing communication loads, management should use filtering techniques in order to check what information is important and needs to be disseminated without any delay. Delegation and decentralization in decision-making methods should be key to ensure that not all messages go to a particular executive. Careful selection of vital information sources and eradicating of the unreliable and inaccurate ones should be a daily function (Rao & Prasad 2007).

From these scholars, it is evident that organizational communication plays a vital role in ensuring employee job satisfaction. The attributes of Organizational flow of information, communication climate, nature of information being shared with employees, and information load, all work together for the benefit of employees' productivity and satisfaction at work. These are four features that informed the purposes of this study and it is the interplay and harmony of these aspects that will ensure effective organizational communication that leads to job satisfaction within the telecommunication industry in Kenya.

2.5 Demographic factors on job satisfaction

Positive employee attitudes comprise total satisfaction and loyalty towards the organization. Employee job satisfaction is absolutely associated with job involvement, motivation, employee commitment and mental health which translates to job performance and satisfaction (Sek and Khin 2009). A Case Study of two Malaysian universities on factors influencing jobs satisfaction indicated that demographic factors which include gender, age and designation (position/rank) of employees had a great influence on how an employee is satisfied with their work. Various researchers have presented diverse opinions in regards to the relation between job satisfaction and these factors (Hooi 2012, Kosteas 2009, Hanif & Kamal 2009, and Chimanikire et al. 2007). Kosteas (2009) showed that there is a U-shaped relationship between age and satisfaction. This means that, fresh entrants feel positive regarding their job, nonetheless after a few years they lose motivation, probably due to lack of career growth, monotony and dullness in their job. Afterward, when the employees are promoted to different desirable positions, they become pleased and therefore, their satisfaction goes up again. According to a study by Hickson and Oshagbami (2009) on the effect of age on satisfaction level among the research and academic (teaching) staff of higher education institutions, it was observed that age affects negatively the job satisfaction of teaching staff, while job satisfaction goes up with increase in age for research staff. Male employees appeared to be more content than female employees. In the United States and United Kingdom, given the assessed gender earnings difference, female employees get less pay and less viable working conditions, nevertheless, they seem to be more content with their jobs compared to male employees since females have fewer expectations (Chiu and Mason 2008). Female employees put more value on social factors while male employees emphasize on extrinsic aspects such as financial benefits, promotions and pay (Hooi 2012). Notwithstanding all the moderating factors, the role of organizational communication plays a significant role in determining the level of job satisfaction in organizations. Abundant knowledge on the impact of organizational communication on employee job satisfaction will be sought.

III. METHODOLOGY

This study was based on literature review related to organizational communication and job satisfaction in organizations. It also examined the role of organizational flow of information on employee job satisfaction. Thirdly, it evaluated the role of communication climate on employee job satisfaction. Additionally, it assessed the role of nature of information on employee job satisfaction and the role of information load on employee job satisfaction. Finally, it investigated on whether, demographic factors affect job satisfaction in organizations.

IV. CONCLUSION

The study established the following conclusions based on literature reviewed. Today, more employees find that a vital part of their work is communication, especially when service workers outnumber production workers. Therefore, communication goes beyond training managers to be effective speakers. It requires them to have relational communication habits with the employees.

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Effect of Supervision of Instructional Practices on Teaching and Learning in Secondary Schools in Kenya

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Abstract- Despite the government strengthening capacities of education managers, inducting subject teachers and funding day secondary education, many secondary schools still perform poorly in KCSE. The purpose of this study was to investigate the influence of supervision of instructional practices on teaching and learning in sub-county secondary schools in Bungoma County. The study adopted a mixed methods approach and a descriptive survey design. The study was based on Glatthorn's theory of differentiated supervision which advocates for use of different supervision approaches for different circumstances. Using purposive and simple random sampling techniques, a sample size of 44 principals, 369 class teachers and 369 class prefects was selected to participate in this study, giving a sample size of 782 respondents. Data was collected by using questionnaire and interview. Data was analyzed using percentages, Pearson correlation coefficient and by describing emerging content from the respondents in relation to the study objective. The study established that there was significant relationship between supervision of instructional practices at $p = 0.000 < 0.05$. Therefore, it was concluded that supervision of instructional practices significantly influenced teaching and learning in secondary schools in Bungoma County. From the results it is concluded that academic performance could be improved if instructional supervision is enhanced. The following recommendations were made: Ministry of Education (MoE) to induct school managers on more effective managerial skills, Information and Communication Technology (ICT) to be embraced in school administration to enhance communication skills, Teachers Service Commission (TSC) to employ more teachers and MoE to increase funding to enhance teaching and learning.

Index Terms- Instructional supervision, practices, teaching and learning

I. INTRODUCTION

Education forms the basis upon which economic, social and political development of any nation is founded. Investment in education can help to foster economic growth, enhance productivity, contribute to national and social development and reduce social inequality (World Bank, 1998). Provision of quality secondary education generates the opportunities and benefits of social and economic development (Onsumu, Muthaka, Ngware and Kosembei, 2006).

UNESCO (2005) argues that the level of a country's education is one of the key indicators of its level of development. Globally, education is recognized as a basic human right. The

human rights charter treats education as one of the human rights. Bishop (1989) indicates that in 1948 the Universal Declaration of Human Rights laid down Article 26, that everyone had the right to education and that education would be free at least in the elementary and fundamental stages. According to Boit, Njoki and Chang'ach (2012), the purpose of education is to equip the citizenry to reshape the society and eliminate inequality.

Secondary school education is regarded as the most important point in the education system, which could help in solving the manpower constraints of the nation by creating a country's human resource base at a level higher than primary education (Institute of Policy Analysis and Research, 2007). According to the Sessional Paper No. 1 of 2005 on Education, Training and Research, Secondary education serves as a link between primary and higher education, and subsequent world of work (Republic of Kenya, 2005)

The education system in Kenya is examination-oriented. The quality of education is seen in terms of the number of students passing national examinations (Eshiwani, 1993). Tirop (2011) says that:

Our curriculum has been wanting. It has veered off track. It has condemned our children to a life of books, and more books. It is a pity to see a standard one child waking up at 5.00am to attend to morning preps, heading to school carrying reading and writing materials, attend class the whole day with barely enough time to play, go back home in the evening with a mountain of home work to finish, and inevitably going to bed at 10.00pm. The curriculum over emphasizes on grades and marks in examinations at the expense of character development and other attributes of learning. (P.6)

Yusuf and Adigun (2010) and Lydia and Nasongo (2009) note that the performance of students in any academic task has always been of special interest to the government, educators, parents and society at large. Therefore, good performance of a student in K.C.S.E is critical in his or her future life as it determines further learning and career placement.

However, the performance of students in national examinations in Kenya is considered as below average standards (Ongiri and Abdi, 2004; Musungu and Nasongo, 2008). Ongiri and Abdi (2004) report that many of the country's 4000 secondary schools post bad examinations results every year and that there are only about 600 schools that excel and if a student is not in any of those schools, he or she is not expected to get a credible grade. Tirop (2009) says that half of the students sitting K.C.S.E get grade D+ and below. He says that in the years 2004-2006, 45% got grade D+ and below, in 2007, 43% got D+ and below and in 2008, 50% scored D+ and below.

According to the information obtained from the county education office, performance by secondary schools in KCSE in

Bungoma County is not any better as shown in Table 1 where it was always in the last position except 2010 when it was second last.

Table 1 Western region K.C.S.E performance per county for the period 2008 -2012

County	Mean score for				
	2008	2009	2010	2011	2012
Bungoma	4.397	4.989	5.318	5.322	3.816
Kakamega	4.662	4.996	5.431	5.390	3.969
Vihiga	4.859	5.282	5.511	5.534	4.097
Busia	4.854	5.088	5.28	5.494	4.015

Undoubtedly, the reasons of poor performance in the county can not be easily discerned without focused investigation. Surveys on examination performance have shown that majority of schools which display good results each year have adequate curriculum implementation supervision. Certainly, the same can not be said of Bungoma County because it has consistently posted poor examination results in the previous years.

The issue of poor academic performance in examination signifies a critical impediment in any Country since education is a major contributor to economic growth (Atkinson, 1987).

However, previous researchers have suggested that a number of factors contribute to the establishment of quality education in schools. For example, Digolo (2003) and Eshiwani (1993) observe that the maintenance of factors such as curriculum, instructional materials, equipment, school management, teacher training and resources are some of the indicators of quality education. In addition, Digolo (2003) reports that low performance could be attributed to inadequate finance which results into inadequate supply of teaching and learning materials and equipment. Olemba (1992) also suggests that provision of quality education requires that head teachers be involved in translation of education policies into viable programs within the school; while Shiundu and Omulando (1992) emphasizes that on a daily basis head teachers have the responsibility to ensure that teachers implement the set curriculum and that learning activities take place. This study therefore focused on the influence of supervision of instructional practices on teaching and learning.

Supervision of instruction is a process of inspecting both what the teachers were teaching and what the students were learning. Those involved in instructional supervision include; Principals, deputy principals, departmental chairs, lead teachers, mentors, curriculum specialists, trainers, programme evaluators and educational officers or administrators.

Through the effective supervision of instruction the administrators can reinforce and enhance teaching practices that contribute to improved student learning. By skillfully analyzing performance and appropriate data, administrators can provide meaningful feedback and direction to teachers that can have a profound effect on teaching that occurs in each classroom. If schools are to provide equal access to quality educational programmes for all students, administrators must hold teachers accountable for providing an appropriate and well planned programme. These programmes include a variety of teaching strategies designed to meet the diverse needs of all students in our complex society. This process may lead to a restructuring of practices and procedures that could result in the enhancement of

student teaching (Fischer, 1995). According to Fischer (1995), supervision of instruction involves: teacher evaluation, assessing pupil progress, analyzing instructional strategies, planning, preparing and presenting the lesson and conducting practice sessions. This management practice evolved after it was realized that there was little that could be achieved by grouping employees together without a leader (Okumbe, 1998). It is through supervision that the head teacher gets a clear framework of activities and responsibilities of each member of staff in the school. It enables head teachers to evaluate the extent to which policies, objectives, activities and events are successfully carried out (Too, Kimutai and Zachariah, 2012).

Research on effective schools has provided characteristics which successful schools share. These characteristics have come to be known as the correlates of an effective school (Lezotte, 2010) or the effective school model. The model is seen as a means to achieving high levels of student learning in which students are expected to learn essential skills, knowledge and concepts needed to be successful.

According to Nyagosia et al. (2013), the correlates of an effective school are: Strong instructional leadership, clear and focused mission, safe and orderly schools, climate of higher expectation for success, frequent monitoring of student progress, positive home-school relationship and opportunity to learn/student time on task. The findings of Nyagosia et al. (2013), confirm that the effective schools' model is applicable in Kenyan schools, which is in line with other studies in South Saharan Africa by Verspoor (2006), ADEA (2006) and Yu (2007). Their results revealed that indeed the seven correlates of effective schools do account for improvement in academic achievement. Lezotte (2010) argues that these correlates are powerful indicators of successful schools where all children learn, regardless of social economic status or ethnicity.

Glickman (1985) and Wiles and Bondi (1996) emphasize instructional supervision as a fundamental component of instructional leadership, viewing this role as imperative to improved instruction and student achievement. Wiles and Bondi (1996) define supervision as a "general leadership function that coordinates and managed these school activities concerned with learning" (p. 10). Sergiovanni (1987) presented a reflective model of supervision in which he proposed that since teachers vary in their goals and learning styles, supervisors should be responsive to these differences in the ways they supervise (pp. 105-106).

School leaders need to be knowledgeable of curriculum and other school matters. They must link staff improvement to instructional improvement. As school leaders, they must be

“teachers of teachers”, constantly diagnosing educational problems, counseling teachers, and evaluating and remediating the pedagogical work of teachers. Leadership in this sense is multidimensional, involving managerial human and educational skills (Wiles and Bondi, 1996). The quality of leadership makes the difference between the success and failure of a school (Millette, 1988). In highly effective schools as well as schools which have reversed a trend of poor performance and declining achievement, it is the head teacher who sets the pace, leading and motivating pupils and staff to perform to their fullest potential. The head teacher is therefore a key person in any education system.

More effective schools have a shared vision and a strong instructional leader is responsible for establishing and communicating that vision. According to Manasse (1986), vision includes the development, transmission, and implementation of an image of a desirable future (P. 150). Lezotte (1991) proposes that in effective schools “there is a clearly articulated school mission through which the staff shares an understanding of and commitment to instructional goals, practices, assessment procedures and accountability” (P.6). Schools require good leaders to organize the process of teaching and learning to ensure that the mission of the school is achieved (Lydiah & Nasongo, 2009). Joyce and Showers (1982) found that in effective schools there is a coaching environment where teachers work as one another’s coaches, a situation Glatthorn (1984) in his theory of differentiated supervision calls *peer supervision or collegial supervision*.

Research by Lezotte (2001; 2010) revealed that in the effective school there is a climate of high expectation in which the staff believes and demonstrates that all students can obtain mastery of the school’s essential curriculum. Students are given challenging and demanding tasks and each child is considered to possess a unique gift to offer to the society (Bauer, 1997).

Glatthorn (1984) in his theory of differentiated supervision recognizes that some situations call for a more direct approach to supervision by school administrators. He refers to this as administrative monitoring. Visible presence of the principal in school is correlated with higher student achievement (Water et al., 2004). Studies conducted by Musungu and Nasongo (2008) and Reche Bundi, Riungu and Mbugua (2012) reveal that head teachers in high performing schools checked lesson books, schemes of work, records of work covered, attendance registers, class attendance records and clock-in clock out books more frequently than those in average and low performing schools. This study established that head teachers’ frequency of internal supervision contributed towards better performance. This involved proper tuition and revision, thorough supervision of teachers’ and students’ work, proper testing policy, syllabus coverage, teacher induction courses and team building.

Similar findings have emerged from various Kenyan studies, all of which reveal that poor performance in secondary school examinations is a function of poor administration and leadership practices (Ackers & Hardman, 2003; Githua & Nyabwa, 2008). Nyagosia et al. (2013), did a research in Central Kenya on factors influencing academic achievement in secondary schools and found out that top performing schools are characterized by teachers keeping updated professional documents, a climate conducive to teaching and learning,

keeping students focused on their core business in school, giving students a high expectation for high performance, involving parents in students discipline and teacher commitment characterized by regular attendance and punctuality. From their findings of t-test and Pearson Correlation Coefficient analysis, they concluded that top performing schools put more emphasis on instructional leadership, focus on school mission and vision, safety and orderliness of schools, expectations for success, home-school relations and opportunity to learn for students. According to them, frequent monitoring of students progress is not significant in determining school performance.

From the literature that was reviewed, no research on quality education had been conducted in Bungoma County to find out why the performance of schools in K.C.S.E was still low. With the persistent poor academic performance in the county, this research came in handy. This current study therefore attempts to verify these findings and conduct further research in this area to investigate the influence of instructional leadership on academic achievement.

II. RESEARCH DESIGN AND METHODOLOGY

This study adopted a concurrent mixed methods approach and its research design was descriptive survey. Orodho (2003) and Fraenkel and Wallen (1993) describe descriptive survey as a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. A survey, according to Kodhari (2003), is a method of securing information concerning an existing phenomenon from all or a selected number of respondents of the concerned universe. From the sample results the researcher generalizes or makes claims about the population (Cresswell, 2003). The study was descriptive because it looked at the various aspects of a phenomenon that already existed, namely supervision of instructional practices influencing teaching and learning in sub-county secondary schools in Bungoma County. Class teachers and class prefects of Form I-IV each responded to a questionnaire and the principals were interviewed to get their views on the role of curriculum practices on teaching and learning. However, Kodhari (2003) says the main weakness of descriptive survey is that it may give low response rates especially in mailed questionnaire

The target population was 175 principals, 1433 class teachers and 2865 class prefects of the 175 sub-county secondary schools. The sample size selected for this research from the study population was 782. Using purposive and simple random sampling, a sample of 44 principals, 369 class prefects and 369 class teachers was chosen to participate in the study as respondents.

This study used questionnaires and interview schedules to elicit responses from the study subjects. The questionnaire titled class teachers and class prefects was used to gather data for this study. Interviews were scheduled for the principal to get qualitative data. Gay (1992) maintains that questionnaires give respondents freedom to express their views and their opinions and also make suggestions. According to Nzubuga (2000), qualitative data gives the researcher much information and helps them identify significant factors to measure.

The researcher conducted a pilot study in the neighbouring county using 2 schools to establish reliability of research instruments through the test re-test method. To validate the research instruments the researcher used the technique of content validity which showed whether the test items represented the content that the test intended to measure (Borg and Gall, 1989). Content validity ensured that the instruments covered all the areas to be examined. Two supervisors from the department of curriculum, instruction and Educational Media, and colleagues, Moi University scrutinized the instruments and made necessary adjustments so that the instruments were adequate and able to elicit adequate data. Validity was also further ascertained through the results of the pilot study.

Descriptive statistics was used to analyse data. Results from quantitative data were presented by use of percentages and correlation coefficient while qualitative data were recorded, grouped in themes and findings reported. Data were analysed using Statistical Package for Social Sciences (SPSS v. 20) for easy interpretation.

III. RESULTS AND DISCUSSION

The main objective of this study was to determine the influence of supervision of instructional practices on teaching and learning in secondary schools in Bungoma County.

In order to determine the relationship between the independent variable (supervision of instructional practices) and the dependent variable (teaching and learning expressed in terms of KCSE mean scores 2008-2012), Pearson Product Moment Correlation Coefficient (PPMCC) was used at the 0.05 level of significance. The results obtained are as shown in table 2. Their results were summarized as follows in table 2. According to results as shown in table 2, 42.0% and 23.8% of the class teachers and 46.6% and 31.7% of the class prefects respectively strongly disagreed and disagreed that **teachers and students have not been observed in the classroom**, 1.6% of the class teachers and 7.0% of the class prefects were undecided about teachers and students having not been seen in the class room, while 22.0% and 10.6% of the class teachers and 10.0% and 4.6% of the class prefects respectively agreed and strongly agreed that teachers and students have not been seen in the classroom.

Table 2 Cross tabulation of supervision of curriculum implementation and quality of learning and teaching N= 369 N = 369

Statement	Respondents	SD		D		UD		A		SA		TOTAL		MEAN RATE
		F	%	F	%	F	%	F	%	F	%	F	%	
		Teachers and students have not been observed in the classroom	CTRS	155	42.0	88	23.8	6	1.6	81	22.0	39	10.6	
	C.PRE	172	46.6	117	31.7	26	7.0	37	10.0	17	4.6	369	100	1.94
My input in meetings after observing me teach and learn in class is valued	C.TRS	27	7.3	137	37.1	16	4.3	134	36.3	55	14.9	369	100	3.14
	C.PRE	67	18.2	51	13.8	39	10.6	134	36.3	78	21.1	369	100	3.28
Teachers' professional documents and students notes are frequently checked	C.TRS	80	21.7	116	31.4	6	1.6	142	38.5	25	6.8	369	100	2.77
	C.PRE	117	31.7	106	28.7	52	14.1	58	15.7	36	9.8	369	100	2.43
Our suggestions made during meetings are implemented	C.TRS	81	22	110	29.8	12	3.3	95	25.7	71	19.2	369	100	2.91
	C.PRE	106	28.7	133	36	34	9.2	63	17.1	33	8.9	369	100	2.41
We receive suggestions following observations in class	C.TRS	45	12.2	87	23.6	12	3.3	156	42.3	69	18.7	369	100	3.32
	C.PRE	44	11.9	48	13.0	43	11.7	137	37.1	97	26.3	369	100	3.53
I am frequently observed when in class.	C.TRS	82	22.2	110	29.8	16	4.3	120	2.5	41	11.1	369	100	2.80

C.PRE	35	9.5	52	14.1	40	10.8	139	37.7	103	27.9	369	100	3.60
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The response categories were: 1=strongly Disagree, 2 = Disagree, 3=Undecided, 4 = Agree and 5=strongly Agree.

The findings indicate that teachers and students are visited in the classes as agreed by 65.8% and 78.3% of the class teachers and class prefects respectively.

My input is valued in meetings after observing me teach and learn in class was supported by 51.2% class teachers and 57.4% class prefects. 44.4% of the class teachers and 32% of the class prefects refuted the statement. 4.3% of the class teachers and 10.6% of the class prefects were undecided on the statement that my input is valued in meetings after observing me teach and learn in class.

On checking teachers' professional documents, the statement was rejected by 53.1% of the teachers, and checking of students notes was rejected by 60.4% of the class prefects. 1.6% of the class teachers and 14.1% of the class prefects were undecided. 45.3% of the teachers and 25.5% of the class prefects agreed and strongly agreed with the statement.

Our suggestions made during meetings were not implemented was supported by 51.8% of the class teachers and 64.7% of the class prefects. 3.3% of the teachers and 9.2% of the class prefects were undecided. 44.9% of the class teachers and 26% of the class prefects say that suggestions made during meetings are implemented.

Respondents who agreed and strongly agreed that **they were given suggestions of improvement after being observed in the class** were 61% of the class teachers and 63.4% of the class prefects. 3.3% of the class teaches and 11.7% of the class prefects were undecided. 35.8% of the class teachers and 24.9% of the class prefects rejected the statement.

According to the results in table 20, 43.6% of the class teachers and 65.6% of the class prefects say that they are **frequently observed in the class rooms**. 4.35% of the class teachers and 10.8% of the class prefects were undecided. 52% of the class teachers and 23.6% of the class prefects rejected the statement.

Pearson Product correlation coefficient for supervision of instructional practices and teaching and learning (KCSE 2008-2012 performance)

The study sought to determine the influence of curriculum practices namely: Supervision of instructional practices on teaching and learning in sub-county secondary schools in Bungoma County. To accomplish this, a correlation analysis was conducted to determine whether there was a significant correlation between KCSE means scores and the mean scores obtained from the perceptions of respondents (class teachers and class prefects) on the curriculum practices. The results are presented in table 3 and 4 for the class teachers and class prefects respectively. The results in table 3 revealed that there were significant correlations, at $p < 0.05$ between the KCSE mean scores and supervision of instructional practices. The correlation coefficient was positive, meaning they influence teaching and learning as expressed in terms of KCSE performance. The positive value means that the more adequate the supervision of the curriculum the higher the quality of learning and teaching in sub-county secondary schools in Bungoma County. The findings in table 3 imply that schools putting more emphasis on this variable could record more improved KCSE mean scores than those putting less emphasis on them, again this confirmed that effective schools were characterized by strong instructional leadership, clear and focused communication, adequate provision and management of teaching and learning resources and appropriate motivation of teachers and students as was also noted by Lezotte (2010). However, it should be noted that the correlation coefficients, r , was low, meaning that although significant, the relationships was weak.

The results in table 4 shows that there was significant correlations at $P < 0.05$ between KCSE mean scores and supervision of instructional practices. The correlation coefficient was positive, meaning that it influences teaching and learning in sub-county secondary schools in Bungoma County. The positive value means that the more adequate the supervision of the curriculum the higher the quality of learning and teaching. However, the correlation coefficients, r , was low, meaning that although significant, the relationships was weak.

Table 3 correlation coefficient of the curriculum practices for the class teachers' responses

		Supervision of instructional practices
Supervision of instructional practices	Pearson Correlation	1
	Sig. (2-tailed)	.000
	N	369
School mean	Pearson Correlation	.153**
	Sig. (2-tailed)	.003
	N	369

Table 4 correlation coefficient of the curriculum practices for the class prefects' responses

		Supervision of instructional practices
Supervision of instructional practices	Pearson Correlation	1
	Sig. (2-tailed)	.020
	N	369
School mean	Pearson Correlation	.121*
	Sig. (2-tailed)	.020
	N	369

Interacting in class meetings was mentioned by 30 (68.2%) of the principals. These principals said that they went to class during class meetings and to observe teachers teach during lessons. Visiting classes enabled principals to observe lesson attendance by students and teachers, observe students discipline, check physical state of classes, get class issues/requirements, discuss syllabus coverage with teachers and students, assess teachers preparation and delivery of content, assess students level of concentration and observe teachers class control.

These principals said that class meetings enhanced content delivery, boosted teachers and students' interaction, acted as an induction for new teachers and sharing teaching skills. Musungu and Nasongo (2008) said that internal supervision ensured that work in the school was done effectively. One principal felt that he promoted the sharing of classroom management strategies by having teachers observe two other teachers, one in their content area and one outside of it. He further said that instructional conferences held after class observations improve teaching and learning.

A few of the principals interacted with teachers during official release of internal of examinations. These principals said that official release of examinations brought all teachers and students together to reward best performers; both teachers and students, get report on academic performance of the school, subjects and students, analyze factors affecting performance and identify and counsel weak students and even invite their parents to school. One principal remarked:

“official release of examinations greatly motivated and created competition among teachers and students and helped to improve performance in the school”

However these results show that is only a few principals release officially examination results despite the exercise being a motivator for competition and hard work.

