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PREFACE

We are delighted to welcome you to the twelfth issue of the International Journal of Engineering, Business and Enterprises Applications (IJEBEA). In recent years, advances in science, engineering, and business processes have radically expanded the data available to researchers and professionals in a wide variety of domains. This unique combination of theory with data has the potential to have broad impact on educational research and practice. IJEBEA is publishing high-quality, peer-reviewed papers covering a number of topics in the areas of business process models, engineering and enterprise applications, knowledge engineering science, modeling and designing, control and deployment techniques, e-Commerce applications, B2B and B2C applications, Protocol management and channel management, Mobility, process, engineering, security and technology management, Semantic Web and interfaces, Enterprise applications for software and web engineering, open-source platforms, Human resource management, Operations management, Organizational and management issues, Supply chain management, Strategic decision support systems, Cloud computing, Risk management, Information technology, Information retrieval systems, Aspect-oriented programming, e-Libraries and e-Publishing, Data mining and warehousing, Distributed AI systems and architectures, Bioinformatics and scientific computing, Knowledge and information management techniques, and other relevant fields available in the vicinity of engineering, business and enterprise applications. The editorial board of IJEBEA is composed of members of the Teachers & Researchers community who have expertise in a variety of disciplines, including business process models, software and technology deployments, ICT solutions, and other related disciplines of engineering, business and enterprise applications. In order to best serve our community, this Journal is available online as well as in hard-copy form. Because of the rapid advances in underlying technologies and the interdisciplinary nature of the field, we believe it is important to provide quality research articles promptly and to the widest possible audience.

We are happy that this Journal has continued to grow and develop. We have made every effort to evaluate and process submissions for reviews, and address queries from authors and the general public promptly. The Journal has strived to reflect the most recent and finest researchers in the field of emerging technologies especially related to engineering, business and enterprises applications. This Journal is completely refereed and indexed with major databases like: IndexCopernicus, Computer Science Directory, GetCITED, DOAJ, SSRN, TGDScholar, WorldWideScience, CiteSeerX, CRCnetBASE, Google Scholar, Microsoft Academic Search, INSPEC, ProQuest, ArnetMiner, Base, ChemXSeer, citebase,

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We are grateful to all of the individuals and agencies whose work and support made the Journal's success possible. We want to thank the executive board and core committee members of the IJEBEA for entrusting us with the important job. We are thankful to the members of the IJEBEA editorial board who have contributed energy and time to the Journal with their steadfast support, constructive advice, as well as reviews of submissions. We are deeply indebted to the numerous anonymous reviewers who have contributed expertly evaluations of the submissions to help maintain the quality of the Journal. For this twelfth issue, we received 89 research papers and out of which only 41 research papers are published in two volumes as per the reviewers' recommendations. We have highest respect to all the authors who have submitted articles to the Journal for their intellectual energy and creativity, and for their dedication to the fields of engineering, business and enterprises applications.

This issue of the IJEBEA has attracted a large number of authors and researchers across worldwide and would provide an effective platform to all the intellectuals of different streams to put forth their suggestions and ideas which might prove beneficial for the accelerated pace of development of emerging technologies in engineering, business and enterprise applications and may open new area for research and development. We hope you will enjoy this twelfth issue of the IJEBEA and are looking forward to hearing your feedback and receiving your contributions.


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TOPICS OF INTEREST

Topics of interest include, but are not limited to, the following:

- e-Commerce applications using web services
- B2B and B2C applications
- Advanced web service technologies including security, process management and QoS
- Surveillance technologies and security policies
- Security for protocol management
- Resource and channel management
- Mobility management
- Network Security management
- Technology management
- Information security management
- Semantic web for e-Business and e-Learning
- e-Learning design and methodologies
- Instructional design methodologies
- Content management and development
- Knowledge and information management techniques
- Enterprise Applications for software and web engineering
- Open-source e-Learning platforms
- Internet payment systems
- Techniques for B2B e-Commerce
- e-Business models and architectures
- Service-oriented e-Commerce
- Human resource management
- Business-oriented and consumer-oriented e-Commerce
- Development of e-Business and applications
- Supply chain management
- Strategic decision support systems
- Enterprise resource planning and e-Business
- Intranet and extranet business applications
- Enterprise-wide client-server architectures
- Information systems analysis and specification
- Strategic issues in distributed development
- Semantic web technologies and cloud computing
- Legal aspects of e-Government
- Risk management
- Methods and tools for e-Government
- e-Democracy and e-Voting
- Operations management
- Information technology
- Information retrieval systems
- Aspect-oriented programming
- e-Libraries and e-Publishing
- Intelligent tutoring systems
- Digital libraries for e-learning
- Web-based learning, wikis and blogs
- Social networks and intelligence
- Social science simulation
- Information retrieval systems
- Wired and wireless data communication networks
- Data mining and warehousing
- Distributed AI systems and architectures
- Bioinformatics and scientific computing
- Knowledge and information management techniques

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The unseen language communication breakdown impact in the two KwaZulu–Natal based hospitals

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Abstract: *This paper aims to examine the interpreting services provided during consultations in the medical settings. It looks broadly at the communication deficiencies created by the difference in the languages spoken by both medical practitioners and the patients during consultations. For several times the researcher's personal experience has shown that isiZulu speaking patients are frequently consulted by English speaking doctors whenever they visit medical institutions. Consequently, as a result of this situation, these isiZulu speaking patients with limited English proficiency find it difficult to fully express all their medical conditions to the English speaking doctors vice versa due to the existing language barriers. These language barriers are most likely to give rise to inferior medical assistance to isiZulu speaking patients. Furthermore, the nurses find themselves being ad hoc interpreters in this regard based on the assumption that they are bilingual. However, their linguistic and interpreting ability are not considered. The study therefore investigates the possible shortcomings and also looks at the implications most likely to occur as a result of reluctance in the provision of professional medical interpreting services also by professional personnel. The data is collected from medical practitioners (doctors and nurses) and patients. From the results obtained, the researchers therefore draw possible recommendations in order to address the identified shortcomings.*

Keywords: *Language difference, inaccurate diagnosis, treatment incompliance, medical interpreting*

I. Introduction

Interpreting in the medical settings in South Africa still remains the outermost informal activity occurring during consultations. According to Lesch (2007:79) the main sources of interpreting services is still provided by nurses, nursing assistants, auxiliary staff and community volunteers if not family members of the patients. According to Angelelli (2007:63) interpreting in the medical field involves a unique type contextually bound communication in two languages, which normally takes place under pressure. Nevertheless, it has been over two decades now ever since it was announced that indigenous languages are now recognized as official languages and acquire equal access and recognition in the new Republic of South Africa (RSA). However, it is very unfortunate that the interpreting profession still suffers an extreme lack of recognition even in critical and life threatening institutions like hospitals and clinics.

Could this suggest that we as a nation are just turning a blind eye in such critical matters or illiterate about the significance of such services being made available at a professional level? Furthermore, most health care workers can only speak one language fluently as compared to other languages. It is therefore obvious how this can lead to major problems when it comes to providing adequate health care (Schemmer and Mash 2006:1084). Where there are no proper interpreting services to facilitate communication between a health care provider and a patient, it will lead to a degree of miscommunication and disempowerment. The service rendered will only be a disadvantage for the patient because the patient's access to information and help is blocked effectively (Pienaar 2006:44) and (Saulse 2010:4).

II. The linguistic situation

According to the 2011 census it is estimated that 22.7 % of the South African population speak isiZulu while only 9.6% of the population speak English as their home language (South Africa. Info: 2012). In KwaZulu – Natal, isiZulu is the home language of 77.8% of the population and English as a home language is sitting at 13.2 %. However in 2008 a report that was published which showed that in 2007 only 35.1% of the doctors in public healthcare were African (Department of Labour 2008:28). Likewise, the aforesaid percentage of African doctors does not specify as to how many of these doctors are isiZulu speaking doctors. As a result, it is rather safe to assume that not all of them are isiZulu language speakers or neither fluent isiZulu speakers as per the language communication is concerned regarding effective language communication during medical consultations.

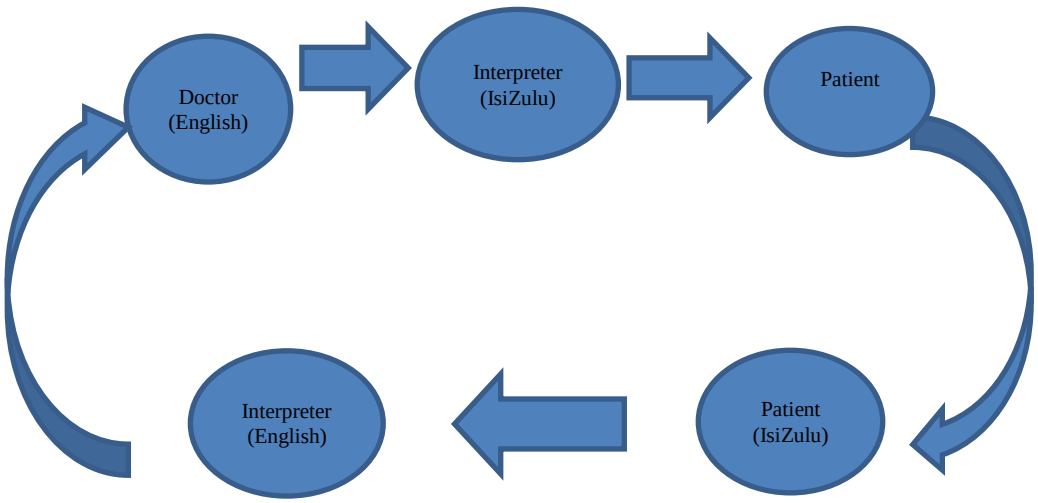
The reality of the public health system in KwaZulu - Natal therefore is that in the region of 70% of doctors and specialists are unable to speak isiZulu while well over 70% of the population of the province are isiZulu mother tongue users. Furthermore, "among the any acts and regulations emanating from the Department of Health since 1994 are a number designed specifically to correct the imbalance between rural/ urban/ private provision" (Department of Labour 2008:47).Therefore with that being stated as one of the aims of the healthcare service's

aim, surely means for effective communication should also form part of these aforementioned aims. Especially in the case of the rural settlements, efficient interpreting services are in great demand. This is because there is also a high percentage of illiteracy as well, which is another contributing factor to poor language communication in the medical sector. There are places where people cannot even utter one meaningful sentence in English. Therefore these people depend highly on the interpreters for better healthcare delivery. As further discussed above that there is a very limited number of doctors who are isiZulu speakers, this means that both parties require these services to be readily available at all times during medical consultations.

III. Medical interpreting situation

In a presentation by Bancroft on 20 January 2013, medical interpreting is defined as interpreting in settings where healthcare services are provided. She further distinguishes it from community interpreting by defining community interpreting as that form of interpreting that supports access to public or community services. On the other hand, Saulse (2010: 13) argues that there is a difference between medical interpreting and healthcare interpreting as defined by Bancroft. She defines medical interpreting as a type of interpreting that includes the setting in which health care interpreting usually takes place, as well as any other setting related to the medical profession. These settings may include events such as conferences held by the United Nations and other events which include discussions on medical matters. She further states that "medical interpreting is thus the overall term encompassing any interpreting that takes place in a medical setting, which may or may not include a patient". She then states that health care interpreting, on the other hand, usually takes place with a patient present. However, this seems to be a matter of how each of these authors chooses to define and distinguish medical and healthcare interpreting according to their understanding of the matter. In the end though, the results of it all involve better or worse service delivery to patients. Thus, whether patients were involved or not, they are directly or indirectly linked to the impact of either of the presence or absence of either of the two types of interpreting. These forms of interpreting therefore do not seem to be distinct from one another.

Likewise, as defined in Bancroft's presentation on 20 January 2013, community interpreting is a form of interpreting that supports access to public or community services. According to Corsellis (2008:4) '"public service refers mainly to those services that are provided for the public either by the local or central government". These include legal, health, and a range of other social services such as housing, education, welfare and environmental health. Saulse (2010:14) states that the purpose of community interpreting is to provide access to any public service to a person who does not speak the majority language spoken in that service. She further illustrates a mechanism which this form of interpreting results in. She says both of these types of interpreting (medical and community interpreting) are bi-directional, meaning that interpreting takes place between two languages where each language functions as both the source language (SL) and target language (TL). For example:



Interpreting in the medical setting has increasingly become a focus of attention as a significant area of speciality practice (Pöchhacker and Kadric 1999:161). Often times in South Africa, interpreting services are not provided at a professional level in medical institutions. If one happens to be fortunate enough to be provided with such services, they are either provided by the nurses or general working staff members such as hospital cleaners or even by family members of the patients. However, none of these people are professionally trained medical interpreters. This is also supported by Pöchhacker and Kadric (1999:161), Drennan (1996:343) and Lesch (2007:75) when they state that the main sources for interpreting services are still nurses, nursing assistants, auxiliary staff and community volunteers if not family members. Therefore this makes the entire interpreting session very informal. The nursing staffs who interpret also complain that their role is not recognised, it keeps them away from their work and they are not paid for it. This practice is merely based on the assumption that they since they can speak both the languages of the doctors and patients and they can interpret.

The aforementioned complains of the nurses show that health care interpreters require more than just a linguistic knowledge; they also need to have knowledge of the medical terms and most importantly, they need to have empathy and sensitivity for the doctor – patient relationship. Similar to any other professions, 'healthcare interpreting is a distinctive and specialized area of practice. Interpreters working in healthcare facilitate communication between providers and patients or families who do not share a language' (NCIHC 2005:2). This shows clearly that there is indeed a demand for suitably qualified interpreters to execute these prescribed specialized duties. This would make a positive impact towards a more improved healthcare service delivery, as qualified interpreters have the ability to understand patient's socio-cultural perspectives of health problems (Pöchhacker and Schlesinger 2007: 12).

Saulse (2010:7) argues that besides the fact that ad hoc interpreters do not have the theoretical knowledge of interpreting; health care interpreters should also possess certain qualities. In the case of liaison interpreters, interpreters should have a good knowledge and grasp of the target language (they interpret into) as well as the source language (the language they interpret from). They should also have sufficient knowledge on the subjects that they interpret. Lastly, interpreters should know how to interpret. These basic traits set the norm for all interpreters: anything above the norm suggests an interpreter who is qualified; anything below the norm suggests the opposite, an interpreter who is unqualified.

According to Levin (2006:1076) where language barriers exist, there is patient dissatisfaction. These barriers have been identified in various countries including South Africa as the core sources of unsuccessful therapy. Language difficulties result in reduced patient understanding of diagnoses, medication and follow –up as well as non –adherence to medical advice. This appears to be a direct contravention of a very favourable constitution, especially in a country like South Africa where eleven official languages are equally recognised by the constitution and by right should "enjoy parity of esteem and must be treated equitably" (Republic of South Africa 1996:4). Erasmus (1999: 145) further states that in the case of a medical setting, it is very important to know that the communication problem experienced by the two parties is not simply a matter of language, but of power as well. The difference in power is directly related to class, race, culture and/or gender as well as to knowledge differences between the medical professional and his lay patient. Furthermore, community or medical interpreters are accountable to the community rather than the institution at which they work. This is because they do not only convey the message between both parties involved but also represent the interest of public service clients, assess their needs and help them obtain the care to which they are entitled (http://www.bls.gov/oco/ocos175.htm).

IV. Bilingual personnel versus qualified interpreters in the medical setting

Quite often people assume that if an individual can speak more than two languages that person can therefore interpret. As a result of this assumption, in most hospitals, nurses, general personnel, family members and cleaners are used as interpreters for doctors and patients (Lesch 2007:75 and Pöchhacker and Kadric 1999:161). This is astonishing, as one cannot help but wonder if the information rendered is anywhere close to being accurate. "Interpreting is a profession where - like medicine, teaching and law - the client's welfare is affected directly because interpreting has its own particular kinds of knowledge, skills and practices which require particular ethical considerations" (Gentile et.al 1996:57).

However, according to Edlow (1996: 456) having interpreting services provided by healthcare providers including the family members and general working staff members is an advantage because it reduces the need for interpreters and the patient can form a better relationship with the doctor. Furthermore, in a study which was conducted in one of the hospitals in the Western Cape by Drennan (1996), results suggest that individual units would not be able to support full-time interpreters. Hence, it appears that the majority of patients with limited English proficiency are being assisted through the use of family members, cleaners and other inappropriate or untrained people (Drennan 1996:344).

Now the greatest concern is that, how can a doctor and a patient relationship be formulated and nourished if there is not sufficient communication or similar level of understanding due to the language barrier and socio economic status? Besides that, the high expectations of interpreting arise in part of the complexity of determining meaning in situations where there are multiple levels at which the meaning can be constructed. Furthermore, omissions or inaccuracy could be of great detrimental factors in the medical setting (Drennan and Swartz 1996:170). Hale (2007:35) argues that untrained interpreters may not understand all procedures and various forms of questioning or different modes of delivery in various settings. Likewise, professionals working with interpreters rarely understand the complexity of the task and the interpreters' needs in producing an accurate rendition. She further states that professional interpreters have a responsibility to acquire the necessary language and interpreting skills to gain an understanding of the settings in which they work in and the specific requirements, of the purposes for which language is used in each and every setting and to abide by a code of ethics.

In a study conducted by Athorp and Downing in 1996, where a professional interpreter and a nurse were used to interpret in different consultation rooms it clearly appeared that the interview with the professional interpreter compared favourably to the other event, with the interpreter's utterances on the whole being accurate to the doctor's-patient's turns.

They also discovered that the nurse often assumed a caregiver role and reduced the number of direct interactions between the doctor and the patient. This is in line with the role of a nurse as an information provider and care giver. The study was concluded by them stating that there is great benefit for the medical profession in using the services of professional, trained interpreters, as opposed to untrained bilinguals (Hale 2007:58).

Another example to substantiate this argument would be again of Dimitrova where he also conducted a study on the analysis of the work of a professionally trained medical interpreter and discovered that every turn was interpreted accurately and the interpreter always used the first person (Hale 2000:56). That study also found that untrained, ad hoc interpreters always interpret what comes naturally at the time simply because they want to offer a summary of what they feel is relevant. This again compromises the accuracy of the target message which is the most significant component in the patient and doctor communication process (Scott 2009: 1). That is why Lesch (2007:76) suggests that healthcare interpreters must undergo a more specific medical interpreting training which might be of assistance to them with the relevant terminology and this will enhance the communication flow. According to Candlin and Candlin (2003:137) the severe lack of qualified medical interpreters is almost endemic in healthcare worldwide in such a way that pragmatic, ethical, clinical and ideological issues inevitably arise. This has also been proven to be the case here in South Africa. Often times when one visits the medical institutions, such services are either provided by people who are considered bilingual or not provided at all. Both the medical practitioners and patients have to struggle for better communication.

V. Study methods or research approach

The data for the study was collected from two hospitals i.e. King Edward VII and R.K. Khan Hospitals. Both the medical institutions are situated in the eThekwini metropolitan region in the province of KwaZulu - Natal.

The following methods were used to collect data:

- Questionnaires were furnished to twelve (12) Doctors who are not isiZulu speakers consisting of six (6) participants from each hospital.
- Another set of questionnaires were given to twelve (12) nurses who were confirmed by both the doctors and patient to have been the ad hoc medical interpreters during consultations. Again the number was divided into two in per a hospital.
- Interviews were conducted with twenty (20) isiZulu speaking patients; a similar division of the number of participants also took place in per a participating hospital.

VI. Discussion

Based on the data collected from all three groups of the participants in the study, the study has discovered that there are indeed some language barriers existing in the medical sector as a result of the difference in languages spoken by both medical practitioners and patients (isiZulu and English). It is also evidently clear that all the three parties (patients, nurses and doctors) involved in the consultation process are not satisfied with the language communication. This is because it was firstly stated by the doctors that indeed they found the communication process with limited English speaking patients very difficult. Also in the events where nurses were used as ad hoc interpreters for both parties as they are considered to be bilingual, but still some nurses had some interpreting difficulties due to their linguistic inability to speak English fluently as well, and as result the message suffered from a lot of omissions and inaccuracies.

According to Karliner et al. (2008:1559) the use of bilingual individuals to act as interpreters in the medical setting negatively affects health quality services. Nolan (2005:6) also argues that the aforesaid interpreters may not always be bilingual, as being bilingual requires an early exposure to both languages, which appears not to be the case for the nurses whom are regarded as bilinguals and expected to interpret. This has also been supported by Ngo- Metzger et al. (2007:324) where they state that even with the use of ad hoc interpreting services, the quality of health services given to the patient and the degree of health education received is found to be below the expected standard. Also some of the doctor participants stated that "nurses understand occasionally limited leading to inaccuracies and omissions" which is also a confirmation that the nurses are not truly bilingual.

Furthermore, patients seem to give lengthy information to the nurse in the presence of the consulting doctor, but a nurse will only convey a very short summary of what was being said by the patients, which obviously shows that there has been a severe omissions taking place in the dialogue. Having mentioned the reasons above, it would therefore seem unfair to hold the nurses accountable for any inaccuracies or omissions in the message during their course of interpreting. This is because in some of the responses given, it was discovered that interpreting is a profession on its own, therefore nurses cannot be expected to perform such duties exceptionally because they do not have all the relevant and required kills to do so. It is therefore evidently clear that with all the language communication barriers experienced, the diagnosis and treatment prescription end up being

inaccurate and causing inferior medical assistance. Again the responses given by the doctors and patient participants in this study confirmed another part of the hypothesis which stated that "isiZulu speaking patients frequently encounter non-isiZulu speaking doctors in consultations". This is because almost one hundred percent of the responses given confirmed this to have been the case which still exists. Although there were also doctor participants who stated that they understood isiZulu, but it was discovered that their level of understanding was below average. This is because it also appeared that they only understood the minor basics of isiZulu, which are not very much of great assistance during medical consultations with patients for effective diagnostic process. Furthermore, according to some of the responses given by the patients whereby they stated that the doctors use *isifanakalo* which again is found to be more confusing to some of the patients is also an indication of inferior medical services given to limited English proficient patients. This was also confirmed by the responses given by the majority of the patients, whom it was also ascertained that their level of the English command was quite poor due to various reasons. One of the most prominent reasons given for poor English command was that of illiteracy as some of the patients were never afforded an opportunity to attend school. As for those who were given such opportunities, it was however also not adequate acquire sufficient linguistic knowledge which would have enable them to speak English fluently.

It was further noticeable that none of the participants from all three categories of the targeted populations has ever witness a worse case as a result of language communication breakdown. Unlike in some of the cases in the globe and in some parts of the country where this has been witnessed more than once and where some of the bad experiences resulted in a lifetime changes especially for the patients. Such cases include, errors in surgical procedures e.g. amputations of the wrong body parts or names being mispronounced and resulting to patients being not attended at all. Therefore, these are some of the actual and potential consequences which could also be suffered in the hospitals in the province, if not already by other patients who utilize these public health facilities but never participated in the study as a result of language communication breakdowns.

Another area of concern was that of the nurses being demanded to interpret for doctors and patients. The results obtained show that indeed they are not happy about being forced to render these services due to the fact that it keeps them away from their original nursing scope of practice, especially in instances where they are giving treatment to the admitted patients. It is said that, they have to leave everything and attend to the doctor and the patient involved in order to render the interpreting services this is also confirmed by Schlemer and Mash (2006:185) and Lesch (2007:75). It was also discovered that interpreting does not form part of the nurses' scope of practices. The nurses emphasised the fact that their main scope of practice was strictly for patient care rather than interpreting, which was found to be a challenge to the majority of the nurses due to the specialised medical jargon in use. As a result, some patients expressed dissatisfaction of the medical services given to them as some of them noticed that their explanations were summarized when conveyed to the English speaking doctors.

According to the National Patients' Right Charter, "every citizen has the right to participate in the development of health policies, whereas everyone has the right to participate in decision – making on matters affecting one's own health" it also states that "everyone has a right to be given full and accurate information about the nature of one's illnesses, diagnostic procedures, the proposed treatment and risks associated therewith and the costs involved" (HPCSA: 1 and 3). These are indeed the most favourable and significant rights for both parties involved in the therapeutic process. However, the unfortunate reality is the fact that these seem to exist on paper only, as the actual situation encountered in the public health facilities in the daily basis proves to be the opposite of what is written on the charter. This is because from the responses given by the participants, it is clear that such significant information is not fully communicated to them. Also it shows that the patients are not afforded efficient information and being given an opportunity to make their own decisions based on what they have been told or diagnosed with by the doctors. Not to mention the fact that accurate diagnosis is achieved after sever language communication difficulties. These difficulties are also compromising the accuracy of diagnosis as it was said that the nurses omit so much information which is considered critical in this stage. According to the Health Care Interpreting in the News (2011:1) patients may even present symptoms unrelated to the real problems and the diagnostic doctor relies heavily on skilful questioning. However, with all the aforesaid challenges in the diagnostic process it seems almost impossible to achieve accurate diagnosis. It was further noted that this was not the case for all the patients, as some of the responses given indicated that some of the doctors do go an extra mile in explaining the situation to the patients some with the help from the nurses and some without. However, again the responses given by the majority of the patients indicated that critical decisions e.g. surgical procedures are made on their behalf, rather than allowing the patients themselves to decide on the issues affecting their health or allowing for a second opinion as enshrined in the charter. This again is an impact of the language communication breakdown caused by the difference in languages spoken by doctors, nurses and patients in the hospitals. Also the lack of professional medical interpreting services is the main cause of this unpleasant situation. If ever such services were provided by suitably qualified personnel, some of the errors would be prevented from occurring. Also patients would have more detailed information regarding their illnesses.

Nevertheless, the medical staff participants also felt that indeed language difference has an impact on the treatment compliance. Although their personal ratings on treatment compliance were above average and creating exceptionally well acceptable situation, but there was still an existing gap as patients still do not fully comply with the prescribed treatment. Some of the doctors stated that proper understanding of treatment and it importance needs to be explained in a manner that is easily understood by the patient. This is because the lack of the treatment understanding could also result in high risk difficulties such as defaulting the treatment or consuming an over dosage of the prescribed treatment. Therefore, the only possible way to ensure that such risks are prevented is by other no means except effective language communication achieved by speaking the mother tongue language of the patient. This allows both speakers to have a mutual understanding of the situation at hand and enables the patient to ask all the necessary follow up questions for better understanding and a caregiver is also able to provide all the necessary medical information.

VII. Conclusions

In conclusion , the findings of the study all boiled down to the fact that there was a massive lack on the provision of professional interpreting services which as a result led to the patients not being able to describe their medical conditions to the English speaking doctors. The results obtained from the study also proved language barriers to have a severe bad impact on treatment compliance and other significant therapeutic processes. Also as a result of the lack of these services the doctors were limited to make proper diagnosis, further advice significant information to the patients due to the language barrier experienced.

VIII. Recommendations

Based on the study findings the following initiatives are recommended:

- Implementation of proper language units in the hospitals and other public entities should come into effect. These language units will cater for both translation and interpreting services to the public. This way the public will have full access to information and this significant information will be accessed through the use of a language of choice (mother tongue) without any linguistic limitations.
- Appointment of professionally trained interpreters to render medical interpreting services in the medical institutions. Having these personnel will improve the healthcare system by ensuring quality healthcare, especially with regards to accurate diagnosis which is the fundamental stage of the therapeutic process. Furthermore, having professionally trained interpreters will allow the nurses to practice their scope of practice more efficiently without any disturbances caused to them as it is the case.
- Training of medical staff members is also required in order to clarify the roles of the medical interpreters particularly where there are one on one consultation between the doctors and patients taking place.
- As a short term solution, a medical bilingual dictionary should be made available in order to assist the nursing staff members with interpreting of the terms, especially the ones they regard as difficult and do not have direct equivalence in either of the two languages in question.
- South African indigenous languages must not only be recognized on paper (constitution), but the equal use of these languages must come into effect as enshrined in the South African constitution.

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Optimizing a container terminal and facilities assignment using a simulation approach by ED software: a case study of Iran

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Abstract: *These days container transportation is one of the fastest and cheapest ways to carry the cargoes with an extent volume. Some features of maritime transportation are reducing loading and unloading costs, reducing transportation risk, better using of deck space and etc. In this paper we use a simulation optimization model to make a better assignment of facilities cooperating in loading and unloading operation (LUO) at berth in order to minimize the ships waiting time. To validate the experiments, a real case study is taken. The case is one of the national container terminals in Iran named "Shahid Rajaee" which has been located near the Persian Gulf. Comparing the output of the model and real data implies the good efficiency of the model.*
Keywords: *Container terminal, Trucking, Berth allocation problem, ED simulation approach, facilities assignment, case study.*

I. Introduction

Nowadays container ships play an important part in transportation industry. This kind of carrying is one of the fastest and cheapest ways for high volumes of goods. Shahid Rajaee is one of the largest container ports in Iran shown in figure 1. This harbor has been located in Hormozgan province and near the Persian Gulf. Shahid Rajaee – as the largest container terminal of Iran – has the highest volume of container operations showing economic and commercial aspects of it. This terminal includes one-container and two-container parts and accepts all Feeder and Liner ships – 21 Liner ways travel to the harbor. Shahid Rajaee terminal development project consists of building a new terminal in scope of the port which is supposed to increase the container capacity. So we determined the issue as an important task and tried to do it under a simulation project.

Since deciding about investing in harbors includes a lot of factors about which uncertainty is an inseparable part, so a comprehensive analysis of container terminals before any kind of measure is an essential matter. One of the ongoing disturbances of the terminal is increasing coastal (fixed) cranes, moving and enclosure ones, lift trucks and other facilities.

The paper is based on the real data which has been produced in statistical systems. The data includes container ships, length of coastal ways, operations and arrival time of ships, facilities, number of docks and etc. Also investigating the issue shows that maintenance operations have not been propounded yet and therefore we have included the subject in our study.

II. Literature review

With the extension of computer technology and gained successes in harbors, simulation approach has been widely applied in solving and programming problems related to container terminals. During the last decade a noticeable development has been occurred in the subject of container transportation suggesting need for optimization and close competition in harbors. Mazza and Legato (2001) have presented a logistic simulation model related to processes of ships' arrival to the dock, their berthing and also return operations in container terminals and studied the berth programming. Kia and colleagues (2002) considered the computer simulation in performance of container terminals and also compared the capacity of terminal with the same in past. Investigations of Shabayek and Yeung (2002) implied that development of which matters brings forward the estimations of a simulation model to the reality in a terminal. R. Stahlbock and S.Vo (2008) presented a paper with the subject of operations research in container terminals in which many aspects have been considered. Sun and friends (2012) studied a general simulation model for Mikro port that was a three-level programming model with the goal of preparing a flexible and integrated system for container terminals. Arango (2011) considered an optimization technology based on simulation for programming and assignment of ships' berthing in dock space resulted in changing the management of the dock. Cortés and friends (2007) also focused on transportation process and applied Arena software for simulation of serveel harbor.Some authors have focused on programming and investing problems. For example Afandizadeh and Allahviranloo have presented a fuzzy

integer programming for optimization of investing in harbors. Analysis methods also should be applied in second stage when comparing to the simulation technology because of complication and uncertainty of container systems. Papers which have studied the investment issue are too rare but it is pointed that Nam and colleagues (2009) studied the berthing operation and a special kind of cranes for container terminals in Korea resulted in the fact that most of cranes should be participated for increasing productivity. Demirci (2003) also surveyed a simulation problem in a harbor of Turkey and found that a large number of bottleneck points have been settled by the use of simulation technology.

Different authors have focused on BAP – ships assignment for berthing- for example Imai (2001) and Nishimura (2001) pointed the matter, they also applied a genetic algorithm for conformity with the reality. Park and Kim (2003) and LIU (2005) surveyed the problem considering quay cranes and intended to optimize the number of them. Imai and friends (2007) developed an approach in MUT – multiple container terminals. At the beginning, they presented an approach based on continues assignment and then solved the problem with a genetic algorithm. Imai (2003) had considered the relation between ship ways and harbor.

Few papers have developed in port simulation and optimization measures. Cortés (2007) studied the transportation operations in a harbor and argued all kinds of loading, towers and scenarios. Demetro (2005) and Legato (2009) considered a simulation model about cranes programming.

III. Problem definition

Accurate definition of the problem has the most effects on the model simulated. If the problem is defined incorrectly, it will cause lots of time for analyzing. So it is important to define the problem obviously and document it as an essential property.

Although the harbor has been developed in the container part, the management has determined to extend it more. We aim to find the optimum number of cranes based on the available capacity and also the ships' waiting time until the end of unloading process, so we are going to balance the mentioned time. Ships anchored in the harbor for unloading are included in staying charges meaning that it is paid an amount of money for an hour of sleeping. So we are to optimize the average sleeping expense which has not been investigated before.

A. Container ships

There are three types of ships including large of 150 meters, 200 meters and small ones of 60 meters. The arrival of large ships is in a linear schedule but it is randomly for the small ones (Features of the ships have been shown in table 1). The time between two successive arrivals of large ships is constant so that their arrival distribution is linear. For example the time between two successive arrivals for large ships of 150 meters is constantly 10 (h) and never changes. But since small ships arrive in harbor randomly so we consider poison process for them meaning that the time between two successive arrivals follows exponential distribution with the parameter of $\lambda=1/5$. In this way we have used the daily and monthly statistics in December, January and February of 2013-2014 by ports organizations.

Table 1: Ship features

type of arrival	time between successive arrivals (hour)	average TEU	length (meter)	type of ship
Linear	6	1500	150	Big-150
Linear	8	2200	200	Big-200
Random	4	140	60	Small-60

Figure 1. The location of Shahid Rajaee port

Cranes and facilities

3.2.1. Tow:

As a ship is settled at a certain distance of port, its engines are turned off and the first action to do in this stage is that the small boats known as tows carry the ship to the dock. We have considered four tows in the paper.

3.2.2. Coastal (fixed) crane:

There are some coastal cranes which have been fixed in the dock doing unloading operations from the ship by designed rails. They are components of the harbor and we have considered two of them.

3.2.3. Moving cranes:

Moving cranes are applied to accelerating the unloading process and they are rented from non-governmental organizations. We have used two moving cranes in the study.

3.2.4. Lift trucks:

Lift trucks are applied to carrying containers – which are in the temporary storage – to the permanent ones or outer cargo trucks. If there is any truck in the dock, the container will be placed on it otherwise it will be stored in the permanent storage. There are also two lift trucks applied under the determined policy in the problem.

3.2.5. Cargo trucks:

Given container transportation system is connected to the outer cargo trucks carrying the containers to the out of the dock. The operations are done in a special policy.

Figure 2. Berthing in the harbor

3.3. Policies and assignment:

We aim to follow a policy based on reality to be applied to development of the container part. So we have considered lower and upper bounds for the number of coastal (fixed) cranes, moving ones, towers and lift trucks shown in table 2. We have also accomplished maintenance system for towers and moving cranes in the aspect of container ships for the first time that will be explained in the concerned part.

There are also special policies in different parts of carrying and lift trucks described in simulation scenario. As shown in table 2, upper and lower bounds let us do sensitivity analysis for gaining optimal solution. For example, the number of fixed cranes is actually two and the upper bound four shows the development potential of wharf. These policies have been taken to make the model more actual.

Table 2: Upper and lower bounds for development

Facilities	Lower bound	Upper bound
Fixed crane	2	4
Moving crane	2	3
Lift truck	1	2

3.4. Simulation flowchart:

Simulation scenario involves ships arrival, data partitioning, services and ships departure which has been shown in figure 3. First, the ship arrives in system and then it is categorized into large or small ones. It should be considered that ships arrival time, capacity, length and their priority are different and the ships are kept waiting until an unoccupied wharf is found for assignment. Then it is checked weather the tower is ready or not and if the answer is no, we will ask weather is working or being served by maintenance system and the wharf is assigned as well. As the wharf assignment and ship berthing is done, the coastal cranes begin to work and it is determined weather are enough or not. If there aren't enough fixed cranes, the moving ones are applied – if they are ready and do not need maintenance. As cargoes are moved to the temporary coastal storage, they are analyzed and it is commanded for departure. Then the lift truck begins to unload from temporary storages under the assumed policy and the cargoes are taken to transportation system or permanent storage. The transportation

system involves trucks with the capacity of 20 containers and if there isn't any truck, the containers will be moved to outer storage by the lift trucks.

IV. Simulation and model details:

We have developed an efficient and complicated model for port simulation which is based on the following assumptions – some of these assumptions are discussed for the first time in systems for container ships:

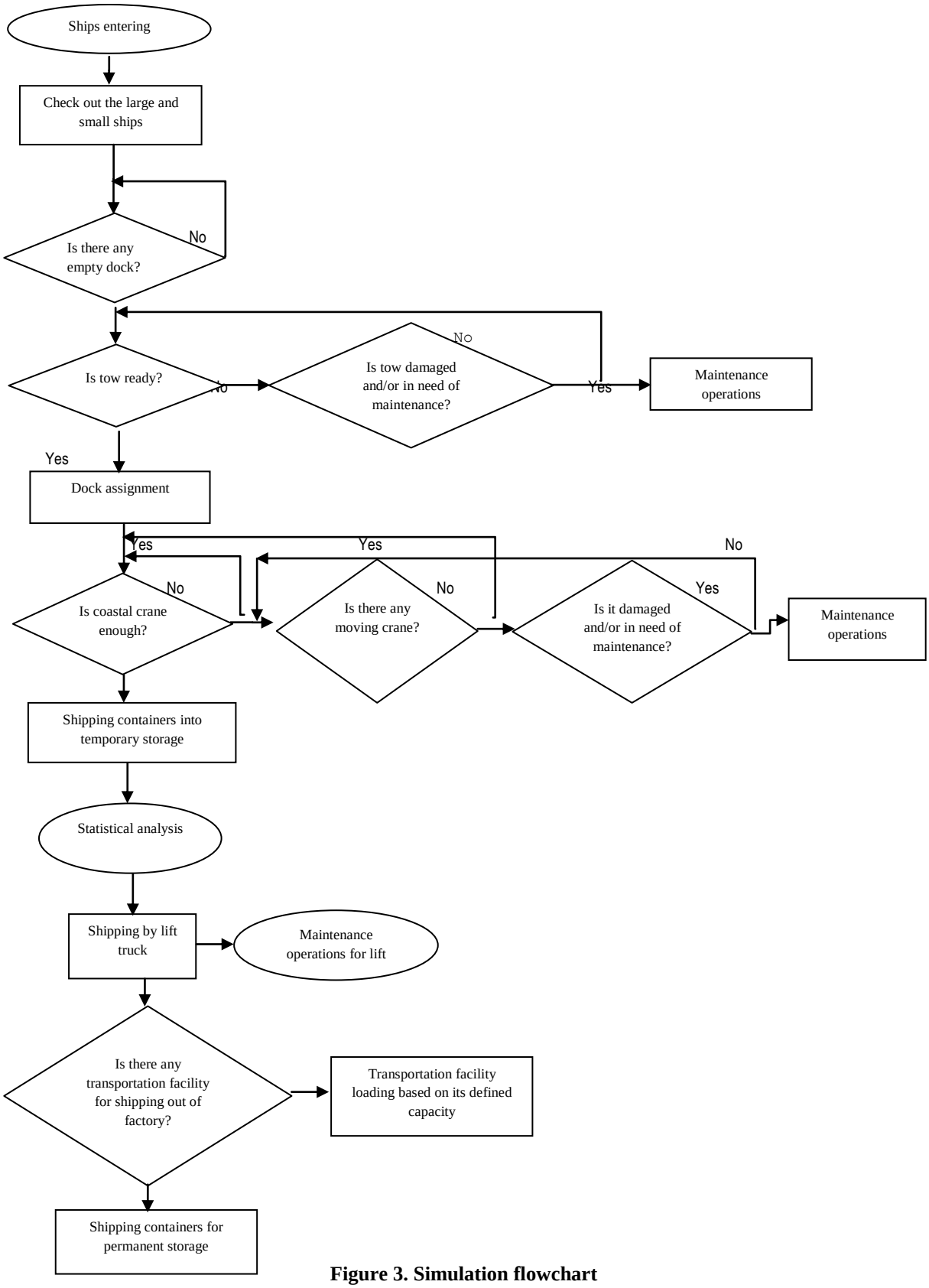


Figure 3. Simulation flowchart

- Demand forecast is accurate enough and the paper is based on detailed assumptions such as time between two arrivals and etc.
- Costal cranes are in need for maintenance operations and they don't always work well. They need maintenance after ten times unloading operations.
- Moving cranes which are privately owned, need periodic inspections and maintenance in every ten days and for two hours.
- All ships berth immediately upon providing the conditions and leave the wharf after loading process.
- There is no limit on the depth of water (tide).

The mentioned simulation model is based on four systems including ships arrival and their berthing, allocation of resources and equipment, maintenance operations and transportation. These systems are listed above

A. Arrival and berthing of ships

This is the driving force of the whole system because all the next steps start from here and special rules also arise from it. For example, 200-meter ships come once every 8 hours.

B. Allocation of resources and equipment

When a ship enters the resource allocation system, the associated equipment - if available - is allocated, otherwise waits as long as conditions allow.

C. Maintenance system

We have considered maintenance policy in this system which has been discussed in the literature related to the container ships for the first time.

D. Transportation system

The mentioned system includes trucks with a capacity of 20 containers.

V. Validation of the model

The validation is used to measure the closeness of the model to actual system and it is impossible to reach the complete match between these two, because the best model is actually the real system. However, there are methods for examining the adequacy of the model with respect to the objectives of the project. There are the actual system and its important information in our study and therefore we do compare the gained results from the model with the actual ones. Actual system of the port works 18 hours a day and there is the possibility to extract its outputs by field study or the website of Shahid Rajaee port. Accordingly, we set the model on 18 hours and compared the outputs with reality so that we can validate our model for different scenarios.

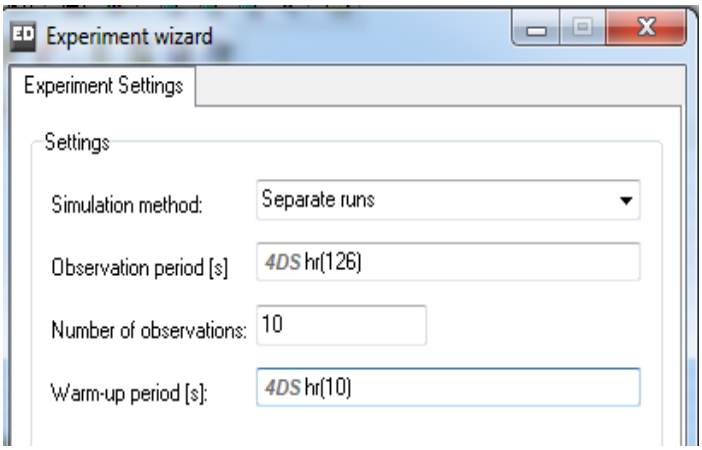


Figure 4. Experimental wizard

These steps are done as shown in figure 4 which displays 7 days and 18 hours per day. The model is run ten times and also setup or warm up time is considered 10 hours. In describing the warm up time, we can say that it is considered until equilibrium is reached. For example, it could be supposed a factory which has recently begun to work and its outputs are not appropriate and in a fixed level until the equilibrium time. The mentioned model could be observed in figure 5.

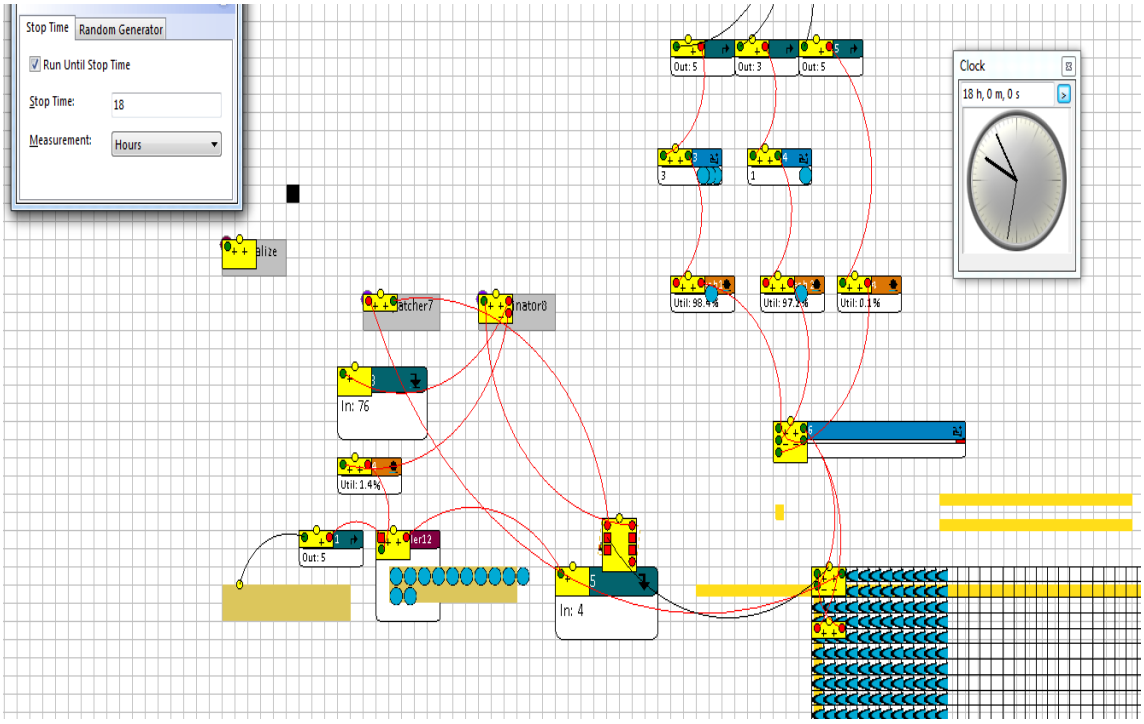


Figure 5. Simulation model

Figure 6 shows the analysis of software can be viewed on the number of containers in internal storage. For example, there is an average of 120 and a maximum of 133 containers in the storage and also the number of outer trucks is observable in which 3 and 4 are the minimum and maximum range. Next output shows the number of containers shipped by lift trucks from the internal to external storage which is an average of 38. Also at the end you can see that the average number of ships waiting to load is obtained 2.86 which is close the number declared by Shahid Rajaee port (3 ships on average) and the next model results can be completely trusted as well. As seen in figure 6, the simulation has been performed 18 hours showing three large ships of 200-meters and a large one of 150-meters in the queue of loading, departure of 4 trucks with the capacity of 20 containers, 120 containers in the storage of wharf and also shipping 76 containers to the external storage.

Now we evaluate the system in real mode in June 2013 and obtain the average output of external truck with the capacity of 20 containers. It is interesting that the average output is exactly the number 4 which was obtained in our calculations as well. But one container is being filled and because the port is off for 6 hours, the truck will have to wait this time – such issues arise in real systems. Now, after considering the validity of the model and its accuracy, different scenarios can be implemented on it.

Results Table

Observation	648000						
Warmup peri	10						
Number of ob	10						
Simulation m	Separate run						
Description :							
Atom :	Ground Store						
		Average	St.Deviation	L-bound(95%	U-bound(95%	Minimum	Maximum
content		120.10	10.72	112.43	127.77	104.00	133.00

Results Table

Observation	648000						
Warmup peri	10						
Number of ob	10						
Simulation m	Separate run						
Description :							
Atom :	Sink15						
		Average	St.Deviation	L-bound(95%	U-bound(95%	Minimum	Maximum
khorooji		3.80	0.42	3.50	4.10	3.00	4.00

Results Table

Observation	648000						
Warmup peri	10						
Number of ob	10						
Simulation me	Separate run						
Description :							
Atom :	Sink13						
		Average	St.Deviation	L-bound(95%	U-bound(95%	Minimum	Maximum
khorooji		38.20	6.37	33.64	42.76	26.00	46.00

Results Table

Observation	648000						
Warmup peri	36000						
Number of ob	10						
Simulation me	Separate run						
Description :							
Atom :	Queue23						
		Average	St.Deviation	L-bound(95%	U-bound(95%	Minimum	Maximum
content		2.86	0.11	2.78	2.94	2.71	2.99

Figure 6. The primary model output

VI. Scenario analysis

In this paper we implemented a number of scenarios and the results will be presented:

The first scenario involves the development of the transportation system to have a more realistic model including four types of transportation with different percentages and container capacity shown in table 3. The mentioned system can be applied in different real cases in container network in future. Be noted that this scenario makes the system more flexible so that it can be barely seen a half full truck after 18 hours of working otherwise the system is a major weakness that the truck must wait 6 hours for the system to go back to work – it is abundantly found in real cases. Figure 7 shows how the scenario is applied.

The second scenario has been considered in order to accelerate containers shipping, decrease workload on lift trucks, and also increase the outputs. As shown in figure 8, the second lift truck idle time is only 32%, then in almost all cases, employed and it requires a more appropriate policy to reduce the working pressure. To consider the problem, a second lift truck was added to the system with a particular policy stating that if there are more than 20 containers in internal storage, the second lift truck will be applied beside the first truck. We have also presented the formula making the second truck work in terms of reaching the top 20 which has been shown below:

if(Content(in(2,c))<20,1,dUniform(1,2))

This formula should be inserted in the atom connecting the two lift trucks.