Interacting with teachers when checking professional documents; schemes of work, record of work covered, progress records and lesson notes was mentioned by a few of the principals. These principals said that they checked and endorsed schemes of work, record of work covered and lesson notes and used these documents to ascertain teachers' preparedness for class work, syllabus coverage and corrective measures put in place, students performance, adequacy in teaching and methodology of teaching

However these results indicate that a few checked and endorsed professional documents. These data concur with results from the quantitative study where 53.1% of the class teachers and 60.4% of the class prefects said that principals do not check professional documents and students' class notes respectively. Too et al. (2002) reveal that checking of professional documents and class notes had a positive relationship with the schools' overall mean scores in KCSE examinations.

Interacting on education day of principals and teachers was mentioned by a few of the principals. They said that on education day, teachers, students and parents came together to discuss teaching and learning in the school. Each parent met subject teacher to inquire about academic progress for his or her child. They all discussed the academic performance of the school and the way forward for even performing better. The forum is used by teachers and students to ask parents to buy the required instructional materials and create unity between teachers,

students and parents. According to Ubogu, (2004), schools where parents are actively involved in school development, pupils do well in examinations as they are encouraged by both teachers and parents.

Induction of especially new members of staff was mentioned by few principals. They said that they used induction to orientate new members of staff especially beginning teachers and teachers employed by Board of Management (BOM) about their professional conduct and ethics and Ministry of Education policies. Induction according to these principals ensured implementation of school goals and appropriate methods of teaching.

IV. SUMMARY AND CONCLUSIONS

Basing on the results of the frequency table of respondents perceptions, correlation coefficient and qualitative data analysis it is concluded that despite having a significant relationship between the supervision of instructional practices and teaching and learning, the low r values indicated a weak relationship, meaning schools were not carrying out this role effectively according to the class teachers and class prefects. The class teachers and class prefects also perceived the supervision of instructional practices to be average. Therefore this could be contributing to the poor performance of most sub-county secondary schools in KCSE.

V. RECOMMENDATIONS

Based on the findings of the study, it was therefore recommended that:

1. MoE to improve on induction of teachers on more effective managerial skills.
2. ICT to be embraced in all schools' administration to enhance teachers communication skills.
3. MoE to increase educational funding to enhance provision and management of teaching and learning resources.
4. Schools to increase the material and or verbal reward of all forms of academic achievement to create both intrinsic and extrinsic motivation.
5. The local community to enhance teaching and learning by improving on their attendance of school functions, serving on school committees and providing teaching and learning resources.

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The Relationship between Teacher and Student Motivation and the Quality of Teaching and Learning in Secondary Schools

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Abstract- This study determined the relationship between teacher and student motivation and academic performance of students in secondary schools of Bungoma County. The purpose of this study was to investigate the influence of teacher and student motivation on teaching and learning in sub-county secondary schools in Bungoma County. The study was based on the Herzberg's theory of motivation. The study adopted a mixed methods approach and a descriptive survey design. Using purposive and simple random sampling techniques, a sample size of 44 principals, 369 class teachers and 369 class prefects was selected to participate in this study, giving a sample size of 782 respondents. Data was collected by using questionnaire and interview. Data was analyzed using frequencies, Pearson correlation coefficient and chi-square and by describing emerging content from the respondents in relation to the study objective. The study established that there was significant relationship between motivation at $p = 0.000 < 0.05$. Therefore, it was concluded that supervision of instructional practices significantly influenced teaching and learning in secondary schools in Bungoma County. From the results it is concluded that academic performance could be improved if motivation of teachers and students is enhanced. The following recommendations were made: Ministry of Education (MoE) to induct school managers on more effective managerial skills and school administrators to use both material and verbal motivation to reinforce teaching and learning.

Index Terms- Teachers and students, motivation, quality, teaching and learning

I. INTRODUCTION

One question that has pre-occupied researchers for decades is why some public schools consistently perform well in examinations while others consistently perform poorly. Edmonds (1981), Lezotte, Skaife and Holstead (2002), Kirk and Jones (2004) and Daggett (2005) have demonstrated that successful schools have unique characteristics and processes, which help all children to learn at high levels. Many studies have therefore been carried out to determine what accounts for improved academic outcomes. Academic performance is a key concern for educational researcher because failure in national examinations spells doom for the students whose life become uncertain and full of despair. Academic performance determines whether the students will proceed to university or to other tertiary institutions. It is for this reason that secondary school administrators in

Kenya are pressurised to improve the grade attained grades attained by students in the Kenya Certificate of Secondary Education (KCSE).

Public pressure on school administrators and teachers to improve academic performance has led to schools coming up with various performance improvement strategies including extra supplementary tuition, reward and punishment systems for well performing and poor performing students, forced grade repetition among others. However, some of the strategies employed by schools to improve academic performance are not grounded on research evidence, while some like grade repetition and extra supplementary tuition have been shown to be counter productive (Bray (2007)). In Bungoma County, according to information obtained from the county education office, the secondary schools' performance in KCSE has consistently been poor. The study sought to establish the influence of teacher and student motivation on students' academic performance.

The primary job of principals, teachers, parents and other stakeholders is to help students experience learning excitement and joy as frequently as possible in an atmosphere where they can discover for themselves the pleasure of acquiring new knowledge (Renchler, 1992). The goal of helping students acquire self motivation that leads to a perpetual desire to learn should therefore be foremost in every educator's mind.

Maehr and Fyans (1989) say that principal interested in establishing the motivation to learn and academic achievement as central features of a school's culture must first persuade everyone—students, teachers, parents and school board that goals related to those areas are desirable, achievable and sustainable. Stipek (1988) makes a strong case for strengthening the degree of intrinsic motivation students fill for learning.

Wanjala (2002) looks at motivation as a phenomenon which is related to personality but is oriented toward the goal that people seek in life. Motivation is a process that starts with physiological or psychological deficiency or need that activates behavior or a drive that is aimed at a goal or incentive (Luthaus, 1989). Lovell and Wiles (1983) define motivation as the level of effort an individual is willing to expend towards the achievement of a certain goal. Motivation according to Cole (2004) refers to those processes, both instinctive and rational, by which people seek to satisfy the basic drives, perceived needs and goals, which trigger human behavior.

Motivation can either be intrinsic; drives or motives perceived as expressions of a person's needs and so they are personal and internal or extrinsic; incentives which are external to a person and they are made part of the work environment by management in order to encourage workers to perform tasks

(Okumbe 1998). This study examines both intrinsic and extrinsic motivation. However, the motivation teachers and students are to experience in this research is basically extrinsic because it is supposed to be initiated by principals.

Motivation is a concept that was very much at the core of the human relations school of thought. In their study of organizations, the humanists found a complex and fascinating human system operating along side the technical system profoundly affecting its functioning. Maslow (1954) for example postulated a hierarchy of human needs with self-actualization (need to accomplish something) at the apex. Herzberg (1966) followed the Maslow's principles with evidence to support the lower level needs (security) and higher level needs (job or motivational) factors affecting productivity and satisfaction at work. In his two factors theory, Herzberg states that there are some aspects of a job which provide positive satisfaction for employees, which he called "motivators" and they include such issues as recognition, advancement and achievement.

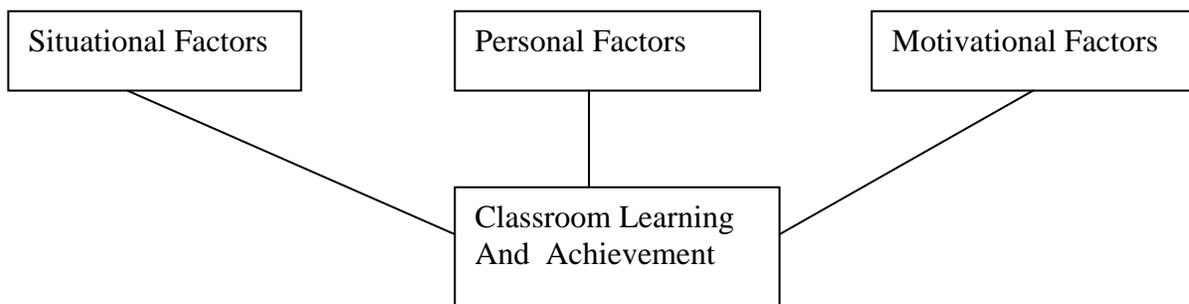
An atmosphere or environment that nurtures the motivation to learn can be cultivated in the home, in the classroom, or at a broader level, throughout an entire school. Much educational motivation is centred on the classroom, where the majority of learning takes place and where students are most likely to acquire a strong motivation to gain new knowledge (Ames, 1987, Brophy, 1987; Grossnickle, 1989; Wlodkowski and Jaynes, 1990).

Motivation on the part of the principal translates into motivation among students and staff through the functioning of goals. According to Leithwood and Montgomery "Personally

valued goals" they say are a "central element in the principal's motivational structure –a stimulus for action" (P. 24). Pastor and Erlandson (1982) conducted a survey and found that teachers perceive their needs and measure their jobs satisfaction by such factors as participation in decision making, use of value skills, freedom and independence challenge, expression of creativity, and opportunity for learning. They conclude that internal motivation, work satisfaction, and high quality performance depend on three "critical psychological states" namely experienced meaningfulness, responsibility outcome and knowledge of results.

In a related study, Klug (1989) describes a measurement based approach for analyzing the effectiveness of instructional leader and provides a convenient model for motivation. The model is shown in figure 2. Klug notes that school leaders can have both direct and indirect impact on the level of motivation and achievement within two of the three areas shown in figure 2. Although the personal factor – difference in ability level and personalities of individual students –usually fall outside a school leader's domain of influence, the other two categories, situational factor and motivational factor, are to some degree within a school leaders power to control. Klug's summary of the model describes how these two areas can be a source of influence:

Figure 1: A conceptual model for understanding classroom learning and achievement.



Source: Klug (1989, P.253)

School leaders enter the achievement equation both directly and indirectly by exercising certain behaviors that facilitate learning; they directly control situational (S) factors in which learning occurs. By shaping the schools instruction and the community at large toward education, they create both student and teacher motivation and indirectly impact learning gains. (P. 253)

There are many strategies school leaders can use to reward motivation and promote academic achievements. For example Huddle (1984), in a review of literature on effective leadership, cites a study in which principals in effective schools use a variety of methods to publicize the school goals and achievements. These included: bringing in outstanding speakers to talk to

students especially candidates, placing names of special education students on the honor roll, publishing annual report of academic achievement and mailing it to parents and displaying academic awards and trophies in the school trophy case

From an analysis of data collected from more than 16000 students in Illinois, Maehr (1990) concludes that goal stresses associated with the school environment seem to relate systematically to student motivation and achievement and that psychological environment of the school is a measurable variable, a variable of some importance in predicting motivation and achievements of students. Therefore, by formulating and clearly communicating relevant goals, by developing and instituting workable program to sustain those goals, and by monitoring and rewarding success a principal can shape a

school's culture so that it reflects the importance of motivation directed towards academic success. There should be extensive use of recognition and rewards in the school setting. Goals should be established that will provide opportunities for all students to be recognized, recognize progress in goal attainment, and emphasize a broad way of learning actively. Strategies could include "personal best" awards and recognition of a wide range of school-related achievements.

Lorna and Poipoi (2010) in their study in Busia District conclude that teachers were more satisfied in schools with good working environments in terms of improved terms of service. Therefore this study intends to investigate the influence of student and staff motivation on academic achievement in Bungoma County.

II. METHODOLOGY

The study approach was mixed methods and its research design was descriptive survey. Orodho (2003) and Fraenkel and Wallen (1993) describe descriptive survey as a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. A survey, according to Kodhari (2003), is a method of securing information concerning an existing phenomenon from all or a selected number of respondents of the concerned universe. From the sample results the researcher generalizes or makes claims about the population (Cresswell, 2003). The study was descriptive because it looked at the various aspects of a phenomenon that already existed, namely teacher and student motivation influencing teaching and learning in sub-county secondary schools in Bungoma County. Class teachers and class prefects of Form I-IV each responded to a questionnaire and the principals were interviewed to get their views on the role of curriculum practices on teaching and learning. However, Kodhari (2003) says the main weakness of descriptive survey is that it may give low response rates especially in mailed questionnaire

The target population was 175 principals, 1433 class teachers and 2865 class prefects of the 175 sub-county secondary schools. The sample size selected for this research from the study population was 782. Using purposive and simple random sampling, a sample of 44 principals, 369 class prefects and 369 class teachers was chosen to participate in the study as respondents.

This study used questionnaires and interview schedules to elicit responses from the study subjects. The questionnaire titled class teachers and class prefects was used to gather data for this study. Interviews were scheduled for the principal to get qualitative data. Gay (1992) maintains that questionnaires give respondents freedom to express their views and their opinions and also make suggestions. According to Nzubuga (2000), qualitative data gives the researcher much information and helps them identify significant factors to measure.

The researcher conducted a pilot study in the neighbouring county using 2 schools to establish reliability of research instruments through the test re-test method. To validate the research instruments the researcher used the technique of content validity which showed whether the test items represented the content that the test intended to measure (Borg and Gall, 1989). Content validity ensured that the instruments covered all the

areas to be examined. Two supervisors from the department of curriculum, instruction and Educational Media, and colleagues, Moi University scrutinized the instruments and made necessary adjustments so that the instruments were adequate and able to elicit adequate data. Validity was also further ascertained through the results of the pilot study.

Descriptive and inferential statistics was used to analyse data. Results from quantitative data were presented by use of frequencies correlation coefficient and chi-square while qualitative data were recorded, grouped in themes and findings reported. Data were analysed using Statistical Package for Social Sciences (SPSS v. 20) for easy interpretation.

III. RESULTS AND DISCUSSION

Analysis of the influence of teacher and student motivation on teaching and learning

The objective of the study was to determine the influence of teacher and student motivation on teaching and learning. To achieve this objective, respondents were asked to react to several statements concerning the schools' motivation of teachers and students. The findings are indicated in table 1.

The findings in table 1 indicate that 64.7% of the class teachers and 38.5% of the class prefects rejected the statement that **my school uses reprimands as an incentive to make us improve academic performance**. 4.6% of the class teachers and 15.7% of the class prefects were undecided. 30.7% of the class teachers and 45.8% of the class prefects supported the statement.

Regarding the statement that **teachers and students are publicly praised by my school**, 45% of the class teachers and 15.8% of the class prefects rejected it 2.7% of the class teachers and 10.3% of the class prefects were undecided, while 52.4% of the class teachers and 74% of the class prefects accepted it.

My school provides material rewards was rejected by 29.3% of the class teachers and 21.1% of the class prefects, 3.5% of the class teachers and 13.0% of the class prefects were undecided, while 67.3% of the class teachers and 65.9% of the class prefects supported the statement.

My school uses class and staff meetings to praise teachers and students. This statement was rejected by 20.9% of the class teachers and 41% of the class prefects. 4.6% of the class teachers and 10.8% of the class prefects were undecided. 74.5% of the class teachers and 48.2% of the class prefects supported the statement.

My school celebrates teachers' and students' achievement was rejected by 27.1% of the class teachers and 20.4% of the class prefects, 2.4% of the class teachers and 10.6% of the class prefects were undecided and 70% of the class teachers and 69.1% of the class prefects accepted the statement.

The statement that rewards provided by my school motivates me was rejected by 31.5% of the class teachers and 21.9% of the class prefects, 1.9% of the class teachers and 9.8% of the class prefects were undecided, and 66.7% of the class teachers and 68% of the class prefects supported the statement.

Table 1 Analysis of the views of respondents on school' motivation of teachers and students
N = 369 N = 369

Statement	Respon dent	SD	D	UD	A	SA	TOTAL	MEAN RATE
		F %	F %	F %	F %	F %	F %	
My school uses reprimands as an incentive to make us improve academic performance	C.TR3	157	82 22.2	17 4.6	84 22.8	29 7.9	369	2.31
	C.PRE	42.5	67 18.2	58 15.7	92 24.9	77 20.9	100	3.07
		75					369	
Teachers and students are publicly praised by my school	C.TR3	37	129 35.0	10 2.7	143 38.8	50 13.6	369	3.11
	C.PRE	10.0	36 9.8	38 10.3	149 40.4	124 33.6	100	3.86
		22					369	
My school provides material rewards	C.TR3	38	70 19.0	13 3.5	205	43 11.7	369	2.94
	C.PRE	10.3	30 8.1	48 13.0	55.6	111	100	3.62
		48			132	30.1	369	
My school uses class and staff meetings to praise teachers and students	C.TR3	22	55 14.9	17 4.6	193 52.3	82 22.2	369	2.94
	C.PRE	6.0	77 20.9	40 10.8	110 29.8	68 18.4	100	3.62
		74					369	
My school celebrates teachers' and students achievements	C.TR3	17	83 22.5	9 2.4	166 45.0	94 25.5	369	3.64
	C.PRE	4.6	36 9.8	39 10.6	136 36.9	119 32.2	100	3.70
		39					369	
Rewards provided by my school motivates me	C.TR3	49	67 18.2	7 1.9	135 36.6	111 30.1	369	3.52
	C.PRE	13.3	41 11.1	36 9.8	126 34.1	125 33.9	100	3.68
		40					369	
		10.8					100	

The response categories were: 1=strongly Disagree, 2 = Disagree, =Undecided, 4 = Agree and 5=strongly Agree.

Table 2 Correlation coefficient of the curriculum practices for the class teachers' responses.

Curriculum practice	Correlation with KCSE Mean score (2008-2012)		N
	Correlation coefficient (r)	significance	
Motivation of teachers and students	0.159	0.002*	369

*Significant at p<0.05

The study sought to determine the influence of curriculum practices namely, motivation of teachers and students on teaching and learning in district secondary schools in Bungoma County. To accomplish this, a correlation analysis was conducted to determine whether there was a significant correlation between KCSE means scores for the period 2008 to 2012 and the mean scores obtained from the perceptions of respondents (class teachers and class prefects) on the curriculum

practices. The results are presented in table 2 and 3 for the class teachers and class prefects respectively.

The results in table 2 revealed that there were significant correlations, at p<0.05 between the KCSE mean scores (2008-2012) and motivation of teachers and students. The correlation coefficient was positive, meaning it influences teaching and learning as expressed in terms of KCSE performance. The positive value means that the more adequate the motivation of

teachers and students the higher the quality of learning and teaching in district secondary schools in Bungoma County.

The findings in table 2 imply that schools putting more emphasis on this variable could record more improved KCSE mean scores than those putting less emphasis on it. Again this confirmed that effective schools were characterized by strong instructional leadership, clear and focused communication, adequate provision and management of teaching and learning resources and appropriate motivation of teachers and students as was also noted by Lezotte (2010). However, it should be noted that the correlation coefficient, r , was low, meaning that although significant, the relationship was weak. The results in table 3 shows that there was no significant correlation at $P < 0.05$ between KCSE mean scores (2008-2012) and the motivation of teachers and students with a significance level $= 0.717 > 0.05$). The r in this variable was low, (0.019), which was close to $r = 0.0$, meaning it has very low influence on teaching and learning. These results could imply that motivation do not necessarily translate into high quality teaching and learning. On motivation, Sheppard (1996) says that providing incentives did not account for variance in teachers' innovativeness at the high school level. Sheppard concludes that incentives given by high school principal have less impact on instruction.

Table 3 Correlation coefficient of the curriculum practices for the class prefects' responses

Curriculum practice

**Correlation with
KCSE Mean score
(2008-2012)**
0.019 0.717* 369

Motivation of teachers and students

*Significant at $p < 0.05$

The Chi-square results for curriculum practices influencing teaching and learning

The study sought to determine how curriculum practices influenced teaching and learning in district secondary schools in Bungoma County. To accomplish this, Chi-square was used to test the influence of motivation of teachers and students on the quality of teaching and learning as expressed in terms of KCSE performance. The results of the analysis are summarized in table 4 and 5 for the class teachers and class prefects respectively.

Table 4 Chi-square of the curriculum practices for the class teachers' responses

	Motivation of teachers and students
Chi-Square	214.103 ^d
Df	22
Asymp. Sig.	.000

Table 5 Chi-square of the curriculum practices for the class prefects' responses

	Motivation of teachers and students
Chi-Square	242.992 ^c
df	24
Asymp. Sig.	.000

The null hypothesis was: there is no significant relationship between schools' motivation of teachers and students and teaching and learning.

Chi-square was used to test the effect of schools' motivation of teachers and students on teaching and learning. The findings in table 4 and 5 show that there was significant relationship between schools' motivation of teachers and students and teaching and learning at $P = 0.000 < 0.05$. The study therefore rejected the null hypothesis and concluded that motivation of teachers and students significantly affects teaching and learning. Job satisfaction is the extent to which an employee feels about his or her job (Denvir, 1992). According to Abbassi and Hollman (2000), individuals with high levels of job satisfaction would have healthier physical and psychological records that very likely result in higher productivity and effectiveness in their job performance and are willing to stay longer in an organization. However, these results contradict the findings of Sheppard (1996) who says that providing incentives did not account for variance in teacher innovativeness at the high school level.

Regarding the responses of the principals in the qualitative study, they gave the following on the effect of motivation of teachers and students on teaching and learning:

Question 16: Describe what you think motivates teachers in your school?

All the interviewed principals indicated that they all motivated their teachers and students although using varied strategies and at different levels. According to them, the common strategies used to motivate teachers were: praised for good performance, monetary motivation, promotion opportunities, letters of recommendations, awarded certificate of merit, attend seminars, sponsored for in-service courses, free meals, academic trips and creation of cordial relationship between students, teachers and support staff. As regards students, strategies used to motivate them include: praised for good performance, monetary rewards, awarded certificate of merit, adequate and balanced diet, academic trips and entertainment. However, it was noted that motivation strategies though present in schools, the findings indicated that only a few schools use most of them. To increase teachers and students' teaching and learning satisfaction respectively, all these factors need to be incorporated in the teaching and learning process. They need to be developed and concentrated on to enrich teaching and learning. One principal felt that he motivated

teachers to make changes in technology through promising a new computer. The principal stated that:

“And then there are times, it has been common, where I say, “Hey I want to make a transition to an electronic based instructions, do I have any volunteers” with the seven or eight volunteers I told them that I was going to get them new computer for volunteering. The next year I pushed everyone onto it, but I had seven or eight coaches now. I had seven or eight people who were saying, “Hey this is great. This is what it did for my efficiency and my time”.

Motivation of teachers and students as indicated by the principals creates a sense of focus, commitment and recognition.

Question 17: Tell me about the collegial relationships teachers in your school have with one another.

All the principals interviewed said that generally the collegial relationship between teachers is cordial. They also indicated that teachers in their schools mostly talked about academic performance of students, the school and in subjects, performance of neighboring schools, educational policies, their own welfare, classroom experiences and student’s discipline. The principals also indicated that teachers shared instructional approaches with each other. Such approaches included: team teaching, pool marking, observing each other teach in class, departmental scheming, and peer coaching and standing in for one another when absent or committed. Sharing instructional approaches among teachers according to the principals, had the following effects: enhances syllabus coverage, creates variety in teaching skills, reduces missing of lessons, enhances staff unity, creates interest among learners as different teachers use different teaching approaches, team marking and setting ensures fairness in marking and setting. Sharing of a class increases teacher-student contact and creates effective teaching because through team teaching teachers handle only areas they are comfortable with.

Internal inspection identifies one’s weaknesses and strengths and recommends for appropriate measures. Sharing of lessons increases span of consultation, breaks monotony of being taught by one teacher, creates competition among teachers over teaching and subject performance and improves on class control. Common schemes harmonize teaching and learning.

IV. SUMMARY AND CONCLUSIONS

The study sought to determine the influence of curriculum practice namely motivation of teachers and students on teaching and learning in district secondary schools in Bungoma County. To accomplish this, a correlation coefficient and chi-square analysis was conducted to determine whether there was a significant relationship between KCSE means scores for the period 2008 to 2012 and the mean scores obtained from the perceptions of respondents (class teachers and class prefects) on the curriculum practices.

The results according to the correlation coefficients and chi-square and qualitative data revealed that there was significant relationship between the KCSE mean scores (2008-2012) and motivation of teachers and students. The correlation coefficient for this variable was positive, meaning it influences teaching and learning as expressed in terms of KCSE performance. The

positive value means that the more adequate the motivation of teachers the higher the quality of learning and teaching in sub-county secondary schools in Bungoma County. However according to the students there was no significant correlation between motivation and teaching and learning.

According to teachers, these findings imply that schools putting more emphasis on this variable could record more improved KCSE mean scores than those putting less emphasis on it and effective schools were characterized by strong motivation of teachers and students. However, it was noted that the correlation coefficient, r , was low, meaning that although significant, the relationship was weak.

It is therefore concluded that motivation of teachers and students is not adequate and is contributing to poor performance of most sub county secondary schools in KCSE.

V. RECOMENDATIONS

Schools to adequately motivate teachers by use of material and verbal rewards.

School administrators to be inducted more on effective managerial skills.