Table 3: Different types of trucks and their capacity

capacity	% of employment	type of vehicle
12	13%	1
18	26%	2
20	44%	3
16	17%	4

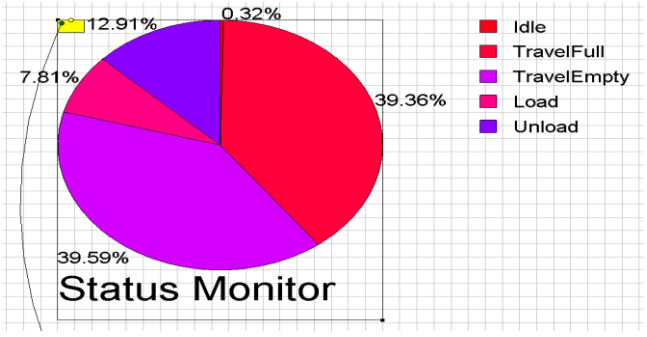
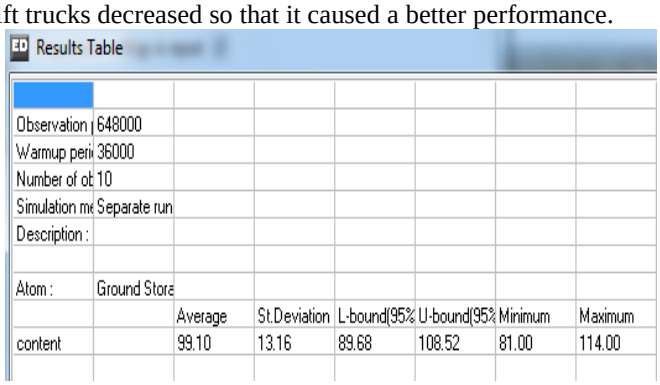


Figure 7. Working pressure of lift truck before scenario

Now after doing this scenario, we analyze the obtained results including the number of containers in internal storage and the working pressure to see the resulting change. As shown in figure 10, with the adoption of the policy on the use of two lift trucks at the same speed, the inventory level in storage has been reduced and also the working pressure of lift trucks decreased so that it caused a better performance.


Results Table

Observation	648000						
Warmup peri	36000						
Number of ob	10						
Simulation me	Separate run						
Description :							
Atom :	Ground Stora						
		Average	St.Deviation	L-bound(95%	U-bound(95%	Minimum	Maximum
content		99.10	13.16	89.68	108.52	81.00	114.00

Figure 8. Output after doing scenario

In the third scenario, we have examined the issue of increasing the number of cranes and for this purpose, the upper bounds of fixed and moving cranes – three from each – were placed and put into our analysis. In this regard, the obtained results showed a considerable improvement in the system, thus in the absence of restrictions can increase the number of cranes.

VII. Conclusion

In the world around us, there are many real examples that analysts are interested to improve their performance and the main purposes of these improvements include reduced costs, increased customer satisfaction, improved system efficiency and increased income. In our model inspired from a real case in the port, the goals are also to increase performance and improve the working conditions of facilities regarding the maintenance program. We adopted an optimal policy for lift trucks and observed a considerable improvement in storage and also evaluated a second policy on increase in the number of cranes and noted the gained improvement. It is also worth mentioning that we were looking at the issue that what can be added to models and papers of past to have a more realistic system.

VIII. Future study

From the applicability point of view, there are different features to be considered in the study in order to get closer to the reality and we will try to advance towards these actual features that are: (i) addressing tides assumption which can have a great influence on the model and its constraints, and (ii) considering sleeping costs about ships waiting in the harbor meaning that we can compare the mentioned cost with the cost of buying cranes and do a proper analysis.

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Safety, Standards and Certification Marks on Consumables – An investigation on Awareness with Reference to Rural Consumers of Vellore district, Tamil Nadu, India.

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Abstract: *This study investigates the awareness of safety, standards and certification marks on consumable products and/ or services among rural consumers of Vellore district, Tamil Nadu, India. The independent variables are demographic profile such as age, educational qualification, occupation, income and residential status and the dependent variables are with the core factors such as certification marks, awareness on obtention of cash receipt for product purchase, checking date of expiry, checking whether the product is sold in Maximum Retail Price and checking whether consumable product is properly packed and sealed. From the analysis using Linear Regression, the study found that there is a significant association between respondents and certification marks and safety and standard factors, except a few. Consumers should consider the factors such as hygiene, quality, quantity, standard of performance, which make them to choose the right product and/ or service and make the manufacturers and the service providers to rectify their fault in the business conduct.*

Keywords: *Awareness; Certification Marks; Consumers; Safety and Standards; Vellore district*

I. Introduction

An act of ingesting a product and/ or service is called as consumption. Consumers, before consumption must ensure the safety and standards, which can be recognized from the quality, quantity, purity, potency, standard and price [1], so that they can ease their life healthily. But, the present scenario of human life is endangered with the lack of safety on consumption, unfair trading in the marketing and food adulteration. As per the estimation by McKinsey Global Institute (MGI), India will triple its average household income and become the fifth largest consumer economy in the world by 2025[2]. India has huge population of Poor, illiterate and rural consumers, who are not aware of quality, hygiene, cleanliness, brands, standards and performance manner of product and/ or service, rather they seek for more quantity and less price. Regulations such as Prevention of Food Adulteration Act, 1954, Consumer Protection Act, 1986 and Food Safety and Standards Act, 2006, were implied in the nation to shield the consumers' life from peril [3]. The current study explores the knowledge of rural consumers at Vellore district on safety and standards of consumable products and/ or services, which are accomplished by the certification marks such as ISI (Indian Standards Institute) for industrial products, which was took over by the Bureau of Indian Standards (BIS), BIS Hallmark, a mark for the purity of precious metal; FPO (Food Process Order), a mark for all processed fruit products in India; Agmark (Agricultural Certification Mark), a mark for agricultural products and TM (Trade Mark) to affirm the legal properties of products and/ or services [4]. Other factors surveyed in this study are the awareness on (i) bill receipt on purchase of products, (ii) expiry date for products purchased; (iii) products, sold at Maximum Retail Price (MRP); and (iv) packaging of products with seal.

II. Literature Review

Consumption is an activity carried out by every living being to use any resource in the world. Such consumption should be safe and healthy, which can be obtained from products and services with quality standards [5]. The quality standards awareness in India began its establishment with Indian Standards Institution (ISI), which protect and promote the interest of the consumers towards the certified products. The factors such as affluence, standard, promotion, convenience, social, necessity and longevity are measured using ISI [6]. The standard factor plays most significant role in the product and / or service than the other and this certification mostly found in white goods and electrical appliances. Homemakers are mostly the end-user of home appliances with ISI mark and their awareness on the mark were tested in Dharwad city of Karnataka State. The ISI mark was well known to seventy one percent of the respondents and a few was aware of Agmark [2]. They insisted for more consumer awareness to safeguard themselves from scrupulous manufacturers and service providers [7]. If a consumer is buying a product, it is mandatory that the product's quality and quantity must rely on standards, which can be conformed through product specifications. The specifications of a product must be mentioned in its label such as ingredients, quantity in weight and certification mark, so that it shall display the product's transparency to the

consumer while buying a product. It is most important for a consumer to get the bill for the product purchased. This shall help the consumer in case of fault or defect in a product. Most of the shops are not providing proper bill receipt to the consumer, which shall not help them under the circumstance of seeking redressal [8]. Quality is contested and complex notion from the consumer and marketing point of view [9], [10]. To confirm the quality and quantity of any product, it should be properly labeled, which is the only description about the ingredients the consumer shall trust the product and the manufacturers can prove the consumer that their product is as per specified [11]. It can be noted that a product with perfect packing, sold at Maximum Retail Price (MRP), with manufacturing date and expiry date mentioned, shall be a trusted product by the consumers [12]. Researchers pertain to this study suggested that the legislation should be made with effective enforcement so that the existence of unsafely consumables can get eliminated and safety can be assured [16]. Another important indication of consumer awareness to determine the quality of product and / or service is billing. It is most mandatory for a consumer to get the bill for the product purchased or for service availed. Especially the products with high sensitivity such as medicines and cosmetics should be billed on purchase so that the aggrieved party can sue the scrupulous manufacturers for their defective products sold [14]. It was found by the researchers that the quality standards on products and/ or services are not similar all over the world and the regulations is not firm in India as it pave the way for adulterated product in the market [15]. It was well known that the marketing irregularities are being controlled by consumer protection legislations, which empower the consumers to take legal action and make multiple choices of purchases as well. The policy of consumers concentrates in traditional manner with their economic interests through factors such as quality, price, choice and redress. The consumer policy too protected the safety and health of the consumers from their consumable products especially food, that ensure their access to protected goods and services [17]. Most of the literature reviews are explaining the safety and standards of consumable products and/ or services. There are many studies conducted in food products safety because food is the most essential consumable product and need in the human life. Consumption of defective product and availing of deficiency service will endanger the consumers' life. This study throws the light upon the existing reviews by making clear about the awareness on standards and safety of consumable products and/ or services, which can be made more effective than present so that the people shall get their products and services at the best.

III. Objectives of the Study

The core objectives of the study are:

(a) To evaluate the awareness on certification marks in consumable products and/ or services among rural consumer of Vellore district, Tamil Nadu and

(b) To assess the awareness of safety and standards on date of expiry, Maximum Retail Price, bill receipt and package of products among the rural consumer of Vellore district, Tamil Nadu.

IV. Research Methodology

Vellore district is selected for the study because it is the second most economically backward district in the Tamil Nadu state and consists of 56.76 % of rural population living in the district and this is the homeland of the researchers, who are willing to know the awareness status on safety and standards of consumable products and/ or services among their people in the district. The sample for the study is selected from the Vellore district, which contains 20 village blocks. The sample of 23 respondents from each block is selected through stratified random sampling technique. Using Krejcie and Margon (1970) model of sample size determination, 460 structured questionnaires were distributed in total, out of which, 400 samples were finally selected from Vellore district. In the questionnaires left over, 32 questionnaires were received with incomplete information and 28 questionnaires were not returned back by the respondents. Descriptive research design is considered to be appropriate because it portrays various characteristics and attitudes of the present study in an accurate manner. Hybrid of Primary and secondary data are used for the study. Primary data is collected by using structured questionnaire and secondary data is collected from books, websites and e-sources, online articles and journals, e-newspapers and previous research studies. Linear Regression analysis is used to find the association between dependent variable and independent variable. This study considers awareness factors as dependent variables and demographic profile as independent variables. These tools are appropriate because the samples are independent and drawn from normal population. The application of these tools and techniques is identified on the basis of the objectives framed for this study.

V. Analysis and Results

A. Awareness on Certification Marks

Certification marks indicates legal evidence, assurance and product and / service certification, which creates the trust among the consumers, so that they can believe the product and/ or service as safe and hygiene. This study analyzes the most frequently used certification marks for consumable products in India such as ISI (Indian Standards Institute), BIS (Bureau of Indian Standards), FPO (Food Process Order), Agmark (Agricultural Certification Mark) and TM (Trade Mark). The demographic profiles such as age, educational qualification, occupation, income and residential status of the respondents' are cross tabulated with the certification marks, to know whether the rural consumers of Vellore district are aware of the above marks, and they are analyzed with

Linear Regression analysis to know the significant association among those variables. The tested variables are tabulated in Table I.

Table I Linear Regression analysis for certification marks awareness

Demographic Profile * Awareness on Certification marks		t	Sig.
ISI	Age	4.750	0.000
	Educational qualification	1.472	0.142
	Occupation	3.856	0.000
	Income	1.149	0.251
	Ownership status of residence	-7.344	0.000
BIS Hallmark	Age	4.442	0.000
	Educational qualification	11.164	0.000
	Occupation	0.014	0.989
	Income	-9.926	0.000
	Ownership status of residence	3.183	0.002
FPO	Age	15.27	0.000
	Educational qualification	2.343	0.020
	Occupation	-2.625	0.009
	Income	-10.010	0.000
	Ownership status of residence	2.588	0.010
Agmark	Age	-0.942	0.347
	Educational qualification	-3.310	0.001
	Occupation	0.858	0.391
	Income	26.629	0.000
	Ownership status of residence	-14.160	0.000
TM	Age	11.602	0.000
	Educational qualification	1.342	0.180
	Occupation	-0.670	0.503
	Income	-5.916	0.000
	Ownership status of residence	-0.580	0.562

Source: Primary data compilation; Independent variable: demographics, Dependent variable: Certification marks awareness

From the table I, it is found that there is the significant association between demographic profile and certification marks except educational qualification and income with ISI, occupation with BIS Hallmark, age and occupation with Agmark, educational qualification, occupation and ownership status of residence with TM. The remaining combinations accept the alternative hypothesis.

*B. **Awareness on Safety and Standard Factors***

Corresponding to the certification marks, the other core factors that focus on awareness of safety and standard of consumable products are bill receipt of the product purchased or service rendered, checking expiry date in a product, product purchased in MRP and product package with seal. These factors are cross tabulated with socio economic statuses of the respondents and analyzed using Linear Regression analysis to test the significant association between demographic profile and safety and standard factors of the study. The tested variables are tabulated in Table II.

Table II Linear Regression analysis for awareness on safety and standard factors

Demographic Profile * Safety and standard factors		t	Sig.
Bill Receipt for the product purchased or service rendered	Age	3.539	0.000
	Educational qualification	12.225	0.000
	Occupation	0.258	0.796
	Income	-10.136	0.000
	Ownership status of residence	3.308	0.001
Checking expiry date in the product	Age	0.692	0.489
	Educational qualification	8.705	0.000
	Occupation	3.577	0.000
	Income	-8.796	0.000
	Ownership status of residence	6.055	0.000
Product purchased in MRP	Age	-2.076	0.039
	Educational qualification	1.098	0.273
	Occupation	13.674	0.000
	Income	-11.370	0.000
	Ownership status of residence	21.966	0.000
Product package with seal	Age	9.414	0.000
	Educational qualification	1.322	0.187
	Occupation	0.498	0.619
	Income	-3.900	0.000
	Ownership status of residence	-2.262	0.024

Source: Primary data compilation; Independent variable: demographics, Dependent variable: Certification marks awareness

From the table II, it is found that there is the significant association between demographic profile and safety and standard factors except occupation in case of bill receipt for the product purchased or service rendered, age and checking expiry date in the product, educational qualification and product purchased in MRP and educational qualification and awareness on product package and seal.

VI. Recommendations

From the light of analysis and results, the following recommendations are derived. Protection of consumers is one of the vital objectives of every manufacturer. They should manufacture the product compliance to quality standard. People in rural area never check out the product package. They generally consume the food which is kept open and sold in food centres and in eateries. On one side, the manufacturer should stick with the standards. On the other side, it is the responsibility of the consumer to beware of what they are consuming. They should check the product's date of manufacture and the expiry date of a purchasing product. In some shops, the products were sold more than MRP. In some cases, we can find the MRP is erased or hidden by the shop keeper and were sold to the people. The consumer must find whether the product is sold on MRP. Another most important substance to be noted is the receipt when the product is purchased. This must be taken care especially when a pharmaceutical product is purchased because there is chance of health problem when an expired medicine or wrong medicine is taken. Only a receipt received along with the product will help the consumer to sue against the shop keeper in case of danger. The consumers can be educated about their safety and standard through various media such as television, newspaper, and magazine and through internet. The government should inform the concerned authorities to educate the school and college students regarding safety and standards by including the information in their syllabus so that they can be aware of it and can instruct and educate their surroundings.

VI. Conclusion

India is one of the fastest developing nations in the world. On one side, the nation is gaining technological advancement in many industries, which makes the country to grow fast. On the other hand, the people were exploited by deceitful manufacturers and sellers by food adulteration, products with false price and expired product is sold with false manufacture date. From the study, it is fathomed that the consumers must be more aware of their products and/ or services before they consume or avail. Though the government is continuously putting their efforts to regularize the problems confronted by the consumers, it is the duty of the consumer to be aware before consumption. The bill must be obtained from the shop keeper during their purchase of goods, thereby the expiry date, certification mark and MRP must be checked on purchasing a product, which shall drastically increase the acuity of safety and standards about consumables among the consumers. It will make the manufacturers to rectify their fault in their business conduct. As the present study's scope is limited to Vellore district rural consumers, this project could be taken as a model for the further research in other districts of Tamil Nadu and also other states of India to find out the shortcomings of reaping the actual benefits of the safety and standards and effectively remove the hurdles for ushering better consumer awareness.

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A STUDY ON THE CONTENTMENT OF RETAILERS IN SELLING VODAFONE DATA TO CUSTOMERS

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Abstract: *In our present economy we can see a lot of technological inventions being contributed to the world for its various uses. The communication channels have been rapidly developing, enabling people to communicate from anywhere in the world. The 21st century shows the change of telephones into the highly advanced smart phones to which we find ourselves attached to. Recently, unbelievable changes and technological improvements have been taking place in the telecommunication sector. In 1946, the official cell phone was launched by the Swedish mobile. Later in the year 1983, the first portable cell phone was brought into the market by Motorola. Mobile internet is another area which is very common among today's youth. The adoption of smart phones has led to an increase in the number of people who accesses the Internet through mobile phones. Present situation divulges that laptops and computers have been replaced by the mobile phones for browsing the Internet. In this present economy, there are various telecommunication service providers like Airtel, Vodafone, Idea etc. This paper focuses on the "satisfaction of retailers on selling Vodafone data to customers"*

Key word*: Distributors Sale Executive (DSE), Communication Channel, Telecom Operator*

I. INTRODUCTION

A mobile phone is a phone that can receive calls and make calls via radio links over a wide geographic area. This communication is provided by mobile phone operator. The basic features of a mobile are: Text messaging, SIM Card, Multi-card hybrid phones In addition to the basic features of communication the modern mobile phones come with various new features such as Text message(SMS), MMS, Video conferencing, short range communication using Bluetooth or infrared, Gaming, Internet connection etc. Now days the mobile phone industry provides phones which have capability to perform like computers, these phones are known as 'smart phones'.

Telecommunication implies the transmission of information, data image or sound from one point to another through a communication medium. A communication medium or channel is a transporter used to transporter used to transport data from one location to another.

Indian telecommunication is one of fastest growing industries in the world after China. In India telecommunication was provided by Telecom, it was formed in 1975 as Department of Telecom (DoT). In 1992 the telecommunication industry was opened to the private sector as part of liberalisation and DoT was renamed as Bharat Sanchar Nigam Limited (BSNL). After liberalisation many private companies (both Domestic and International) have entered the Indian Telecommunication industry. The mobile operators in India provide both GSM and CDMA services. In 2008 3g was introduced by MTNL and BSNL. Later it was opened to private sector in 2010.

The top players in the industry are: BharatiAirtel, Vodafone Essar, Idea, Tata DoCoMo, Reliance, and BSNL. Vodafone is multinational telecommunication company based on Britain. It is a public limited company, it was founded in 1991. Vodafone has its own network in 21countries and has partners in 40 countries. Vodafone operate in India with the name "Vodafone India Limited". It is a member of Vodafone Group and headquartered at Mumbai. Vodafone India was previously known as Vodafone Essar. Vodafone purchased Essar's stake in July 2011.Vodafone India provide GSM SIM card, it started providing 3G services in the year 2011.

Vodafone India has been awarded the Most Admired Telecom Operator and Best 3G Operator at the recent Telecom Operator Awards 2012. The company has also received the globally recognized prestigious 'Product of the Year 2012' consumer award for Vodafone Apps Store in the Mobile Services Category. In another survey conducted by Nielsen, Vodafone India was the only telecom player in the Top 10 'Most Exciting Youth Brands' in India. Vodafone India also features in the Top 10 'Most Trusted Brands in India' for 2011, in a survey conducted by a leading financial daily.

MANUFACTURERS AT A GLANCE

Table 1 :Top Five Worldwide Total Mobile Phone Vendors, 2013

Rank	Manufacturer	Gartner	IDC
1	Samsung	24.6%	24.5%
2	Nokia	13.9%	13.8%
3	Apple Inc.	8.3%	8.4%
4	LG	3.8%	3.8%
5	ZTE	3.3%	-
5	Huawei	-	3.0%
	Others	34.0%	46.4%

Note: IDC- International Data Corporation, an American market research and analysis firm. Gartner- an America IT research and advisory firm.

II. OBJECTIVE OF THE STUDY

- To study about retailers attitude towards data packages provided by Vodafone Mobile Service
- To know the awareness level of retailer towards Vodafone.

III. SCOPE OF THE STUDY

The study is to help the researcher in understanding the retailers' viewpoint with regard to services, facilities, connectivity etc. The study basically consists of survey of the retailer who deal with users, and collection of their suggestions for betterment of the services. On the basis of analysis the company can improve the services and can make long term competitive consumer friendly strategies.

IV. METHODOLOGY OF THE STUDY

The methodology adopted in the research comprises of primary & secondary data and their systematic analysis. The Primary data is collected through survey with the help of questionnaire, personal interviews from distributors, shopkeepers. The questionnaire includes closed as well as open-ended questions and Secondary data is collected from website, books, brouchers, magazines, newspapers etc.

V. FINDINGS AND INTERPRETATIONS

The study focuses on the satisfaction of retailers with regard to the data package of Vodafone usage of customers. For analysis data were collected from nearly 80 retailers from Cochin City, Ernakulam. A questionnaire consisting of 15 questions were circulated among the retailers. Based on the data collected tables were formulated and interpretations were formed. The details can be outlined as follows:

Table 5.1: How long have you been running this outlet/shop?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-2yrs	23	28.7	28.7	28.7
	3-6yrs	25	31.3	31.3	60.0
	7-10yrs	21	26.3	26.3	86.3
	10yrs+	11	13.8	13.8	100.0
	Total	80	100.0	100.0	

Source: Primary Data

1. Through this research it has been found that a majority of the retailers has 5-6 yrs experience and this means that they have a very good understanding of the telecom industry and market.

Table 5.2: Which service provider provides best data offer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Airtel	30	37.5	37.5	37.5
	BSNL	1	1.3	1.3	38.8
	Vodafone	37	46.25	46.25	85.00
	Docomo	12	15	15.0	100.0
	Total	80	100.00	100.00	100.00

Source: Primary Data

2. Vodafone is the highest selling recharge coupon in retail shops with Airtel right behind. Reason- Vodafone offers 3G data packs at reasonable rates and very good speed.

Table 5.3: Age group of customers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-18	5	6.3	6.3	6.3
	19-24	28	35.0	35.0	41.3
	25-35	44	55.0	55.0	96.3
	36-50	3	3.8	3.8	100.0
	Total	80	100.0	100.0	

Source: Primary Data

3. The researcher has found that most of the customers are employees and students. On comparing the two kinds of customers it was found that, being frequent users of social networking sites and with more time to spare, students use more data than the employees. A majority of the older section of society is only getting used to the new generation ways and is neither familiar with the latest smart phones or the ways in which mobile internet works.

Table 5.4: Which gender uses data plans more?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	34	42.5	42.5	42.5
	Female	11	13.8	13.8	56.3
	Cannot Differentiate	35	43.8	43.8	100.0
	Total	80	100.0	100.0	

Source: Primary Data

4. It was also found that both men and women use data equally.

Table 5.5: How far you are satisfied with the service of the DSE with the company?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Highly Satisfied	41	51.2	51.2	51.2
	Satisfied	26	32.5	32.5	83.8
	Moderate	6	7.5	7.5	91.3
	Dissatisfied	4	5.0	5.0	96.3
	Highly Dissatisfied	3	3.8	3.8	100.0
	Total	80	100.0	100.0	

Source: Primary Data

5. This research has also found that Vodafone provides high quality service for their retailers through the distributors. A good relationship is being maintained between the company and the retailers. The retailers are provided with promotional items, banners and wall posters so as to increase sales and attract more customers.

Table 5.6: How far you are satisfied with the commission from the company?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Highly Satisfied	8	10.0	10.0	10.0
	Satisfied	16	20.0	20.0	30.0
	Moderate	39	48.8	48.8	78.8
	Dissatisfied	14	17.5	17.5	96.3
	Highly Dissatisfied	3	3.8	3.8	100.0
	Total	80	100.0	100.0	

Source: Primary Data

6. Though there has been a hike in the prices of other products, commissions of the retail agencies remains the same. This has caused dissatisfaction among the retailers as they are unable to meet their daily expenses.

E.g.: If retailer sells 10 Rs Vadofone recharge voucher earns only 50 Ps. Where as he can earn Rs 1 when he sells other company's recharge voucher.

VI. SUGGESTIONS

- More danglers, posters and others promotional materials should be given to retailers to increase the sales.
- Incentives, gifts and other benefits should be provided to retailers to motivate them.
- Create strong awareness among the retailers about the data and its various possibilities.
- Introduce more attractive data plans, offers to influence customers
- Reduce the pricing of the Vodafone in order to compete with other telecom industries.
- Reduce network conjunction and make it smooth.
- Introduce better offer for voice and SMS.
- Create awareness among distributors about data and provide bonus and gifts so that it creates push effect in the retailers.
- Incentives for achieving targets
- Create contest in retail shops such as visibility contest, in-shop branding
- Training should be provided to Distributors.

VII. CONCLUSION

In today's market there are lots of opportunities. But at the same time the competition is tough. There are many difficulties in data selling but maintaining the business is very difficult because the customers can easily change the products or supplier as there are many new service providers in the market. So resistance is important. Nothing is permanent in this world except change. So there is always a need to find out what the customers need and the problems faced by them, so that it can be analyzed and solutions formed. The retailer's satisfaction survey was very helpful in finding out the needs of the retailers and the problems faced by them, so that it can be rectified. This will ensure a good relation with the company. It has also helped in understanding the market and the heavy competition that the company is facing.

As per the findings of the researcher, suggestions have been made and were further implemented. The company has brought a new project named B.O.L.T (Building Outlet Of Tomorrow). The project is to meet the needs and requirements of retailers as well as the distributors and to ensure a 'push effect' for the retailers in data selling. This is so because the retailers have high influence over the customers' decision making process. The company is going to introduce B.O.L.T in top data selling outlets of Bangalore and the company had made certain strategies for it too.

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Effectiveness of Mobile Handset Advertisements: A Comparative Analysis in North India

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Abstract: *India is one of the fastest growing telecom markets in the world. The telecom companies are investing huge expenditure on advertising and are using various extensive research techniques to know the effectiveness of their advertisements. This research paper investigates the effectiveness of mobile handset advertisements in the select states/UT of Northern region of India. Five major mobile handset manufacturing companies namely; Nokia, Samsung, Micromax, Blackberry and Karbonn have been considered for the purpose of study. The study concludes that Samsung's advertisements are most effective as it was the most recalled brand by the consumers and Samsung also scored highest on the basis of other parameters of effectiveness i.e. likability, rationality, believability and persuasiveness. Samsung's brand ambassador i.e. Aamir Khan was most preferred by the respondents. Study has the implications for the advertisers as some recommendations are provided to improve the advertising effectiveness to the companies with poor advertising performance.*

Keywords: *Advertising effectiveness; mobile handset advertisements; Nokia, Samsung; Micromax; Blackberry; Karbonn.*

I. Introduction

Nearly everyone in this modern world is influenced to some degree by advertising and other forms of promotion. Organizations in both the public and private sectors have learned that the ability to communicate effectively and efficiently with their target audiences is critical to their success. We are experiencing perhaps the most dynamic and revolutionary changes of any era in the history of advertising and promotion. These changes are being driven by advances in technology and developments that have led to the rapid growth of communications through interactive media, particularly the internet. The increasing growth in advertising and media expenditures provides evidence of their rising significance. (Belch and Belch, 2012).

India is one of the fastest growing telecom markets in the world. India's telecom sector has shown massive upsurge in recent years in all respects of industrial growth. From the status of state monopoly with very limited growth, it has grown to the level of an industry. The stupendous growth of the telecommunication companies in India over the last fifteen years can be attributed to the liberal government of India's economic policy. The telecommunication companies in India went through a huge make-over during the implementation of the open-market policy of India. Since the telecom companies are investing huge expenditure on advertising, they are obviously interested in knowing the impact of advertising. That's why companies are using various extensive research techniques to know the effectiveness of their advertisements.

II. Riview of Literature

Schoham and Aviv (1996) conducted research on the effectiveness of standardized and adapted TV advertising. Findings of the study showed varied levels of standardization, recognition, recall, believability and purchase levels in the outcome measures. **Simon Broadbent (2000)** advocated in the study that the effects of advertisements must be seen in behavior before discussing how individuals are affected. **Brett et al (2002)** examined the effectiveness of infomercials and their influence on advertisement design elements. The results of the survey revealed that infomercials with expert comments, testimonials, product demonstrations, the use of elements such as market models, celebrity endorsers, product comparisons and bonus offers is more effective in infomercials. **Claire et al (2003)** focused on the influence of selective exposure of context effects on advertising effectiveness in their study. The study concluded that the attitude of the respondents to advertisements positively correlated with recall and recognition of advertisements. **Brian and Daniel (2005)** assessed the importance of creativity in advertisements. The results of the study suggested that creative advertisements generate significantly greater brand execution recall on unaided basis. **Demetrios and Zhengeng (2005)** examined the long term effectiveness of multimedia advertising in a competitive setting and its implications for budget allocation decisions using multivariate persistence methodology. **Tim Broadbent (2008)** studied the historical evidence and recent case histories of successful marketing campaigns form UK's IPA effectiveness awards. **Peter et al (2009)** consolidated past findings on clutter with analysis of four new data sets, documented the

empirical patterns for how advertising works in TV and Radio with different levels of clutter. **Yognick et al (2011)** studied how brand recall and recognition are affected by non-editorial clutter in mega events broadcasting. The results revealed that increase in the number and length of other ads and on-air promos negatively affect brand recall and recognition. **Purva & Himanshu (2011)** advocated that absurdity in advertisements increases notice ability and brand recall of the consumers. A strong correlation was found between brand recall of absurd advertisements and entertainment scale of the likeability dimension. **Yashmin (2011)** opined that that the agencies in India have no formal way of evaluating their advertising campaigns. The study concluded that the most common and popular factor for evaluating the effectiveness of advertising agencies' campaign is client's feedback. **Dalip & Kritika (2012)** studied the effectiveness of advertising in terms of impact of general advertising, whether it may be through media on the awareness, knowledge, liking, preference, trial, purchase decision and post purchase decision of the consumer and analyzing variation in consumer responses.

III. Objectives of the Study

Keeping in mind the rationale behind the study, the following research objectives have been framed:

- To know the most recalled mobile handset brand by the consumers
- To evaluate the effectiveness of mobile handset advertisements on the basis of (a) Creativity (b) Likability (c) Rationality (d) Believability (e) Persuasiveness
- To find the most preferred celebrity endorser by consumers in mobile handset advertisements

IV. Research Methodology

Research Design: The study is descriptive in nature and is focused on the comparative analysis of effectiveness of mobile handset advertisements in north India.

Sampling: The study attempts to investigate the effectiveness of mobile handset advertisements in the select states/UT of Northern region of India. At the first stage; 3 states; namely Punjab, Haryana, Himachal Pradesh and one UT; namely Chandigarh were selected on the basis of simple random sampling. Then, a sample of 500 respondents was selected from different cities of these states on the basis of convenience sampling. The sample was comprised of 330 male respondents and 170 female respondents.

Scope of the Study: Five major mobile handset manufacturing companies namely; Nokia, Samsung, Micromax, Blackberry and Karbonn have been chosen on the basis of their market share in India for the purpose of study. Further, in order to evaluate the advertising effectiveness of these five major mobile handset manufacturing companies, two advertisements from each company were selected randomly. So, total ten advertisements were shown to the respondents and their opinion about them was drawn and evaluated.

Data Collection: The study is based on primary data. A well structural schedule of questions containing different aspects of the study was developed and circulated among the respondents. Certain information has been collected through personal observations.

Statistical tools: The Pearson Chi-square test was used to compare the results for brand-recall. The mean and standard deviation were used to compare the results of effectiveness of mobile handset advertisements. Further, ANOVA was used to check the significant difference among effectiveness of different mobile handset vendors on the basis of creativity, likability, rationality, believability and persuasiveness. The mode was used to find the most preferred celebrity by the respondents on the basis of ranks assigned to different celebrities.

V. Analysis and Findings

(1) Comparative analysis of Brand-Recall

Table 1: Descriptive Statistics for Gender

Gender	Nokia	Samsung	Micromax	Blackberry	Karbonn	Total	Pearson Chi-Square	p-value
Male	110	163	21	17	19	330	6.341	.175ns
	33.3%	49.4%	6.4%	5.2%	5.8%	100.0%		
Female	46	84	20	12	8	170		
	27.1%	49.4%	11.8%	7.1%	4.7%	100.0%		

ns = not significant

It is evident from table 1 that majority of male and female respondents recalled Samsung with equal proportion i.e. 49.4%. In order to verify the statistical significance of gender and brand recall, Pearson Chi-Square test was applied and following hypothesis was framed:

H_o: There is no significant difference among male and females towards brand recall

H_A: There is significant difference among male and females towards brand recall

The computed Pearson Chi-Square value is 6.341 which is not significant i.e. 0.175 at 95% confidence level i.e. null hypothesis is accepted and it can be concluded that there is no significant difference between the male and female respondents towards brand recall.

Table 1.1: Descriptive Statistics for Age

Age (In years)	Nokia	Samsung	Micromax	Blackberry	Karbonn	Total	Pearson Chi-Square	p-value
<= 20	29	57	16	10	12	124	32.223	.001**
	23.4%	46.0%	12.9%	8.1%	9.7%	100.0%		
21 - 30	51	78	11	10	5	155		
	32.9%	50.3%	7.1%	6.5%	3.2%	100.0%		
31 - 40	32	77	9	3	6	127		
	25.2%	60.6%	7.1%	2.4%	4.7%	100.0%		
Above 40	44	35	5	6	4	94		
	46.8%	37.2%	5.3%	6.4%	4.3%	100.0%		

Table 1.1 signifies that in age the groups <=20 years, 21-30 years and 31-40 years, the most recalled brand was Samsung. Whereas the respondents of the age group of above 40 years had mostly recalled Nokia with 46.8%. In order to verify the statistical significance of age and brand recall, Pearson Chi-Square test was applied and following hypothesis was framed:

H_o: There is no significant difference among respondents from different age groups towards brand recall

H_A: There is significant difference among respondents from different age groups towards brand recall

The computed Pearson Chi-Square value is 32.223 which is significant i.e. 0.001 at 95% confidence level. This shows that null hypothesis is rejected and it can be concluded that there is significant difference among respondents from different age groups towards brand recall.

(2) Comparative Analysis of Advertising Effectiveness on the basis of different parameters

(a) Comparative Analysis on the basis of Creativity

Table 2: Descriptive Statistics for Creativity

Company	Number of Respondents	Mean	Std. Deviation
Nokia	500	3.5540	1.06271
Samsung	500	3.6040	1.15492
Micromax	500	3.6940	1.01904
BlackBerry	500	3.5040	1.23654
Karbonn	500	3.0020	.97360
Total	2500	3.4716	1.11933

Table 2 clearly shows that mean value with respect to creativity is higher for Micromax i.e. 3.6940 as compared to other companies. It reveals that respondents had found Micromax advertisements most creative followed by Samsung, Nokia and Blackberry. Karbonn advertisements were found to be least creative of all.

Table 2.1: ANOVA for Creativity

Creativity	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	147.678	4	36.919	30.876	.000**
Within Groups	2983.306	2495	1.196		
Total	3130.984	2499			

Austerely to verify the statistical significance of creativity in the advertisements of different mobile handset companies, ANOVA test was applied and following hypothesis was framed:

H_o: There is no significant difference in the creativity of advertisements of different mobile handset companies

H_A: There is significant difference in the creativity of advertisements of different mobile handset companies

The computed value of F is 30.876 which is highly significant i.e. 0.000 at 95% confidence level. This shows that null hypothesis is rejected and it can be concluded there is significant difference in the creativity of advertisements of different mobile handset companies.

(b) Comparative Analysis on the basis of Likability

Table 2.2: Descriptive Statistics for Likability

Company	Number of Respondents	Mean	Std. Deviation
Nokia	500	3.4420	1.15121
Samsung	500	3.5100	1.16129
MicroMax	500	3.5020	1.15441
BlackBerry	500	3.0340	1.16772
Karbonn	500	3.2780	1.07844
Total	2500	3.3532	1.15628

Table 2.2 reveals that mean value for Samsung is higher i.e. 3.5100 with respect to likability as compared to other companies. It shows that respondents had found more likeability in Samsung advertisements followed by Micromax, Nokia and Karbonn. Respondents have given least preference to Blackberry regarding likability.

Table 2.3: ANOVA for Likability

Likability	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	81.078	4	20.270	15.513	.000**
Within Groups	3260.046	2495	1.307		
Total	3341.124	2499			

Austerely to verify the statistical significance of likability of the advertisements of different mobile handset companies, ANOVA test was applied and following hypothesis was framed:

H_o: There is no significant difference in the likability of advertisements of different mobile handset companies

H_A: There is significant difference in the likability of advertisements of different mobile handset companies

The computed value of F is 15.513 which is highly significant i.e. 0.000 at 95% confidence level. This shows that null hypothesis is rejected and it can be concluded there is significant difference in the likability of advertisements of different mobile handset companies.

(c) Comparative Analysis on the basis of Rationality

Table 2.4: Descriptive Statistics for Rationality

Company	Number of Respondents	Mean	Std. Deviation
Nokia	500	3.4960	1.10473
Samsung	500	3.5620	1.17512
MicroMax	500	3.5100	1.12803
BlackBerry	500	3.2160	1.21173
Karbonn	500	3.4740	1.19674
Total	2500	3.4516	1.16936

Table 2.4 signifies that mean value for Samsung is higher i.e. 3.5620 with respect to rationality as compared to other companies. This shows that respondents had found Samsung advertisements more rational followed by Micromax, Nokia and Karbonn. Blackberry advertisements were found to be least rational by respondents.

Table 2.5: ANOVA for Rationality

Rationality	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	36.790	4	9.197	6.788	.000**
Within Groups	3380.354	2495	1.355		
Total	3417.144	2499			

Austerely to verify the statistical significance of rationality of the advertisements of different mobile handset companies, ANOVA test was applied and following hypothesis was framed:

H_o: There is no significant difference in rationality of advertisements of different mobile handset companies

H_A: There is significant difference in rationality of advertisements of different mobile handset companies

The computed value of F is 6.788 which is highly significant i.e. 0.000 at 95% confidence level. This shows that null hypothesis is rejected and it can be concluded there is significant difference in the rationality of advertisements of different mobile handset companies.

(d) Comparative Analysis on the basis of Believability

Table 2.6: Descriptive Statistics for Believability

Company	Number of Respondents	Mean	Std. Deviation
Nokia	500	3.5020	1.10655
Samsung	499	3.5511	1.16977
MicroMax	500	3.4760	1.11171
BlackBerry	500	3.2220	1.20483
Karbonn	500	3.2000	1.06878
Total	2499	3.3902	1.14214

Table 2.6 signifies that mean value for Samsung is higher i.e. 3.5511 with respect to believability as compared to other companies. This shows that respondents had believed most in Samsung advertisements followed by Nokia, Micromax and Blackberry. Karbonn advertisements were found to be least believable by the respondents.

Table 2.7: ANOVA for Believability

Believability	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	55.083	4	13.771	10.721	.000**
Within Groups	3203.515	2494	1.284		
Total	3258.598	2498			

Austerely to verify the statistical significance of believability of the advertisements of different mobile handset companies, ANOVA test was applied and following hypothesis was framed:

H_o: There is no significant difference in believability of advertisements of different mobile handset companies

H_A: There is significant difference in believability of advertisements of different mobile handset companies

The computed value of F is 10.721 which is highly significant i.e. 0.000 at 95% confidence level. This shows that null hypothesis is rejected and it can be concluded there is significant difference in the believability of advertisements of different mobile handset companies.

(e) Comparative Analysis on the basis of Persuasiveness

Table 2.8: Descriptive Statistics for Persuasiveness

Company	Number of Respondents	Mean	Std. Deviation
Nokia	500	3.4980	1.14219
Samsung	500	3.6000	1.10564
MicroMax	500	3.4100	1.15263
BlackBerry	500	3.2700	1.18317
Karbonn	500	3.4100	1.12980
Total	2500	3.4376	1.14727

Table 2.8 signifies that mean value for Samsung is higher i.e. 3.6000 with respect to persuasiveness as compared to other companies. This shows that respondents had found Samsung advertisements more persuasive followed by Nokia, Micromax and Karbonn. Blackberry advertisements were found to be least persuasive by respondents.

Table 2.9: ANOVA for Persuasiveness

Persuasive	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	29.818	4	7.454	5.706	.000**
Within Groups	3259.448	2495	1.306		
Total	3289.266	2499			

Austerely to verify the statistical significance of persuasiveness of the advertisements of different mobile handset companies, ANOVA test was applied and following hypothesis was framed:

H_o: There is no significant difference in persuasiveness of advertisements of different mobile handset companies

H_A: There is significant difference in persuasiveness of advertisements of different mobile handset companies

The computed value of F is 5.706 which is highly significant i.e. 0.000 at 95% confidence level. This shows that null hypothesis is rejected and it can be concluded there is significant difference in the persuasiveness of advertisements of different mobile handset companies.

(3) Ratings of Brand Ambassadors of Mobile Handset Companies

Table 3: Descriptive Statistics for Most preferred Celebrity

Company	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Total	Mode
Nokia	112	125	150	70	43	500	3
(Priyanka Chopra)	22.4%	25.0%	30.0%	14.0%	8.6%	100.0%	
Samsung	271	137	44	34	14	500	1
(Aamir Khan)	54.2%	27.4%	8.8%	6.8%	2.8%	100.0%	
Micromax	38	125	191	124	22	500	3
(Akshay Kumar)	7.6%	25.0%	38.2%	24.8%	4.4%	100.0%	
BlackBerry	49	89	72	154	136	500	4
(Ranbeer Kapoor)	9.8%	17.8%	14.4%	30.8%	27.2%	100.0%	
Karbonn	32	24	47	114	283	500	5
(Virendra Sehwag)	6.4%	4.8%	9.4%	22.8%	56.6%	100.0%	

Respondents were asked to rank different celebrities on the basis of their liking and preference and it is evident from the table 3 that Samsung's brand ambassador i.e. Amir Khan was most liked by the respondents followed by Priyanka Chopra in Nokia and Akshay Kumar in Micromax, Ranbeer Kapoor in Blackberry. Karbonn's brand ambassador i.e. Virendra Sehwag was least liked by the respondents.

VI. Conclusion and Recommendations

The study concludes that Samsung advertisements are more effective and were able to leave a considerable impact on the consumers. Samsung was the most recalled brand by the respondents of different gender and different age groups. Micromax advertisements were found to be most creative of all. Consumers had found Samsung advertisements most likable, rational, believable and persuasive as compared to other brands. Further, brand ambassador of Samsung i.e. Aamir Khan was most preferred by the respondents among all the celebrities. On the basis of results of the study, certain recommendations could be provided to the companies like Blackberry and Karbonn. Since both these companies scored low in almost all the parameters of advertising effectiveness, therefore they need to make their advertisements more creative and interesting in order to improve their advertising performance.

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Employee Empowerment: A strategy to sustain in Globalization

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Abstract*: Employee empowerment is a process which begins with tactics of handling people, rewards, duties, technology, organization structure and information procedure. Empowered employees can accept change or initiate change in organization. Dedicated Employees are emotionally involved to an organization and they contribute a lot in organizational success. This lead to improved competitiveness, accountability, risk taking, low wastage, inter personal intractation, degree of satisfaction and improved job performance. Empowerment, Inspires Change which leads to increase the individual employee commitment and helps in accomplishment of Organisational Goals. Strong wind of competition have forced organizations , which have been limited to local and national markets with their limited environmental conditions to move to big field . And Empowerment is the only tool which helps the people to become more dedicated and result oriented in globalized economy. This paper explains the theoretical review of empowerment, its strategy to sustain in globalized economy, its requirement to survive in competitive environment and innovative strategies of employee empowerment.*

Keywords*: Employee Empowerment, Initiate Change, accountability and risk management, Handling people, Global Economy, Stability and accomplishment of Goals.*

I. Introduction

Employee empowerment is a means by which individuals are given authority to analyze situations autonomously and take proactive decisions. This instills a sense of ownership towards the company in the employees. IT is a philosophy which believes in enriching people's jobs and giving power to exercise control over and take responsibility for outcomes of efforts (Venkat Ratnam, 2006). Employees are the real drivers of any organization, this is a unique resource which cannot be copied by competitors and also not easily available in the market. An empowering organization emphasizes on autonomy, proper information and individual participation for organizational excellence. In order to achieve empowerment, the executives must ensure that employees having the right mix of information, knowledge, power and rewards to work more enthusiastically (Singh, 2003). Employee empowerment, is a perception of novel management which is beneficial to share different knowledge, skill and talent of the employees at the highest level, it plays a vital role in customer satisfaction. We can also say that customer satisfaction starts with employee satisfaction. The most effective way to save companies from the whirlpool price competition on the basis of „similarities", which destroy the companies rapidly, is differentiation (Argüden, 2006).

II. Employee Empowerment: A Theoretical Perspective

Employee empowerment is the practice of changing power and liability to employees at junior level in the organizational chain of command. It is a transmit of power from the employer to their subordinates. Employee empowerment tended to revolve around issues of power and control, where empowerment was considered a management technique used to motivate employees by delegating or sharing of power with them (Kanter, 1983). Ashcraft and Kedrowicz (2002, p. 89) have defined in their earlier study, empowerment as enabling relations of power through a perception and process that fosters both a sense of competence and control. It was reflected in sharing of power that those of staff members who were given power more likely to achieve the desired outcomes (Conger and Kanungo, 1988). Conger and Kanungo (1988) define empowerment as a process of enhancing feelings of self-efficacy among organizational members through the identification of conditions that foster powerlessness, and through their removal by both formal organizational practices and informal techniques of proving efficacy information. This definition implies developing people mind set to excel individual and organizational peak performance in order for achievement of company goals.

The examples of definition that emphasize the purpose, process and different dimensions of employee empowerment are as follows:

The examples of definition that emphasize the purpose

According to Kanter (1977), empowerment is to give power to people who are weak in organizations (Ugboro & Obeng, 2004: 249) Empowerment is spreading the administrative responsibility to all the places in the

organization (Cunnigham & Hyman 1999; 193). Empowerment is to give more authority to employees in organization in management of work (Pearson & Chatterjee, 1996: 17). It is to bring employees to the position of owners of work (Koçel, 2003: 414). According to Foster, Fishman and Keys (1995), it is a process of bringing an individual or a group to a position that he/she can affect events and the results (Hanold, 1997: 202).

The examples of definition that emphasize the process and dimensions of empowerment

According to Rothstein (1995), Empowerment is "an act of building, and increasing power through cooperating, sharing and working together"(Honold,1997:202).

According to Pet and Miller, employee empowerment is the concept of enabling subordinates to have the authority and capacity to make decisions and to act for the organization in order to improve both individual motivation and organizational productivity (Elmuti, 1997:233).

According to Zemke and Schaaf (1989), employee empowerment means turning the "front line" loose, and encouraging and rewarding employees to exercise initiative and imagination.

A more operational-level and process-oriented definition of empowerment was offered by Bowen and Lawler. They define empowerment "as sharing with front-line employees the information about an organization's performance, information about rewards based on the organization's performance, knowledge that enables employees to understand and contribute to organizational performance, and giving employees the power to make decisions that influence organizational direction and performance"(Ugbaro and Obeng, 2000:249).

Empowerment is an elementary motivation that involves positively valued experiences for which an employee derive directly for a task. The employees consider themselves as having freedom, autonomy and discretion, feel personally connected to the organization, and feel confident about their abilities and capable of having an impact on the organization. Randolph (1995) asserts that employee empowerment is a transfer of power from the employer to the employees. Newstrom and Davis (1998) define empowerment as any process that provides greater autonomy through the sharing of relevant information and the provision of control over factors affecting job performance.

Employee Empowerment is not only giving power. The sense of empowerment can be enhanced by listening and being more responsive to employee comments, training, support by management and associate employees, sharing significant information. It is found that empowerment starts at the top and it is practically applicable with the support of top management. Empowerment can change an organization's model. Thus, upper management must be an active factor for building and implementing employee empowerment initiatives. According to the researchers R. Ripley and M. Ripley (1992) and Spatz (2000), employee empowerment will bring the followings:

- increase employees' trust and commitment;
- increase motivational level to reduce mistakes and individuals take more responsibility for their own
- actions;
- provide a forum though which employees can express their beliefs and innovative ideas about day-to-day activities;
- assist the continuous improvement of processes, products, and services;
- increase employee loyalty, while at the same time reducing turnover, absenteeism, and illness;
- increase productivity by increasing employee pride, self-respect, and self-worth;
- use peer pressure and self-managing team methods for employee control and productivity;
- increase the bottom line by such methods as reducing waste and building quality, while meeting
- customer requirements;
- maintain and increase competitiveness and achieve long-term competitiveness with an ever increasing
- market share;
- increase trust and cooperation with management;
- increase communication among employees and divisions;
- enable employees to identify & solve problems so that they can improve their own performance;
- increase organizational commitment and organizational effectiveness; and
- build a healthy organizational climate and culture.