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The Role of Microfinance on Youth Empowerment. An Examination of Theoretical Literature

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Abstract- The strategy of giving micro-loans to the youth for their empowerment more especially the poor youth in the rural areas is very important for the youth as well as the country as a whole. The research studies which have been done on youth empowerment indicates that at least there has been some improvements on their standard of living and that at least some degree of empowerment has taken place in their lives. On the other hand there has been limitations in defining empowerment in economic terms only but the researcher here proposes that its multidimensionality meaning of the concept should be adopted that is, it's meaning in economic, social and political terms. This review of literature has captured the use of power theories that is: power over, power within, power with and power to, at the same time the researcher has applied the Resource, Agency and Achievement theories to explain the empowerment concept of the youth. Finally the researcher has developed a simple conceptual framework where Micro-credit is an independent variable, empowerment as a dependent variable and intervening variables as: culture, economic conditions, and levels of education.

Index Terms- Youth, empowerment, microfinance, micro-credit, financial services.

I. INTRODUCTION

Youth empowerment is a process where young people are encouraged to take control of their lives. They do this by lecturing to their conditions and then take action in order to advance their access to resources and transform their perception through their beliefs, values, and attitudes. It aims at improving the quality of life they live. Youth empowerment can be realized through involvement in youth empowerment programs but some researchers argue that the youth's rights should go beyond learning of formal rights and procedures to create about potential of great concrete experience of rights. According to Kenya National Youth Policy (2006), youths are defined as persons resident in Kenya in the age bracket 15 to 30 years, taking into account physical, psychological, cultural, social, biological and political definitions of the term. Young people represent an important statistical grouping globally. According to United Nations Program on Youth (2012), defines youth as young people between the ages 15 to 35 representing approximately 34% of the global population, nearly 2.4 billion people. In Africa, youth population represents 30%, while in Kenya the youth number is about 9.1 million and account for 32% of the population (World Bank, 2006).

Youth population therefore forms the largest source of human resource (Kirby & Bryson 2008), however, they have been placed on the sideline and not fully utilized for social, economic and political development (Anderson & Sandman, 2009; Jennings 2006; Oliver *et al.* 2006; Roth & Brooks, 2004). Many of the youth who are productive and energetic remain unemployed or underemployed, they continue to suffer from poor health, drugs and substance abuse and lack sufficient support from the government. As a result, they are stuck in a "low productivity, low income, low wealth, vicious cycle of poverty etc. (Gilead, *et al.* 2008). The Heads of States and Governments in the United Nations' Declaration at the beginning of new Millennium resolved, among other things, "to develop and implement strategies that give young people everywhere a real chance to find decent and productive work." The Secretary General of the United Nations, in his report to the Millennium Assembly, highlighted the need to explore imaginative approaches to this difficult challenge (UN, 2000).

1.2 The Theory of Empowerment.

Empowerment theory focuses on processes that enable participation, enhance control through shared decision making, and create opportunities to learn, practice, and increase skills. Empowerment theory suggests that engaging youth in pro-social, meaningful, and community enhancing activities that the youth themselves define and control, helps youth to gain vital skills, responsibilities, and confidence necessary to become productive and healthy adults. According to (Kabeer 2005), "empowerment refers to the processes by which those who have been denied the ability to make life choices acquire such ability". From the above definitions, empowerment can be said to be an ongoing change process that involves self-determination through the making of choices that can improve a person's wellbeing. UNIFEM on the other hand suggests that youth economic empowerment should be defined as "having access to and control over the means to make a living on sustainable and long term basis and receiving the material benefits of this access and control (Carr 2000, and Mosedale 2005). Kabeer (2005b) argued that "for an individual to make meaningful choices, there must be alternatives and these alternatives must be seen to exist". Eventually, the youths should be free to make their choices and be responsible for the choice they make. In other words, resources plus agency makes achievement possible. Achievement is defined as the potential for a person to live a life the person wants.

The authors correctly note that loans can be a tool for reinforcing the negative impacts of channeling, or for alleviating them, depending on the context and especially how they relate to magnifying or reducing the negative impacts of scarcity and its taxation. This insight forces us to think differently about the

decayed and perhaps reckless critiques of micro-loans centered on how some of the funds officially sanctioned for starting or expanding small businesses are in fact used for other purposes, which may not help to empower the youth, or bring any economic benefit to the youth, usually defined as “consumption.” In fact, some studies that have found out that up to 40% of the funds clients receive in the form of micro-loans are not used for investment in business, or for the purpose on which they were meant. Studies indicate that more of this money is being misused and this results to statistics that are sometimes used to undermine the importance for microcredit to the youth. This critique loses some of its power when viewed through the behavioral economics lens. If micro-loan proceeds are not directly invested in a business ventures that are used to provide extra revenues to be used to reduce scarcity and the negative behaviors it leads to, or pay off high-interest debts accumulated in the past then it may be of no use to the youth.

1.3 Definition of terms:

1.3.1 Empowerment:

According to (Kabeer 2005), “empowerment refers to the processes by which those who have been denied the ability to make life choices acquire such ability”. Empowerment is a process that strengthens and activates the capacity of the youth to satisfy their own needs, solve their own problems, and acquire the necessary resources to take control over their lives. Empowering the youth is important because empowerment leads to competence and confidence, which, in turn, are linked to self-esteem and self-actualization. The word empowerment has different meanings and variations in different contexts. Some words that would come up as one seeks to define empowerment are words such as: self-reliance, self-power, ability to make choices, potential, self-rule and the list goes on, these are entrenched in the belief system. Empowerment is therefore fundamental and has influential value in many levels, it can be relevant in political or social levels, economic and can be relevant collectively or to an individual level. As people experience increased power of choice, an increased power in control of their lives happens simultaneously. The term “empowerment” therefore means to give somebody the power or authority to do something (Oxford Dictionary). It is a course of action by means of which the youth takes ownership and control of their lives through extension of their selections.

Definitions of empowerment for a long period of time has been limited to only one meaning of economic empowerment but this is not the case, empowerment is a multidimensionality concept, which may be measured by many indicators. Further ESPS stress that, women’s empowerment is a multidimensional concept, which intends to measure many abilities in an individual. It intends to measure youth’s ability to control resources, their ability to choose and control different outcomes, their self-esteem, their educational levels, their employment status, and their autonomy and status in society etc. are commonly used to capture youth empowerment. Kabeer (2001), whose definition is the most extensively accepted, defines empowerment as “the development of people’s ability to make strategic life choices in a context where this ability was formerly denied to them”. (Ismail et al, 2011) described empowerment as “a process whereby the youth become able to organize

themselves to increase their own self-reliance, to assert their independent right to make choices and to control resources which will assist in challenging and eliminating their own subordination”.

Empowerment therefore, refers to individuals, families, organizations, and communities gaining control and mastery, within the social, economic, and political contexts of their lives, in order to improve equity and quality of their life (Zimmerman 2000). According to (Pigg 2000) defines empowerment as “the development of individual leadership skills and knowledge regarding the practice of leadership, and formal recognition by the community. Empowerment seeks to oppose oppression and marginalization, it can be viewed as a process of increasing interpersonal or political power so that individuals can take action to improve their life situation (Gutierrez, 1990).

1.3.2 The Youth:

This is a defined group, “the youth” describes boys and girls who find themselves in a transition phase from childhood to adulthood, in the age between 15 and 24 years (World Bank, 2011). In reality, some people can due to their behavior and life circumstances belong to the youth even when they are younger than 15 years or slightly older than 24 years. Different cultures and communities define youth based on influences of previous understanding of the same terminology, this was stated in a conference held in Abuja Nigeria, and the conference was geared toward the young people trying to define their role in the society. The Macmillan dictionary on the other hand states the definition of youth as “the time of one’s life when they are young”. In Kenyan society, the reference to youth is made of an individual, who is at least 15 years of age, but no more than 30 years. In this African context, it is believed that any one above the age of nineteen is of a consenting opinion; hence assuming adult responsibilities and is therefore accountable for all his or her actions. The definition of youth is relatively subjective, can be influenced by economical, demographical, cultural, and to an extent gender.

1.2.3 Youth Empowerment:

Youth empowerment means creating and supporting the enabling conditions under which young people can act on their own behalf, and on their own terms, rather than at the direction of others. It can be regarded as an attitudinal, structural, and cultural process whereby young people gain the ability, authority, and confidence to make decisions and implement change in their own lives and the lives of other people, including both youth and adults. In fact, the youth can be considered as empowered when they themselves acknowledge that they have created, or can create, choices in life, and they are aware of the implications of those choices, make informed decisions freely, take actions based on those decisions, and accept responsibility for the consequences of those actions (Commonwealth Secretariat, 2007). The YES (2011) defines “youth empowerment” as the outcome by which youth, as change agents, gain the skills to impact their own lives and the lives of other individuals, organizations and communities. The Youths that are empowered using the YES empowerment model continue to create community change throughout their lives. The YES’s definition

of youth empowerment at the individual level is “exercising power over one’s life by being skilled, critically aware, and active in creating community change”. The YES’s definition of youth empowerment at the organizational level is the implementation of a culture, vision, and system that supports youth empowerment at the individual level. Empowerment and capacity building enable a person to have a voice, gives him or her the encouragement that their voice has a right to be heard, and give them hope for tomorrow in that their skills are sharpened and hence allowing them to access the future economic opportunities. We also mean that they have increased interpersonal power to influence their future. It is about supporting to bring change and increasing opportunities thereby enable the potentials of these youth to be realized.

In response to the worldwide phenomenon of young men and women calling for meaningful civic, economic, social and political participation, UNDP’s Youth Strategy 2014-2020 recognizes the involvement of young men and women in participatory decision-making and development processes is vital to achieving sustainable human development. Identifying developmental challenges and issues facing youth today, the strategy offers recommendations for strategic entry points and engagement of a broad range of partners in addressing youth empowerment. UNDP supports the capacity development of young people and youth-led organizations, and the development of youth caucuses in government, parliament and other bodies. We engage with relevant stakeholders through outreach, advocacy, through leadership, global networks, and policy debates, in particular in the context of the post-2015 development agenda and the Sustainable Development Goals. We also support the mainstreaming of youth issues in development planning and inter-ministerial and inter-sectorial coordination. UNDP promotes: i) Inclusive youth participation in effective and democratic governance. ii) Economic empowerment of youth. iii) Strengthened youth engagement in building resilience in their communities and iv) Inclusion of youth in the future development agenda, through consultations and discussions.

1.3.4 Aims of empowerment.

Youth empowerment programs are aimed at creating healthier and higher qualities of life for underprivileged or at-risk youth. The five competencies of a healthy youth are: (i) Positive sense of self, (ii) Self-control, (iii) Decision-making skills, (iv) A moral system of behavior and (v) Pro-social connectedness. Developmental interventions and programs have to be anchored on these competencies that define positive outcomes of healthy youth.

1.3.0 Forms of empowerment programs for the youth:

This helps young people to look beyond their personal needs and interests to see their relationship to a collective groups, organizations and communities (Listen 2000), has developed seven key forms of empowerment through community Art, plus five other forms from the researcher: these are as follows in detail:

1.3.1 Youth empowerment through collaboration.

Youths were empowered from gaining social capital in the form of building relationships through collaboration, teamwork,

mentorship, and community participation. (Michael Mosher 2012) In his article, Painting Material Culture: Community Art Research in Saginaw, Michigan, says, “A community in democratic politics in the best sense of the word collaboration, is a process of incorporation of many voices, addressing multiple agendas and needs in which everyone benefits” (Mosher, 2012). Of the participating youths, 77% indicated that they enjoyed working with others on this project, while 74% agreed or strongly agreed they would like to work with others on a project in the future, and 56% agreed or strongly agreed they would be more likely to participate in a community project in the future. Thus from this study we can tell that at least over 75% of all the youths are ready and they enjoy to work as teamwork in collaboration with the mentors and they are ready to participate in community service and both leads to youth empowerment.

1.3.2 Youth empowerment through accomplishment of a task:

Youths can be empowered through building self-esteem, which resulted from the students having tremendous pride for their accomplishment of the completed work done, and from having acted in an important part in the work process. It can be seen that most of the youths are shy and unsure of speaking up or coming forward to discuss an issue. They need to be pushed due to lack of confidence in themselves and because they grew up when they were out of their comfort zone. When the youth participate in a project and at the end of it they are able to come up with something good, they feel proud and build up their confidence having realized that they could do something meaningful and important, and that their opinion does matter, and by the end of the project most students are able to express themselves even more.

1.3.3 Youth empowerment through Leadership opportunities:

Youths are empowered through participating in leadership opportunities. Developing leadership skills among youth members is critical to community organizing and also important to passing on the legacy of engagement to youth (Bobo, Kendall & Max, 1996). Youth participation is the process of young people contributing to decision-making that affect their lives and communities, the youth are given the opportunity to make-decisions, give opinions, and give direction and take control. (Checkoway & Gutierrez, 2006). Researchers argued that youth participation can have multiple developmental benefits. (Walker & Pearce 2005; Quane & Rankin, 2006; Zeldin, Camino & Calvert 2003). They suggest, for example, that it can foster empowerment, autonomy, competence, and provide a safe space to explore identity through meaningful roles. Youths given the opportunity, a piece of knowledge acquired about leadership increases their ability to release control to other persons, who always can be in charge and people don't mess things up, and therefore it is important to relinquish some of the control to other people, so that others can get the opportunity to learn and acquire more skills.

1.3.4 Youth Empowering through Building skills:

Youths were empowered through gaining social capital from building skills and participating in a complex process. Youths have the power to acquire skills as they participate in various projects. They have many choices of how to participate

in various projects including: design team, photo documentation, project planning, team leadership, fundraising, contributing themes and ideas, painting, drawing, and participating in evaluation, (Mosher 2012). By doing the above activities the youth do build capacities which finally empower them economically.

1.3.5 Youth Empowerment through Creation of a meaningful place:

By creating a meaningful place through the expression of a shared identity and experience, youths are empowered. Through creative place making, the youth discover a place that matter to them. In their article, (Kenneth Temkin and William Rohe 1996) in their article, Neighborhood Change and Urban Policy “Social mobility and spatial mobility are inherently intertwined”. Youths were able to express what matters to them and let that become public knowledge. The youth’s voices became publicized, and were made vulnerable to them being seen and heard. Young people are not accustomed to their opinions and stories being recognized and acknowledged, and their project attempted to shed light on youth voices and ideas, and to validate those as important and worthy of being told through a painting. This is a case where the story was a collective of shared ideas and inspirations. The youths had recognition, hope and belief and learned to set goals that are extremely challenging.

1.3.6 Youth empowerment through project ownership.

Youths were empowered through gaining a sense of project ownership. Ownership of the project is achieved through youths participating in planning and decision making. One way of creating a sense of ownership is to have certain teams being in charge of specific areas of the project. Many youths need to take ownership of certain areas of the project or certain aspects of planning. For example, a youth may take ownership of the fundraiser in planning its logistics, take ownership of some assets like estates etc.

1.3.7 Youth empowerment through levels of responsibility and accountability:

Youths can be empowered through having high levels of responsibility and expectation placed on them, and for being accountable for the process and final product. Only when youths have a high stake and high responsibility, can they build skills to become agents of change. Youths are empowered, but their level of involvement in the project and their direct involvement with decision making are intrinsically connected to the level of empowerment obtained.

1.3.8 Youth empowerment through entrepreneurship:

An entrepreneur is a person who sets up a business or businesses, taking on financial risks in the hope of profit making (oxforddictionaries.com). Lazear (2005) emphasizes that entrepreneurship requires the ability to combine resources simultaneously and efficiently. Entrepreneurs need to be “jacks-of-all trade”, When these three factors are fully integrated within youth planning and programmes, youth empowerment tends to be much more of a realized objective and the benefits to the youth and the society at large are enormous (Anderson & Sandmann, 2009). Another variable to consider here, in the quest

for youth empowerment in Kenya, is the 2010 Kenyan constitution, in the Bill of Rights, there is a specific application of rights for the youth. If applied as it reads, it provides not only the best policy guidance of what needs to be done to successfully accomplish youth engagement and development, but also a firm legal foundation for challenging the government if it fails to do so.

1.3.9 Youth empowerment through Education:

Education is the next important area for engaging the youth and for youth development. In fact, youth access to relevant education and training is also entrenched in the 2010 constitution of the government of Kenya. Beyond building human capital to raise worker productivity, another institutional function of education and training is to provide young people with what they need to become effective agents of change. In order to find a decent job, for example, the youth need to develop a range of skills and knowledge that are typically gained through education and training. Moreover, a reduction in youth inequality is determined, to a significant extent, by the quality of education and training that youth receive (United Nations Human Settlements Programme, 2010).

1.3.10 Youth empowerment through employment:

In Kenya and the world at large, youth unemployment is a major development challenge, governments have attempted to tackle this challenge through several initiatives. participating in the consultative forum of the Youth entrepreneurship and sustainability, Kenya Network, which is a national youth multi-stakeholder network involved in promoting youth entrepreneurship and employment in Kenya; entertaining the notion of a Youth Employment Marshall Plan in 2009, which was to incorporate various projects: organizing and hosting a National Youth Employment Conference in 2009 whose objectives included the formulation of policy recommendations to provide an enabling environment for youth employment creation, and the identification of areas and measures to create large-scale employment opportunities for the youth in the short term; and actively supporting the March 2010 launch, and partnering thereafter, in the efforts of the Kenya Youth Empowerment and Employment Initiative, which is an initiative, under the leadership of Africa Nazarene University, whose goals are to prepare youth for the world of work and to facilitate job creation in Kenya and the East Africa region, if possible. Economic growth generates job opportunities and, hence, stronger demand for labour, the main and often the sole asset of the youth. In turn, increasing employment has been crucial in delivering higher growth. This relationship between growth and employment remains robustly positive despite recent signs of ‘jobless growth’ in Kenya and elsewhere. But even in circumstances of a weakening relationship between growth and employment, this may suggest a stronger rationale for a higher growth strategy in the future.

1.3.11 Youth empowerment through Training.

Feigenberg et al., (2011) underscored that, entrepreneurship education is a lifelong learning process, starting as early as elementary school and progressing through all levels of education, including adult education. Robinson (2001) drew a

boundary around entrepreneurship education as comprising the following three components: First, personal development: entrepreneurship education should build confidence, motivate progress, strengthen the entrepreneurial mind-set, foster a desire to achieve and inspire action. Second, business development: Technical, financial literacy and skills to engage in self-employment, and entrepreneurship that can lead to self-improvement. This would include the expected business and functional curricula. Finally, entrepreneurial skills development, entrepreneurship education should provide training in social skills, networking, creative problem solving, opportunity seeking, selling, interviewing, presentations, group leadership, community co-operation, dealing with bureaucracy, local cultural norms and how they affect business, etc.

Youth organizations have come up with innovative programmes to address the youth's economic needs, health interventions, especially those aimed at reproductive health and alleviating the spread of HIV/AIDS among the youth, environmental programmes, and character building programmes, literacy, vocational training, sports and recreational as well as social-cultural programmes. However, the following constraints have hampered their effectiveness in achieving their objectives: i) Pressure from the high population growth: The high population growth, currently standing at 2.5% as per 2005 census puts pressure on available resources as the number of young people keeps on rising. ii) Lack of appropriate skills: The 8-4-4 education system and tertiary training institutions continue to release thousands of graduates, who are neither properly equipped for entry into the labour market nor possess the necessary life skills. iii) Unclear and uncoordinated youth policies and programmes: While a number of Government Ministries and youth organizations have their own programmes and sectoral youth policies, lack of a national youth policy and effective co-ordination mechanisms hamper their effectiveness. iv) Resource Constraints: Most of the youth programmes, run by both the Government and Non-governmental agencies lack adequate funds and equipment, which limits their success. v) Low status given to youth: Existing structures and prevailing attitudes do not provide an enabling environment for youth participation in decision-making, planning and implementation processes.

1.3.12 Youth adult relationship are another type of empowerment method used around the world. This method has been defined as a developmental process and a community practice. The partnership involves people of different ages working together on community issues over a period of time. The method emphasizes reciprocity among adults and youth with a focus on shared decision making and reflective learning. The concept of shared control is key for empowering youth. Youth empowerment has also been used as a framework to prevent and reduce youth violence. Research shows that these youth empowerment programs can improve conflict avoidance and resolution skills, increase group leadership skills, and civic efficacy and improve ethnic identity and reduce racial conflict.

1.4 The discoveries of empowerment on the youth.

The research studies done on youth empowerment have come up with the following thinking about the same, they are as follows:

1.4.1 Benefits of Empowerment:

The practice of youth involvement and empowerment became entrenched within the organizational culture and the community culture. Adults and organizations also benefit from empowerment programs. Both become more connected and more responsive to youths in the community, which leads to program improvements as well as increased participation from youth, the youth gains competence through the acquired skills, increase in incomes, and increase in quality in performance, increased leadership, increase in the ability to participate in decision making etc.

1.4.2 Critiques of youth empowerment.

One major critique of the youth empowerment is that most programs take a risk-focus approach. There has been a major emphasis on what is going wrong with the youth in their lives rather than what goes right. This portrays young people as a problem that need to be fixed, and displays the process of development as a process of overcoming risk. This may discourage youth from joining youth development programs. The risk-based model can obscure the fact that adolescence is a time when young people master skills and concepts.

1.5. Microfinance.

Microfinance can be broadly defined as: The provision of small-scale financial services such as savings, credit and other basic financial services to the poor and low income people. Although the word is literally comprised of two words: micro and finance which literally mean small credit; the concept of microfinance goes beyond the provision of small credit to the poor. Christen (1997) defines microfinance as the means of providing a variety of financial services to the poor based on market driven and commercial approaches. This definition encompasses provision of other financial services like savings, money transfers, payments, remittances, and insurance, among others. However many microfinance practices today still focus on micro-credit, providing the poor with small credit with the hope of improving their labour productivity and thereby leading to increment in household incomes. Micro-finance promises not only to break the vicious cycle of poverty by injecting liquidity into the vicious cycle, but also it promises to initiate a whole new cycle of worthy spirals of self-enforcing economic empowerment that leads to increased household well-being. That is the theory that has promoted the microfinance institution and given it the "polite and respectable" image it currently enjoys. Micro-finance began in 1970's when social entrepreneurs began lending money on a large scale to the working poor, (Grameen Bank 2007). Therefore, micro-finance is the provision of financial services to low income clients or solidarity lending groups including consumers and the self-employed who traditionally lack access to banking and related services. Lack of access to affordable financing is perceived as being one of the biggest obstacles for younger people to start their own business (Greene, 2005; Llisterra 2006).

Lenton and Mosley (2011) described financial exclusion as the inability of low income people to access mainstream financial services. Micro-finance is unique as an economic process that can flourish successfully in particular, difficult economic conditions, including lack of infrastructure, deficient macroeconomic policies, and low levels of national growth (Bernal-Garcia, 2008). Youth make up the bulk of these low income earners and most of them are unable to access financial services as the majority live in rural areas. Micro-finance refers to the financial services designed to meet the needs of the poor and low income individuals, particularly in developing countries, with a view to fighting poverty and financial exclusion (Robinson, 2001). Lenton and Mosley (2011) described financial exclusion as the inability of low income people to access mainstream financial services. Micro finance came into being from the appreciation that micro entrepreneurs and some poorer clients can be bankable, that is, they can repay both the Principal and interest on time, and also make savings, provided financial services are tailored to suit their needs. (Yunus 1998) establishing Grameen bank in 1983, Muhammad Yunus sought to realize his vision of self-support for the poorest people by means of loans on easy terms. The bank has since been a source of inspiration for similar microcredit institutions in over one hundred countries. Grameen bank works on the assumption that even the poorest of the poor can manage their own financial affairs and development given suitable conditions.

According to the UNCDF (2004) there are approximately 10,000 MFIs in the world but they only reach four percent of potential clients, about 30 million people. On the other hand, according to the (Microcredit Summit Campaign Report 2004) as of December 31st 2003, there were 2,931 microcredit institutions that we had data on, reported reaching "80,868,343 clients, 54,785,433 of whom were the poorest when they took their first loan". Even though they refer to microcredit institutions, they explain that they include "programs that provide credit for self-employment and other financial and business services to very poor persons" (Microcredit Summit, 2004).

1.5.1 Background of Microfinance.

According to Khan and Rahaman (2007) Microfinance is not a new development. Its origin can be traced back to 1976, when Muhammad Yunus set up the Grameen Bank as experiment on the outskirts of Chittagong University campus in the village of Jobra, Bangladesh. The aim was to provide collateral free loans to poor people, especially in rural areas, at full cost interest rates that are repayable in frequent instalments. The inspiration of Grameen Bank came to Yunus' mind when he lent the equivalent of between US\$26 to US\$46 to exploited women and others who were working as bamboo furniture makers. He saw that the women were enthusiastic about it and paid back their loans in full and on time. According to Sarkar (2001), Professor Muhammad Yunus observed that conventional banking practices had in-built constraints and were aimed only at those who were already well off. In this context, Professor Yunus contemplated an alternative institutional framework that could be used to raise the wellbeing of impoverished sections of society. The hypothesis was that, if financial resources were made available to the poor at reasonable terms and conditions, the poor could generate productive employment without external

assistance. The Grameen Bank is now a very distinct poverty alleviation organization, exclusively for the poor. By definition, it is purely a bank and provides banking services to the poor including the youth. Although it is a poverty alleviating organization, it is designed to run on commercially viable terms. It extends credit to the poor to invest in productive areas such as processing, manufacturing, agriculture, forestry, livestock, fisheries, services and trade. Although its primary responsibility is to provide credit, it has involved itself in different social development activities as well. Sarkar further states that as per December 1999, 1,149 Grameen Bank branches were operating in 39,706 villages with 67,691 centers. There were 2,357,083 members, of which 2,234,181 were female and 122,902 male (Grameen Bank 1999). The Grameen Bank's main objectives according to Sarkar, (2001) are: i) Extending banking facilities to poor men and women. ii) Eliminate the exploitation by moneylenders. iii) Create opportunities for self-employment among Bangladesh's vast and underutilized manpower resources.

1.5.2 Main objectives of Microfinance.

Microfinance is a type of banking service that is provided to unemployed or low income individuals or groups who would otherwise have no other means of gaining any financial services. Ultimately, the goal of microfinance is to give low income people an opportunity to become self-sufficient by providing a means of saving money, borrowing money and insurance policy to protect their investments. The goals of MF banks are as follows: i) To provide diversified, trustworthy and timely financial services to the economically active poor. ii) To mobilize savings for financial intermediation. iii) To create employment opportunities. iv) To provide real revenues for the administration of the micro-credit program of government and high net worth individuals. v) To provide payment services such as salaries, gratuities and pensions on behalf of various tiers of government. vi) To engage the poor in the socio-economic development of the country, vii) Self-sufficiency for talented youth entrepreneurs, viii) Breaking of poverty cycle, ix) facilitating and encouraging entrepreneurial spirit in quest for self-reliance and x) economic empowerment through business expansion and growth.

1.5.3 Major Principles of Microfinance.

i) The poor need a variety of financial services, not just loans. Each one needs a wide range of financial services that should be elastic, suitable and realistically priced. The poor do not always insist in cash loans only they also need medical insurance, rampant and cash transfer etc.

ii) Microfinance is a powerful instrument against poverty: It is necessary to provide the access of financial services to deprived people for increasing their income, building assets and reduced their liabilities and need to empower against the poverty. iii) Microfinance means building financial systems that serve the poor: Poor people constitute the vast majority of the population in most developing countries. Yet, an overwhelming number of the poor continue to lack access to basic financial services. In many countries, microfinance continues to be seen as a marginal sector and primarily a development concern for donors, governments, and socially-responsible investors. In order to achieve its full potential of reaching a large number of the

poor, microfinance should become an integral part of the financial sector. iv) Financial sustainability is necessary to reach significant numbers of poor people most poor people are not able to access financial services because of the lack of strong retail financial intermediaries. Building financially sustainable institutions is not an end in itself. It is the only way to reach significant scale and impact far beyond what donor agencies can fund. Sustainability is the ability of a microfinance provider to cover all of its costs, allows the continued operation of the microfinance provider and the ongoing provision of financial services to the poor. Achieving financial sustainability means reducing transaction costs, offering better products and services that meet client needs, and finding new ways to reach the unbanked poor.

1.5.4 challenges facing micro-finance.

Yunus (1998) highlights them as follows: i) High costs of service delivery, ii) Poor infrastructure, and iii) Lack of appropriate regulatory oversight, iv) Diversity in institutional form, v) Inadequate governance and management capacity, vi) Limited market outreach, vii) Unhealthy competition, viii) Limited access to funds, ix) Unfavorable image and x) Lack of performance standards etc. (Susan 2012) the chief executive officer of Youth Agenda says that "given the low growth of employment in the formal sector, the growth of micro-enterprise provides the best opportunity for youth livelihood". Susan says the Youth Enterprise Development Fund which was meant to enhance youth participation in socio-economic development through the provision of credit to enable young entrepreneurs to access finances to set up or expand business appears to be failing in this mandate.

1.5.5 Characteristics of Micro-finance:

Empowering small business is the key objective of microfinance, it is to provide means of financing which will enable: small business to expand, create employment and contribute to national development. This makes microfinance to possess the following features; i) Target poor clients who do not have access to formal financial sources, ii) mostly collateral free, iii) MFIs go to clients rather than clients going for MFIs, iv) have simplified savings and loan procedures, v) offers small and repeating loans, vi) repayment considers income from business as well as other sources.

1.5.6 Characteristics of microfinance products:

Microfinance services are aimed at the poor clients who do not have access to formal financial sources. According to Rwanda, 2004 study, the following are the characteristics of microfinance products: i) Small amounts of loans and savings ii) Short loan terms less than one year iii) Payment schedules featuring frequent instalments/deposits. iv) High rates on credit. v) Easy access to the MFI. vi) Simple application forms which are easy to complete. vi) Short processing period between completion of application and disbursement of the loan. vi) Availability of repeat loans of higher amounts for clients who pay on time. vii) Tapered interest rates decreasing interest rates over several loans as an incentive to repay on time. viii) No collateral required, only alternative methods such as individual or group. ix) Guarantees (solidarity groups).

1.5.7 The impact of microfinance on poverty.

Youth poverty in developing countries implies not only the loss of potential human and economic capital, but it exposes produces youth at-risk. Boys and girls who are involved in criminality, violence, substance abuse, drug dealing, risky sexual behavior and prostitution. Thereby, adolescents endanger not only their own well-being and health but also impact the life conditions for the rest of the population (World Bank, 2003). Hence, youth poverty is often caused by poor planning by the government and it is also the reason for youth at-risk. This vicious cycle does not only have negative impacts on the immediate environment, but it also affects the overall development outcome of a country. The strengthened negative development trends, increases the likelihood for and the frequency of youth impoverishment again (Cunningham et al., 2008). Moreover, researchers assume that the risky behavior of the young generation in Latin America and the Caribbean leads to an annual reduction of the economic growth by 2 percent.

Wright (1999) highlights the shortcomings of focusing mainly on increased income as a measure of the impact of microfinance on poverty. He states that there is a HIV/AIDS, malaria and other diseases. He argues that by increasing the income of the poor, MFIs are not necessarily reducing poverty. Youths are high-risk borrowers due to insufficient assets and low capitalization, vulnerability to market fluctuations and high mortality rates. Lack of accounting records, inadequate financial statements or business plans makes it difficult for creditors and investors to assess the creditworthiness of potential SME proposals. To reverse the vicious circle of low income, low savings, low investment, low income, changing it into an expanding system of low income, credit, investment, more income, more credit, more investment, and more income. Microfinance can pay for itself and must do so if it is to reach very large numbers of poor people. Most young people cannot get good financial services that meet their needs because there are not enough strong institutions that provide such services. Strong institutions need to charge enough to cover their costs. Cost recovery is not an end in itself. Orrick further states that the primary goal of micro finance is to reduce poverty in developing countries by providing poor people with basic financial services.

1.5.8 Criticism of micro-finance.

According to Zeller and Meyer (2002), the excitement about the use of micro-finance to empower low income people is not backed up with sound facts. Most micro-finance providers are unwilling to evaluate the appropriateness and effectiveness of such schemes because the requisite process is perceived to be rigorous and expensive. In Zimbabwe, unemployment is one of the most pervasive challenges faced by youths due to the socio-economic and political collapse that characterized the past one and a half decades. Governments and the donors should know whether the poor gain more from small loans than accessibility to good health care, food and infrastructures. Is the support for microcredit a waste or worthwhile? No one knows the appropriate answer. The question is whether microfinance is better than some other development projects for the poor as a whole. The performance of MFIs is based on outreach and sustainability, whereby outreach is the social value of the MFIs in terms of the depth, worth to the users, cost to the users and the

scope. These also include the financial and organizational strength of the lender and the number of products offered including deposits. Operating and financial expenses are high, and on average, revenues remain lower than in other global regions.

Efficiency in terms of cost per borrower is lowest MFIs technological innovations, product refinements, and ongoing efforts to strengthen the capacity of African MFIs are needed to reduce costs, increase outreach, and boost overall profitability. Overall, African MFIs are important actors in the financial sector, and they are well positioned to grow and reach the millions of potential clients who currently do not have access to mainstream financial services. sustainability is performance. The goal is to maximize expected social value less social cost discounted over time. Sustainable MFIs tend to improve the welfare of the poor. Unsustainable MFIs inflict costs on the poor in excess of the gains expected. Therefore sustainability is not an end in itself but a means to the end of improved social welfare. MFIs must prove to be a powerful instrument in reducing poverty, building assets, increasing incomes and reducing their vulnerability to economic stress. Nonetheless the microfinance industry globally is meeting difficulties as funding dries up, misbehaviors arise and disbelievers begin to question its efficiency in driving poverty reduction and development.

1.6. Micro-credit

It is a component of micro-finance and it is the extension of small loans to the youth who are too poor to qualify for commercial bank loans, especially in developing countries. Micro-credit enables every youth to engage in self-employment projects that generate income, thus allowing them to increase their standard of living for themselves and for their families. On the other hand it is generally defined as making small loans available directly to small-scale entrepreneurs to enable them either to establish or expand their micro-enterprises and small businesses (Commonwealth, 2001. Dondo 2001). Micro-credit serves best for those who have identified business opportunity and ability for repayment as agreed. Microcredit empowers the youth by placing money in their hands and allowing them to earn independent income and donate economically to their households and communities, (Cheston and Kuhn, 2002). In theory, the youth invest their own income earning activity, either in the form of a micro enterprise or agricultural production, and therefore their income, which they themselves control and spend increases. In other words, youth involvement in a successful income generating activity should translate into greater control and economic empowerment.

1.7. Micro saving

Village Savings and Loans Associations (VSLAs) relies on local financial mobilization, where groups of 15-30 people meet on a weekly basis to pool their savings and to allocate loans to each other. Savings and loans are made up entirely from the group's own savings. (Douglas 2004) defined micro-saving as consisting of "a small deposit account offered to lower income families or individuals as an incentive to save funds for future use". Micro-savings accounts work similar to a normal savings account, however, it is designed around smaller amounts of money. The minimum balance requirements are often waived or

very low, allowing users to save small amounts of money and not be charged for the service. Micro-saving is an integral component of microfinance. Since long it was a misconception that the poor cannot save. Emergence of microfinance has proved that the poor also have the ability to save. In fact it is their saving capacity which determines the credit amount to be awarded.

1.8. Micro insurance.

The public sector is expected to assist in building the institutional and intellectual infrastructure to support the development of a healthy micro insurance market in health and agricultural sector. This is true for agricultural products which are vulnerable to poor climatic conditions. (Churchill 2006) refers to micro insurance as a protection of low income people against specific risks in exchange for low premiums. Micro-insurance means small financial transaction that each insurance policy generates. The target group consists of persons ignored by mainstream commercial and social insurance schemes. Products offered include health insurance, contracts covering properties such as assets, livestock and housing. Personal accidents are also covered. The other product is the crop micro insurance which covers against natural calamities whose occurrence could affect agricultural activities.

1.9. Microfinance Institutions.

Mushendami et al (2004b) defines Microfinance Institutions (MFIs) as institutions that provide financial services to people and small and micro enterprises who do not have access to commercial bank loans. A microfinance institution can either be a credit union, savings and credit co-operative (SACCOs), non-governmental organization (NGO), self-help organization or specialized banks. The instrument is microcredit small long term loans on easy terms. By 2006 Grameen bank had granted more than seven million borrowers microloans, average amount being 100 dollars and repayment being very high. By the end of 2008 the bank had loaned over USD 7.6 billion to the poor and in the same year it had 2100 branches. (Regal 1996) finds five major faults with MFIs. He argues that: i) They encourage a single-sector approach to the allocation of resources to fight poverty, ii) Microcredit is irrelevant to the poorest people. iii) An over-simplistic notion of poverty is used. iv) There is an over-emphasis on scale. v) There is inadequate learning and change taking place.

1.10 Microfinance and Youth fund in Kenya.

According to John Hatch (2010), "No one ever ended poverty by going bankrupt", MFIs have proven that it is possible to serve the poor successfully while maintaining sustainability. Across the world there are over 10,000 microfinance institutions serving in excess of 150 million customers, and over 100 million being the poorest. Global demand stands at 500 million families meaning that there is still a long way to go. (Kenya National Youth Policy paper 2006) defines youth as persons resident in Kenya at the age bracket of 15 to 30 years who are about 10.8 million as per 2005 population projection. Out of this 57% are female and they form about 60% of the total active labour force in the country. This takes into account the physical, psychological, cultural, social, biological and political definition of the term.

UNDP sums up unemployment in Kenya as “a Youth problem” (UNDP, 2005). Youth development Fund was established in January 2007 in Kenya with an aim of spearheading the general empowerment of the youth in order to reduce risk factors and promote positive factors. The department coordinates and mainstream youth issues in all aspects of National Development as stipulated in the National Youth Policy 2006. The state department empowers youth through provision of accessible appropriate and quality training in technical, vocational, industrial, entrepreneurship and life skills. This is to enable the youth to be self-reliant and have necessary skills to steer the country towards the attainment of the goals of vision 2030. With existing youth and women fund initiated by President Mwai Kibaki of Kenya operated ksh4.8 billion and 5.2 billion. Kazi Kwa Vijana had 5.2 billion for which all have been in disposal for the last seven years but many young people still languish in object poverty (Kiberenge, 2013).

1.11 Kenya's national youth policy.

The Kenya Government started the National Youth Service, in 1964 and has supported it to date. Most other youth programs are largely social and recreational in nature. In addition, they are urban-based. The current Government has taken a keen interest in youth issues in its efforts of national integration. The problem of unemployment has continued to be a big challenge. The third National Development Plan of 1974-78, while acknowledging the efforts made to address unemployment among the youth, warned that the problem would in future loom large. Efforts to initiate youth development programs have been made in other subsequent policy documents, such as Sessional Paper No. 2 of 1992 on Small Scale and Jua Kali Enterprises, the 1997-2001, Development Plan and the National Poverty Eradication Plan 1999-2015, among others. But, despite these efforts, as well as an increase in the number of agencies dealing with the youth, problems affecting young people have continued. This situation has been attributed to lack of a comprehensive policy to provide a blueprint for youth. Youth organisations have come up with innovative programmes to address the youth's economic needs, health interventions, especially those aimed at reproductive health and alleviating the spread of HIV/AIDS among the youth, environmental programmes, and character building programmes, literacy, vocational training, sports and recreational as well as social-cultural programmes. However, the following constraints have hampered their effectiveness in achieving their objectives: i) Pressure from the high population growth: The high population growth, currently stands at 2.5% in 2005, puts pressure on available resources as the number of young

People keeps on rising. ii) Lack of appropriate skills: The 8-4-4 education system and tertiary training institutions

Continue to release thousands of graduates, who are neither properly equipped for entry into the labour market nor possess the necessary life skills. iii) Unclear and uncoordinated youth policies and programmes: While a number of government ministries and youth organisations have their own programs and sectorial youth policies, lack of a national youth policy and effective co-ordination mechanisms hamper their effectiveness. iv) Resource Constraints: Most of the youth programs, run by both the Government and Non-governmental agencies lack adequate funds and equipment, which limits their success. v) Low status given to

youth: Existing structures and prevailing attitudes do not provide an enabling environment for youth participation in decision-making, planning and implementation processes.

1.12.0 Challenges facing youth empowerment.

1.12.1 Unemployment and underemployment.

The economic growth rate has not been sufficient to create enough employment opportunities to engage the increasing labour force of about 500,000 annually in Kenya. Only about 25% of the youth are absorbed, leaving 75% to bear the burden of unemployment. Furthermore, some of those absorbed in the labour market have jobs that do not match their qualifications and personal career choices.

1.12.2 Health related problems.

The youth face a myriad of health related problems, including widespread malaria, malnutrition, HIV/AIDS and Sexually Transmitted Infections (STIs), drug and substance abuse as well as poor access to health services. The HIV/AIDS pandemic is more prevalent among the youth under 30 years of age. Available statistics show that the youth make up to 33% of Kenyans infected with Aids. Female genital mutilation and teenage pregnancy are unique to the female youth. Some of the consequences of these are: dropping out of school and risks to life through unsafe abortions and unprotected sex.

1.12.3 Increasing school and college drop-out rates.

Many youth drop out of school and college due to the high cost of education and increase in overall poverty levels, poor returns on investment in education and lack of a re-admission policy for teenage mothers, among other reasons.

1.12.4 Crime and deviant behaviours.

Due to idleness, especially after formal education at various levels, that is secondary, middle level colleges and universities, the youth become restless and try anything. Some end up in crimes, addictions or with deviant behaviours.

1.12.5 Limited sports and recreation facilities.

Sports and recreation facilities provide the youth with an opportunity to socialize and spend their time productively, strengthening and developing their character and talents. However, such facilities are scarce and, if they exist, they are sometimes not accessible or accessible through some fee which the youth may not be able to pay.

1.12.6 Abuse and exploitation.

Owing to their vulnerability, the youth are exposed to sexual abuse, child labour and other forms of economic exploitation under the pretext of employment and support. There is currently little protection from the authorities.

1.12.7 Limited participation and lack of opportunities.

Despite their numerical superiority, youths are the least represented in political and economic spheres due to societal attitudes, socio-cultural and economic barriers, and lack of proper organization and good government policies.

1.12.8 Limited and poor housing.

Many youths, especially those in the urban areas, do not have access to decent housing in good environments that favors healthy living.

1.12.9 Limited access to information and communication technology (ICT).

The youth cannot exploit career, business and education opportunities available because they lack access to ICT, due to unavailability especially in rural areas, and high costs.

1.12.10 Youth empowerment, education, employment key to future development by (YES).

Countries must invest in the empowerment, education and employment of their young people. There are 1.8 billion young people in the world today, representing a staggering amount of human potential. Yet too many of them are trapped in poverty, with few opportunities to learn or to earn a decent living. "We all appreciate the massive waste of human capital in our world when 74 million young people cannot find work," said Mr. Ban in the United Nations conference. Young people are hungry for better options. "They are rejecting the status quo and demanding a better future. Many of them are claiming their right to a decent living, and they are willing to take risks to do so and this is now very dangerous. We have seen in recent times the high numbers of young people taking risks around the Mediterranean, trying to reach a better life," said Dr. Babatunde Osotimehin, Executive Director of the United Nations Population Fund, UNFPA. But if these youth are allowed to realize their full potential, developing countries could see huge economic gains. "The more young people grow into well-educated adults with fewer dependants and new opportunities to acquire wealth, savings and purchasing power, the more they will be able to accelerate economic growth and development," said Sam K. Kutesa, President of the 69th Session of the General Assembly, who convened the high-level event with support from UNFPA and the International Labour Organization.

1.13 The current global Perception of microfinance.

In the global arena there is already the impression that microfinance is successful in reducing poverty and empowering the youth. Many policy makers are therefore engaged on how to make microfinance sustainable and available to many poor households in the future. Many stakeholders in the microfinance industry especially donors and investors argue that, Microfinance can pay for itself, and must do so if it is to reach very large number of the Poor youth households". The overall message in this argument is that unless microfinance providers charge enough to cover their costs, so as to become sustainable they will always be limited by the scarce and uncertain supply of subsidies from governments and donors. The main underlying assumption in the argument is that microfinance is already good for the clients and therefore what is really urgent is to make the financial service available to as many poor people as possible. (Morduch 2000) correctly points out that this kind of enthusiasm for microfinance rests on an appealing win-win proposition that microfinance institutions that follow the principles of good banking will also be the ones that alleviate poverty. The assumption being that with good banking practices it is possible

to cover costs and operate in a sustainable manner to continue serving clients and alleviating poverty (Morduch 2000).

The "win-win" situation both for the investor and the poor can be explained as follows: The investor in microfinance programs follows good banking practices with the possibility of making some profit, while the poor continue to benefit by accessing reliable credit that is assumed to be beneficial to their welfare. The supporters of the "win-win" proposition stress that the ability to repay loans by the poor is a good indicator that whatever investments the poor make with their micro credit loans must be giving back profits. Given the assumption that microfinance is already beneficial to the poor, the "win-win" proposition further assumes that the amount of household poverty reduced is directly proportional to the number of households reached with microfinance. The "win-win" vision has been translated into a series of "best practices" circulated widely by a number of key donors including the Consultative Group to assist the Poorest (CGAP). CGAP is a consortium of NGOs hosted at the World Bank. Other donor organizations that embrace "best practice microfinance" include, United States Agency for International Development (USAID) and the United Nations Development Programme (UNDP) among other key donors. The youth have increased academic achievement, a stronger self-concept, self-esteem and attachment to others.

1.14 Research Gap:

A narrow scope of empowerment may lead to misleading conclusions, (Tuuli & Rowlinson, 2007), therefore it is most appropriate to incorporate multiple aspects of empowerment in research. In this literature review the researcher considers empowerment as a multi-level concept in his attempt to explore how the youth micro-credit borrowers perceive and experience empowerment, thus it is most appropriate to incorporate multiple aspects of empowerment in research and therefore a research study need to be done to discover other forms of empowerment which needs to be incorporated into the programs so as to help the youth to be empowered. There has been tremendous programs adopted to empower the youth in various projects but most researchers feel that the effectiveness of these programs differ from one locality to another, therefore the researcher feels that research studies should be done in each locality to determine the programs preferred by the youth in each locality so that the right programs may be introduced to each project in every locality to bring about its effectiveness in empowerment.

According to Zeller and Meyer (2002), the excitement about the use of micro-finance to empower low income people is not backed up with sound facts. Most micro-finance providers are unwilling to evaluate the appropriateness and effectiveness of such programs because the necessary process is perceived to be rigorous and expensive but then this evaluation should be done, so that researchers may base their arguments on facts. Most governments and donors more especially in the developing world with little resources, diverge money meant for other sectors or ministries to the youth ministry for youth empowerment projects. The question in the minds of many researchers is whether these money or loans diverted to the youth ministry performs better than some other development projects which was initially meant for. Such as health care, food, infrastructure etc. Therefore research study need to be done to evaluate and prove that the

youth benefits more than they could have benefited if the money would have been used where it was previously budgeted for.

Micro-credit is not a silver bullet when it comes to fighting poverty and empowering the youth. (Hulme and Mosley 1996) argues that in some cases the poorest people have been made worse-off by microfinance. This is true because we have seen in many occasions where the youth have borrowed the money but fail to pay, this tells us that the money was not well invested, otherwise the borrower could have been able to pay his or her instalments. The MFIs comes up and take away everything from the borrower's household including the iron sheets from their roofs leaving the family worse than it was. Therefore Microcredit is not always the answer to poverty reduction and empowerment. Thus microcredit is not appropriate for everyone or every situation. The poor youth and the destitute that have no income or means of payment need other forms of support before they can make use of loans. Despite the importance of microfinance services on youth financial empowerment, previous studies by (Ataya 2009, Mueni 2012 and Doro 2012) failed to address the factors affecting accessibility of microfinance services amongst the youth in Kenya. This indicates that few studies have addressed the challenges facing microfinance service accessibility among the youth in Kenya and the world at large and therefore the researcher recommends that research studies need to be done on various challenges facing MFIs in the delivery of their services more especially in the developing economies.

According to Ritherford (2000), Microfinance has been successful in reducing poverty. (Morduch, 2006) reasoned that, to break the "low productivity, low income, low wealth, poverty cycle, there need to be an outside force that will intervene at some point of the cycle to improve demand for goods and services. The major critique of the youth empowerment is that most programs take a risk-focused approach. There has been a major emphasis on what is going wrong for youth in their lives rather than what goes right. This portrays young people as a problem that need to be fixed, and displays the process of development as a process of overcoming risk. This may deter youth from joining youth development programs. The risk-based model is ambiguous and needs to be dealt away with, the fact that adolescence is a time when young people master skills and concepts. Therefore a better approach need to be applied, thus research study need to be done here to do away with this approach of risk oriented and replace it with a better approach which is youth friendly and attractive to the youth.

It is important to note here that the proposal of a commercial approach to microfinance for the poor has been questioned by socially oriented service providers. Especially the assumptions underlying the "win-win" proposition have raised eye brows among socially oriented service providers who question the validity of such assumptions in the real world. Also the researcher proposes that research study should be done to test the validity of the argument of the above proposal. Many MFIs were established to reduce poverty and make financial services more accessible to the unbankable and poor youth. In the early days when MFIs started they were financed by donor funds that had a poverty eradication goal. Hence the performance of the MFIs were measured on how much MFIs reached to the poor and how far the lives of those who got

financial services were changing as compared to those who did not get the credit, therefore research need to be done to prove whether it is possible to run the MFIs to achieve the win-win proposition where both the poor and the MFIs will benefit, whereby the youth will get loans at reasonable interest rates to be able to pay their instalments without much difficulty and the MFIs also to be able to cover their costs and make even little profits for sustainability.