III. Employee Empowerment and Sustainability

In the globalizied economy, we need to fight continuously with the competitors for sustainability. In respect of sustainable competitive advantage Porter (1985) states that such concept arises when a firm creates value for its customers, selects markets in which it can excel and presents a moving target to its competitors through improving position in a continuous manner. The firm can achieve it through the resource that has some specific, unique characteristics. Resource based theorists Barney and Wright opine that in order for a resource to be a source of sustainable competitive advantage it must possess four characteristics. The resource must be (a) valuable that can create value for the organization (through reducing costs or by differentiating the product or service) (b) rare, (c) almost inimitable. And the fourth characteristic is that the firm must have appropriate

structure and systems that can effectively and efficiently utilize the resource . (Barney, 1991, 1995) Again, arise a question in this context: Do all resources possess these four characteristics? The answer is No. Gloria Harrell-Cook (1996) explains that few of the resources traditionally thought of as sources of competitive advantage possess those characteristics. The human resources, however, possess those four characteristics. They with their specific, unique, rare and qualitative ingredients can make differentiating value addition service/product if the firm can make/design appropriate strategy, structure, system and develop/create enabling culture, utilize them efficiently and effectively.

So, human resources can make things happen and organizations can obtain sustainable competitive advantage through human resources, For this, organizations need to make the human resources committed, competent in a distinctive embedded culture through changing, redesigning appropriate structure and systems to enable them to render much more value added service and product to the customers as compared to the competitors. Barney and Wright (1998) contended that firms must be organized in a manner to take full advantage of the resource. More specifically organizations must have highly integrated and cohesive set of practices to motivate human resources to excel individual performance as well as team performance and to produce value that is rare and inimitable. All this contributes to achieve sustainable competitive advantage. Employee empowerment is considered to be one of the most powerful and effective HR practices.

IV. Employee Empowerment and Innovation

In today's competitive environment, change and innovation is required for accomplishment of goals. Empowerment of existing employees is the only tool which helps employees to think differently and increase the level of commitment for survival and sustainability of the organization. Paul Sloane had given a statement, **"A great leader can turn your team into entrepreneurs who are hungrily looking for new opportunities. The key is empowerment"**. The challenge with innovation is finding products and services that are easier to use, easier to maintain and more appealing to customers. Where can you draw the creativity and drive to make this happen? Often the best source for innovation is the team within your business. A great leader can turn them into entrepreneurs who are hungrily looking for new opportunities. The key is empowerment. By empowering people you enable them to achieve goals through their own ideas and efforts. *(http://www.innovationmanagement.se/imtool-articles/empowering-innovation)*

Many organizations in the current framework have come up to develop strategies with the help of empowerment. Several strategies which are exercised for this purpose are:

A. Passing on Power

It is believed that through passing on power to the executives will cultivate the hidden talents or competencies towards the business requirements.

B. Feeling of Ownership

Employers are like the owners for their respective employees because they think for the benefit of organization and welfare of employees'. The most important reason behind the feeling of ownership is to motivate them for organizational achievements and fulfillment of individual desires and needs.

C. Employees Proposal Design

Employee Proposal Design is design where employees are given an opportunity to share their suggestions with management. In this design they can give suggestions in any of the decision of the management and involve themselves in organization building activities. An employee is the best judge of the job, and the best person to suggest changes for improving performance.

D. Communication with Higher Management

In the System of employee empowerment, it is suggested that higher management along with board of directors and CEO should meet their staff in once or twice the year. Meeting with employees or addressing employees is a platform where the employees can raise several issues can give suggestions, share their views for the betterment of the organization. The meeting followed by lunch or dinner hosted by the management to make the employees more emotionally attached with the organization. In order to achieve empowerment, the executives must ensure that employees having the right mix of information, knowledge, power and rewards to work more enthusiastically (Singh, 2004). Empowerment thus helps to create autonomy for employees, allows sharing of responsibility and power at all levels, builds employee self-esteem and energizes for workplace commitment and better individual performance.

V. Conclusions

Employee empowerment facilitates organizations to gain sustainable competitive improvement. It is a essential to increase the ability of employees so that they can make value addition to an organisation. Employee empowerment is closely related to employee involvement, a concept that is easily understood and more uniform throughout the organization. The process comes about by giving employees a combination of information, influence, and incentives (Hammuda & Dulaimi, 1997). Organizations must establish a culture of openness, trust, experimentation and competitiveness to make empowered employees result oriented, to make organization

unique, distinct and incomparable from other organizations in terms of cost, quality and customers' delightment. Organizations must use employee empowerment as a strategic tool to attain business excellence and achieve goals. All these make organizations strong, powerful to face competition and obtain sustainable competitive advantages.

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Prevent conclusion Attack by Removal of Sensitive Attribute from social Network Information

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Abstract: *Online social sites have become one of the most frequent activities on the Internet. Online social sites such as Facebook are mostly access by many people for various uses. OSNs allow users to control and customize what personal information is available to other users. Such networks allow users to publish their details about themselves and to connect their friends. Some of the information revealed inside these networks is meant to be sensitive. A privacy break occurs when sensitive information about the user the information that an individual wants to keep from public is disclosed to an adversary. So it is possible to use some learning methods on released data to predict sensitive information as private information. Sensitive information leakage could be an important issue in some cases. Here the goal of system is simulate the conclusion attacks using released social networking sites data to predict sensitive attribute information. In the proposed system use of data and individual privacy presents an chance for privacy preserving social network data mining. Here in the system some sensitive data removal techniques are like annonymization of data and perturbation that could be used in different situations for preventing conclusion attack, such techniques are removing details of user profile, adding some new attribute information and manipulate some fields in the user profile these techniques are proposed for preventing conclusion attack.*

Keywords: *SNS, FB dataset, NB, ID3, Social network, classifier*

I. Introduction

Social networking used to connect and share information with friends. People use social sites services for different reasons to join network with new contacts, reconnect with formal friends, maintain current relationships, build or promote a business or project, participate in discussions about a certain topic, or just have fun meeting and interacting with other users and it will generate very useful information by such discussions and meeting of facebook users . Social Network site and Twitter website have a broad range of users. LinkedIn has positioned itself as a professional networking site profiles include resume information and groups are created to share questions and ideas with group members in similar fields. Unlike traditional personal homepages people in these societies publish not only their personal attributes, but also their relationships with friends. It may cause the privacy violation in social networks. Information privacy is needed for users. Existing techniques are used to prevent direct disclosure of sensitive personal information. Here focus on social network data Social classification and inferring the individuals' private information. More private information is inferred by applying collective classification algorithm.

The system enhance how the online social network data could be used to find sensitive attribute from individual private trait that a user is not wish to disclose (e.g. gender identification, sexual orientation and religion related data).For example in an office people connect to each other because of similar occupations ,similar business and other profession. Therefore it is possible that one may be able to guess someone's attribute from the attributes of his/her friends. In such cases, privacy is indirectly exposed by their social relations rather than from the owner attribute or status. This is called personal information leakage from conclusion attack. [1]

The Purpose of this work is it has been proposed to design a system that show the effect of possible data sanitization approaches on hiding or preventing such sensitive information leakage, while allowing the recipient of the sanitized data to do conclusion on non-private details.

Motivation of the Proposed Approach

Providing specific use of data and individual profile privacy presents an opportunity for privacy preserving social network sites. That is the discovery of information and relationships from social site data without violating privacy .But the problem of sanitizing a user profile of social network to prevent conclusion of social sites data and then examines the effectiveness of those approaches on a user profile data set.

In order to protect privacy, sanitize both details and the underlying link structure of the graph. That is deleting some information from a users profile and remove some links between friends. In many situations the data needs to be published and shared with others. Social networks are online applications that allow their users to connect

by means of various linktypes. As part of their professional network because of users specify details which are related to their professional life. These sites gather extensive personal information, social network application providers have a rare opportunity direct use of this information could be useful to advertisers for direct marketing. In such situation need to prevent conclusion attack by using sanitization technique, sanitize the data set before release to third party.

II. RELATED WORK

Zheleva and Getoor in [9] propose several methods of social graph anonymization, focusing mainly on the idea that by anonymizing both the nodes in the group and the link structure, that one thereby anonymizes the graph as a whole. However, the methods all focus on anonymity in the structure itself. For example, through the use of k-anonymity or t-closeness, depending on the quasi identifiers which are chosen, much of the uniqueness in the data may be lost. Through the method of anonymity preservation, maintain the full uniqueness in each node, which allows more information in the data post release.

J. He et al [4] authors consider perturbing network data in order to preserve privacy. While their method considers graph structure, it ignores any extra details or traits that a node inside the social network may possess.

R. Gross et al [10] Note that authorized subjects are in terms of user relationships rather than by listing specific instances (i.e., person ids). However, in that work policy propagation is not possible, since no hierarchies are over resources, relationships and actions.

Gross et al.[10] examine specific usage instances at Carnegie Mellon.Note potential attacks, such as node reiden-tification or stalking, that easily accessible data on Facebook could follow with. and further note that while privacy controls may exist on the users profile end of the social networking site, many individual profiles do not take advantage of this system. This finding coincides very well with the amount of data that able to crawl using a very simple HTML crawler on a Facebook network. However, need to extend on work by experimentally examining the accuracy of some types of the demographic reidentification and classification that propose before and after sanitization.

J. Yedidia et al.[11] compare various methods of link based classification including loopy belief propagation, mean field relaxation labeling, and iterative classification. However, their comparisons do not used for prevent link based classification. Belief propagation as a means of classification is presented.

Hay et al.[4] consider various methods for anonymizing social networks data. However,the work fo- cuses on inferring details attribute of nodes in the network, not individually identifying individuals as single profile attribute instead of this it infer the more than one attribute .

He et al. [4] consider methods to infer sensitive or private information via friendship links by creating a network by using Bayesian classifier from the links inside a social net- work.While the data crawl a real social network, LiveJournal, use hypothetical attributes to analyze learning algorithm [4].

Raymond Heatherly,et al[1] the work is based on the user profile information of social network instead hiding personal detail publish all detail but at the time of data release sanitize that data set means remove some sensitive attribute. Before handover that data set to third party for some advertise purpose it should converted into some encrypted format and release it to third party.

III. OVERVIEW OF OUR APPROACH

The system architecture of sanitization method of user profile information is show the detailed work flow of system is as shown in figure 1, how could be gather information of users profile. In that it is important to note that for any detail type, the expected response can either be single or multivalued, and that a user has the option of listing no detail values for any given detail. For example, consider user profile data as home town and activities detail type. A user can only have one home town, but can list multiple activities (for instance, soccer, reading, video games). However, a user also has the option of listing no detail values for these. For example the detail value of video games for the detail type activities will be listed as (activities, video games), to distinguish it from other details that may have the same detail value, such as (groups, video games). Further even if a user lists multiple activities, data can store each independently in a detail with the corresponding detail name. That is a user who enters jogging and swimming as his favorite activities will have the corresponding details favorite activity, jogging and favorite activity, swimming.

The Naive Bays classifier classify the user profile data into specified classes by using Nave Bayes classifier, Naive Bayes classifier improves the accuracy of classification. Classification is occurs on the basis of node and detail information of user profile data.

Details of user profile can be manipulated in some ways: As adding details to nodes of social network, modifying existing details by some modification and removing details from nodes. However here details or link information modification can be categorize by classifier into two categories: perturbation for adding something and anonymization for removing some at- tributes. Adding and modifying details can both be considered methods of perturbation-that is introducing various types of ”noise” into D to decrease classification accuracies. Removing node however it can be considered an anonymization method. After removal of sensitive information it provide

the sanitized dataset for further encryption technique which convert the sanitize dataset into encrypted format for privacy concern.

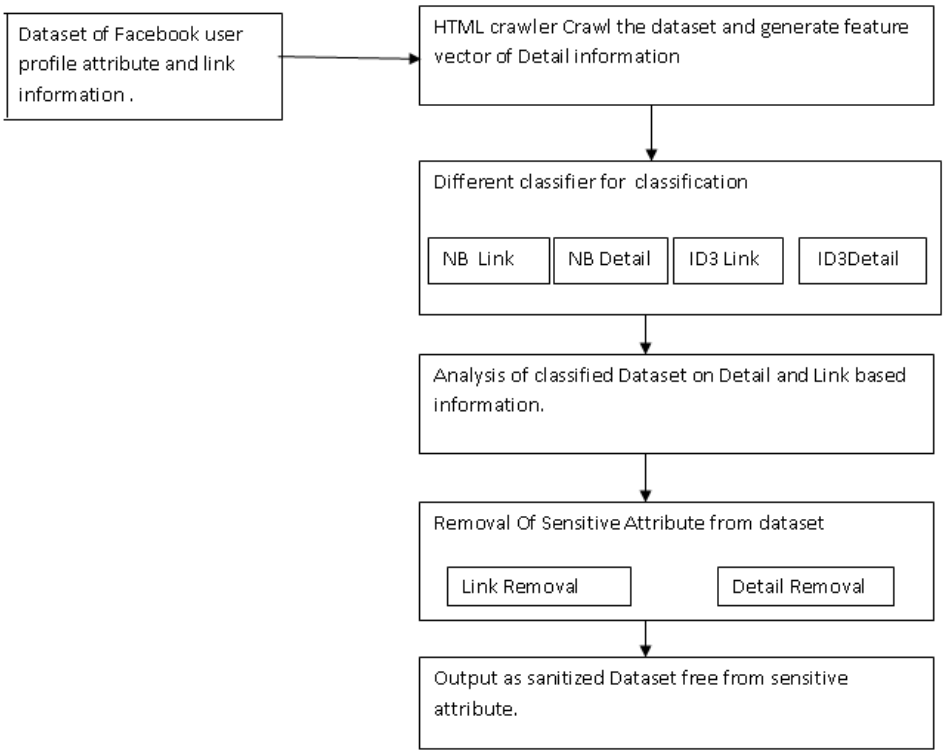

Fig. 1. System architecture of sanitization of user profile data

Naive Bays classifier is used to classify the large number user profile data according to detail and link information of user profile information.Initially friends often share common attributes (e.g. hobbies and professions). Thus, it is possible to predict someone's attributes by looking at the category of friends as their common attributes whatever he/she has. In the real world people are connected with each other via all types of relations, and a personal attribute may only be sensitive to certain types of relations like gender, and sexual orientation. For example, in order to predict someone's age,it is more appropriate to consider the ages of his/her classmates or officemates. Therefore to infer people's privacy from social relations, one must be able to filter out other types of relations between two connected people on social sites.

To solve this problem here find out the privacy conclusion in homogeneous societies where individuals are connected by a single type of social relations as heterosexual and homosexual and the impact of every person on his/her friends is the same. Homogenous societies reflect small closely related groups (such as offices, classes or clubs), where people are connected by a relatively pure kind of relationship. Real social networks can be always as the combinations of many homogeneous societies.

Determining an individual's political affiliation ,gender identification ,sexual orientation are an exercise in graph classification. Given a user node ni with m details of user profile and p potential classification labels (C1; . .. ; Cp, Cix) the probability of ni comes in class Cx, is given by the equation.[1]

$$argmax\ 1 \le x \le p \frac{\mathrm{P}(\mathrm{C}_\mathrm{x}^\mathrm{i}) * P(D_i^1 | C_x^i) * \ldots\ldots * P(D_i^m | C_x^i)}{\mathrm{P}(\mathrm{D}_\mathrm{i}^1, \ldots\ldots\ldots, \mathrm{D}_\mathrm{i}^\mathrm{m})} \quad (1)$$

To perform conclusion use Bayesian networks to show the causal relation in social networks. Specifically, if want to conclude the value of attribute A for a person (referred to as query node X), first construct a Bayesian network from some social network, and then analyse the Bayesian network to achieve the probability that X has attribute A.

However, that P(Di1 ;...Dim) is equivalent for all values of Cxi . That is, because the probability of seeing any particular detail without consideration of any particular class x is equivalent for all x. Thus, here need only compare to determine a new class label for ni.[1]

$$argmax\ 1 \le x \le p\ [P(C_x^i) * P(D_i^1 \big| C_x^i) * P(D_i^m | C_x^i) \quad (2)$$

A. Maintaining the Integrity of the Specifications

ID3 is a simple decision tree erudition algorithm developed by Ross Quinlan (1983) [4]. The basic idea of ID3 algorithm is to create a decision tree of given set, by using top-down greedy search to check each attribute at every tree node. To select the most useful attribute using classification technique, here present a metric information gain and to catch an optimal way to classify an erudite set.The information gain metric is such a function that we can use for efficient balanced splitting. In direction to define information gain exactly, we need to deliberate entropy. First, let's assume that the resulting decision tree classifies instance into two classes without loss of simplification and we would call them P (positive) and N (negative). Given set S, containing these positive and negative targets, the entropy of S related to this Boolean classification is:

Entropy(S) =-P (positive) log2P (positive) - P (negative) log2P (negative) (3)

P (positive): proportion of positive examples in S P (negative): proportion of negative examples in S

B. Link Classification

Collective inference is a method of classifying social net- work data using a mixture of node details and connecting links in the social graph. The classifiers consists of three components: a local classifier, a relational classifier, and a collective inference algorithm.

C. Local classifier

Local classifiers is a learning method that is applied in the initial step of collective inference. Naive bayes algorithm is used as a local classifier. This classifier construct a model based on the details of nodes in the training set, apply this model to nodes.

D. Relational classifier

The relational classifier is a separate method of learning algorithm that consider the link structure of the graph, and uses the labels of nodes of user profile in the training set to build a model which it uses to classify the nodes in the test set.. Four relational classifiers: class-distribution re- lational neighbor (cdRN), weighted-vote relational neighbor (wvRN),network-only Bayes classifier (nBC), and network- only link-based classification (nLB).

E. Hiding Private Information

To be able to formalize a privacy definition with user profile dataset, Here need to address two issues with respect to an conclusion attack. First, need to have some understanding of the potential prior information (i.e., background knowledge) the adversary can use to launch an conclusion attack. For example, if an adversary already knows all the hidden and unhidden private information related to the social network, it will be useless to try to protect against such an adversary. Second, need to analyze the potential success of conclusion attack given the adversary's background information. For example, if the adversary has only the disclosed social network data, what is the best classifier he can build to predict sexual orientation?

F. Manipulating Details

Details attribute of profile can be manipulated by three ways: adding details to user nodes, modifying existing details attribute and removing details from nodes attribute. Here details can classify these three methods into two categories: perturbation for adding manipulation details and anonymization means deleting some details. Adding and modifying details can both be considered methods of perturbation that is, introducing various types of "noise" into Details attribute to decrease classification accuracies.

G. Choosing Details

Now choose which details to remove. The choice is guided by the following definition is used for finding high probabil- ity details to remove which improve classification accuracy. Definition: Given G and a nonzero set of sensitive details I, determine the set of details D'I ε D, where G' = (V, E, D- D') has the most reduction in classification accuracy for some set of classifiers C on the sensitive attributes I for the given number of removals m.

Assume a person, ni, has the class value C2 out of the set of classes C, and this person has public details Di.[1]

$$argmax\ 1 \le x \le p\ [P\left(C_y^i\right) * P\left(D_i^1 \middle| C_y^i\right) * P(D_i^m | C_y^i) \quad (4)$$

This allows to find the single detail that is the most highly indicative of a class and remove it.

H. Manipulating link information

The other option for anonymizing social networks is altering links. Unlike details, there are only two methods of altering the link structure: adding or removing links. Assume that there are two possible classes for a node, and the true class is C1. Remove the links that increase the likelihood of the node being in class C1. Here consider that the define a node to be in class C2 if β (i) is positive.[1]

$$\beta(i) = P\left(C_{2,}N_i\right) - P\left(C_{1,}N_i\right) \quad (5)$$

β (i) as the new value for above equation if the friendship link remove Fi,j. here need to compute β j(i)as

β(i) and Z are constants for all βj(i) the best choice for i that maximizes ,β(i)becomes one that maximizes[1]

$$Mi = (p(p(c2|Fi,j) - p(C1|Fi,j)) * Wi,j) \quad (6)$$

IV. IMPLEMENTATION STRATEGY

A. Dataset

Input for system is Users profile information of social network and Network consisting of only nodes and edges Detail values of nodes i.e user profile details are provided as input to this Naive bays classification.The facebook dataset is extract by log in to user accounts and download their profiles as .html files. Now apply html parser to that parses HTML files and collects attribute values of user profiles and store the results in database.

B. Result analysis

System Output is the data of user profile information those data is in well classified manner. Those data are ready to release to the third party for their advertising purpose .The user profile data set is without sensitive attribute means the release data set is does not contain sensitive attribute so conclusion attacks are prohibited. The effect of removing details and links in preventing sensitive information leakage.

C. Result of classifier accuracy

Bayesian classification provides practical learning algorithms and prior knowledge and observed data can be combined. It provides a useful perspective for understanding and evaluating many learning algorithms. And also calculates explicit proba- bilities for hypothesis and it is robust to noise in input data. Bayesian reasoning is particularly suited when the dimension- ality of the inputs is high. It is applied to decision making and inferential statistics that deals with probability inference, used to predict future events. It requires a small amount of training data to estimate the parameters is the advantage.After giving the facebook dataset from crawler to the classifier as Naive Bays classifier and ID3 classifier that classifier calculate the classification accuracy before any alternation to the dataset. This classification accuracy metric changes is showing the efficiency of this system.

ID3 Algorithm is good at dealing with categorical attributes. When dealing with the multiple attributes in the decision tree, then the split point for the decision tree is going to be computed using the measure from information theory called Information Gain, which is known as an attribute selection method for the ID3 algorithm. Here calculate the accuracy by different algorithms of classification and first calculate the accuracy of correct classified dataset by both algorithm is about 83% accuracy of correct classification of dataset.The classifier accuracy are reduces after removing the sensitive attribute its about 53%.This classification on the basis of gender ,relationship status and friendship link information of the facebook profile data.

sensitive attribute details Here the dataset is collected from facebook users profile the information about their basic contact information. This information contains the attribute as Interest in field as interest in men ,women and both and marital status of the user as is that person is married ,single, in relationship ,engaged ,and last detail about their gender information as male or female. The following table is contain the information about the details of 11 users profile of facebook. In table ”0” means the value of that detail is Null, ”1” means value is pos- itive of that details.Gender ”1” indicate Male and ”2”indicate female.

Load Data : LOAD!! IN : Interested In RS: RelationShip Status : Gender : Men-1 Women-2

Node-Name	IN-MEN	IN-Women	IN-MW	RS-Single	RS-In RS	RS-Engagred	RS-Married	RS-Complicated	RS-OPen	Gender
1	1	0	0	1	0	0	0	0	0	2
2	0	1	0	1	0	0	0	0	0	1
3	0	1	0	0	0	0	1	0	0	1
4	0	0	1	1	0	0	0	0	0	1
5	0	1	0	1	0	0	0	0	0	1
6	0	0	1	1	0	0	0	0	0	2
7	1	0	0	1	0	0	0	0	0	2
8	0	1	0	1	0	0	0	0	0	1
9	1	0	0	0	0	0	0	1	0	2

Fig. 2. Vector generation of Dataset

Here test some user data by classifier in the two cases first case check the correctness of classified dataset before any changes occurs to dataset ,and In second case check the correctness after removal of some attribute from dataset.The accuracy of different classifier shown in following figure.

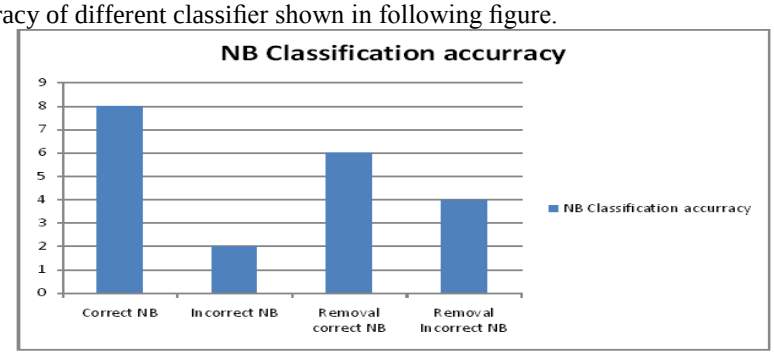

Fig.3 Naïve Bays Classifier Accuracy

In above first graph show the Naive Bays classifier accuracy after remove the some sensitive attribute or deleting some sensitive link information from dataset.Graph contains the correct classified accuracy 83 %before any manipulation on dataset ,after removal sensitive attribute the accuracy is reduce upto 53%. In above second graph show the ID3 classifier accuracy after remove the some sensitive attribute or deleting some sensitive link information from dataset.Graph contains the correct classified accuracy 80 %before any manipulation on dataset ,after removal sensitive attribute the accuracy is reduce upto 40%.So it is very helpful for preventing inference attack on dataset.

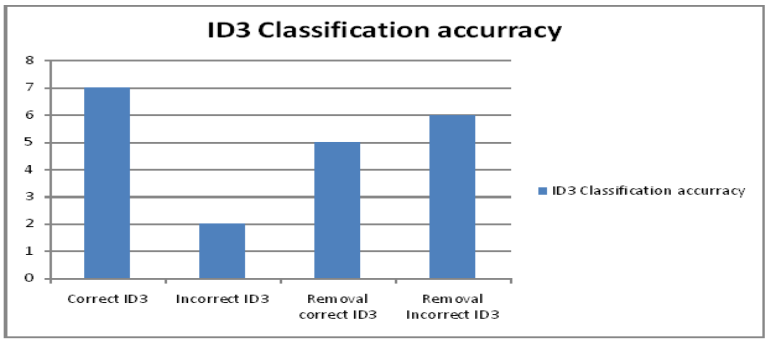

Fig. 4. ID3 Classifier Accuracy

V. CONCLUSION AND FUTURE WORK

The System is use for preventing conclusion attack on user profile data of social network. The proposed system is using both friendship links and details together gives better predictability than details alone. In addition implement the effect of removing details and links in preventing sensitive information leakage. Here show that each of these methods provides a measure of privacy guarantee for users within the network, but can also be used by third parties for classification on non-sensitive attributes. In future the system can extended for prevent private information conclusion attack is by providing user profile information to third party in encrypted format for maintaining privacy for user profile data.

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Rural Industrialisation through Rural Entrepreneurship

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Abstract*: The development of the Indian economy largely depends on the development of rural areas and the standard of living of its rural people .Economic development can only happen when there is a large scale rise in the development of rural areas. Rural entrepreneurs lack a huge problem of education, shortage of finance, marketing ideas and lack of technology in those areas which is the major cause for lack of development in Rural Entrepreneurship .But now various social based institutions have taken huge initiative in the development of rural Entrepreneurs. Through these ways these entrepreneurs can use scarce resources to its maximum utilization and produce various products. Promotion of rural entrepreneurship is a key to develop rural areas and remote towns. This paper focuses on the developments happening within the rural sectors which inversely lead to a rise in rural entrepreneurship. Suitable case studies have been included within the study.*
Key Words*: Entrepreneurs, Rural entrepreneurs, Rural Industrialisation*

I. Introduction

India has a population of around 1.22 billion out of which .854 billion people live in rural areas and .366 billion people live in urban areas .According to this census 70 percent of total population belonging to rural area among which less than 17 percent are have been exposed to rural entrepreneurship.

As we compare the Northern & Southern regions of India, the southern rural areas (especially in Kerala) are yet to acquire rural entrepreneurship in a fully fledged manner.

Entrepreneurship that arises in village levels can take place in various sectors such as business industry, agricultural, traditional handicraft industries etc. that promotes and contributes to economic development of the country as a whole.

According to the Khadhi and Village Industries Commission (KVIC) " Village industry or rural industry means any industry located in rural area, population of which does not exceed 10000 or any other similar figure which produces goods or power where the fixed capital investment or head of an artisan or worker does not exceed a thousand rupees."

Thus by relying on the above concept, the researcher has examples such as Peruvamba in Palakkad Dist. and Kuttampuzha in Ernakulum Dist. to bring insights for development of rural Entrepreneurship within the state of Kerala.

Among the traditional instruments manufactured in Peruvamba, Palakkad, the chenda, Dakka, Edakka etc. produces a percussion sound that attracts people; for example Panchavadhyam, a well known cultural event, inevitably performed by a group during the extravagant festival of Thrissur Pooram includes all the aforementioned instruments. As mentioned earlier, this instrument has been produced in a rural area of Kerala in a small scale.

Besides this, the research also concentrates on utilization of green building materials such as "Bamboo" which is most commonly available in kuttampuzha, the local village in Ernakulum district. Bamboo based entrepreneurship also act as a solution to environmental problems which is indeed an apt example of the proverb "think globally and act locally".

Rural entrepreneurship also provides activities which are eco friendly in nature, moreover keeping the old tradition in the verge of not being extinct.

II. Importance of the study

The rural entrepreneurship is of enormous significance for the development of rural industries in state like Kerala. The vital importance of the rural industrialisation in improving the income of people and generating employment in rural areas has been accepted. So rural industrialization becomes all the more significant in view of the fact that the percentage share of contribution to GDP and the percentage of population engaged in this sector have been plummeting all over the world. The southern region of India, Kerala cannot deviate from this trend. This study tries to guide the entrepreneurs in identifying entrepreneurial opportunities, by suggesting two of the local villages in Kerala and assisting them, in order to start new entrepreneurial ventures in the state of Kerala.

III. Scope of the Study

The scope of the study confined to the areas of Peruvamba in Palakkad district and Kuttampuzha in Ernakulam district, bring insights for development of rural Entrepreneurship within the state of Kerala.

In the case of Peruvamba in Palakkad district, which is well known for production of various traditional instruments like Chenda, Dakka, Edakka etc. are commonly used in various cultural events and festivals all across Kerala. These instruments have been produced in the rural area of Kerala in a small scale, so in order to contribute to the progress of the rural industrialisation it is required to encourage the mass production of these instruments by spreading rural entrepreneurship.

The entrepreneurs are not born they can be originated through providing proper education, training and experience. So the Bamboo based entrepreneurial development in the Kuttampuzha Panchayath promotes the process of rural development in this local village, and it enhance the Potential economically viable Rural enterprises which can utilize this Green Building Materials in a more better way.

The study further emphasises the need to develop rural entrepreneurs to achieve rural development through rural industrialisation.

IV. Methodology

The study is mainly based on case studies within the rural local areas of Palakkad and Ernakulam. This research concentrates on the lifestyle of people who persue this type of Rural Entrepreneurship and have a mentality to keep the traditional business alive for a long time.

V. Findings and Analysis

CASE STUDY-1

The first study is about the rural entrepreneurship in Palakkad. Here the study have concentrated on traditional instruments that are mainly used for festivals in the southern part of India.

Initially, the two producers for traditional instruments within Palakkad are Mr. P. Rajan and Mr. Paramashwaran (otherwise known as Kannan).

They have been supported by NABARD (National Bank for Agriculture and Rural Development), which contains over 74 members in Palakkad District. They have allotted around 10 lakh rupees to aid their business. The government have also provided Health cards and workshops in addition to the financial aid.

Mr. P. Rajan is well known for making traditional instruments, mainly Mridangam. He has inherited the skill from his older generations, starting from his great grandfather. During his childhood, he had no financial support for education and hence had no choice other than to continue with their ancestral profession. When asked about his job satisfaction, Rajan replied “We are proud of our job since it uniquely helps us save our tradition like no other profession”.

Fortunately, the two have various plans for expansion as NABARD (National Bank for Agriculture and Rural Development) have agreed to fund their business and run as a group and keeping their traditions alive for a long time.

Talking about their product, the ‘Mridangam’ is a percussion instrument from India of ancient origin. It is the primary rhythmic accompaniment in a Carnatic music ensemble. Alternate spellings include "mrudangam", "mrdangam", "mritangam" and "miruthangam in Tamil". The mridangam is also played in Carnatic concerts in countries outside of India, including Sri Lanka, Singapore, Malaysia, Australia, United Kingdom, Canada, and the United States. During a percussion ensemble, the mridangam is often accompanied by the ghatam, kanjira, and the morsing. The mridangam is nicknamed as the "King of Percussion".

The artisans have huge sales for their product. The cost they incur for making the instrument is Rs.7000 for the teak wood and Rs.3000 for the skin of buffalo and goat which will lead to total cost of around Rs. 10,000 for a pair of mridangams. Thereafter, they sell the finished product at a price of Rs.11, 000 where Rajan prioritizes customer satisfaction and minimal financial profit.

The personals required for this type of business is limited to two and not more where they should have ample experience and skill in order to retard chances of aberration in the authentic sound of the instrument which may occur due to minor flaws in manufacturing.

Mr.Parameshwaran on the other hand is well known for making 'chenda' and sticks which is a cylindrical percussion instrument used widely in the state of Kerala for various festivals. . This business was started by his father and then followed by his brother. After the demise of his brother, Mr.Parameshwaran was forced to continue this profession. Additionally, he said that he would continue with his profession until the passion for these percussion instruments ends".

As far as the raw materials are concerned, they use purely natural materials, such as buffalo and goat skins, rice and teak wood and absolutely no machines for their production.

The cost that he incurs is around Rs. 400 per pair and the price at which he sells is Rs.600, which would well explain his minimal profit.

CASE STUDY-2

The research also concentrates on utilization of green building material "Bamboo", which is most commonly available in Kuttampuzha, a local village in Ernakulam district. This study on bamboo reeds and its entrepreneurial utilisation extremely points towards quality reeds utilisation, which is commonly found in Kuttampuzha Panchayath.

The people who belong to various rural communities in Kuttampuzha panchayath mainly engage themselves in bamboo based life style. To meet the necessities and needs, the people belonging to these communities try to produce various handicrafts and other related products by using bamboo. Even though there is a greater availability of this green building material and well educated young generation, people are yet to show the entrepreneurial potential for the up growth of this business. For the optimum utilisation of this material, an entrepreneurial development in Kuttampuzha panchayath is absolutely essential.

Bamboo industry belongs to the traditional rural industries of Kerala. Its beginning may be delineated to the time when our forefathers engaged in cultivation of paddy and other food crops thousands of year back. Bamboo industry pioneered with the creation of articles such as murams, mats, baskets made out of reeds are widely used for packing of vegetables, leaves, fish, fruits and many other commodities. Gradually, in due course of time, it adopted the making of various value added products like flattened bamboo board, bamboo flooring files, laminated bamboo ply boards and many others.

Bamboo industry has a separate entity which no other cottage industry has except the coir industry. The industrial contribution of widespread employment opportunities with relatively small volume of investment and focused eco-friendly product make it more attractive. The major participants in bamboo industry comprises of KERALA STATE BAMBOO CORPORATION.LTD (KSBC), ASSAM PLYWOOD, MARINE PLYWOOD, ASSAM MATS. They chiefly engaged in three separate operations such as:-

i) Cutting and collection of reeds from the forest.
ii) Transportation of reeds to the centre of production.
iii) Making of products at factory.

The bamboo reeds are collected from the deep forest of Kuttampuzha by specialised workers from scheduled caste communities and hill tribes. The forest authorities issue passes to the specialised workers for cutting the reeds from the forest. The labourers go deep into the forest, cut the reeds and they bundle it. Thereafter these bundles are negotiated through the Periyar River and its tributaries along the direction of the stream. In Kuttampuzha bamboo corporation (KSBC), the collected bundles are transported to the production areas in Angamaly, Thrissur, Kalady, Malayatoor etc. There have been forty vehicles carrying bamboo to the aforementioned places per month. The bamboos are then converted into variety mats, which are used as an input for producing ply woods and furniture. These mats have been used by the Cinema industry substantially for creating artificial location and to display advertisements.

Nowadays eco-friendly value added products have greater demand, so the call for this bamboo products and bamboo based entrepreneurship is not much longer. It acts as a solution to environmental problems and is an apt example of the renowned proverb "think globally and act locally".

VI. Conclusion

The major conclusion asserted from both the entrepreneurs is that they are satisfied with the job in spite of their minimal financial profit and so are their customers. Whereas the bamboo based enterprises being labour intensive serve, will generate employment, regular income and support and uplift the weaver sections of the society. Rural industrialisation through rural entrepreneurship is one of the most desirable ways of pursuing the

process of rural development. Hence, both of these Panchayaths necessitates the process of rural development in local village.

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Two case Studies on constraints faced by property developers in Mauritius

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Abstract*: One of the major problems encountered by property developers in Mauritius include the funding of particular projects in hand and ensuring that the projects attain successful completion in scope and time. Consequently, the island has witnessed some major projects either never reaching completion or experiencing a very slow progress of works. This paper attempts through the selection of two case studies, to describe the limitations or constraints observed by identified property developers in the construction industry for residential development. While financial and marketing constraints were common and serious for the two case studies; economic, physical and planning constraints have also been observed.*
Keywords*: Limitations, constraints, property developers, residential projects, case studies*

I. Introduction

Indeed any project that has not reached completion or witnesses very slow problems imparts major problems to the various stakeholders concerned. Some property developers in Mauritius have recently encountered serious constraints that have influenced the smooth progress or even have resulted in the non- completion of their respective progress. Nathan S. Collier, Courtl and A. Collier and Don A. Halperin., (2008), state that the developer's knowledge of financial markets is essential. He must be aware of the sources capable of funding the type of projects being worked on. They also added that if visions of development projects are to become realities, the successful investor or developer must find reliable sources of funding. In Mauritius the most important source of finance is the commercial banks. However, such banks are reluctant to lend for purely speculative development because of the high risk involved. They prefer low risk pre-let or pre-sold development; and stick to lending criteria such as repayment capacity, size of companies, nature and size of development, length of loan, security offered, the assets of the companies and their cash flows and finally, the location of the development, prime locations being preferred to less important ones. The viability of projects and the need for rental income to cover interest payments weigh heavily in the scales. But the authors do not consider the various constraints that developers face apart from certain disadvantages. Rughooputh et al., 2014, comment on the various constraints faced by property developers in the funding of residential property development in Mauritius. Among the main limitations faced and discussed, financial and marketing constraints were further elaborated and found to be more critical. Marketing tactics are dealt with extensively by Bevan (1991). He analyses every possible tactic that relates to the property industry. He deals with a wide range of tools used to promote sales of properties like advertising, the use of media which consist of TV, radio, newspapers, magazines, and other forms of media advertising like cinema and posters. Attention is also focused on media events as a promotional tool in the property industry. The role of Chartered Surveyor Weekly which reports on sporting events or the launching of new enterprises is also emphasized. Bevan (1991) does not fail to distinguish between market research and marketing research. The former deals with the size and nature of the market place while the latter looks at the reasons behind demand. This distinction is important since much confusion results in this respect. Inspite of all the details given by Bevan (1991) on marketing of residential property the thirst of the researcher remains unquenched in terms of constraints in marketing apart from the drawbacks of certain marketing techniques.

This paper aims at analysing the main constraints faced by some property developers locally through the selection of two case studies (fictitious names). The objectives were to select two companies that have faced serious defined constraints, identify and analyse these limitations that the developers have faced.

II. Methodology - Case studies

Two uncompleted residential projects in Mauritius were used as case studies in order to identify the sources of finance, financial constraint, marketing strategy and other constraints faced by developers in the island.

II.1 Case Study 1 - *A Construction Ltd*

A Construction Ltd is a property developer specializing in the construction of residential complexes for the middle income bracket which has now gone under administration. It successfully completed two residential projects. The property developer has been facing financial difficulties and around seven of the twelve residential

projects it undertook have been left uncompleted with only skeleton structures standing on land. This property developer did not play an active role internationally except that in 2008 it was in partnership with a South African firm, which was entrusted with the marketing of flats. But this partnership no longer exists.

II.2 Case Study 1 – *B Construction Ltd*

B Construction Ltd launched one of the biggest and most prestigious residential projects consisting of luxury apartments. Construction has stalled and out of five towers only three structures have been erected and left unattended for over 6 months. The project started in 2012 comprising 250 luxury apartments with prices ranging from Million Mauritian Rupees (MUR) to 5 Million MUR, per finished unit. The project was valued at 1.8 Billion MUR with an additional 1.5 Billion MUR development in terms of commercial facilities attached to the original project. Since July 2014, this company has also gone under administration. The chairman of the same company is a renowned property developer and an award winning architect. The project (in plan) has received various Design and Development awards and received in 2012 two other recognitions, the International Star for Leadership in Paris and the International Diamond Prize by the European Society for Quality Research in Rome.

III. Analysis

III.1 Case Study 1 - *A Construction Ltd*

The main constraints faced by *A Construction Ltd* are summarised below.

III.1.1 Financial constraints

(a) Reluctance of banks to finance

As the company sold its flats 'on plan', that is, before construction had even started, the banks which were the main source of funding refused to lend to such a company. Banks are usually unwilling to lend to companies which either do not have assets or have insufficient assets as security. Thus the developer relied wholly on the payments made by clients who had to make a reservation deposit of 25% of the total amount. Further payments were made accordingly as construction proceeded.

(b) Clients' failure to pay

A Construction Ltd had started site clearance after 60% of reservations had been made. But as work proceeded a number of clients failed to pay on time thus creating a shortage of funds for further works. The only way out for the company was to borrow from banks through limited overdraft facilities at an exorbitant rate (18-19%). At a certain construction stage the bank became flexible in giving loans.

III.1.2 Marketing constraints resulting in lower sales of apartments

The Marketing manager of A Construction Ltd operating under the name of A Marketing highlighted the following constraints in the disposal of his flats which in turn resulted in lack of funds to reinvest in the development.

(a) High marketing costs

The manager allocated huge financial resources to modern means of advertisement. He complained about the high costs of advertising on TV, radio and the press. He expressed the view that he was in favour of government intervention to regulate advertising costs so as to boost up property sales. The company spent fifty thousand rupees monthly on advertising and admitted that it was not sufficient to promote sales in the property market.

(b) Cut throat competition in the property market

The Manager was of the view that cut throat competition was prevailing in the buoyant property market. The supply of flats increased as more and more developers turned towards such a market. The company lowered its price of flats so as to compete out other developers. This price cutting policy paid handsome dividends but the situation was complicated by late payments by clients.

III.1.3 Other constraints

In addition to funding constraints faced by A Construction Ltd, other constraints were also noted as summarised below:

(a) Economic constraint

- 2 acres of land were brought for the project at a price of 40 Million MUR. This was indeed a high price when compared to the Open Market Value of comparable properties in the area.
- Scarcity of skilled labour- This resulted in attracting skilled labour from competing firms at a higher cost.
- The prices of building materials skyrocketed.

(b) Physical constraint

- The existence of wetlands- Wetlands were governed by stringent law. The first site chosen by A Construction for the project was not suitable and had to be given up in favour of the current one because it would have caused great damage to the ecosystem.
- The construction company further experienced much hardship due to the rocky nature of the land. An increase in both costs and time taken occurred thus causing considerable delay in keeping within the time frame.

(c) Planning (Legal) constraint

In Mauritius, stringent guidelines for a Building and Land permit and other planning requirements need to be satisfied. Not much could be done about that. The District Council took too much time to deliver building permits for huge projects. Delay beyond limit was an impediment and resulted in higher costs.

III.1.4 Summary

The main findings from Case Study 1 – A Construction Ltd are as follows:

- Banks were reluctant to finance a development where sales were on an 'on plan' basis because of the high risk profile of the project.
- Clients' failure to pay once construction had started resulted in an inability on the part of the developer to complete the project on time.
- Prices of building materials increased significantly during the construction period which was scheduled for 2 years thus causing an increase in expenditure on materials.

III.2 Case Study 2 - B Construction Ltd

The main constraints faced by *A Construction Ltd* are summarised below.

III.2.1 Funding process

(a) Commercial banks

Reservations for flats were taken before construction had started. Commercial banks did not have any issues with financing the purchase of flats by their customers as payments were made in instalments depending on the stage of construction. Furthermore, the project enjoyed a good reputation as it had recently completed a big project successfully.

(b) Stock Exchange of Mauritius

Funds were also generated through the sale of shares on the SEM. According to information available at the registrar of companies (verbal communication), in October 2012, the company changed ownership, split at 41.6% each between D Investments Ltd and E Properties Ltd. The remaining 16.8% was floated on the SEM to attract capital into the project.

III.2.2 Financial Constraints

(a) High expectations on returns

The first problem was that the developers oversold the project to potential investors and customers. Investors were promised rich returns and according to documents presented by the company; these investors were told that profits of the company would jump by over 42% a year between 2012 and 2015. In 2012 (verbal communication), for instance, when profits of 64 Million MUR were promised, the company made only 51 Million MUR and in 2013 instead of the 109.4 Million promised MUR, a profit of only 32 Million MUR was reaped. These differences among figures floated by the company and the profit projections led to the suspension of the company from the Stock Exchange.

(b) A major contraction in demand

According to the developers, there was a major contraction in demand which led to sales falling drastically thereby generating a shortage of funds to complete the project. As funds were needed to complete the construction and since the company was suspended from the SEM, a fall in sales of units complicated matters and a lack of revenue resulted in construction being stopped. Sales of apartment stopped at 108 out of 250 units.

(c) A reduction in the ability of commercial banks to finance the purchase of flats in the project.

Commercial banks were no longer willing to finance their clients' purchase of flats in this project. As the construction did not progress at a reasonable pace and with all the problems encountered by the developers, doubts about the viability of the project were amplified. Clients who had paid first and second instalments could not obtain additional funds from their banks for the completion of their units. According to figures supplied by the company itself (verbal communication), 84.9 Million MUR were received in deposits and with all the instalments paid for the 108 units sold, this figure rose to up to 300 Million MUR.

III.2.3 Summary

The main findings from Case Study 2 – B Construction Ltd are as follows:

- There was a major contraction in demand for apartments which led to a drastic fall in revenue thus reducing the cash flow of the company and making it difficult to repay its creditors.
- Commercial banks were reluctant to finance their client's acquisitions of apartments when it became obvious that the company would default and construction was not progressing at a reasonable pace
- The developer oversold the project to investors promising wild returns on the Stock Exchange of Mauritius. When these high expectations were not met, SEM suspended the company therefore further exacerbating their financial condition.

IV. Conclusions

The research attempts to identify constraints faced by the residential property developers. The philosophy behind it is to produce something that has rarely been dealt with in the country by professionals in the field. In this connection two case studies in Mauritius were selected, analysed and reported. Evidence shows that the

Mauritian property developer faces numerous constraints. Among the identified limitations were those of financial and economic, marketing; as well as legal (planning) and legal ones. Moreover, client's inability to pay for their already reserved apartments is another constraint the developers face. Some developers thrust the blame on the economic crisis. Others believe that an oversupply of apartments and housing units in residential complexes over the last 5 years is the cause of failure for new projects. Hence in light of the study, it is expected that similar works be conducted to substantiate the need to encourage major residential projects in the island.

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EMOTIONAL INTELLIGENCE - AN IMPORTANT CONTRIVANCE FOR INNOVATION

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Abstract: *In the corporate world, emotional intelligence is crucial, especially for the innovative purposes, where there is a need of continuing relationships and feedbacks between the superiors and subordinates. Organizations should consider emotional intelligence as a vital tool to improve the innovative climate which in turn derives optimal performance and high return on investment (ROI). In this paper, the application of Emotional Intelligence skills and concepts at the work place is discussed to make the innovations meaningful and successful for individuals and organizations, which will generate a positive work environment.*

Key words: *Emotional Intelligence; innovation; organizational climate; relationship management; work culture*

I. Introduction

"Innovation need people and better the people, better the innovation"

With the increasing competition in all the sectors due to globalization and privatization, it is imperative for organizations to bring about innovations and focus on innovative processes. The innovation is the need of the hour in view of continuous changes taking place all around. It can be an innovation of a product or process or business practice, but the innovation cannot be achieved by theory. People have to break the inertia, give respect to the innovative ideas and be prepared to take risks within reasonable limits after providing resources. On the part of all concerned, there is a need for in depth knowledge on the subject; one is dealing, either with a person, or knowing where it is available.

Successful businesses are always looking for new ways to do business, finding different solutions for the range of problems, new products and more efficient systems. To stay competitive, it keeps innovation at the top of its business agenda. Thus the study about any concept which will help in successful implementation of innovative methods and processes is very imperative and necessary one at any cost. In this way the study about emotional intelligence principles having high impacts and applications on innovative processes comes to prominence. This paper attempts to study the role of Emotional Intelligence in an innovative and creative process in organizations and its effectiveness implying thereby that Emotional Intelligence should be an integral part of an organization's overall innovative attempts.

II. Innovation

Innovation refers to novelty in ideas, approaches, methods, processes, structures, behaviors, attitudes and cultures as well as in technologies and skills. It is referred to the process by which an idea or invention is translated into a good or service for which people will pay, or something that results from this process. To be called an innovation, an idea must be replicable at an economical cost and must satisfy a specific need. Innovation involves deliberate application of information, imagination and initiative in deriving greater or different value from resources and encompasses all processes by which new ideas are generated and converted into useful products. In business, innovation often results from the application of a scientific or technical idea in decreasing the gap between the needs or expectations of the customers and the performance of a company's products. In a social context, innovation is equally important in devising new collaborative methods such as alliance creation, joint venturing, and flexible working hours and in creative buyers' purchasing power through methods such as lay away plans for our purposes, management innovation is anything that substantially alerts the way in which the work of management is carried out, or significantly modifies customary organizational forms and by doing so advances organizational goals.

Patterson (2005) argues that creativity and innovation are overlapping constructs, but the main distinction is with regard to novelty. Creativity is exclusively concerned with generating new and entirely original ideas. Innovation is a broader concept as it also encompasses the application of new ideas to produce something new and useful (in the context of groups, organizations or societies). Innovation is often referred to as a process, because implementing new ideas necessarily involves influencing others (whereas creativity could be achieved in isolation).Employee innovation goes beyond individual creativity as it also concerns the extent to which

employees implement and sustain innovations. Further, an innovation could be the application of something familiar in one organization to another unfamiliar organization (i.e., imported innovation).