II. LITERATURE REVIEW

2.1 Theoretical framework:

The researcher will mainly review on the four theories of power which are all important in trying to explain how youth empowerment is determined and acquired by the youth in society, that is: power over, power within, power with and power to and on these basis the theoretical framework will be based. Also the researcher will focus on the concepts of agency and power because he finds their interrelatedness appropriate for his review. (Rai, et al. (2002) argues that an understanding of youth's empowerment necessitates a more detail examination of power. The following are the theories of power:

2.1.1 Power over:

Power over refers to the ability of some actors to overtake the agency of others through the use of "authority or the use of violence and other forms of coercion" (Kabeer 2005). It is "the power of one person or a group to get another person or a group of people to do something against their will. (Rowlands 1995) states that power is about control over ideology or beliefs which comes up with rules and principles. When 'power over' is too strong, it becomes oppressive, divisive and damaging. According to Rowlands, 'power over' implies an 'instrument of domination' and indirectly suggests a limited resource in which 'the more power one has, the less the other has. Therefore, empowerment through the lens of 'power over' is 'a force exerted by an individual or groups of people and it has capacity to produce change and gaining the 'control over others' thus requires a revolution and fundamental social transformation, (Rai, et al. 2002).

2.2.2 Power from Within.

Power from within' is a product of the contrary 'power over', as a result, 'power from within' is a visible form of self-awareness and self-confidence. It is the inside strength and a sense of identity. It helps the youth to recognize what they can do and understand what holds them back. To (Kabeer 2005), the process of empowerment begins from within and involves not only decision-making but also the encouragement, it carries the meaning and purpose with which individuals bring to their activities, therefore, people's sense of self-worth, how people see themselves and how they are seen by those surrounding them and their society is a crucial point while evaluating their level of empowerment. Kabeer argues that the multi-dimensional nature of power necessitates that youth to build on "the power within" as a required supporter in improving their ability to control resources, to determine their agenda and to make decisions. (Rowlands 1997) also believes that the empowerment process accelerates the self-confidence and self-esteem, a sense of

agency and of self in a wider context, and being worthy of having a right of respect from others. The researcher's review of 'power from within' is helpful in explaining whether the youth recipients have gained the capacity to increase their own "self-reliance and internal strength" to realize what they can do and what holds them back. How is their contribution perceived by those surrounding them like their parents, teachers, and the society as a whole? This form of power is important in order to look at how and why the youth beneficiaries lead the lives they do.

2.2.3 Power With.

According to (Townsend et al. (1999) power with is "the competency to achieve with others what one could not have attained alone; a positive-sum outcome whereby each person gains from the process and exercise of "power". 'Power with' implies a cooperative relationship in which individuals work together to multiply individual capacities and knowledge. It puts participation at the center of empowerment, and creates consciousness that the "whole" is greater than the individual, especially when a group, tackles a problem together. Kabeer sees grassroots participatory action the power to work with others together as the key to youth empowerment. Because farmers are supported by the NAADS programme in groups, 'power with' will be important in realizing the youth beneficiaries' capability to achieve with others what they could not have attained when working independently, without groups. For instance, there are beneficiaries' testimonies of acquiring skills and advice from one another which is a social resource. They tackle their problems together with other youths within the sub-county and outside when they go for learning tours, thereby amassing individual talents and knowledge. It is therefore essential to investigate how this 'power works with others helping these youths to carry out their activities and how it contributes to their empowerment.

2.2.4 Power To.

This is another type of empowerment which comprises gaining access to full variety of human abilities and potential (Townsend, et al. 1999b). It is the strength and ability to act, to build new capacities and skills in order to 'build upcoming talents. The 'power to' is imaginative and facilitates the youth to rebuild and reinvent themselves a new. This power is often used to mean political power, a power to inspire others to have a say in decision making. This power relates more with the youths' skills, the power to do new things and relate in new ways that indirectly challenge the status quo relations and duties and it is a form of agency and purposive choice (Kabeer 2005b). In this literature review the 'power to' will be beneficial in explaining how the youth beneficiaries transfer out their activities, the challenges they face, and how they overcome such challenges. It will help in understanding how the youth beneficiaries are using the skills attained from the previous activities to try out new things that directly or indirectly challenge the status quo of relations and roles. Some beneficiaries were purchasing land to carry out their farming enterprises and others were involved in intensive farming initiatives due to the challenge of limited land. This kind of power helps us to understand the choices the youths make, as well as their agency, power to do things they want (Kabeer 2005c). It should also be noted that the four forms of

power explained above are interrelated, overlapping and build on one another.

2.3 Resources, Agency and Achievement:

Kabeer defines empowerment as "the process by which those who have been denied the ability to make strategic life choices acquire such ability" (2005c). She argues that this ability, in turn, rests on three distinct but interrelated dimensions, that are: Resources, Agency and Achievements' (2005).

2.3.1 Resources:

According to Kabeer (2005d) it is the medium through which agency is exercised. They include material, human and social resources. They are acquired and disseminated through various social relationships in institutions like family, community, market and state. Such institutions, however, benefit particular people at the expense of others through rules, customs, and treaties, hereby enabling or disabling different categories of youths to exercise their choices. Therefore, the distribution of resources depends on one's ability to define priorities and enforce claims (Kabeer 2005e) as well as the social structures in which he or she lives. Resources that will be considered include material resources (agricultural inputs, land, and credit), human resources (labour) that is intellectual resources (farming and life skills, educational levels), and social resources (parents, other siblings, teachers, peers and the society).

2.3.2 Agency:

Agency the "power to" it refers to people's ability to make and act on their own life choices, even in the face of others' opposition (Kabeer 2005f). In relation to empowerment, agency involves challenging power relationships. It involves not only decision-making and other forms of observable action but also the meaning, motivation, and purpose that individuals bring to their actions (Kabeer 2005g). This is a theory that looks at how to ensure that agents (executives, managers) act in the best interests of the principals (owners, shareholders) of an organization. This happens because of the separation of ownership and control, when the owner of the company or the board of directors (the 'principals') have to employ managers ('agents') to run the business and they need to monitor their performance to ensure that they act in the best interest of the owners. (Luhman & Cunliffe, 2012). The main concern of agency theory as proposed by (Jensen and Meckling 1976) is how to write contracts in which an agent's performance can be measured and incentivized so that they act with the principal's interests in mind. Many MFIs were established to reduce poverty and make financial services more accessible to the unbanked and poor. In the early days when MFIs started, they were financed by donor funds that had a poverty eradication goal. Hence the performance of the MFIs were measured on how much MFIs reaches to the poor and how far the lives of those who got financial services were changing as compared to those who did not get the credit, but as the MFIs industry grew in size, the need for increased financing coupled with unpredictability of donor funds triggered the issue of building sustainable MFIs that stand on their own leg i.e. MFIs started covering their own cost of operation from their program revenues. Managers are entrusted with the responsibility of building sustainable MFIs and at the

same time increase the number of the poor households accessing the credit. This creates an agency problem.

2.3.3 Achievements:

It refers to the extent to which people's potential for living the lives they want is realized or fails to be realized (Kabeer 2005h). It refers to both the agency exercised and its consequences such as women's greater self-reliance and sense of independence. The researcher will use Kabeer's three interrelated dimensions of empowerment to explore the contribution of NAADS programme to youth's empowerment. I will explore the resources available to youth beneficiaries and how they access and control such resources. According to (Chambers, 2005), empowerment means that poor people are enabled to take more control of productive assets.

2.4 Models for lending:

Despite lack of data in the sector, it is clear that a wide variety of implementation models are employed by different MFIs. The (Grameen Bank 2000) has identified fourteen different microfinance Models, some of whom are closely related with each other, most efficient and sustainable microfinance institutions have used two or more models in their activities. The models were developed through extensive field Work and interviews carried out in the field in all over the world, they are as follows:-

2.4.1 Associations.

This is where the targeted community forms an association through which various microfinance activities were initiated. Such activities may include savings, credit, insurance, training etc. Associations or groups can be composed of youth, or women, they can form around political, religious, cultural issues, can create support structures for microenterprises and other work-based issues. In some countries, an 'association' can be a legal body that has certain advantages such as collection of fees, insurance, tax breaks and other protective measures. Distinction is made between associations, community groups, people's organizations, etc.

2.4.2 Bank Guarantees.

A bank guarantee is used to obtain a loan from a commercial bank. This Guarantee may be arranged externally through a donation, government agency etc. or internally using member savings. Loans obtained may be given directly to an individual, or they may be given to a self-formed group. Bank Guarantee is a form of capital guarantee scheme. Guaranteed funds may be used for various purposes, including loan recovery and insurance claims. Several international and UN organizations have been creating international guarantee funds that banks and NGOs can subscribe to.

2.4.3 Community Banking.

The Community Banking model essentially treats the whole community as one unit, and establishes semi-formal or formal institutions through which microfinance is distributed. Such institutions are usually formed by extensive help from NGOs and other organizations, who also train the community members in various financial activities of the community bank.

These institutions may have savings components and other income-generating projects included in their structure. In many cases, community banks are also part of larger community development programs which use finance as an inducement for action.

2.4.4 Cooperatives.

A co-operative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise. Some cooperatives include member-financing and savings activities in their mandate.

2.4.5 Credit Unions.

A credit union is a unique member-driven, self-help financial institution. It is organized by and comprised of members of a particular group or organizations who agree to save their money together and to make loans to each other at reasonable rates of interest. The members are people of some common bond: working for the same employer; belonging to the same church, labour union, social fraternity, etc.; or living and working in the same community. A credit union's membership can be open to all who belong to the group, regardless of race, religion, colour or creed. A credit union is a democratic, not for profit making. Each is owned and governed by its members, with members having a vote in the election of directors and committee representatives.

2.4.6 Grameen.

The Grameen model emerged from the poor-focused grassroots institution, Grameen Bank started by Prof. Mohammad Yunus in Bangladesh. It essentially adopts the following methodology: A bank unit is set up with a field manager and a number of bank workers, covering an area of about 15 to 22 villages. The manager and workers start by visiting the villages to familiarize themselves with the local in which they will be operating and identify prospective clientele, as well as explain the purpose, functions, and mode of operation of the bank to the local population. Groups of five prospective borrowers are formed; in the first stage, only two of them are eligible for, and receive, a loan. The group is observed for a month to see if the members are conforming to rules of the bank. Only if the first two borrowers repay the principal plus interest over a period of five weeks do other members of the group become eligible themselves for a loan. Because of these restrictions, there is substantial group pressure to keep individual records clear. In this sense, collective responsibility of the group serves as Collateral on the loan.

2.4.7 The Group model.

The Group Model's basic philosophy lies in the fact that shortcomings and weaknesses at the individual level are overcome by the collective responsibility and security afforded by the formation of a group of such individuals. The coming together of individual members is used for a number of purposes: educating and awareness building, collective bargaining power, peer pressure etc.

2.4.8 Individual model.

This is a straight forward credit lending model where micro loans are given directly to the borrower. It does not include the

formation of groups, or generating peer pressures to ensure repayment. The individual model is in many cases part of a larger 'credit plus' programs where other socio-economic services such as skill development, education, and other outreach services are provided.

2.4.9 Intermediary model.

Intermediary model of credit lending position is a go-between organization between the lenders and borrowers. The intermediary plays a critical role of generating credit awareness and education among the borrowers. In some cases starting savings programs. These activities are geared towards raising the 'credit worthiness' of the borrowers to a level sufficient enough to make them attractive to the lenders. Intermediaries could be individual lenders, NGOs, microenterprises, microcredit programs and commercial banks. Lenders could be government agencies, MFIs, commercial banks, international donors, etc.

2.4.10 Non-Governmental Organizations model (NGOs model).

NGOs have emerged as a key player in the field of microcredit. They have played the role of Intermediary in various dimensions. NGOs have been active in starting and participating in microcredit programmes. This includes creating awareness of the importance of microcredit within the community, as well as various national and international donor agencies. They have developed resources and tools for communities and microcredit organizations to monitor progress and identify good practices. They have also created opportunities to learn about the principles and practice of microcredit. This includes publications, workshops and seminars, and training programmes.

2.4.11 Peer Pressure model.

Peer pressure uses moral and other linkages between borrowers and project participants (MFIs) to ensure participation and repayment in microcredit programmes. Peers could be other members in a borrower's group where, unless the initial borrowers in a group repay, the other members do not receive loans. Hence pressure is put on the initial members to repay. Community leaders usually identified, nurtured and trained by external NGOs. The 'pressure' applied can be in the form of frequent visits to the defaulter, community meetings where they are identified and requested to comply and make their payments etc.

2.4.12 Rotating Savings model.

Rotating Savings are essentially a group of individuals who come together and make regular cyclical contributions to a

common fund, which is then given as a lump sum to one member in each cycle. For example, a group of 12 persons may contribute ksh.100 per month for 12 months. The ksh. 1,200 collected each month is given to one member. Thus, a member will 'lend' money to other members through his regular monthly contributions. After having received the lump sum amount when it is his turn he then pays back the amount in regular monthly contributions. Deciding who receives the lump sum is done by consensus, by lottery, by bidding or other agreed methods.

2.4.13 Small Business model.

The prevailing vision of the informal sector is one of survival, low productivity and very little Value added. But this has been changing, as more and more importance is placed on small and Medium enterprises for generating employment, for increasing income and providing services which are lacking. Policies have generally focused on direct interventions in the form of supporting systems such as training, technical advice, management principles etc.; and indirect interventions in the form of an enabling policy and market environment. A key component that is always incorporated as a sort of common denominator has been finance, specifically microcredit, in different forms and for different uses. Microcredit has been provided to SMEs directly as a part of a larger enterprise development programme, along with other inputs.

2.4.14 Village banking model.

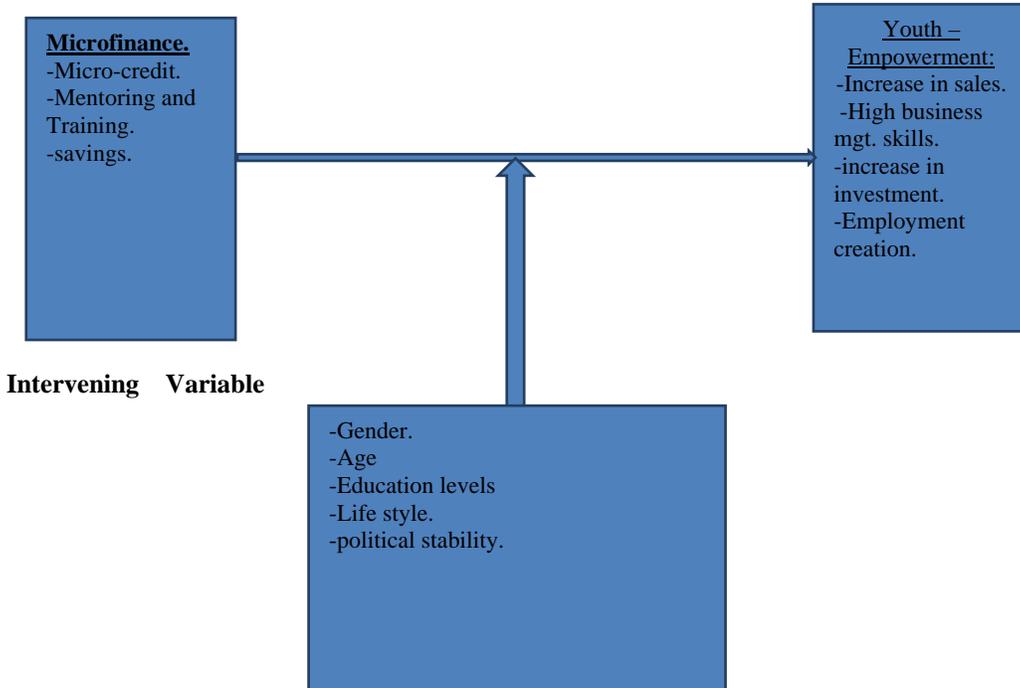
Village banks are community based credit and savings associations. They typically consist of 25 to 50 low-income individuals who are seeking to improve their lives through self-employment activities. Initial loan capital for the village bank may come from an external source, but the members themselves run the bank: they choose their members, elect their own officers, establish their own by-laws, distribute loans to individuals, and collect payments and savings. Their loans are backed, not by goods or property, but by moral collateral: the promise that the group stands behind each individual loan. (Grameen Bank).

3.0 Conceptual framework.

The following conceptual framework shows the correlation of variables between microfinance services and youth empowerment through changes in increasing sales, savings, employment creation and business Management skills.

Independent variables

Dependent variables



3.1 Independent variable:

Microfinance as an independent variable, comprises of the following: i) Micro-credit: these are the loans given to the youths through different programs under various projects. ii) Mentoring and training: Specific adults are chosen to be mentors who then trains the youth in various skills which enables them to be empowered. At the same time the youth can also be trained through special training seminars. Training can be done internally within the organization or externally. iii) Education: The educational levels determines the rate at which the youth acquire the skills during training, it is obvious that the youth with high levels of education develop higher absorption capacity than those with low education levels. The higher the education levels, the higher the rate at which the youth acquire the skills. iv) Savings: when the savings increases it promotes the investments thus empowering the youth.

3.2 Dependent Variable:

Youth empowerment is a dependent variable which depends on microfinance services such as: i) Increase in sales: as micro-credit increases, productivity also increases thus leading to an increase in demand as well as increase in sales. ii) Enhancing business management skills: MFIs offers training which leads to capacity building of the youths thus youth empowerment. iii) Increase in investments due to an increase in micro-credit leads to an increase in liquidity consequently thus increase in investments. iv) Creation of employment: it is obvious that as investment increases more job opportunities are created.

3.3 Intervening variables:

3.3.1 Educational level and experience.

A study conducted by (Kim 1996), involving entrepreneurs in Singapore, demonstrates that, after entering the entrepreneurial

world, those with higher levels of education were more successful in acquiring micro financial services and products because university education provides them with knowledgeable and modern managerial skills, making them more conscious of the business world and thus they are able to use their learning capabilities to negotiate for favorable terms and services from financiers.

3.3.2 Political environment.

An economy with a stable political environment tends to create a good environment for business which attracts both foreign and local investments which automatically leads to the growth and expansion of business organizations.

3.3.3 Life style.

The life style of the youth determines to what extend empowerment will be effected. Example if the life style of a youth is high then it means that the youth's expenditure will also be high causing a decline in investment and vice versa.

3.3.4 Entrepreneurship.

It is not an easy option for everyone; it is only best suited to those with the necessary skills and knowledge. According to (School 2006) entrepreneurship education is not only a means to foster youth entrepreneurship; it also seeks to equip young people with entrepreneurial attitude and skills. According to (OECD 2010) many experts believe that entrepreneurial education and training should begin as early as possible for two main reasons: 1st it forms an essential component by motivating potential young entrepreneurs to go into business by themselves. 2^{ndly} it instils entrepreneurial habits and work skills in the mind of young entrepreneurs which can serve equally well for successful employees in the new, globalized, post-industrial

economy and those who actually choose to establish their own enterprises.

3.4 Discussions.

The assumption that all the youths whose incomes have increased have all been empowered is wrong. This is because empowerment has been narrowly defined in economic terms, but the fact remains that empowerment is not all about income, it is beyond that. The financial sustainability approach, which defines and measures empowerment exclusively in economic terms is wrong. It becomes problematic, because it addresses only the economic component of empowerment, and it fails to acknowledge the multidimensionality of this concept. (Tuuli and Rowlinson 2007) assert that "assigning only one meaning to the empowerment concept will ultimately hinder research and practice". This therefore means that there are other hindrances that need to be addressed in order to unlock the full potential of the youth. Therefore, research that investigates the relationship between micro-credit membership and empowerment must extend beyond the financial sustainability hypothesis to explore multiple dimensions of empowerment and not just in economic terms only.

i) Continuous training is important in promoting the capacity and the efficiency of the youth in enabling them understand why prior skills and knowledge in entrepreneurship and financial matters are important in youth empowerment. The Kenyan government of late is putting more emphasis on TIVET programs since they are good in imparting technical skills to the youth thus empowering them.

ii) High productivity and management efficiency takes place in the lives of the youth as well as the increase in investment opportunities and good financial planning becomes possible through entrepreneurial training imparted to the youth.

iii) It is important to note here that most studies that have been done on youth empowerment more especially (Kabeer, 2001) indicates that at least a good number of the youth who were able to get loans from financial institutions have managed to do various investments such as: buying land, owned properties, started businesses, have developed self-confidence, high capability in decision-making, high mobility, highly knowledgeable, high bargaining power and better access to capital. At the same time have taken up family responsibilities like paying school fees for their younger siblings and incurring some household expenditures.

iv) The researcher has also discovered that, the rate of economic dependency of the youth on their parents' income has dropped tremendously and this has led to the youth gaining respect from their parents and their family members when they started realizing that the youth are capable of making their own decisions concerning their future life, business and also even contributing to their family decisions.

v) The research has also confirmed that micro financing has influenced the economic status, decision making power and the knowledge hence it is effective in graduating the poor youth and the middle class people to higher living standards.

vi) The researcher has also noted that MFIs should impress demand driven initiatives that fit their clients' needs and preferences. This is important in promoting the effective demand

of the youth thus creating employment opportunities for the youth thus bringing about economic growth and development.

vii) Availing microfinance services with proper utilization had significant role in economic empowerment of the youth economically, which is acknowledged by study findings.

viii) Interest rate ceilings can damage poor people's access to financial services. It will make the cost of getting loans to go up and it causes many small loans to be more expensive than a few large loans the micro financial institutions do give. This will hinder the MFIs from achieving its major objective of raising the standard of living of the poor more especially the youth.

ix) The growing ability of the MFIs and its sustainability will be limited by the scarce and uncertain supply of subsidized funding. When governments regulate interest rates, they usually set them at levels not too low to fail to permit sustainability by covering their cost of operations at the same time not too high to make it unavoidable for the youth to take loans.

x) Microfinance is not a silver bullet when it comes to fighting poverty and empowering the youth. Hulme and Mosley (1996) said that in some cases the poorest people have been made worse-off by microfinance. Microcredit is not always the answer, microcredit is not appropriate for everyone and in every situation. The poor and the destitute that have no income or means of payment need other forms of support before they can make use of loans. The government and donors before lending should ensure that the poor have access to improved infrastructure, health, training with appropriate tools for poverty alleviation. Grameen bank works on the assumption that even the poorest of the poor can manage their own financial affairs and development given suitable conditions.

3.5 Recommendations.

i) Further education is crucial for the youth (borrowers) and the MFIs should be able to offer such training so as to enable the youth use the loans efficiently, that is put the money into the best use and to the MFIs to do the same to their staff so as to improve on their service delivery, resource mobilization and financial utilization.

ii) The study recommends that the government, investors and other interested stakeholders should be involved in key decision-making on issues affecting micro MFIs. This would help bring in new ideas which MFIs are able to tap and implement.

iii) The interest rate should be kept at a balanced level, not too low making the MFIs unable to cover their operation costs at the same time, not too high, to discourage the youth from borrowing money for their business activities.

iv) MFIs should have simplified designed systems of operation that provides efficient and effective services delivery that are accessible, less costly and preferred by the youth across the country in enabling them improve their living standards.

v) All the costs involved need to be recovered to ensure a continuous sustainable growth and expansion for the MFIs to allow for the smooth operation of the organization for the alleviation of poverty.

vi) Some incentives to be introduced such that good performance both by the youth borrowers and the microfinance staff should be rewarded for the job well done particularly in training, loan advancement, loan use and loan repayment.

vii) It is important that the parents may understand the need to let their youth to be in charge of their loans without having any interference and to see the increase in their youths' income as a blessing to the family.

viii) Further research studies to be done on various products to be developed so as to diversify the products to fit various needs of the youth of various financial abilities.

ix) Encourage the adults to allow their youths to participate in various levels of decision-making in societies, so that they may bring up issues concerning the youth themselves to the table for debate this will create ownership of the decisions made the youth being inclusive.

x) The researcher proposes for a review of all curriculums, for primary, secondary, and higher learning institutions to bring up the content concerning entrepreneurship and development aspects and align their contents to the needs of the job market, this can be done better by bringing in the all the stakeholders more especially the employers to say exactly what they need in the market.

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Response of Bread Wheat Varieties to Different Levels of Nitrogen at Doyogena, Southern Ethiopia

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Abstract- Soil fertility decline is one of the principal factors contributing to low productivity of crops and food insecurity in Ethiopia. A study was conducted at Doyogena with the aim to determine the effect of different nitrogen levels i.e. 0, 23, 46 and 69 kg/ha N on yield and yield component of three bread wheat varieties. A factorial approach in randomized complete block design with three replications was used. From the data collected and analyzed, results showed that there exist significant difference among the wheat varieties in maturity day, plant height, spike length, grains per spike, grain weight per spike, 1000 grain weight, biological yield and grain yield. Digalu was superior with plant height, number of grains per spike and grain weight per spike and also producing higher grain yield and biological yield but statistically at par with Hidasse variety. On the other hand, Hidasse variety surpassed other varieties by 1000-grain weight. Digalu expressed late maturity while Hidasse appeared to be early maturing variety. Except thousand seed weight, all other yield and its components was increased with increasing rate of nitrogen generally. The interaction of wheat varieties and N fertilization significantly affected spike length, grain weight per spike, thousand grain weight, grain yield and biological yield. The maximum agronomic efficiency of varieties was recorded in Digalu whereas minimum in Danfe cultivar. Application of 46kg/ha nitrogen observed the maximum agronomic efficiency while the minimum agronomic efficiency was recorded at 69kg/ha nitrogen level. Grain yield response index showed that Digalu belonged to non-efficient but responsive and Hidasse appeared to be efficient but non-responsive while Danfe variety indicated neither efficient nor responsive

Index Terms- wheat, nitrogen levels, agronomic efficiency, grain yield response index

I. INTRODUCTION

Wheat (*Triticumaestivum L.*) is one of the most important world cereal crops and is a staple food for about one-third of the world's population [1]. In the highlands of Ethiopia (i.e., >2000m above sea level), bread wheat (*Triticumaestivum*) occupies up to 45% of the total cropped area in specific zones [2]. The national annual mean wheat yield of Ethiopia was estimated at about 2.2 t/ha [3]. However, by international standards such yields are considered to be low. The Government of Ethiopia (GOE) estimates that over 4.5 million households are involved annually in wheat production, but that still does not satisfy the country's annual domestic demand. Hence, a large quantity of wheat is imported every year to meet the rising

domestic consumption demand [3]. The declining of soil fertility is a fundamental impediment to agricultural development and the major reason for the slow growth rate in food production and food insecurity in Ethiopia [4].