III. Emotional Intelligence

Emotional Intelligence (EI) is the capacity to recognize our own feelings and those of other for motivating ourselves and for managing emotions well in our relationship. It is the ability to monitor and regulate one's own feelings and use feeling to guide thought and action (Goleman, 1995). EI is the ability to acquire and apply knowledge from our emotions and the emotions of others. We can use the information about what to say or do (or not to say or do). EI is not about being soft! It is a different way of being smart - having the skill to use our emotions to help us make choices in the moment and have more effective control over ourselves and our impact on others.

The discovery of the emotional intelligence and its impact on the interpersonal relationships and human consciousness in the modern times has so far been endorsed to Goleman's Emotional Quotient (EQ) model, wherein he propagates the self and its supreme acceptance by the individual mind by making self-awareness, self-assertiveness and self love as the centre piece of all interpersonal relationships be it in the social sphere, the work place or the dealing and living with the people skills.

The concept of EI, defined as "the ability to perceive accurately, appraise and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge and the ability to regulate emotions to promote emotional and intellectual growth" (Mayer & Salovey, 1997), has become very popular in recent years. Some suggest that EI has a positive influence on organizational innovation, both for leaders and individual employees. Specifically, researchers have suggested that employees who show high levels of EI are likely to benefit more from both positive and negative creativity-related feedback (Zhou, 2008). Similarly, leaders' levels of EI are likely to accentuate the employees' inclination to engage in the innovation process (Zhou & George, 2003).

Before we go through various aspects of emotional intelligence, we should understand the meaning of the word of emotion. The word emotion connotes various meanings to various people. Going by the Oxford dictionary, emotion is defined as "any agitation or disturbance of mind, feeling, passion, any vehement or exited mental state" (Baron & Parker, 2000). Emotions vary in accordance with the blends, variations and mutations of the mental state. In such emotional repertoire, each emotion plays a unique role as prompted by their biological tendencies. The bodily response towards the emotional stimuli could be classified into various feelings like anger, fear, happiness, love, surprise, disgust and sadness.

IV. Four Provinces Of Emotional Intelligence

Daniel Goleman (1995), in his book "Emotional Intelligence: why it can matter more than IQ", theorized four domains of emotional intelligence. They are briefed below.

A. Self- Awareness: (Emotional self-awareness, accurate self-assessment and self-confidence)

This is about how aware one is and how accurately he can assess his own emotions. It is the ability to recognize emotions and how they affect thoughts and behaviors. It reflects the importance of recognizing one's own feelings.

B. Self- management: (Emotional self-control, transparency, trustworthiness. adaptability, achievement orientation, initiative, optimism and conscientiousness)

It is the ability to control impulsive feelings and behaviors, manage emotions in healthy ways take initiative, follow through on commitments, and adapt to changing circumstances. It helps in regulating and distressing affects like anxiety and anger and to inhibit emotional impulsivity.

C. Social Awareness: (Empathy, organizational awareness and service orientation)

It is the ability to observe and understand the emotions, needs and concerns of other people, pick up on emotional cues, feel comfortable socially and recognize the power dynamics in a group or organization. It generally encompasses the competency of empathy.

D. Relationship Management: (Inspirational leadership, influence, developing others, change catalyst, conflict management, building bonds, team work, collaboration, communication)

It is the ability to develop and maintain good relationships, communicate clearly, inspire and influence others, work well in a team, and manage conflict. In other words it means having good social skills and being competent in relating to the emotions of others and remaining connected.

V. Role of Emotional Intelligence on innovation

EI is the crucial and key factor in accelerating innovative processes in many organizations. If the superiors and subordinates are trained well in emotional intelligence skills, they can undoubtedly, act as the catalysts of innovations and overcome all difficulties related with it. Emotionally intelligent human resources will be well aware of their emotions and of others and they can control and manage all blends of emotions and feelings. They can develop a positive attitude towards innovation and understand the things in the right perspective. They

can think that the problems are bound to occur and challenges are always there in any job instead of complaining and brooding about unpleasant matters and situations, they will stay calm and will focus on how to handle the deadly situation.

Employees with Emotional Intelligence will always keep smile, enjoy the work and encourage others to do the work better for innovative purposes. EI skills help them to accept criticism in a positive way and support team members whenever there is an innovation opportunity. Though being emotionally intelligent they can manage their work and life at once and maintain a balance between the both. All these positive attitudes and optimistic beliefs lead him finally to the better performance and great success at the workplace. Thus the emotional competencies and motives work as the generator of innovative steps in an organization. By ensuring better relationships at work place brings some changes at culture and climate of workplace, which leads to gregarious innovation practices in the organization.

A. Ensure relationship management

Innovation process produces a range of emotions and feelings in an individual as it brings a certain kind of organizational change that require micro level management. The emotional skills are highly required to successfully manage these organizational changes. As the relationship management domain of EI act as a change catalyst initiating and managing changes it is mostly required in this aspect.

One of the most important characteristics of innovation is knowledge accumulation and it comes from complex and dynamic interactions between the firm's own internal innovation capacity and external expertise. The emotional intelligence is very essential for keeping these interactions healthily and it comes under the relationship management domain of emotional intelligence as described by Daniel Goleman.

B. Culture and climate at innovative workplace

Innovation at the individual, team and organizational level can be affected by the organizational climate and organizational culture. Climate and culture are important antecedents to creativity and innovation to the extent to which risk taking and idea generation are encouraged (Ciarrochi, 2000). Supportive and challenging climates encourage innovation whereas environments characterized by distrust, personal hostilities, limited autonomy and unclear work goals inhibit the implementation of ideas. Organizational support for innovation is characterized by support for members pursuing new ideas, and encouragement of innovation through both words and deeds. The espoused expectations and organizational values in relation to innovation (such as openness to change and willingness to experiment with ideas) are likely to have a major influence on employee behavior, work environments that are influential in promoting innovation. A supportive and stimulating work environment enhances idea generation and innovation. Various other sources contribute to providing a supportive and stimulating work environments including, amongst other; supportive management practices and leadership, constructive evaluation and feedback and supportive and stimulating co-workers.

An organization can build the innovative culture and climate which will lead to the increased employee morale and robust revenues through training its human resources in emotional intelligence skills. All EI domains and principles such as relationship management and social awareness have a direct linkage to the creative and innovative work place culture.

VI. Conclusion

The study finds that EI practices play a positive and significant role in the innovation process. This paper conclude that EI principles are an important part in building a positive and innovative environment inside the organizations helping them to introduce and keep introducing new processes and products into the market. Organizations have to come forward to develop emotional intelligence skills in its employees and train them well on its principles to make its innovative agenda successful.

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Influence of Smartphones on Shoppers Behaviour: An Empirical Study

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Abstract*: Recognizing the importance of technology like smartphones during shoppers purchase journey , this paper reports results from an empirical study that investigates Smartphone's influence on Shoppers before visiting a store and inside store undertaken in organized retail in Delhi. One hundred fifty shoppers' data was attained using a survey questionnaire. Study reveals that before visiting a store majority of shoppers use smartphones to receive discount offers and coupons to redeem them at store followed by barcode scanning to know more about products , receiving promotional SMS ,researching products and locating nearby stores . However while inside store shopper use smartphone to access promotional coupons followed by checking product reviews online, scanning barcode for price comparison with other retailers ,product knowledge ,checking prices on retailer's mobile site, price comparison online ,making an online purchase at other retailer. Based on the findings the research provides retail marketing strategies. Research outcomes encourage retailers to implement technology driven targeted marketing*.

Keywords: *Shopper, Retail, Retail marketing, Behaviour, Technology*.

I. Introduction

Technologies such as smartphones are driving buying behaviour as never before. Technological developments have opened up new opportunities to influence shopper attitudes and behavior [1] .Shoppers are using smartphones for searching products, coupons, price comparisons etc. which is influencing their perception . Technology has given power to both marketer to influence shopper buying cycle and the shoppers who have more control over the access and use of information than ever before. Understanding how a shopper behaves with the smartphone is thus imperative for retailing and manufacturing organizations to affect shopper attitude and behaviour along the shopping cycle. The present paper explores shoppers' Smartphone behaviour in a market like Delhi. Based on the findings it suggests shopper Marketing strategies to retailers and manufacturers.

II. Review of Literature

Researchers have highlighted the use of Smartphone during the buying process [2] observed shoppers' behaviour in traditional and new formats in the city of Ahmedabad. .The research highlighted that Shoppers generally refrain from browsing and getting the touch and feel of the products while buying from the traditional format In most cases they window shop. However in case of the new retail format, they browse and consider several brands before choosing. The findings also revealed that some shoppers make telephone calls to their family members for advice and to obtain "remote approvals [3] mentioned that Shoppers often visit the websites of manufacturers and retailers prior to making purchase decisions. Few researches highlight the usage of smartphone by retailers in offering promotions and other offers and by shoppers for gathering information etc. [4] mentioned that retailers are looking forward to offer real time coupons while shopping. They would offer loyalty cards on smartphones. Even shoppers are comparing prices & scanning information using their smartphones [5] highlighted that US marketers must contend with shoppers who can use their smartphones inside stores to check whether the special promotions are actually special and shoppers can compare prices [6] revealed that promotions inside store targeted to shoppers based on their projected shopping path and delivered via mobile shopping app can increase path length [7] reveled that in US most of cell owners used their phone while inside a store to call a friend or family member for advice about a purchase they were considering followed by look for reviews of a product to help decide if they should purchase it and look for prices of a product, to see if they could get a better price elsewhere.

III. Objectives

The present study has been conducted in organized retail formats in Delhi to accomplish following objectives:

1) To study shoppers' behaviour using smartphones
2) To suggest Retail marketing strategies.

IV. Research Methodology

The methodology involved is as follows:

A. Sampling Element

The study is carried out in Delhi. The shoppers visiting various types of organized retail formats are the targeted respondents. The individual & family visiting for purchase are considered as a sampling unit for the research work

B. Sampling Technique

The study involves non-Probability convenient sampling technique based on judgment of surveyor for the purpose of data collection. Due care is taken to ensure that the sample represents all demographic profiles of the population

C. Sample Size

A sample size of 150 respondents is selected from different organised retail formats.

D. Data Source

Data is collected using both, Primary and Secondary sources. Primary data is collected using a structured questionnaire. Initially a pilot study is conducted to test the reliability, validity and sensitivity of the questionnaire and finally the data is collected by survey method whereby face to face interaction with the respondents are done.

V. Results and Findings

The finding are based on only the most frequent and frequent options chosen by shoppers.

Checking prices has always been core to shoppers' behaviour but smartphones have elevated both access and usage prior to store visits. Smartphone users track store information ,compare prices and source deals .When asked respondents about usage of smartphone for shopping activity before visiting a store majority , thirty four percent of the respondents use smartphone to receive discount offers and coupons to redeem them at store(Figure 1).Thirty one percent respondents use it for QR scanning to know more about products . Twenty eight percent use it receive SMS of retail promotions followed by twenty four percent using it to research about different products and twenty three percent using it to locate a nearby store(Figure 1).

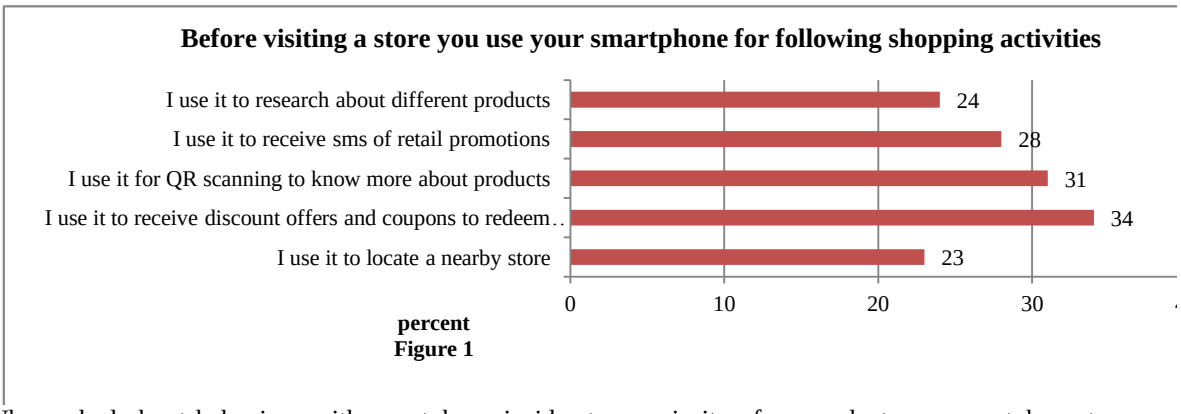

Figure 1

When asked about behaviour with smartphone inside store majority of respondents use smartphone to access promotional coupons to redeem at store (twenty eight percent), check product reviews online (twenty seven percent) , scan barcode code to compare prices with other retailer (twenty seven percent) and product knowledge (twenty six percent). Price comparison was also accorded higher importance as twenty three percent use smartphone to check prices on retailers' mobile site and twenty two percent for checking competitive pricing online (Figure 2).

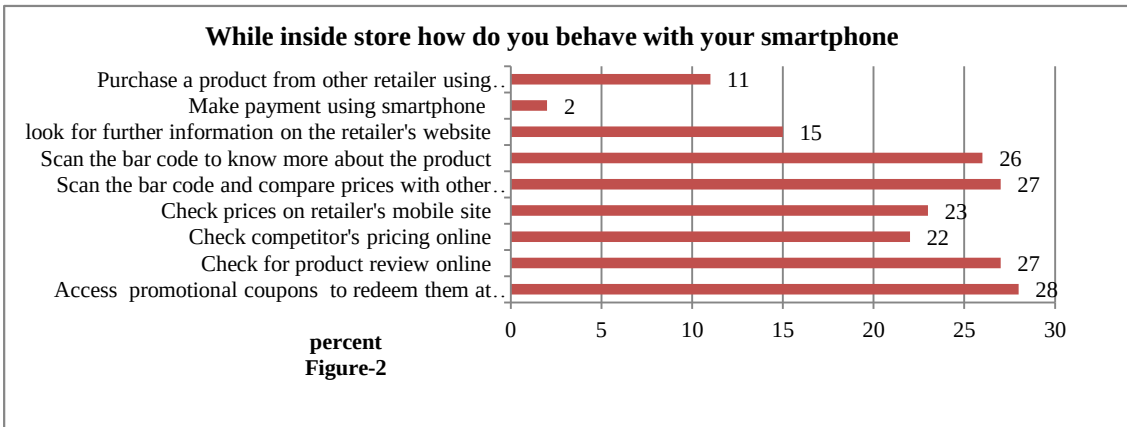

Figure-2

Fifteen percent respondents further search for information on retailer's website while inside store. Few respondents, eleven percent make an online purchase at other retailer having had entire information inside the store. Usage of smartphone for making payment was accorded least importance (Figure 2).

VI. Retail Marketing Strategies

Based on the finding retailers may incorporate following in their marketing strategies:

1) Retailers must think beyond traditional and incorporate mobile commerce to capture shoppers.
2) Retailers must deliver a comprehensive online shopper experience well supported by core elements like search functionality , sufficient product information and imagery
3) Retailers must localize their marketing efforts by connecting shoppers to the retail outlets, introducing coupons and discounts.
4) Price comparison must be facilitated by providing enough information online and otherwise as customer checks for fair pricing
5) Reviews must be integrated into the shopping experience fostering an onsite shopper community

VII. Conclusion

The changing shopping behaviour has shifted the balance of power from the manufacturer to the retailer and is now moving towards the shopper. As a result, both manufacturers and retailers stand to benefit by better understanding how people shop and what really impacts their behaviour at the shelf. The changing technological environment has further changed the entire picture. Consumers are using Smartphones to scan product information, compare prices, receive coupons and other promotions, check reviews thus retailers need to develop their strategies accordingly in order to engage and generate more revenues

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Optimization of Plate Thickness of Air Receiver Tank of Centrifugal Compressor Using Neuro Fuzzy Logic

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Abstract: *Optimization has become a significant area of development, both in research and practice among design engineers. In this paper for optimization of air receiver tank, of reciprocating air compressor, the SLP method is being used. The capacity of tank is considered as optimization constraint. Conventional dimension are utilized as reference. Inequality constraints such as different design stresses for different parts are determined theoretically, experimentally and with the help of ANSYS software. Algorithm is prepared and conventional SLP is done in MATLAB software to get optimized dimension of the air receiver tank. The conventional SLP is modified by fuzzy heuristics and the relevant algorithm is prepared. Fuzzy based SLP is prepared and executed in MATLAB software, corresponding dimension are obtained. Comparing FSLP with SLP it is observed that FSLP is easier in execution. In FSLP starting point is easily accepted while it is cumbersome in case of conventional SLP. It can be observed that the thickness obtained from FSLP is 5% more than suggested by SLP method for crown section. Neuro Fuzzy logic can also be used for SQP which expands the possibilities of Sequential programming for various design optimization problems.*

Keywords: *Fuzzy, SLP, FSLP, Stress, and Optimization*

I. INTRODUCTION

Pressure vessel is a leak proof container and is very common in engineering application as well as in day-to-day life. At every bicycle mart and tyre works one will see an air receiver tank of reciprocating compressor, which is nothing but pressure vessel. Compressed air storage tank at automobile service station, cylinder for LPG, air vessels of pneumatic brakes in automobiles and oxyacetylene tank at welding workshop are a few applications of pressure vessels. In different chemical plants, the containers or vessels of pressurized liquid or gases are also pressure vessels. Generally employing a spiral welding using annular force makes cylindrical pressure vessel. As change in ratio of thickness on layer is accompanied by change in the reinforcement strength. Even small deviation from optimum design parameters can reduce the load carrying capacity of composite structure [9].

II. STRESS ANALYSIS OF AIR RECEIVER TANK

Pressure vessels commonly have the form of spheres, cylinders, ellipsoids or some combinations of these. Based on the ASME code, stresses are categorized into three types with different stress limits

The stress limits change for different service levels. Since these stress limits change for the types of stresses and the service levels, multiple loading conditions should be utilized during an optimization. According to the ASME code, the failure condition can be evaluated by comparing the stress intensity, which was obtained from the stress linearization at the concerned section, with the prescribed one.. The three categories of stresses are primary, secondary, and peak. Primary stresses are load controlled; secondary stresses are displacement controlled; and peak stresses are local in nature. Primary and secondary stresses can be a membrane or a bending.(A) In practice, vessels are usually composed of a complete shell together with flange ring and fastening devices for connecting and securing mating parts. The main purpose is to contain a media under pressure and temperature; however, in doing so they are subjected to the action of steady and dynamic support loading, piping reaction, thermal shocks results in various stresses [18].

A. Comparison of Stress Values

Table 1 Comparison of stress value

Parameter	Theoretical	Expt.	F.E.A.
σ_l	45.11	45. 92	47.68
σ_h	90.23	91.5	91.14
σ_{mcs}	58.49	61. 2	64.14
σ_{cs}	58.49	62.31	64.14
σ_m	58.49	57.5	60.14
σ_c	-134.34	-141.28	-102

Table 1 shows stress values are obtained using Theoretical, Experimental, and Finite Element Analysis Using ANSYS

Circumferential stress on knuckle section of head ($\sigma_{c)}$, Meridional stress on knuckle section of head (σ_m)

Circumferential stress on crown section of head (σ_{cs}), Meridional stress on crown section of head (σ_{mcs})
Circumferential stress on shell (σ_h),Longitudinal stress on shell (σ_l)

III. PROBLEM FORMULATIONS FOR SEQUENTIAL LINEAR PROGRAMMING

Aim of this work is to determine the optimum dimensions of air receiver tank. To workout the same one need to write the expressions for objective function and constraints. For the convenience objective function is considered as the volume of material of air receiver tank of reciprocating compressor.

Objective function is given as,

F (x) = Volume of material of air receiver tank = Volume of material of cylindrical shell + 2(Volume of material of Torispherical head)

Volume of material of Torispherical head = (surface area of knuckle region + surface area of crown region)*(thickness of head)

$F(x) = (\pi (R+ts)^2L - \pi R\text{^}2L) + 2 (2\pi r_c(\beta(R-r_c)/57.3 + r_c \sin \beta)t_h + 2 \pi r_k^2(1-\sin\beta) t_h)$ [10],[18]

where,

R = radius of shell = x_1
L = length of shell = x_2
t_s= thickness of shell = x_3
r_k = knuckle radius of head = x_4
r_c = crown radius of head = x_5
t_h = thickness of head = x_6
r_2 = radius of curvature = x_7
β = angle included by knuckle radius = 3.14/2- angle included by crown radius

where as, $\sin(\Phi) = (R-r_k)/(r_c-r_k) = (x_1-x_4)/(x_5-x_4)$

$= \pi/2 - (x_1/(x_5-x_4) - x_1^2/(6\, x_5(x_5-x_4)) - x_4/(x_5-x_4) + x_1 x_4/(6\, x_5(x_5-x_4))$

The objective function can be written as,

$F(x) = 6.28\, x_1 x_2 x_3 + 3.14\, x_3^2 x_2 + 6.28\, x_4^2 x_6 + .3443\, x_5 x_6 x_1 - .3443\, x_5^2 x_6 - .256\, x_5 x_6 x_1^2/(x_5-x_4) + .0366\, x_6 x_1/(x_5-x_4) + .256\, x_5 x_6 x_1 x_4/(x_5-x_4) - .0366\, x_6 x_4 x_1^2/(x_5-x_4) + .2194\, x_6 x_1 x_5^2/(x_5-x_4) - .2194\, x_6 x_4 x_5^2/(x_5-x_4) + 12.56\, x_5^2 x_6 \cos[(x_1/(x_5-x_4)) - x_1^2/6\, x_5(x_5-x_4) - x_4/(x_5-x_4) + x_1 x_4/(6\, x_5(x_5-x_4))][(x_1/(x_5-x_4)) - x_1^2/6\, x_5(x_5-x_4) - x_4/(x_5-x_4) + x_1 x_4/(6x_5(x_5-x_4))] - 12.56\, x_4^2 x_6 \cos[(x_1/(x_5-x_4)) - x_1^2/6\, x_5(x_5-x_4) - x_4/(x_5-x_4) + x_4 x_1/(6\, x_5(x_5-x_4))][(x_1/(x_5-x_4)) - x_1^2/6\, x_5(x_5-x_4) - x_4/(x_5-x_4) + x_1 x_4/(6x_5(x_5-x_4))]$

Capacity of tank as equality constraint h (x) and expressing it in the terms of design variables as follows,

Capacity of tank is $5.86*10^8$ mm^3 i.e. (586 lit)

Volume of tank = Volume of shell + 2(Volume of Torispherical head)

Therefore, $h(x) = 3.14\, x_1^2 x_2 + 2.1008\, x_1^3 - 5.86*10^8 = 0$

The five inequality constraints, g (x) are longitudinal and circumferential stress in shell, circumferential and meridional stress for knuckle section and meridional and circumferential stress for crown section of head. Representing these constraints in the form of design variables [3], [11].

IV. FUZZY KNOWLEDGE BASED CONTROLLER

Fuzzy controllers, contrary to classical controllers are capable of utilizing knowledge elicited from human operators. This is crucial in control problems for which it is difficult or even impossible to construct precise mathematical models. These difficulties may result from inherent nonlinearities, the time varying nature of the processes to be controlled, large unpredictable environmental disturbances and a host of other factors.