Nitrogen is the most important plant nutrient needed to obtain high wheat yields. Several investigators [5] and [6] reported a beneficial effect of nitrogen application on wheat. They reported that numbers of tillers and spikes/m², plant height, spike length, number of spike lets and grains/spike, grain and straw yields of wheat increased with increasing N to optimum level.

The interest in maximizing wheat yields has encouraged growers to adopt intensive management practices. It should be noted that both an optimized nitrogen management for a less responsive variety and a restrictive management for a more demanding variety may result in crops with little yield potential. High nutrient levels can also harm crops by making wheat plants more vulnerable to lodging, causing both damages to the environment through leaching and nitrate volatilization and economic losses to farmers [7], because only 33% of all nitrogen fertilizers applied to cereal crops are absorbed in harvested grains [8]. Therefore, N management is essential for economic yield, optimum water utilization and to minimum pollution of the environment [9]. This study investigates the response of bread wheat varieties to different nitrogen levels based on indicative parameter.

II. MATERIALS AND METHODS

The field study was conducted at Doyogena, Southern Ethiopia at an altitude 2467 m above sea levels. The experiment include twelve treatment combinations in factorial approach with three replications, where one factor was variety and the other, level of nitrogen set in a randomized complete block design. The treatments consisted of four levels of nitrogen (0, 23, 46 and 69 kg per ha) and three bread wheat varieties. The three bread wheat varieties were HAR 3116 (Digalu), Hidasse and Danfe selected based on differences in their morphological characteristics and yield potential.

Each wheat variety was randomly combined with each one of the four levels of nitrogen and three replications giving a total of 36 (4×3×3) plots. Spacing between rows was 0.2m and each plot 2.5m length and 6 rows (1.2 m width). Therefore, the area of each experimental plot was 3 m² (1.2 m x 2.5 m) and the distance between the plots and blocks were kept at 0.5 m and 1 m apart, respectively.

Seeds were sown by uniformly drilling in a depth of 3 cm and in to rows at the recommended rate of 100 kg/ha. Nitrogen

fertilizer in the form of Urea (CO (NH₂)₂) and phosphate fertilizer in the form of Triple superphosphate (TSP) was used for the study. Half nitrogen was supplied by banding at the time of sowing and remaining half was applied at full tillering stage. Phosphate fertilizer/ Triple superphosphate (TSP) as recommended by Ethiopian Institute of Agricultural Research (EIAR) at the rate of 100 kg/ha (46% P₂O₅) was applied equally to all plots by banding and mixing with the soil at planting.

Similarly, N was supplied as urea by banding and incorporated into the soil at the rate 23, 46 and 69 kg/ha nitrogen. Control plots were also included in the experiments, where no fertilizer N was applied. Mechanical and chemical analysis of the soil of the experiment is presented in Table 1. All cultural practices were same for all treatments.

Table 1. Mechanical and chemical analysis of experimental field soils before planting.

Variable	Mechanical	Variable	Chemical
Sand %	14	pH (1:2.5)	6.5
Silt %	38	Organic matter %	2.91
Clay %	48	Available N ppm	38
Soil Texture class	Clay loam	Available P ppm	15
		Available K ppm	154

2.1. Data Collection

At complete loss of green color, the maturity days were counted as difference between sowing to harvest date in each treatment. At harvest, 10 plants were randomly selected from central four rows of each treatment for measuring spike length (cm), plant height (cm), number of grain per spike, grain weight per spike (g) and 1000 grain weight (g). Biological and grain yield were calculated from whole plant of central four rows of each plot. The harvest index (%) was calculated at harvest as a ratio of grain to the total biological yield (dry matter) and expressed as a percentage.

Agronomic efficiency: Agronomic efficiency (AE) as a nitrogen physiological parameter was calculated according to [10] using the following equation. The efficiency of nitrogen usage in cereal crop is calculated by Agronomic Efficiency (AE).

$$AE = \frac{\text{Grain yield at N treatment} - \text{Grain yield at zero N}}{\text{Applied N at N treatment} \times (\text{kg Grains per kg N})}$$

Grain yield response index (GYRI): was calculated for each cultivar, according to [11] using the following equation. It is an indication to the efficient of wheat cultivars for producing higher grain yield at low nitrogen rate and their response to increase N fertilizer rates.

$$GYRI = \frac{\text{Grain yield under high N level} - \text{Grain yield under low N level}}{\text{High N level} - \text{Low N level}} \times \text{kg grains per kg N}$$

Where in this case low nitrogen levels was 0kg/ha and high nitrogen levels was 100kg/ha.

2.2. Data Analyses

The obtained data from each plot were exposed to the proper statistical analysis of variance (ANOVA) with the help of Statistical Analysis System (SAS 9.1.3). All the data were subjected to statistical analysis at 5% level of significance was used to separate the treatment means and compare the effects of grain yields and yield related traits of wheat by using List Significant Difference (LSD) test [12].

3. Result and Discussion

3.1 Plant Maturity

The days to maturity were statistically ($P \leq 0.05$) affected by varieties and nitrogen levels, but their interactive response was insignificant. Digalu (HAR 3116) appeared a late maturing variety (123.5 days) while Hidasse proved early maturing (105.5 days) (Table 2). Among nitrogen levels, the delayed maturity day (120.11 and 119.11) was observed at 69 and 46 kg/ha nitrogen respectively, while the early maturity day (111.44) was observed with no N at control levels (Table 2). The results are similar to [13] who observed when N is applied in excess; the maturity of the crop is delayed by affecting the supply of photosynthesis during critical period of the reproductive phase. Moreover, when N is applied in excess to wheat, the sugar concentration in leaves gets reduced during early ripening stage and hence, inhibition occurs in the translocation of assimilated products to spikelets [14].

3.2 Plant Height

Table 2 data show that the plant height was statistically significant ($P \leq 0.05$) by wheat varieties and nitrogen levels while it is not significantly affected by interaction. Tallest plants (101.97 cm) were observed with Digalu while shortest plants (85.87 cm) were recorded with Hidasse (Table 2). Plant height differences among various cultivars are generally due to their genetic constitution [15]. Of nitrogen levels, tallest plants (96.58cm) were observed at nitrogen level of 69 kg/ha but was statistically at par with the rate of 46kg/ha (95.99cm) nitrogen application; while shortest plants (86.55cm) were recorded at zero (control) level of nitrogen fertilization (Table 2). The result showed that plant height increases at an increasing rate of nitrogen levels. Similar results of plant height increment with N rate increase were also reported by [16].

3.3 Spike Length

The spike length is one of the most important yield components. Data shows that spike length was significantly affected by wheat varieties, nitrogen fertilization level and their interaction. Longer spike length (8.12 cm) was observed with Hidasse while shortest spike length (6.67cm) was observed with Digalu variety (Table 2). Among nitrogen fertilization, longer spike (8.03 cm) were achieved at nitrogen level of 46kg/ha while shorter spikes (6.94 cm) were recorded at zero (control) level of

nitrogen (Table 2). The result shows that there is increasing trend in spike length with increasing nitrogen levels up to 100kg/ha, but further increase had no effect on spike length. The similar result was obtained by [17] they reported that increased nitrogen application increased ear or spike length. The interactive effect

indicated that the longer spike length (8.63 and 8.51 cm) respectively, observed when Hidasse and Danfe varieties interacted with 46kg/ha whereas shortest (5.84 cm) spike length was recorded when Digalu variety interacted with zero levels of nitrogen (Table 3).

Table 2. Mean values of wheat yield and its component as affected by wheat varieties and nitrogen fertilization levels.

Treatments	Maturity days	Plant height (cm)	Spike length (cm)	Grains spike ⁻¹	Grain weight spike ⁻¹ (g)	1000-grain weight (g)	Grain yield (ton/ha)	Biological yield (ton/ha)	Harvest index (%)
Varieties									
Digalu	123.5a	101.97	6.67b	56.72a	3.42a	46.37c	4.8a	11.92a	38.76a
Hidasse	105.5c	85.87c	8.12a	46.89b	2.84b	53.12a	4.79a	11.79a	40.19a
Danfe	119.42b	89.76b	7.56a	50.14b	2.83b	49.99b	4.14b	10.77b	37.80a
LSD (0.05)	1.35	3.56	0.49	3.64	0.17	1.72	0.62	0.73	NS
SE(M) ±	1.16	1.67	0.20	2.29	0.08	0.69	0.14	0.49	2.50
N levels (kg/ha)									
0	111.44c	86.55c	6.94c	41.17c	2.76b	51.48a	2.36c	8.07c	29.16b
23	113.89b	91.01b	7.29b	49.19b	2.95b	49.53ab	4.01b	10.27b	38.99ab
46	119.11a	95.99a	8.03a	58.06a	3.21a	48.95b	6.01a	13.38a	44.91a
69	120.11a	96.58a	7.80a	56.54a	3.19a	48.69ab	5.92a	14.27a	42.60a
LSD (0.05)	1.55	4.12	0.57	4.2	0.19	1.99	0.72	0.84	6.81
SE(M) ±	2.76	2.75	0.15	1.92	0.12	1.06	1.15	0.36	1.98

Means designated by the same letter within the same columns are not significantly different from each other at 0.05 levels of significance.

3.4 Number of Grains per Spike

The yield potential of wheat spike is determined by the grains per spike which is an important yield component of grain yield. The number of grains per spike was statistically significant with varieties and nitrogen levels whereas their interaction did not significantly affect. It is evident from the data that maximum grain yield per spike (56.72) was produced with Digalu variety whereas the minimum number of grain per spike was recorded at rest of varieties (Table 2). As reported by [18], genotypic difference of wheat affects yield and yield components. It is clear from the data that number of grains per spike increased with increasing nitrogen levels generally. The maximum number of grain per spike (58.06) was recorded at 46 kg/ha while the minimum number of grains per spike (41.17) was recorded at control levels. However, at 46 and 69 kg/ha nitrogen levels the number of grains per spike were statistically similar. This can be justified with a reason that nitrogen availability satisfied the plant requirement for growth and development at 46kg/ha, which enable the plants to produce more number of grains per spike. The findings are in line with the data reported by [16] who observed that increased application of nitrogen increases the number of grains yield per spike. Similarly, [19]

indicated that with increasing fertility beyond optimum level, the filled number of spikelets per spike decreased and unfilled spikelets increased.

3.5 Grain Weight per Spike

The potential of wheat spike is also determined by grains weight per spike which is an important yield component of grain yield. The grain weight per spike was significantly ($P \leq 0.05$) affected by wheat varieties, levels of nitrogen and their interaction. Analysis of data shows that higher grain weight per spike (3.42g) was produced in the Digalu variety while lower grain weight per spike (2.83 and 2.84 g) was recorded in the Danfe and Hidasse varieties respectively (Table 2). The difference in grain weight per spike might be a result of genetic make-up of varieties. Among the nitrogen levels, the higher grain weight per spike (3.21 and 3.19) was produced when the nitrogen was applied at the rate of 46 and 69kg/ha respectively while the lower grain weight per spike was observed at the rest of the levels (Table 2). However, the grain weight per spike between 46 and 69 N kg/ha was statistically the same. The higher grain weight per spike with increasing nitrogen levels might be due to the higher availability of nitrogen and the crop's

efficient use of nitrogen. This result is in line with those of [20], who reported that addition of nitrogen increases the grain weight of wheat.

The interaction effect of nitrogen with varieties showed that maximum number (3.65 and 3.86g) of grain weight per spike was produced by Digalu variety when the rate was 46 and 69 kg/ha of

nitrogen application; while the minimum grain weight per spikes was recorded when varieties interact with control (0 kg/ha) nitrogen levels (Table 3). This result is in coherence with those of [21] who reported that the grain weight per spike increases when the varieties interact with an increasing rate of nitrogen.

Table 3. Effect of the interaction between varieties and N levels on yield and yield components.

Variable	Maturity days	Plant height (cm)	Spike length (cm)	Grain spike ⁻¹	Grain weight spike ⁻¹ (g)	Weight of 1000 grain (g)	Grain yield (ton/ha)	Biological Yield (ton/ha)	Harvest index (%)
Digalu 0	119.00	93.70	5.84c	45.77	2.93bc	48.07cd	2.16d	7.06f	30.75
23	121.67	101.80	6.71bc	53.87	3.22b	45.72d	4.19c	11.61cd	35.76
46	125.67	104.41	6.96b	64.50	3.65a	45.93d	6.37a	14.25a	44.71
69	127.67	107.95	7.16b	62.73	3.86a	45.77d	6.47a	14.75a	43.84
Hidasse 0	100.67	79.19	7.50ab	37.67	2.67c	55.18a	2.84d	8.82e	32.46
23	103.00	84.87	7.67ab	43.80	2.80c	53.31ab	4.51bc	10.39d	43.60
46	109.00	90.67	8.63a	53.57	3.04b	52.67b	6.06a	13.38ab	45.32
69	109.33	88.76	8.39a	52.40	2.84bc	51.32bc	5.74ab	14.59a	39.37
Danfe 0	114.67	86.75	7.18b	40.07	2.68c	51.20bc	2.06d	8.33ef	24.27
23	117.00	86.37	7.51ab	49.90	2.82c	51.55bc	3.34cd	8.80e	37.61
46	122.67	92.88	8.51a	56.10	2.94bc	48.25cd	5.58ab	12.51bc	44.71
69	123.33	93.04	7.86ab	54.50	2.87bc	48.98cd	5.56ab	13.46ab	44.59
LSD (0.05)	NS	NS	0.98	NS	0.34	3.45	0.39	1.46	NS
SE(M) ±	0.82	2.17	0.26	2.17	0.1	1.06	0.25	0.39	3.19

3.6. Thousand Seeds Weight

Weight of 1000-grains was measured at seed moisture content of 12.5%. Thousand seeds weight of wheat was significantly affected by different wheat varieties, levels of nitrogen and their interaction. The data showed that heavier (53.12) thousand seed weight of wheat was observed with Hidasse variety while lighter thousand seed weight (46.37) was recorded with Digalu variety (Table 2). The increase of thousand grain weight might be due to genetic make-up of the varieties.

Among nitrogen levels, plots treated with control treatment (without nitrogen) had heavier thousand seed weight (51.48) while lighter thousand seed weight (48.95 and 48.69) was recorded at 46 and 69 kg/ha nitrogen levels respectively (Table 2). This result is in line with those of [22], who reported that nitrogen fertilizer applied at rates to optimize yield response, would not necessarily give a comparable improvement in 1000-

grain weight. Increased number of spikelets per spike and vigorous vegetative growth owing to high N application induce competition for carbohydrate available for grain filling and spikelet formation [23]. This reduces the grain weight because of insufficient supply of carbohydrate to the individual grain. The interaction effect of thousand seed weight was heavier (55.18 g) in Hidasse variety when it interacts with zero levels of nitrogen whereas the lighter (45.72, 45.93 and 45.77 g) was recorded when Digalu variety interacts with 23, 46 and 69 kg/ha nitrogen levels respectively (Table 3).

3.7. Grain Yield

Yield is a very complex attribute. It is a final product of a number of components. Thus, it is essential to detect the variables having the greatest effect on the yield and their relative contribution to the total variability of the yield. Grain yield of

wheat was significantly affected by varieties, nitrogen levels and their interaction. Mean comparison of grain yield in studied genotypes indicated that Digalu and Hidasse genotype with the yield of 4800 and 4788.7kg/ha had the highest grain yield, respectively, and Danfe with the yields of 4132.2 kg/ha, had the lowest grain yield (Table 2). The probable reason might be different varieties have different yield potential due to genetic make-up difference. The genetic make-up determines the productivity of the varieties [24]. Among nitrogen levels, nitrogen applied at the rate of 46 and 69kg/ha produced maximum grain yield (6005.1 and 5924.2 kg/ha) respectively which are statistically at par while lower grain yield (2355.8 kg/ha) was recorded with control N treatment (Table 2). The increments in yield of wheat with increasing N rates up to 46kg/ha might be attributed to the effective role of N as an essential constituent of chlorophyll on dry matter accumulation. The interaction effect revealed that the varieties Digalu and Hidasse showed the better and comparable grain performance at the 46kg/ha nitrogen rate probably due to the highest response by the cultivars to nitrogen and their use efficiency. The minimum grain yield was recorded when the varieties interacted with control (without nitrogen) treatment (Table 3). The findings of this study are similar to those of [20], who reported that increasing N levels increased grain yield by increasing the magnitude of yield attributes.

3.8. Biological Yield

The total above ground biomass of the crop was highly and significantly influenced by varieties, nitrogen levels and their interaction. Higher biological yield (11.92 and 11.79 ton/ha) was obtained from Digalu and Hidasse varieties, respectively while lower biological yield (10.77 ton/ha) was obtained from Danfe variety (Table 2). Among nitrogen levels, the highest biological yield (14.27 ton/ha) was recorded at 69 kg/ha nitrogen application while the lowest biological yield (8.06 ton/ha) was observed at control treatment (Table 2). Biomass yield had increased with increase in N rate from control to the highest level. The interaction result shows that highest biological yield was produced when the Digalu variety interacted with 46 and 69 kg/ha nitrogen levels and Hidasse variety interacted with 69 kg/ha nitrogen levels. The lowest biological yield was produced with Digalu variety interacting with zero levels of nitrogen

application (Table 3). Similarly, the nitrogen application enhanced the vegetative growth of wheat crop, which ultimately increased biological yield with increase in straw yield [25].

3.9. Harvest Index

The harvest index was insignificantly affected by wheat varieties and their interaction while significantly affected by nitrogen levels. Among the nitrogen levels, the highest harvest index (44.91%) was obtained at 46kg/ha nitrogen application but statistically at par with 23 and 69kg/ha nitrogen application levels. The lowest harvest index (29.16%) was obtained with control treatment (Table 2). The findings are similar to [26] who reported an increasing trend of harvest index to a certain level of N and a decreasing one with further increase in its rate of application.

3.10. Agronomic Efficiency

Variation in agronomic efficiency (AE) appeared to result from differences among cultivars and levels of nitrogen. The maximum agronomic efficiency was observed at Digalu cultivar referring that increasing one unit of nitrogen enhanced grain yield by 37.13 kg grain per kg nitrogen (Fig. 3). In Hidasse cultivar, increasing one unit of nitrogen improved grain yield by 28.27 kg grain per kg N. There was low agronomic efficiency (20.65 kg grain per kg N) observed at Danfe cultivar; which indicated that it produced low grain yield per unit of nitrogen supply (Fig. 1). Among the nitrogen application, supplying wheat plant by 46kg/ha produced the maximum grain yield per nitrogen unit increase; being observed the greatest agronomic efficiency which reached 34.47 kg grain per kg nitrogen whereas low agronomic efficiency 22.44 kg grain per kg N was observed at high nitrogen levels i.e. 69kg/ha (Fig. 2). The study showed that agronomic efficiency increases up to 46kg/ha nitrogen application levels then beyond this levels it decreased. According to this study increment of nitrogen above 46kg/ha is not economical and it leads to environmental pollution and it is in line with [21] who reported that agronomic efficiency increases up to optimum levels of nitrogen application. As reported by [27] if a unit of fertilizer does not increase the yield enough to pay for its cost, its application will not be economical and will not return profit even after a constant increase in the yield.

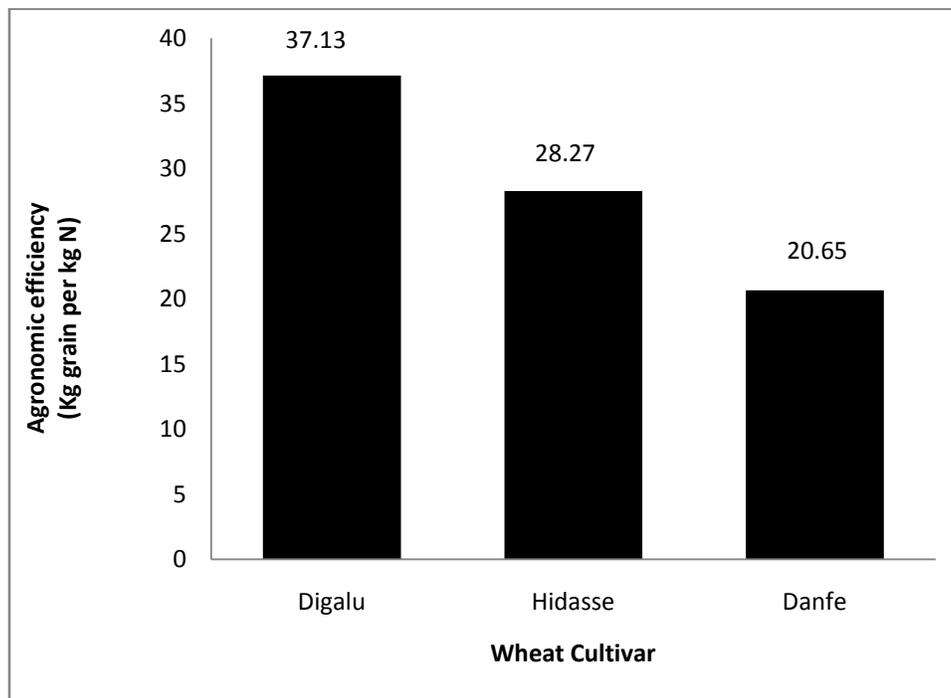


Figure 1. Average agronomic efficiency value (kg grains per kg N) of three wheat cultivars

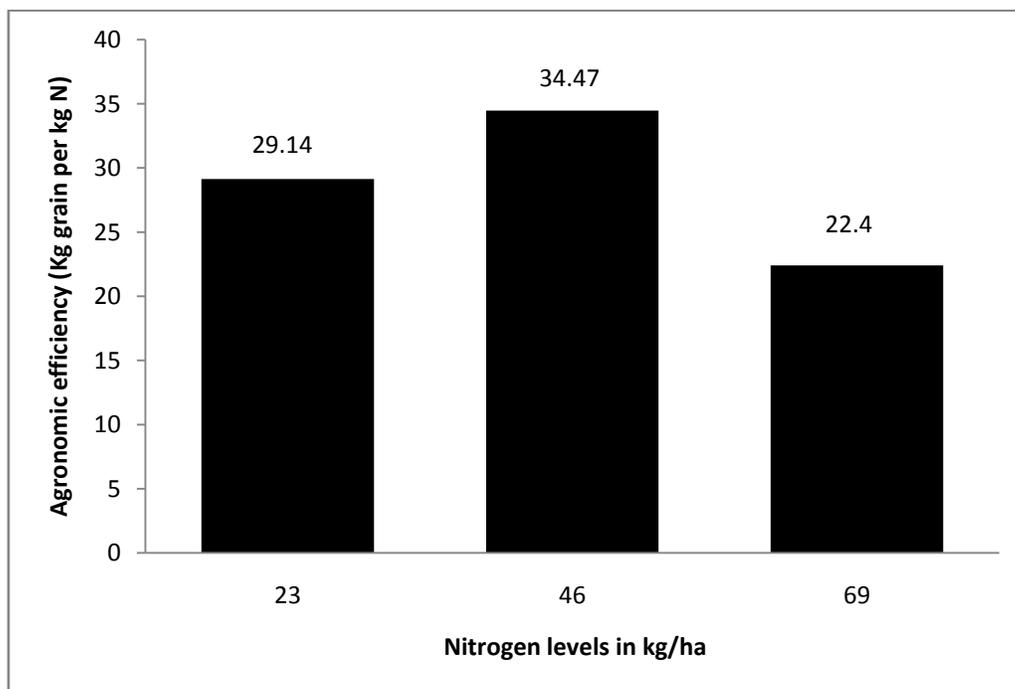


Figure 2. Average agronomic efficiency value (kg grains per kg N) of different nitrogen levels.

3.11. Grain Response Index

Grain yield response index (GYRI) in this study was calculated at 0 and 100 kg/ha as low and high N levels, respectively. Accordingly, it is possible to classify wheat cultivars into four groups: (i) efficient and responsive (ER) that produce high grain yield at low as well as high rates of N fertilizer; (ii) efficient and not responsive (ENR) that produce high grain yield at low N rate with lower response to increased N fertilizer than ER; (iii) not efficient but responsive (NER) that

has low grain yield at low nitrogen rate but responds to increased N fertilizer; and (iv) neither efficient nor responsive (NENR) that has low grain yield at low nitrogen rate and low response to increased N fertilizer.

The grain response index of Digalu, Hidasse and Danfe cultivars was 42.08, 32.17 and 35.23 kg grains per kg N, respectively. The average means value of grain yield at zero level of N rate was 2355.75 kg/ha and the average grain yield response index of three cultivars was 36.49 kg grain per kg N.

Accordingly, Hidasse cultivar belongs to ENR group exceeding the averages of grain yield at zero N rate and under the GYRI while Digalu cultivar (HAR 3116) was NER group demonstrating higher average GYRI and lower average grain yield at zero N rate (Fig 5). Danfe cultivar was NENR, where both grain yield at zero level of nitrogen and GYRI were lower than the averages. The GYRI parameter indicated clearly that considerable differences exist among wheat cultivars for absorbing and utilizing N from deficient soils. Hidasse cultivar exhibited less reduction in yield under low N fertilizer level indicated that it has high utilization efficiency. This result is coherent with [28] who defined a nitrogen efficient genotype as one which realizes higher yield under conditions of low nitrogen supply.

Digalu (HAR 3116) cultivar showed high grain yield response at higher levels of nitrogen rate indicating that it has high uptake efficiency of nitrogen. At low N supply, differences among cultivars for GYRI were largely due to variation in utilization of accumulated N, but with high N, they were largely due to variation in uptake efficiency. The same result was obtained by [21] who reported that GYRI were significantly different between different wheat varieties. As described by [29], under high N input, elevated uptake efficiency is a desirable trait, whereas when farmers grow wheat under low input conditions, the development of cultivars with high utilization efficiency is considered to be more desirable.

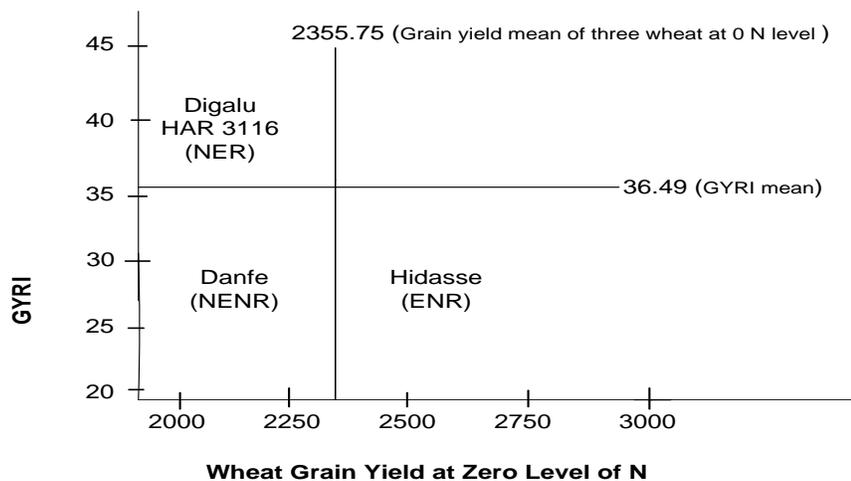


Figure 3. Grain yield response index (GYRI) of some wheat varieties (ENR, efficient but not responsive; NER, not efficient but responsive and NENR, neither efficient nor responsive).

III. CONCLUSION

The results of this experiment indicated increase in grain yield and agronomic efficiency with mineral nitrogen fertilization. Considering the output from this investigate, it can be concluded that nitrogen applied at the rate of 46 kg/ha enhanced wheat productivity and produced the maximum grain yield per nitrogen unit increase and showed the greatest agronomic efficiency. It has become clear that application above 46kg/ha of nitrogen did not influence grain yield and yield components significantly. Digalu and Hidasse variety in combination with application of 46kg/ha nitrogen fertilization giving higher grain yield. However, under low fertilization situation Hidasse variety well for producing higher grain yield.

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Determination of optimum rates of nitrogen and phosphorus fertilization for white cumin (*Trachyspermum ammi* (L.) sprague) in Takusa Woreda of North Gondar Zone

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Abstract- Cultivation practices of white cumin (ajowan) particularly nutrient requirement differ to a certain extent in various soil and climatic conditions. A field experiment was conducted during 2007 to 2008 to determine economically feasible rate of nitrogen and phosphorus fertilization on white cumin. A treatments consisted of 4 nitrogen rates (0, 15, 30 and 45kg/ha) and 4 phosphorus rates (0, 10, 20 and 30kg/ha) was laid out in randomized complete block design with three replications planted at two locations per year. The seeds were sown in the second week of July and harvested on the last week of December. Data on plant height, and seed yield. Statistical analysis was carried out using SAS Statistical Software V8. The pooled data revealed that 45/30 N/P₂O₅ kg/ha fertilization recorded highest yield (whole part grounded) of 4.5t/ha over the unfertilized (2.7t/ha). Application of 45/30 N/P₂O₅ kg/ha gave highest net benefit (12122birr/ha) with acceptable marginal rate of return (208). Sensitivity analysis also revealed that 45/30 NP application gave the highest net benefit (9281birr/ha) with acceptable marginal rate of return (105). Fertilizer rate of 45/30 N/P₂O₅ kg/ha were economical rate and recommended to Takusa and similar white cumin growing areas based on this research output, but to come up with optimum rates, further study will be conducted of higher rates of nitrogen and phosphorus fertilizers.

Index Terms- White cumin, seed yield, economic analysis

I. INTRODUCTION

The great mystery and beauty of spices is their use, blending and ability to change and enhance the character of food. Spices and condiments have a special significance in various ways in human life because of its specific flavors, taste, and aroma. They play an important role in the national economies of several spice producing, importing and exporting countries (NIIR Board of Consultants and Engineers, 2006). The contribution of spice to the Ethiopian economy is not significant however the past four years (2001-2004) export trained from 3.7 to 6.8 million USD is an encouraging progress (Johannes, 2005).

White cumin (*Trachyspermum ammi* [L.] sprague) described as erect, smooth or slightly hairy branched annual, reaching a height of 0.9-1.6 m, small white flowers in compound umbels bearing grayish-brown aromatic seeds. The flowers are hermaphrodite, the plant is self-fertile. It is an annual herb,

flowering after 90-120 days after sowing and ready for harvest after 150-180 days. Originated in Eastern Mediterranean, may be Egypt. In Ethiopia, cumin is often grown together with barley and teff at altitudes between 1700-2200 m (Johannes, 2005).

The main cultivation areas today are Persia and India, but the spice is of little importance in global trade. It enjoys, however, some popularity in the Arabic world and is found in *berbere*, a spice mixture of Ethiopia which both shows Indian and Arabic heritage. Its leaves, stems and roots are aromatic. It is used whole or ground and has a natural affinity with starchy foods, such as root vegetables, legumes, breads, snacks and green beans. Aliza (2006) reported white cumin makes starch and meats easier to digest and is added to legumes to prevent gaseous effects. The fruits find its use as an antispasmodic, anti-flatulent, anti-rheumatic, diuretic and antimicrobial (Malhotra and Vashishta, 2004).

Channabasavanna (2008) found increase in fertilizer levels from 20:10:10 to 40:20:20 NPK kg/ha increased the seed yield of ajowan significantly during individual years and pooled analysis. Further increase in fertilizer levels to 80:40:40 NPK kg/ha did not increase the seed yield (475 kg/ha). The highest net returns (Rs. 2840/ha) and B: C ratio (1.77) were recorded in 40:20:20 NPK kg/ha. Krishnamurthy (1998) recorded higher growth and yield of yield at higher nitrogen (100 kg/ha) and phosphorus (50 kg/ha) levels.

Cultivation practices of cumin, particularly spacing and nutrient requirement differs to a certain extent in various parts of India according to soil and climatic conditions. Cumin being a comparatively new crop, its response to spacing and fertilizer and its impact on productivity and profitability in dry lands needs to be studied (Channabasavanna, 2008). With these back ground the investigation to determine economically feasible rate of nitrogen and phosphorus fertilization was under taken.

II. MATERIALS AND METHODS

A field experiment was conducted at Takusa District, Delgi under moist land conditions during 2007-08 to 2008-09 at Takusa Woreda located at 12°10'N and 37°01'E with an altitude of 1780 m a.s.l. The dominant soil type of the area is light vertisol. The Woreda received an annual rain fall of 730mm. The average temperature of the areas was 21.65° C. The treatments consist of 4 nitrogen rates (0, 15, 30 and 45kg/ha) and 4 phosphorus rates

(0, 10, 20 and 30kg/ha). These treatments were tested in randomized complete block design with three replications planted at two locations per year. The seeds were sown in the second week of July and harvested on the last week of December. The statistical analysis was carried out using SAS Statistical Software V8. Least Significance Difference (LSD) test was used to compare the means of treatments.

Partial budget analysis was made following CIMMYT methodology (CIMMYT, 1988). The cost of and pod were used for the benefit analysis. Marginal rate of return was calculated as change of benefit divided by change of cost. To assess the costs and benefits associated with different treatments the partial budget technique as described by CIMMYT (1988) was applied on the yield results. The economics were calculated based on the market rates prevailing at the current situation (May, 2009 market price). Cost of produce is 3.25Birr/kg, cost of DAP 8.75Birr/kg and cost of urea 6.50Birr/kg. All costs and benefits were calculated on hectare basis in Ethiopia birr (Birr ha-1).

Marginal rate of return (MRR), was calculated by the following formula:

$$\text{MRR} = \frac{\text{Change in NB (NBb - NBa)}}{\text{Change in TCV (TCVb - TCVa)}} \times 100$$

(between treatments, a & b)

Thus, a MRR of 100% implies a return of one birr on every birr of expenditure in the given variable input.

III. RESULTS AND DISCUSSION

The analysis of variance (Table 1) indicated that the fertilizer response mean square values were significant for the three parameters, implying that the application of Nitrogen and phosphorus fertilizer were highly significant difference for the tested parameters. The coefficient of variation ranged from 9.57 % for plant height (cm) to 14.17 % for seed yield.

Table 1. Analysis of variance on yield of white cumin at Takusa

Source of variation	Plant Height (cm)	Biomass Yield	Seed yield
Year	NS	**	**
Site	**	**	NS
N/P ₂ O ₅ fertilizer	**	**	**
Year * Site	**	**	**
Year * N/P ₂ O ₅ fertilizer	NS	*	**
Site * N/P ₂ O ₅ fertilizer	NS	NS	**
Year * Site * N/P ₂ O ₅ fertilizer	NS	*	**
Mean value	49.1	34.78	13.14
Least Significant Difference	3.8	3.09	1.5
CV (%)	9.57	11.01	14.17

NS= non significant difference, ** significant at 1% probability level and * significant at 5% probability level

Plant Height

The effective treatments on increasing plant height were fertilization at 45/30kg/ha N/P₂O₅ which produced the highest plant height of 53.9cm (Table 2). Plant height has a positive relation with yield, number of branch and other yield contributing traits.

Yield

Nitrogen phosphorous fertilization significantly influences the yield of white cumin during all the years, sites and pooled analysis (Table 1). The pooled data revealed that 45/30 N/P₂O₅ kg/ha fertilization recorded significantly highest yield of 4.5t/ha over the unfertilized 2.7t/ha (Table 2). Increase in fertilizer levels from 0: 0: to 45:30NP kg/ha increased the yield of white cumin significantly during pooled analysis. The obtained results are in line with those obtained by Abdel-El-Latif (1999) on *Pimpinella anisum* L. and Swaefy (2002) of *Trachyspermum ammi* L. This may assure the need of the NP elements to enhance the metabolic processes, which reflect on growth and flowering.

Seed yield

Seed yield of white cumin was significantly influenced by growing environment, year and fertilizer rate (Table2). The maximum yield of 1.91t/ha was produced from treatments received 43/30kg/ha N/P₂O₅ whereas the unfertilized treatment gave a yield of 0.73t/ha. Seed yield increases progressively as the rate of NP increases. Krishnamurthy (1998) recorded higher growth and yield of ajowan at higher nitrogen (100 kg/ha) and phosphorus (50 kg/ha) levels. On the other hand further increase in fertilizer levels to 80:40:40 NPK kg/ha did not increase the seed yield (Channabasavanna, 2008)

Economic Analysis

Application of 45/30 N/P₂O₅ kg/ha gave highest net benefit (12122birr/ha) with acceptable marginal rate of return (208). Sensitivity analysis also revealed that 45/30 NP application gave the highest net benefit (9281birr/ha) with acceptable marginal rate of return (105). Thus fertilization at the rate of 45/30 N/P₂O₅ kg/ha is economically feasible both at the current situation and in

the future until the price of the produce decreased by 20% and the input price increased by 20%.

IV. CONCLUSION AND RECOMMENDATION

In all the treatments significant difference was observed across the year and sites. Fertilizer rate of 45/30 N/P₂O₅ kg/ha were economical rate and recommended to Takusa and similar white cumin growing areas. Further study on time of application, seed rate and sowing date shall to be conducted.

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Author Profile



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Table 2. Response of yield and other agronomic traits to NP fertilizer application on white cumin

N / P ₂ O ₅ (kg/ha)	Plant Height (cm)	Yield (qt/ha)	Seed yield (qt/ha)
0/0	47.5 ^{CDE}	27 ^I	7.3 ^L
0/10	44.7 ^E	29 ^{HI}	9.4 ^K
0/20	45.7 ^{DE}	29 ^{HI}	10.6 ^{JK}
0/30	46.4 ^{DE}	32 ^{FGH}	11.6 ^{HIJ}
15/0	46.2 ^{DE}	31 ^{FGH}	10.5 ^K
15/10	47.4 ^{CDE}	30 ^{HI}	11.5 ^{HIJ}
15/20	47.6 ^{CDE}	30 ^{HI}	10.9 ^J
15/30	48.1 ^{BE}	33 ^{EFG}	12.9 ^{FGH}
30/0	48.6 ^{BE}	34 ^{EF}	13.1 ^{EF}
30/10	50.3 ^{ABC}	35 ^{ED}	12.3 ^{GHI}
30/20	51.7 ^{AB}	38 ^C	14.8 ^{DE}
30/30	50.5 ^{ABC}	39 ^{BC}	16.0 ^{CD}
45/0	50.8 ^{ABC}	39 ^{BC}	14.4 ^{EF}
45/10	51.9 ^{AB}	41 ^B	17.4 ^{AB}
45/20	53.9 ^A	41 ^B	17.9 ^{BC}
45/30	53.9 ^A	45 ^A	19.4 ^A
Mean	49.1	35	13.14
LSD	3.8	3	1.5
CV (%)	9.57	11.01	14.17

Table 3. Economic analysis of NP fertilizer application on white cumin at Takusa

N / P ₂ O ₅ (kg/ha)	Current situation (Biological yield)			Sensitivity (Biological yield)		
	TVC(Birr)	NB(Birr)	MRR (%)	TVC(Birr)	NB(Birr)	MRR (%)
0/0	0	7898		0	6318	
15/0	157	8911	645	188	7066	397
0/10	190	8292D		228	6558D	
30/0	313	9632	460	376	7580	273
15/10	347	8428D		416	6604D	
0/20	380	8102D		457	6329D	
45/0	470	10938	6148	564	8562	522
30/10	504	9734D		604	7586D	
15/20	537	8238D		645	6375D	
0/30	571	8789D		685	6803	
45/10	660	11332	208	792	8802	105
30/20	694	10421D		833	8059D	
15/30	727	8925D		873	6849D	
45/20	850	11142D		1021	8573	
30/30	884	10524D		1061	8065D	
45/30	1041	12122	208	1249	9281	105

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Study on Perception on Motivators of the Performance among Grama Niladaries

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Abstract- Motivation seems to be one of the most important tools of Human Resource Management. Organizations design motivation systems to encourage employees to perform in the most effective way but also to attract potential candidates. Employee motivation is a significant psychological aspect of management. To maximize the effort of employees, there should be a mechanism of motivation. This study sought to investigate the perception of motivation on the performance of Grama Niladaries attached to Kandy and Harispaththuwa Divisions. Specially, the study sought to find out whether motivation of GNs had any effect on their morale to perform and: the effect of intrinsic and extrinsic motivation on the performance of the GNs.

The main focus of this study to gain understanding of perception of Grama Niladharis on existing motivators. This is very important not only to understand the level of motivation among Grama Niladharis but also to understand different level of perception toward different motivators. This research was based on both quantitative and qualitative research methods and data were collected from hundred and twenty Grama Niladhari Officers in the Kandy and Harispaththuwa Divisional Secretariats in Sri Lanka by using a convenient sampling method. This study found that the dissatisfaction level of the Grama Niladhari Officers has negatively affected their performances. The study findings revealed that the respondents are not perceived the existing motivators as encouraging factors for them to perform exceptionally. Therefore, when developing a motivational program for the GNs, it should focus on both extrinsic as well as intrinsic motivators to encourage them to perform well in their respective divisions.

Index Terms- Perception, Performance, Grama Niladhari

I. INTRODUCTION

This study focused on “perception on motivators of the performance among “Grama Niladharis” in the two Divisional Secretariat Divisions in the Central Province.

Grama Niladhari (“village officer”) is a Sri Lankan public official appointed by the central government to carry out administrative duties in a Grama Niladhari division, which is a sub unit of a divisional secretariat. The duties of a Grama Niladhari include the reporting of issuing of permits, gathering statistics, maintaining the voter registry and keeping the peace by settlement of personal disputes. Under Kandy and Harispaththuwa Divisional Secretariat Divisions, there are 120 GN divisions. These 120 GNs are varied in term of sex, age, education back ground etc. Therefore, the performance also

varied according the incumbent job holders. Since the GNs are field level officers, most of the time they are in the field. Only two days they are supposed to be in their offices. The public find it difficult to meet them when required to see them. Hence, they have been criticized as inefficient and corrupt set of public officers.

The motivators play a vital role in encouraging staff to deliver efficient services. Unlike in the private sector, public sector officers enjoy limited types of motivators legally. Furthermore, the public services are intangible in nature. So, the public who receive those services cannot be seen the actual services. They assess the performance through how they experience the service. Therefore, personal factor is vital in delivering public services.

The GNs also as public officers are entrusted with number of essential services to the general public. They must receive those services only through the GNs. The GNs also receive a certain amount of motivators legitimately. Therefore, it is important to find out how does the existing legitimate motivators impact on the performance of GNs to provide efficient public services.

II. PROBLEM STATEMENT

This study will focus on the perception of GNs on the motivators for their performance. Accordingly, the problem statement has formulated as follows: “How do GN’s perceive existing motivators towards their performance”?

This study focuses on whether the perception on motivators of Grama Niladhari Officers for their performance? What are the reasons for the perception of the Grama Niladhari Officers? Further, this study reveals how dissatisfaction of a Grama Niladhari Officer affects his performance? Finally, this study provides suggestions to enhance the motivational factors of the Grama Niladhari Officers.

Maslow’s Hierarchy of Needs theory is the most popular one. Maslow believed that the underlying needs for all human motivation to be on five general levels from lowest to highest Self Fulfilment.

Physiological Needs - The need for food, drink, shelter and relief from pain. • Safety and security – Once the physical needs of the moment are Satisfied, man concerns himself with protection from physical dangers with Economic security, preference for the familiar and the desire for an Orderly, predictable world. • Social - become important motivators of his behaviour. • Esteem or egoistic – A need both for self-esteem and the esteem of others, which involves self-confidence,

achievement, competence, knowledge Autonomy, Reputation, Status and Respect. • Self-fulfilment or self-actualization – is the highest level in the hierarchy; 11th International Conference on Business Management - 2014 239. These are the individual's needs for realizing his or her own potential, for continued self-development and creativity in its broadest sense. It shows how expectations of a person will be increased. As a human being this theory is useful to understand the public-sector officials' behaviour.

III. RESEARCH QUESTIONS

1. Are the socio demographic characteristics of GN's in two selected GS divisions notable?
2. Is the perception on effect of working environment on performance of GN's in two DS divisions critical?
3. Does the perception on effect of supervision and supervisors support on performance of GN's in two DS divisions
4. Does the perception on effect of rewards and incentives in performance of GN's in two DS divisions are different?
5. What is the perception on effect of growth and development opportunities on performance of GN's in two DS divisions

Overall Objectives

The overall objective of this study is to find the perception on existing motivators by the GNs.

Specific Objectives

In line with research questions following specific objectives for the study is identified

1. To describe socio-demographic characteristics of GN's in two DS divisions
2. To identify perception on working environment among GN's in two DS divisions
3. To describe perception on supervision and supervisors support among GN's in two DS divisions
4. To analyse perception on rewards and incentives among GN's in two DS divisions
5. To describe perception on growth and development opportunities among GN's in two DS divisions.

Definitions of terms:

Motivation by definition refers to what activates, directs human behaviour and how this behaviour is sustained to achieve a particular goal. Also it can be defined as the set of processes that arouse, direct and maintain human behaviour towards attaining some goals. Jones (1955) argues that "Motivation is concerned with how behaviour gets started, is energised, is sustained, is directed, is stopped and what kind of subjective reaction is present in the organization while all this is going on." Gibson, Ivancevick, Donnelly (Organizations: processes, structure, behaviour Pp214)

Role of financial motivation: The potential role of money as (a) conditioned reinforce (2) an incentive which is capable of satisfying needs (3) an anxiety reducer (4) serves to erase feelings of dissatisfaction Opsahl and Dunette, (motivation and organizational climate Pp 65- 66)

Employee satisfaction: This refers to the positive or negative aspects of employee's attitude towards their jobs or some features of the job Ivancevich etal (Pp 448)

Organizational Goals: A concept, which refers to the focus of attention and decision-making among employees of a sub-unit. Organising: This involves the complete understanding of the goals of organization, the necessity of proper co-ordination, and the environmental factors that influence the goals and employees within the organization.

Employee attitudes: Mental state of readiness for motive arousal. Performance: the act of performing; of doing something successfully; using knowledge as distinguished from merely possessing it; A performance comprises an event in which generally one group of people (the performer or performers) behave in a particular way for another group of people.

Efficiency: The ratio of the output to the input of any system. Economic efficiency is a general term for the value assigned to a situation by some measure designed to capture the amount of waste or "friction" or other undesirable and undesirable economic features present. It can also be looked as a short run criterion of effectiveness that refers to the ability of the organization to produce outputs with minimum use of inputs.

Limitations

Like any research the present research suffers from some of the limitations, which included, but not limited to, the size of the sample of present investigation is limited in its nature, which puts a limitation on the generalization of results of the present study. This study was confined to those GNs who were are working around only two DS areas in the Kandy District, not to all the district as a whole. This limitation of the study again brings limitation of the generalizations of results. And also only selected variables on motivation is included.

Expected research/project outcome or contribution

Since the performance of the GNs is vital for the development of the country, it is needed to improve the performance of GNs through introducing attractive motivators. Therefore, the findings of the research will be useful for policy makers, firstly to understand the reactions from GNs to existing motivators. Secondly, it helps to see the relationship between motivators and performances. Thirdly, it will suggest new strategies to improve the existing motivators for GNs.

IV. LITERATURE REVIEW

Employee Motivation is the core of management. Employee Motivation is an effective instrument in the hands of the management in inspiring the work force .It is the major task of every manager to motivate his subordinate or to create the will to work among the subordinates .

In this research, it is intended to refer the following literature to provide theoretical back ground for the study. Abraham Maslow's Hierarchy of needs theory provides a conceptual framework for understanding the reactions of the individual jobholder for different motivational factors. Douglas McGregor's X and Y theory justify the types of individuals and their responses towards punishments and appreciations. Fredrick Hershberger's two factor theory discussed about the motivation

and hygienic factors. In this study, it is intended to find the application of those three theories in motivating GNs for efficient performances.

Maslow's Hierarchy of Needs

This is the most widely known theory of motivation and was hypothesized by American psychologist Abraham Maslow in the 1940s and 1950s. Maslow put forward the idea that there existed a hierarchy of needs consisting of five levels in the hierarchy. These needs progressed from lower order needs through to higher level needs.

The basic premise of the theory is that we all have these five levels of needs and that starting at the lowest level we are motivated to satisfy each level in ascending order. As each level is sufficiently satisfied we are then motivated to satisfy the next level in the hierarchy. The five different levels were further sub-categorized into two main groups, these being:

Deficiency needs - Maslow considered these the very basic needs required for survival and security. These needs include:

- physiological needs
- safety needs
- social needs

Growth needs - These are needs associated with personal growth and fulfillment of personal potential.

- esteem needs
- self-actualization needs

In Maslow's theory, we can never run out of motivation because the very top level, self-actualization, which relates to the achievement of our full potential, can never be fully met. Maslow's theory has been widely embraced and taught within the business world and few people who have attended a company supervision or basic management training course are unlikely not to be familiar with this theory.

Jones suggested "motivation is concerned with how behavior gets started, is energized, is sustained, is directed, is stopped and what kind of subjective re-action is present in the organization while this is going on. The Jones statement can be converted into a diagram which shows the employee motivational process as it influences performance?

Specifically, Maslow theorized that people have five types of needs and that these are activated in a hierarchical manner. This means that these needs are aroused in a specific order from lowest to highest, such that the lowest-order need must be fulfilled before the next order need is triggered and the process continues. If you look at this in a motivational point of view Maslow's theory says that a need can never be fully met, but a need that is almost fulfilled does not longer motivate. According to Maslow you need to know where a person is on the hierarchical pyramid in order to motivate him/her. Then you need to focus on meeting that person's needs at that level (Robbins 2001)

Per Greenberg and Baron (2003, p192) the five needs identified by Maslow corresponds with the three needs of Alderfer's ERG theory. Whereas Maslow theory specifies that the needs be activated in order from lowest to highest Alder's theory specifies that the needs can be activated in any order. His

approach is much simpler than Maslow's. Alder specifies that there exist three main needs as opposed to five postulated by Maslow. This human basic needs include existence, relatedness and growth. These needs according to Alder need not necessarily activated in any specific order and may be activated at any time. According to him Existence needs corresponds to Maslow's physiological needs and safety needs. Relatedness needs corresponds to Maslow's social needs and growth needs corresponds to esteem and self-actualization needs by Maslow.

Criticisms of Maslow's Need theory of motivation

Maslow proposed that if people grew up in an environment in which their needs are not met, they would be unlikely to function healthy, well-adjusted individuals. Research testing. Maslow's theory has supported the distinction between the deficiencies and growth needs but showed that not all people are able to satisfy their higher-order needs on the job. According to the results of the research managers from higher echelons of organizations are able to satisfy both their growth and deficiency needs lower level managers are able to satisfy only their deficiency needs on the job. Maslow's theory has not received a great deal of support with respect to specific notion it proposes (Greenberg & Baron 2003, p195). To them this model is theorized to be especially effective in describing the behavior of individuals who are high in growth need strength because employees who are different to the idea of increasing their growth will not realize any physiological reaction to their jobs.

According to Graham & Messner there are generally three major criticisms directed to the need theory and other content theories of motivation.

- (a) There is scant empirical data to support their conclusions,
- (b) they assume employees are basically alike, and
- (c) they are not theories of motivation at all, but rather theories of job satisfaction. This was supported by the views of Nadler & Lawler (1979) in Graham & Messner.

Nadler & Lawler cited in Graham & Messner also critical of the need theory of motivation. They argue that the theory makes the following unrealistic assumptions about employees in general that:

- (a) all employees are alike
- (b) all situations are alike and that
- (c) there is only one best way to meet needs. Another critic to this view was Basset-Jones & Lloyd

Basset-Jones & Lloyd presents that in general, critics of the need theory argue that it is as a result of the natural feeling of employees to take credit for needs met and dissatisfaction on needs not met. Nonetheless and regardless of the heavy criticism levied at the hierarchy of need theory, many believe that this theory has made a significant contribution in the field of organizational behavior and management especially in the area of employee motivation and remains attractive to both researchers and managers alike. The incorporation of the need theory into the work environment today could be as a result of the contributions made so far by Maslow's Hierarchy of need theory.

Empirical studies on employee motivation using the original and adapted Maslow's model

If any person has to come up with the question that is there any need for employees motivation? The answer to this type of question of-course should be simple-the basic survival of every organization be it public or private limited before, today and in the foreseeable future lies in how well its work force is motivated to meet the objectives of the organization. This explains why the human resource department in today's organization is became a focus of its core functions. I think that motivated employees are needed in this rapidly Business world where the principal-agent conflict is the issue confronting most managers. Most organizations now consider their human resources as their most valuable assets (a strategic or competitive advantage). Therefore, in order to effectively and efficiently utilize this strategic asset, many believes managers and the organization as a whole, must be able and willing to understand and hopefully provide the factors that motivate its employees within the context of the roles and duties they perform. This is because highly motivated employees are the cause of high productivity levels and hence higher profits for the organization. Having noted this rationale the next question one may ask is what factors motivate today's employees"

According to Wiley at some point during our lives, virtually every person may have to work. He claims that working is such a common phenomenon that the question "what motivates people to work is seldom asked. Wiley went on to say that "we are much more likely to wonder why people climb mountains or commit suicide than to question the motivational basis of their work",. Therefore, exploring the altitudes that employees hold concerning factors that motivate them to work is important to creating an environment that encourages employee motivation

From the much amount of literature available on employee motivation, it is clearly evident that a lot of surveys regarding employees and what motivates them have been undertaking. These employee motivation surveys have been conducted in many different job situations, among different categories of employees using different research methods and applications. One of the very first survey to be conducted was on industrial workers by over the years, similar or different survey employees have been carried out

According to a research carried out by Kovach on industrial employees who were asked to rank ten "job rewards" factors based on personal preferences where the value 1 represented most preferred and 10 being the least preferred.

The results were as follows

- (1) Full appreciation of work done
- (2) Feeling of being
- (3) Sympathetic help with personal problems
- (4) Job security
- (5) Good wages and salaries
- (6) Interesting work
- (7) Promotion & Growth
- (8) Employee's loyalty
- (9) Good working conditions
- (10) Tactful discipline

During the periods when employee surveys were carried out, supervisors were at the time asked to rank job rewards, as they taught employees would rank them. The rankings by the supervisors were relatively consistent for each of the years.

These rankings were as follows:

- (1) Good wages
- (2) Job security
- (3) Promotion and Growth
- (4) Working conditions
- (5) Interesting work
- (6) Personal loyalty to employees
- (7) Tactful discipline
- (8) Full appreciation
- (9) Sympathetic help with personal problems
- (10) Recognition

The results from the supervisor survey indicated that their ranking had not changed over the study period with regards their collective perception of factors that motivate employees. This shows that they had a very inaccurate perception of what motivates employees but also that they did not realize the importance of the need theory.

In a survey by Wiley (1997) in which approximately 550 questionnaires were administered to person employed at different industries and divided into 5 subgroups, or categories namely: (occupation, gender, income levels, employment status and age) they were asked to rank 10 factors according to the level of importance each is in motivating them to perform best with the most important factor ranked 1 and the least important ranked 10th. The survey concluded with the following collective rank order by respondents:

- (1) Good wages
- (2) Full appreciation of work done
- (3) Job security
- (4) Promotion
- (5) Interesting work
- (6) Company loyalty to employees
- (7) Good working conditions
- (8) Tactful discipline
- (9) Recognition
- (10) Sympathetic help with personal problems.

The results from a representative sample of the labor force in seven different countries by Harpaz showed that the two most dominant work goals were "interesting work"

Organizational /managerial Applications of Maslow's Need theory

The greatest value of Maslow's need theory lies in the practical implications it has for every management of organizations. The rationale behind the theory lies on the fact that it's able to suggest to managers how they can make their employees or subordinates become self-actualised. This is because self-actualised employees are likely to work at their maximum creative potentials. Therefore it is important to make employees meet this stage by helping meet their need

organizations can take the following strategies to attain this stage

- ¾ Recognise employee's accomplishments: Recognising employee's accomplishments is an important way to make them satisfy their esteem needs. This could take the form of awards, plaques etc.. Awards that are too general fail to meet this specification.
- ¾ Provide financial security: Financial security is an important type of safety need. So organizations to motivate their employees need to make them financially secured by involving them in profit sharing of the organization. In a research carried out with AT&T and Wang showed that 50% of their employees received financial outplacement services to assist laid-off employees in securing new jobs.
- ¾ Provide opportunities to socialise: Socialisation is one of the factors that keep employees feel the spirit of working as a team. When employees work as a team they tend to increase their performance. Research conducted on IBM shows that it holds a "family day" picnic each spring near its Armonk, New York headquarters.
- ¾ Promote a healthy work force: Companies can help in keeping their Employees physiological needs by providing incentives to keep them healthy both in health and mentally.

V. METHODOLOGY

Research Design

The study is a descriptive cross sectional study among GN's in two DS division in Kandy district. Descriptive cross sectional studies are one of the commonest type of research studies undertaken analyse similar problems in similar scenarios. In addition, cross sectional studies provides a clear picture of the study population while utilizing minimal resources and suits best in this scenario.

Research Model

It is evident from the literature reviewed that almost all the researchers have taken an immense effort to introduce models with high explanatory power in explaining the motivation to work. This is because a model with high explanatory power in other words depicts the capturing of correct combination of explanatory variables. Further it is vital to understand that either a mode with several explanatory variables or few variables does not ensure the better model building. But however the multidimensionality nature of social phenomena limits any researcher in selecting explanatory variables even upon theoretical grounds as theories are built upon several assumptions and different socio-economic and political back grounds. Thus regardless the degree of explanatory power of the model comes up it is vital to realize the limitations of the model in explaining the multidimensionality nature of social phenomena.

In the effort of selecting the explanatory variables it is vital to consider the different scholarly views and those are explained in the following paragraphs as the justification on variables selected for this study in terms of different dimensions.

Conceptual Model

All four identified independent variables can have direct effect of the performance of GN's. Thus, following mini conceptual model is used for the research study and in operationalization of variables.

Figure 3 1: Conceptual Framework

Dependent Variable

Dependent variable in this research is considered as the performance of GNs, which includes different dimensions of the performance criteria's of Grama Niladharis' services.

Independent Variables

Selection of independent variables is a curtail turning point for any researcher for the success of any research study. In this regard theoretical back ground of the research, the researcher's interest as well as the academic and the practical experience of the researcher in the relevant field is vital for the selection of explanatory variables for the study. Accordingly, the researcher selected nature of duties assigned, supervisors' support, reward and incentives, working environment and opportunity for growth and development as independent variables for this research.

Study Setting

The study has focused on GN's in government settings. Therefore, divisional secretary offices was selected as service setting for the study.

Study Population

The study population composed of all the GN's working in selected divisional secretary offices. Two divisional secretary offices were selected based on the convenience to the principal investigator.

Inclusion Criteria

Selected GN's currently working in Kandy and Harispaththuwa divisional secretariat offices using simple random sampling method.

Exclusion Criteria

All GN's on maternity leave, foreign leave during the study period

Study Period

Data from All GN's were collected during the month of May 2015.

Sample

Sample Size Calculation

There were no studies carried out in the same subject in Sri Lanka. Therefore, researcher was unable to find figure on prevalence. Thus, 0.5 prevalence is assumed and sample size was calculated using an accepted statistical formula. This yields sample size of 422. However, as the total population is less than that, it was decided to include entire population for the study.

Sampling Technique

The study population is composed of only 120 GN's. Thus, it was decided to include all the population in the study. Final sample was composed of 120 GN's selected on simple random basis.

Study Instrument

The study instrument was a pre-tested self-administered close-ended questionnaire. The principle investigator himself collected the data at each divisional secretary offices. Principal investigator has visited twice to each office during the period to collect data.

Questionnaire development

Extensive literature search, by the researcher did not reveal any suitable existing scale to measure perception on existing motivators on the performance of GN's. Questionnaires developed in other countries were not suitable in Sri Lanka due variation in service settings. Therefore, the principle investigator chose to develop an instrument.

A panel consisting of experts that included a two senior administrator, a sociologist, a statistician scrutinized selected questions.

Final questionnaire comprised of 36 question. Closed-ended questions were used in most occasions as close-ended style.

All questions were arranged logically and sequentially in three parts to secure collection of required data and to minimize confusion.

1. Part 1 - Basic socio-demographic data (6 questions)
2. Part 2 – Perception on existing motivators. Divided in to 5 section according to the each of motivator group.
3. Part 3 – Open ended question to collect suggestion

Modified Likert scale with five responses were used in most occasion to avoid centralization of responses.

The questionnaire was pre tested at divisional secretary office of Kundasale.

Data Analysis

Data analysis was done using the IBM® SPSS® 22 statistical software. Due to the nature of questionnaire, mainly non-parametric tests used in determining statistical inferences (Jamieson, 2004).

VI. DATA PRESENTATION AND ANALYSIS

Demographic Characteristics

Once categorized into age groups, there was fairly wide distribution among all the age categories with highest number from 46 -50 age group (19.2). Males dominated the sample with relative percentage of 71.7%. Most of the GN's in the study belongs to experience of 0 -10 years category and comprises 45% of the sample. 4.1 illustrates distribution by service experience.

Table 4 1: Distribution of Sample by Service Experience

	Frequency	Percent
1-5 Years	24	20.0
6-10 Years	30	25.0
11-15 Years	7	5.8
16-20 Years	8	6.7
21-25 Years	10	8.3
26-30 Years	16	13.3
31-35 Years	12	10.0
36-40 Years	13	10.8
Total	120	100.0

Distribution of Sample by Service Grade

Class II GN's has the highest proportion of 44.2% of the sample while super grade was only 1.7%.

Figure 4 1: Distribution of Sample by Service Grade

Distribution of Sample by Educational Level

Most of the GN's were only studied up to ordinary level (41.7%) and bulk of the other were up to advanced level. Together above two categories comprised of 80% of the sample. There were no GN's with postgraduate qualification.

Perception on Working Environment

Perception on working environment was assessed using seven Likert scale and results were used to form a single score out of 25. A single score was formed to analyse the perception on working environment by the GN's of two divisions. The possible scores were 0 -25. Perception on working environment was good with mean score of 17.96 and SD of 3.51. The descriptive statistics are summarised in table below (Table 4 2).

Table 4 2: Perception on Working Environment

Descriptive Statistics	
Mean	17.96
Median	18.75
Std. Deviation	3.51
Range	15.18
Minimum	9.82
Maximum	25.00

On analysing the distribution of scores, it was evident that distribution of perception scores on working environment did not show normal distribution pattern. It showed a pattern with two peaks and may be due to limited number of questions. Figure 4 2 shows the histogram of the distribution of scores.

Figure 4.2: Perception Score on Working Environment

Perception on Supervisor Support

Similarly, a single score was formed to analyse the perception on supervisor support by the GN's of two divisions. The possible scores were 0 -25. Perception on working environment was good with mean score of 18.74 and SD of 2.20. The descriptive statistics are summarised in table below.

Table 4 3: Perception Scores on Supervisor Support

Descriptive Statistics	
Mean	18.74
Median	18.75
Std. Deviation	2.20
Range	11.72
Minimum	11.72
Maximum	23.44

On analysing the distribution of scores, it was evident that distribution of perception scores on supervisor support did not show near normal distribution pattern. It was bit negatively skewed and shown below.

Figure 4 3: Perception on supervisor support

Perception on Rewards and Incentives

Similarly, a single score was formed to analyse the perception on rewards and incentives by the GN's of two divisions. The possible scores were 0 -25. Perception on working environment was good with mean score of 12.76 and SD of 3.75. The descriptive statistics are summarised in table below. The perception score on reward and incentives appeared lower than that or working environment or supervisor support.

Table 4 4: Perception score on Rewards and Incentives Statistics

Mean	12.76
Median	13.54
Std. Deviation	3.75
Range	17.71
Minimum	1.04
Maximum	18.75

Perception on Opportunities of Growth and Development

Perception on opportunities of growth and development was assessed using five Likert scale. A single score was formed to analyse the perception on rewards and incentives by the GN's of two divisions. The possible scores were 0 -25. Perception on working environment was good with mean score of 12.76 and SD of 3.75. The descriptive statistics are summarised in table below. The perception score on reward and incentives appeared lower than that or working environment or supervisor support.

Table 4 5: Perception Score on Opportunities of Growth & Development Statistics

Mean	9.86
Median	10.00
Std. Deviation	2.63
Range	15.00
Minimum	2.50
Maximum	17.50

On analysing the distribution of scores, it was evident that distribution of perception scores on working environment showed normal distribution pattern and shown below.

Figure 4 4: Perception Score on Opportunities of Growth & Development

On summarizing the scores on working environment, supervisor support, rewards & incentives and opportunities of growth and development, it was evident that apparently different perception pattern. Highest perception score was on supervisor support while lowest on development opportunities. This showed GN's were more concern on career development. However, this needs further analysis to see whether there is significant difference on these scores. Friedman test was used in comparing means due to nature of scores and due to non-normal distribution of the scores. For the test significant level was set as 0.05. Test result is summarized in Table 4 6.

Table 4 6: Friedman Test Ranks

	Mean Rank	
Working Environment (Q1)		3.19
Supervisor support (Q2)	3.54	
Rewards & Incentives (Q3)		2.00
Opportunities (Q4)	1.26	
Test Statistics on Friedman Test		
Number 120		
Chi-Square	241.539	
Degree of freedom	3	
Asymp. Significance	.000	

As significance level is less than 0.05, we can confirm that there is significant difference among means on for selected score. However, to find each group Wilcoxon signed-rank test was employed several times. From the test results, it was evident that there was significant differences on all occasion except between working environment and supervisor support.

Total Score on Perception

Overall perception score was obtained by adding four score on working environment, supervisor support, reward & incentives and opportunities on development. The possible scores were 0 -100. Overall perception score was good with mean score of 59.32 and SD of 6.71. The descriptive statistics are summarised in table below (Table 4 7).

Table 4 7: Overall Perception Score Statistics

Mean	59.32
Median	59.55
Std. Deviation	6.71
Range	36.35
Minimum	39.48
Maximum	75.83

On analysing the distribution of scores, it was evident that distribution of perception scores on working environment showed normal distribution pattern.

Figure 4 9: Distribution of overall Perception

Independent sample T test was employed to analyse differences among male and female GN of the population and following results were obtained. As value obtained from t test was above the 0.05, it is concluded that perception do not differ based on the gender of the GN.

Table 4 8: T test on Gender vs Perception

	F	Sig.	t	df	Sig.	
Equal variances assumed	.069	.794	-.030	118		
	.976					
Equal variances not assumed					-.030	
	61.040	.976				

One way ANNOVA test was performed to identify difference according to age of GN and found to have no significant difference (Sig = 0.17). Another one way ANNOVA test was performed to identify difference according to service

experience. It was found to have no significant difference (Sig = 0.14). Similarly, one way ANNOVA test was performed to identify difference according to service grade of GN and found to have no significant difference (Sig = 0.47).

VII. CONCLUSIONS, RECOMMENDATIONS & LIMITATIONS

The overall objective of this study was to investigate the perception on motivation of the performance among GNs. The conceptual model, developed according to three selected theories, was the foundation of this study. Both extrinsic and intrinsic motivational factors were identified as independent variables to conceptualize the dependent variable of employee performance and their perception on motivation.

Relationship between independent and dependent variable

To examine the relationship between the GNs perceptions on motivation of the performance was the key objective of this study. Results obtained through the inferential analysis, concludes that extrinsic and intrinsic motivation can positively contribute towards employee performance. Therefore, factors that can enhance the dimensions used to measure extrinsic motivation and intrinsic motivation can enhance the performance among GNs.

The results of this research suggest that the most appropriate motivation and reward system should try to satisfy variety of needs from more than one category. The perfect job of a GN should be interesting and well paid. Moreover, the work environment should create the feeling of involvement, appreciation and safety. Perhaps there should be also a great chance for promotion. The described job definitely would motivate employees to perform very well. Although, it might be hard to offer a position that satisfies all those needs, organizations should be aware of their existence. The information gained from this research might be a good starting point for creating motivation systems for supervisors of GN at present as well as for planning new recruits.

As per the primary research study, it is evident that the Grama Niladhari officer is dissatisfied with his job. The extent to which they are dissatisfied can be identified at three different levels – Strongly Dissatisfied, Dissatisfied and Neither Dissatisfied nor satisfied – further, did observations indicate that there is a difference between Job Dissatisfaction of male Grama Niladhari officers and female Grama Niladhari officers. Salary, Promotion, Political Influence, Recognition, Technology and Training are the main factors affecting job dissatisfaction of the Grama Niladhari officers. There is a negative relationship between job dissatisfaction and performance of Grama Niladhari officers.

Even though Grama Niladhari Officers have to stay at their office premises from 08.30a.m to 11.30a.m, it is observed that they do not come to the office on time. In the evening they have to visit their divisions to observe the people of their divisions. Excepting newly recruited officers, no one used to visit their divisions. If they do not have any field duty, they must stay at their office in the evening. But as per the observations, no one follows the rules as there is no person to supervise them. On the other hand, there are many social welfare programs for the

disabled people and for the widows which are carried out by the Divisional and District Secretariats.

It is the responsibility of the Grama Niladhari officer to identify disabled or widows in his division and recommending them to the Secretariats. But Divisional and District Secretaries blame to Grama Niladhari officers, that they do not perform their duty well.

VIII. RECOMMENDATIONS

The final objective of this study is to provide suggestions to minimize the identified factors which cause dissatisfaction of the Grama Niladhari officers. Performance based Salary Scheme one of the main factors which causes job dissatisfaction of the Grama Niladhari Officers is low salary. Grama Niladhari officers demand some indicators to measure their performance. According to the performance, salary increments should be given. Even some performance measurements exist, but the performance is not measured fairly and correctly. One of the GN's stated as follows; "I received two years vacation with salary to follow a Diploma in social work in the Institute of National Social Development which is established under the Ministry of Social Services. I conducted a research too. But they did not give me even a salary increment. I did not receive any benefit from that diploma to improve my career life..." This kind of grievance is apparent with several Grama Niladhari officers. Thus, the government should pay more attention to encourage them by giving them the necessary financial benefits, career prospects etc.

At the same time, officials who show poor performance should be identified and necessary action should be taken to motivate them. 11th International Conference on Business Management - 2014 249 Opportunity to Career Development The promotion scheme of the Grama Niladhari officers have made frustrated them. Once a person is recruited as a Grade III Grama Niladhari officer, she/he has to wait ten years to enter into Grade II. Even, the government does not hold necessary examinations on time. In fact, even their EB exams are not held on time and in a systematic manner. Sometimes Grama Niladhari officers have to wait twelve years or fourteen years to get promoted. The period of conducting examinations should be reduced and the government should take the responsibility to hold examinations on time.

Minimize unnecessary political influence. Earlier, the interviews for the recruitment of the Grama Niladhari officers" were conducted at Provincial Council level. But currently those powers have been delegated to the local government agencies. Therefore, politicians receive more opportunity to influence that process. Unnecessary political influence is another major factor for the dissatisfaction of Grama Niladhari officers. All the powers of recruiting and promoting the Grama Niladhari officers should be centralized with the Ministry of Public Administration and Home Affairs. Then, politicians will not be involved those procedures.

The Recognition and dignity of Grama Niladhari Officers are also reduced due to lack of formal office premises, Social well-fair facilities, opportunity to show the seniority and qualifications. Thus, a part of a government building should be given to the Grama Niladhari officers to establish their office. It

is not an additional cost to the government. They can build single premises for all public officers in a particular area. Midwives, Samurdhi Officers, Development Officers, Grama Niladhari officers and other related officers could be available in one place. The absence of transport facilities is another issue. The Grama Niladhari officers do not visit their divisions and they often make an excuse due to the absence of the transport facilities, they are unable to visit divisions. So, they request some kind of transport facility to do their job.

At the same time, there should be social well-fair programs for the Grama Niladhari officers such as housing facilities in order to enhance the living standard of the Grama Niladhari officers.

Politicians and other people cannot use Grama Niladhari officers for political activities if the Grama Niladhari officers are well paid based on an independent performance evaluation system. They should be allowed to display their certificates in their office and mention their tenure in the name board.

Assistance of technological and Training Since the Grama Niladhari officer has to deal with more paper work and prepare documents; it is difficult to handle those entire activities manually. They request computers and other related technological equipment which make their tasks easier and faster. It is not enough providing technological equipment; they should be given training programs to handle those equipment to improve their performance.

General public always seek guidance from the Grama Niladhari Officers when they need assistance from any government institute. Therefore, the Grama Niladhari officers should have regularly updated information regarding all the services which are offered by the government. Therefore, continuous training programs and awareness programs should be conducted.

The Grama Niladhari officers should be closely supervised at office as well as their field duties. Necessary arrangements must be made by the Divisional Secretariats. As the closest Administrative officer to the general public, Grama Niladhari officers will perform better than they did, if they are recognized by government that the GN is the first point of contact by the public in the government's concepts of taking public administration and its delivery systems to the door step of the public.

Here, in a nutshell, some of the things we can take away from research in the field of the psychology of work motivation for GNs are:

- Set challenging and specific goals for employees.
- For complex or new tasks, set a goal of learning or mastering the task. For other tasks, set a goal that specifies performance (quantity and quality).
- Supervisors should explain the relevance and importance of the goals that are set, and they should discuss the goals with the employee to make sure that the goals are both achievable and challenging.
- Performance-oriented employees need to be given the tools and shown the steps necessary to achieve the goals. Training, modelling, and conveying confidence in the employee's abilities can increase their chance of success and maximize their future performance.

- Performance planning and management scheme for GNs.
- Goal setting and goal discussions should occur as often as necessary, which is probably more often than is being done now.
- All employees need direct and immediate feedback on progress toward goals.
- Performance-oriented employees need recognition and praise when they achieve their goals. Pointing out that they didn't meet their goals is de-motivating, and it reduces future performance. Instead, the manager should help the employee with strategies to achieve the goals.
- ICT facilities for delivery prompt services. (With an appropriate network systems)
- Upgrade the quality of work life an environment of GNs by status buildings and facilities enhancement.
- Provide for performance instruments and career growth thought execution of appropriate HRD plans.

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