Knowledge here means a model, which provides a conceptual structure to capture those aspects of the project, which accurately represent its behavior. A knowledge based system for closed loop control is a control system that enhances the performance reliability and robustness of control by incorporating knowledge as in the case of manual modes of operation. This cannot be accommodating in the analytical model. [7]

In particular, fuzzy knowledge based controller replaces completely the conventional controller in the closed loop. Specific knowledge representation technique derived from fuzzy logic can be utilized to build knowledge-based controller. The methodology of the same is shown below as block diagram. Figure 1

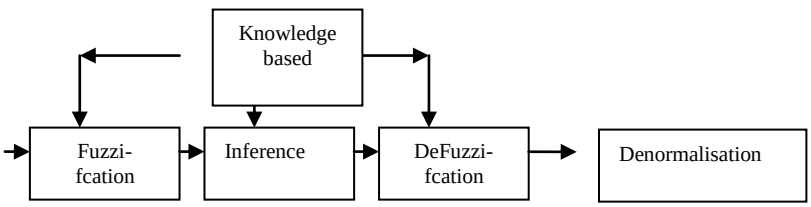

Figure 1 Fuzzy Block Diagram

A. Fuzzy Design Procedure

Step 1 defining the universe of disclosure

The range of values that input and output may take is called as universe of disclosure. It is necessary to define the universe of disclosure for all the input and output crisp values of fuzzy controller. The universe of disclosure for individual inputs and outputs are given in table 5.1

Table 2 Universe of disclosure for individual inputs and outputs

Constraint	Input/ output	Minimum value	Maximum value
σ_l	1	-5	10
σ_h	1	-10	20
σ_{mcs}	1	-45	30
σ_m	1	-7	9
σ_c	1	-50	20
β	0	0.5	1.2
α	0	0.5	1.2

Step 2 fuzzify the inputs

The inputs to the fuzzy controller are the constraints 1 to 5. Gaussian membership function is used to fuzzify these inputs. The input variable can be discredited in the following fuzzy sets table 3 (Feasible, Binding, and Infeasible, Very infeasible)

Table 3 Fuzzify inputs

Fuzzy Variable Constraint	Feasible	Binding	Infeasible	Very Infeasible
1	(-5) to (-2)	(-3) to (3)	(3) to (7)	(6.5) to (10)
2	(-10) to (-2)	(-4) to (5)	(3.5) to (10.5)	(10) to (20)
3	(-45) to (-10)	(-11) to (6)	(5) to (20)	(20) to (30)
4	(-7) to (-3)	(-4) to (3)	(4) to (6)	(5) to (9)
5	(-50) to (-10)	(-20) to (1)	(1) to (14)	(10) to (20)

Step 3 fuzzify the outputs

The outputs of fuzzy controller are move limit factor and boundary control factor. Fuzzified outputs assigning membership function are shown in table 4

Table 4 Fuzzified outputs

For β	For α	Fuzzy variable
[1.00]	[0.95,1.05]	Unchanged
[0.9]	[0.87,0.912]	Reduced
[0.5]	[0.45,0.55]	Reduced much
[1.05]	--------	Increased

Step 4 creation of fuzzy rule base

It is necessary to construct a set of rules that describe the operation of fuzzy logic controller. The heuristic proposed are

I) if the design point is feasible, then increase the move limits slightly

II) If the design point is very infeasible, then slightly reduces the move limit factor and tightens constraints

III) If the design factor is near the binding constraints, then rapidly reduce

The first heuristic is an attempt to speed up the movement when design point is inside feasible space and constraint boundaries are far away. The second heuristics are encouraging movement towards feasible space by tightening the constraints aggressively. It shifts the next solution closer to feasible space. Once the binding constraints are identified, the third heuristic aims at rapid convergence by shrinking the move limits quickly. Thus, fuzzy heuristic for Sequential linear programming can be expressed in the form of fuzzy rules as

1 If $g_j(x)$ is feasible, then β is increased.

2 If $g_j(x)$ is binding, then β is reduced much.

3 If $g_j(x)$ is infeasible, then β is reduced.

4 If g_j (x) is infeasible, then α is unchanged.
5 If g_j (x) is infeasible then α_j is reduced
6 If $g_{j(x)}$ is very infeasible, then α is reduced much. .
Where gj (x) are input constraints
α_j is boundary control factor at j = 1 to 5
β is move limit factor.

Step 5 Clipping of fuzzy output and defuzzification

For every input, constraint is determined and applied to fuzzy rules and checked whether it satisfies any of the rule or combination of these rules. If it is satisfied, the rules are said to be fired. Accordingly, the problem defined here, four rules are fired. Each of four rules is satisfied for the applicability of five constraints to get individual output of move limit factor and boundary control factor. The overall output of each of these rules is determined by clipping in the form of membership function

The outputs are then defuzzified by the method of area defuzzification using MATLAB software and the results are obtained [20].

V. NEURAL NETWORKS

Neural Networks are a different paradigm for computing: Von Neumann machines are based on the processing/memory abstraction of human information processing.

- Neural networks are *based on the parallel architecture of animal brains*.

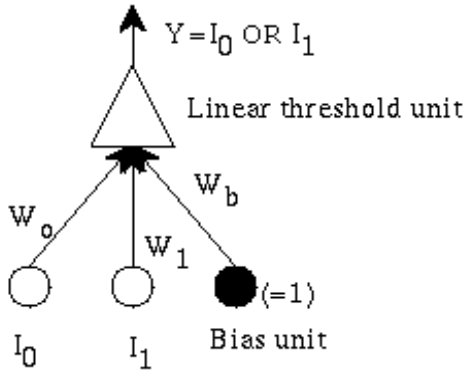

Fig 2 Simple Perceptron

Neural networks are a form of multiprocessor computer system, with

- simple processing elements
- a high degree of interconnection
- simple scalar messages
- adaptive interaction between elements

A biological neuron may have as many as 10,000 different inputs, and may send its output (the presence or absence of a short-duration spike) to many other neurons. Neurons are wired up in a 3-dimensional pattern. Real brains, however, are orders of magnitude more complex than any artificial neural network so far considered [21][22].

VI. RESULTS AND CONCLUSION

Design Variable	Conventional Dimensions in mm	Optimum dimensions obtained using fuzzy based SLP in mm	Optimum dimensions obtained using Neuro fuzzy based SQP in mm
Radius of shell	353	353	351
Length of shell	1200	1211	1208
Thickness of shell	7.1	7.55	7.5
Crown radius of head	593	589	585
Knuckle radius of head	138	135.2665	140
Thickness of head	9.2	9.1685	9.35

FSLP is easier than conventional SLP. Even though the later is easy to prepare, it has a limitation such as not suitable for arbitrary starting point. This problem is overcome by fuzzy based SLP, so as to choose arbitrary starting point for iteration. This can be obtained by introducing move limit factor and boundary control factor.

Thus it can be stated that Conventional Sequential linear programming can be improved by introducing fuzzy heuristics

In this work optimization method used is sequential linear programming, applied with fuzzy logic and result compared with Sequential Quadratic programming with Neuro fuzzy. Other optimization technique can also be employed with Fuzzy logic, which expands the possibilities for various design optimization problems.

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CONSUMER BEHAVIOR OF PRE-TEENAGERS

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Abstract: *In this paper, we have reviewed the techniques and parameter responsible for customer behavior. Since the customer varies by age. This paper studies the behavior of teenagers and children's by surveying teenagers with simple questioner. In this paper, we have discoursed the different marketing strategies used by companies to capture the product market of teenager customers.*

Keywords: *WWW; component; formatting; style; styling; insert (Minimum 5 to 8 key words)*

I. Introduction

Consumer behavior is an attempt to understand & predict human actions in the buying role. It has assumed growing importance under market-oriented or customer oriented marketing planning & management. Consumer behavior is defined as "all psychological, social & physical behavior of potential customers as they become aware of, evaluate, purchase, consume, & tell others about product & services"[1].

In consumer behavior we consider not only why, how, & what people buy but other factors such as where, how often, and under what conditions the purchase is made. An understanding of the buyer behavior is essential in marketing planning & programs. In the final analysis, buyer behavior is one of the most important keys to successful marketing [1].

II. Major Factors Influencing Buyer Behaviour

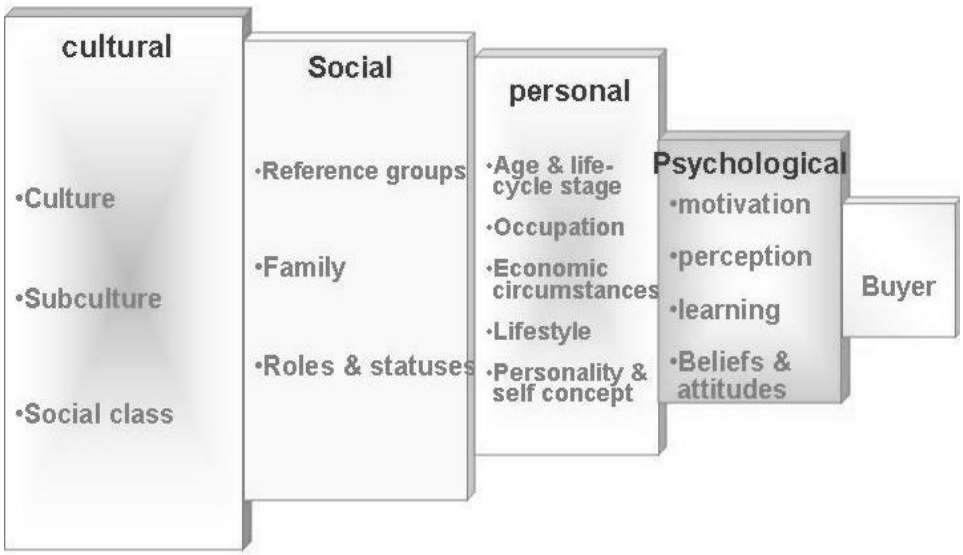

Fig. 1 Buyer Behaviour

A. Cultural Factors

Cultural factors exert the broadest and deepest influence on consumer behavior. The roles played by the buyers culture, subculture and social class are particularly important.

- Culture: Culture is the most fundamental determinant of a person's wants and behavior. The growing child acquires a set of values, perceptions, preferences, and behavior through his or her family or other key institutions.
- Sub-Culture: Sub-culture includes nationalities, religions, racial groups, and geographical regions. Many sub-cultures make up important market segments, and marketers often design marketing programs tailored to their needs.

- Social Class: Social classes are relatively homogenous and enduring divisions in a society, which are hierarchically ordered and whose members share similar values, interests, and behavior. Social classes do not reflect income alone, but also other indicators such as occupation, education, and area of residence.

B. Social Factors

- Reference Groups: A Person's reference groups consist of all the groups that have a direct or indirect influence on the person's attitudes or behavior. Groups having direct influence on a person are called membership groups.
- Family: The family is the most important consumer buying organization in society, and has been researched extensively. Family members constitute the most influential primary reference group.
- Role and Statuses: A person's position in each group that he participates throughout his life –family, clubs, and organizations can be defined in terms of role and status. A role consist of activities that a person is expected to perform. Each role carries a status. Marketers are aware of the status symbol potential of products and brands.

C. Personal Factors

A buyer's decisions are also influenced by personal characteristics. These include the buyer's age & stage in the life cycle, occupation, economic circumstances, lifestyle, personality & self concept.

- Age & Stage in the Life Cycle: People buy different goods & services over their lifetime. They eat baby food in the early years, most foods in the growing & mature years & special diets in the later years. People's taste in clothes, furniture & recreation is also age related.
- Occupation: A person's occupation also influences his or her consumption pattern. Marketers try to identify the occupational groups that have above – average interest in their products and services. A company can even specialize its products for certain occupational groups.
- Economic Circumstances: Product choices are greatly affected by one's economic circumstances. Economic stability consist of their spend able income (its level, stability and time pattern), saving and assets (including the percentage that is liquid), debts, borrowing power, attitude toward spending versus saving.
- Lifestyle: People coming from the same subculture, social class & occupation may lead quite different lifestyles. A person's lifestyles the person's pattern of living in the world as expressed in the person's activities, interests & opinions.
- Personality and Self-Concept: Each person has a distinct personality that influences his or her buying behavior. By personality, we mean a person's distinguishing psychological characteristics that lead to relatively consistent and enduring responses to his or her environment. Personality can be a useful variable in analyzing consumer behavior, provided that personality type can be classified accurately and that strong correlations exist between certain personality types and product or brand choices.

D. Psychological Factors

A person's buying choices are influenced by four major psychological factors-motivations, perception, learning, beliefs and attitudes.

- Motivation: A person has many needs at any given time. A need becomes motive when it is aroused to a sufficient level of intensity. Motivational researchers hold that each product is capable of arousing a unique set of motive in consumers.
- Learning: When people act they learn. Learning involves changes in an individual's behavior arising from experience. Learning theory teaches marketers that they can build up demand for a product by associating it with strong drives, using motivating cues and providing positive reinforcement.
- Perception: Perception is the process by which an individual selects, organizes, & interprets information inputs to create a meaningful picture of the world. A motivated person is ready to act. How the motivated person actually acts is influenced by his or her perception of the situation.
- Beliefs & Attitudes: A belief is a descriptive thought that a person holds about something. Through doing & learning, people acquire beliefs & attitudes. These in turn influence their buying behavior. Particularly important to global marketers is the fact that buyers often hold distinct disbeliefs about brands or products based on their country of origin. An attitude is person's enduring favorable or unfavorable evaluations, emotional feelings, and action tendencies towards some object or idea. People have attitude toward almost everything: religion, politics, clothes, music, food, and so on. Attitude put them into a frame of mind of liking or disliking an object, moving toward or away from it.

III. Buying Process

Fig. 2 Buying Process

A. Pre – Teenagers

As people age their needs and wants change, some organizations develop specific products aimed at particular age groups for example Nappies for babies, toys for children, clothes for teenagers and so on. Kids 0-14 years: 31.1% (male 190,075,426/female 172,799,553) (2009 est.)

Our report deals with the consumer group of pre – teenage children who are between the age of 8 and 12 years. These children are also an important target market due to increased globalization in today's arena.They are school going kids who have access to good education and are well aware of the new and innovative products that are introduced in the market. Children like these make the marketers strive hard in order to attract more and more pre – teenage children. Thus, it would not be wrong to say that these kids of the 21st century who are conscious about what product and services they are choosing. These kids are very much aware of different products available in the market.

This is well portrayed in the interviews conducted by us and this report is a concise summary of the conclusions that we got from our interviews. The questions mainly asked by pre teenagers (8-12 years) are:

- What major products / services do they buy?
- How do they search?
- How they evaluate?
- Where do they buy from?
- How do they use/ dispose?

Here, we have interviewed 9 children namely Shubhika, Aashna, Siddhant,Ayush Modi,Prateek and other.
Amit Gupta interviewed Shubhika, Aashna, siddhant who are 8 ,11,7 years old.
Aditya Agrawal interviewed Ayush Modi who is 11 years old.
Abhimanyu Singh interviewed Prateek is who is 09 years old.
Akash Gupta interviewed Varun is who is 11 years old

IV. What Major Products /Services Do They Buy?

In today's scenario both products and services are of utmost importance for pre teenage groups. Firstly, we will focus on the types of products used by children. This is the era of technology, hence video games, remote sensor , toy , cars , bikes and other such Electronic toys are the first preference of pre – teenage children. Apart from this, dolls have always been and still are the first preference of children. Also, Sports items such as bats, balls, studs, sport shoes give the children a joyride and thus are one of their favorite items. It is for this lesson that marketers and producers are launching huge varieties and variants of these products.

We must not forget, that Clothes such as fancy dresses and attire along with matching accessories such as hairpins, ribbons, bellies and shoes have become a must for children. Clothes they mainly buy from(Lilliput, Pantaloons). Sporting activities are concerned, children are extremely fond of bicycles of different colours, sizes and designs. These newly designed bicycles attract a core group of pre- teenage children. Another important product that catches the eye of pre- teenage children are attractive stationery items such as colourful pencil boxes , paints , colored pencils which help children to give wings to their imagination.

We must not forget lunch boxes and well designed colourful water bottles which though are a necessity for school going children have also become products of their choices and interests. It has been often observed that bags – whether school bags or side bags are an important product for both boys and girls as they are used daily and have to be attractive in order to be liked by the children. Wrist watches (Titan, Fastrack) are favorites of pre- teen kids as they want them to be colourful, attractive and of different designs. These products help children to achieve admiration among their friends and peers.

This age Group is also interested in FMCG products like Maggie, Horlics, Bornvita, Noodles, Cartoon Shaped Tooth Brush etc.Not just products, even services are in the wish list of these pre-teen children. The most important service used by the children in today's scenario is when they go to malls they love eating at KFC, Mc Donalds, PAPA JONES etc.They hire TRANSPORTATIONAL SERVICES, which comprise of bus and cab services which drop children to schools and then bring them home.

A. How Do They Search?

With the glowing amount of technology and mass media, it is no longer a difficult task for pre-teenage children to search for various products and services available in the market. The most elusive way which attracts children towards product and services is Television. The televisions commercials are repeated often have a great impact on the minds of the children and hence the products advertised catch the attention of the young brigade. This is how they are able to search for new, trendy products launched in the market. Friends also impact a lot. Children between the ages of 8 to 12 years are influenced by their friend circle.

Few products are:

Fig. 3 Products

A child would always crave for a new and trendy product; say an electronic toy owned by his or her friend. This is an age where friends play a very important role as far as searching for products and services is concerned. It is also important for us to know that not just friends but the siblings also influence each other while searching for and gaining knowledge about the most extravagant items in the market.

One must say that Television has long been the staple of advertising to children and youth. Children view approx 40,000 advertisements each year. The products marketed to children – sugar coated cereals, fast foods restaurants, candy and toys have remained relatively constant over time. But, marketers are now directing these same kinds of product to children online. Hoardings and Banners are also eye catchy and thus give pre-teenage children vast knowledge about goods, electronic items and other products of their interest. Therefore, all these are a vast and enormous source which helps our pre- teenage consumers to search for the products and also assist them in identifying products and services of their interest. Now a days Adds could be found on note books or items they use. Different Magazine, Books also advertise products related to pre teenagers which help parents to learn about the product because in this age group kid also relies on their parent's choice.

B. How they evaluate?

Pre teenagers evaluate the products that they want to buy through the following list:-Design or outlook, Packaging of the product, Color, Brand Name,

They look either for their favorite characters on the product they buy or Look for the autographs or insignia on the product of their favorite players. Most of the time this Age Group take help of their Parent, Friends to judge the quality of the product.

C. Where do they buy from?

Pre teenagers buy from showrooms of branded stores; go to malls, nearby shops. Sometimes pre teens also buy from vendors. In malls showrooms display attractive, eye catchy products to which pre teens get attracted to. Pre teens want to buy all those products which fascinate them in malls but they buy those products on which parents also agree. In apparel stores pre teens like buy those clothes are pretty on them. Pre teens are now also having a

fall for branded products. All pre teens cannot buy from malls or branded stores so they also buy from medium or small sized apparel stores.
Due the social class pre teens display separate buying behavior. In different social class pre teens buy from different stores. Pre teens like to buy sweets from malls or small confectionary shops. Pre teens girls like to buy hair clips, bands from malls or all shops.
Pre teens buy all those products which are of their interest then whether that product is at mall or at a small shop. Sometimes pre teens buy eatables from Road side.

D. How do they use/ dispose?

Pre teens use products till the time they are fully satisfied by the product. Pre teens dispose products by passing on their products to their siblings or on request of their parents giving them to children who cannot who cannot afford them like servants, maids. Sometimes pre teens lose their products. Pre teens lose parts of their products while playing or fighting. Most of the time they share the product with their friends which might his friend to buy similar product. Teens should be taught to handle their toys and stuff carefully and to keep them clean. Teens should use products carefully so that they could showcase their products or make collection of a particular toy. Parents should also keep an eye on how pre teens should use their products. Parents should bring such toys through which children can show their creativity and improve their knowledge.

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Waste Management in Hospitals: An Empirical Study of Selected Hospitals

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***Abstract**: Managing the waste generated daily from the hospital and other health care facilities are not a new issue but it has gained importance in the recent years. Unfortunately, the management procedures and practices in many countries, not to mention those in other, less-developed, parts of the world, leave a lot to be beloved. Large hospitals are providing continuous training and education to staff members on handling of waste, proper waste segregation from risky waste to non-risky waste, safety measures to staff; infection control measures are adopted by the large hospitals against small hospitals of semi urban areas of Mysore city. Whoever it may be generated those wastes and also that of the government in keeping surveillance on them by enacting the laws, rules and regulations to punish for non compliances. Mysore is the city which has been identified as clean city and green city. Hope this identity remains for long period and longer period.*

I. Introduction

The most vital problem faced by almost all urban areas in India is Municipal solid waste management. The trash, garbage, refuse and unwanted things are called as waste. It can be a solid waste or liquid waste or it can be bio-degrable or non bio-durable waste. Rapid changes in the life style of people are the main cause for huge amount of waste or trash. It can be in any form but has to be controlled or managed in a systematic way. Waste management is a biggest challenge for the society today. The waste management process consists of a series of activities in connection with the generation, collection, storage, transport and disposal of the waste generated at any source, at home, at the hospital, at a company, at an institution etc.Any kind of waste requires a proper management to avoid bad circumstances that would arise in case of mismanagement. There should be well planned system of waste management to reduce the consequence of harmful effects of improper waste management cleanliness next to godliness. Hygine and cleanliness leads to better of the surrounding population, healthy nation contributes more for sustainable development of the economy. So it is sure that where there is a health there is development. To ensure this, there should be a proper mechanism for the waste management generated at different sources. It is the responsibility of all the citizens. Whoever it may be generated those wastes and also that of the government in keeping surveillance on them by enacting the laws, rules and regulations to punish for non compliances. Mysore is the city which has been identified as clean city and green city. Hope this identity remains for long period and longer period. In maintenances with the city cleanliness there is need to understand the future challenges, which may pose serious threat to the ecology. In this regard there is a serious need to study and understand the role of hospitals in their waste management in achieving growth and sustainability.

II. Conceptual frame work

According to united nations statistics division, glossary of environment statistics, waste materials that are not prime products for which initial user has no further use in terms of their own purposes of production, consumption and of which he or she wants to dispose. Waste may be generated during the extraction of raw materials or during the time of processing or during the consumption of final products or other human activities. Immediate measures should be taken to treat and dispose biomedical waste or else it will cause damage to the society.Bio-medical waste can be stored maximum time of 48 hrs in case due to some problem if health care or hospital wants to store it for little more time than it should take permission from local state authority by owning the entire responsibility.

III. Need for the study

Due to developments that are taking place in medical and health care field , no doubt the quality of health and life span has been increasing but at the same time quantum of waste generated from such services are also been increasing. Mismanagement of biomedical waste poses a threat to the very purpose of existence of hospitals.

IV. Literature Review

Shahida Rashee in the article title Hospital waste management in the Teaching of the Karachi has mentioned that hospitals should give prior importance to managing of waste than on technology, to keep the healthy

environment need to manage effectively. The hospital waste management guidelines enacted on 7th June 2004 should be followed and regulated.

M. Tsakona, E. Anagnostopoulou, E. Gidarakos "Hospital waste management and toxicity evaluation: A case study" has mentioned that Hospital waste management is an essential ecological and public safety issue, due to the waste's infectious and hazardous character. This paper examines the existing waste policy of a typical hospital in Greece with a bed capacity of 400–600. The segregation, collection, packaging, storage, transportation and disposal of waste were monitored and the observed problematic areas documented

Nosheen Arshad, "Hospital Waste Disposal: A Review Article" study says that awareness of proper waste management training has to be provided to the employees on a continuous basis, there is a lack of technology support to manage the waste logically.

V. Objectives of the study

- To study the need and significance of waste management in hospitals.
- To calculate average waste produced in each hospital.
- To examine present waste management system of the selected hospitals.
- To study the need for the health and safety programmes for employees involved in waste management.

VI. Hypothesis

There is a positive relationship between the size of the hospital and the level of importance given to waste Management.

There is a positive relationship between the location of hospital and the level of importance given to waste Management.

VII. Research Methodology

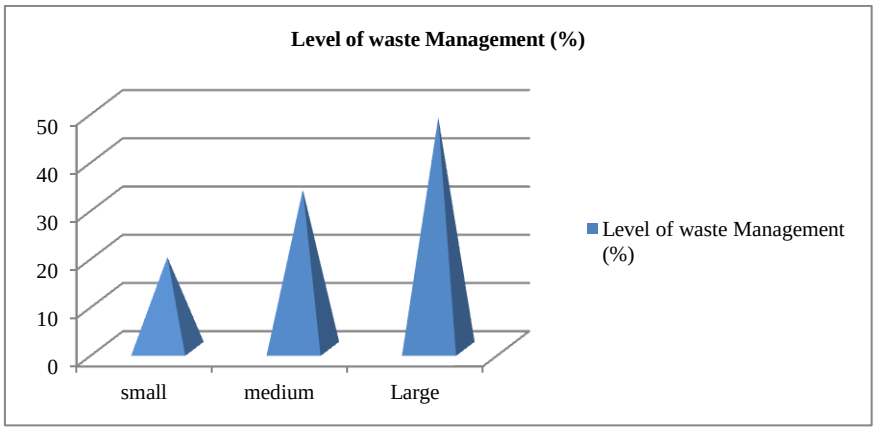
The study included eight hospitals situated at the heart of the Mysore city and rural areas of the district. The random sampling method is used for choosing Hospitals. The target respondents included Nurses, Medical Superintendents, Doctors, Sanitary Supervisors, cleaners, administrative heads. Kannada and English language were used for better communication while interviewing. The primary data collected by personal interview and through observations. Data analysis tools include tabulation, averages, percentage analysis, and charts for hypothesis testing.

.VIII. Data Analysis and Findings

Hospitals have not mentioned about their corporate social responsibility in their vision statements but one can find out from their general practices adopted for day to day transactions. 34% of the hospitals mentioned about corporate social responsibility in their vision statement but many hospitals even big in size have not mentioned in the vision statement but inculcated in their practice, as per the study it shows that many hospitals lagged in waste handling areas, there is a need for waste handling and managing it. Maximum hospitals have an idea and knowledge of waste generators but not managers.

H1: There is positive relationship between size of the hospital and level of importance given to the waste management.

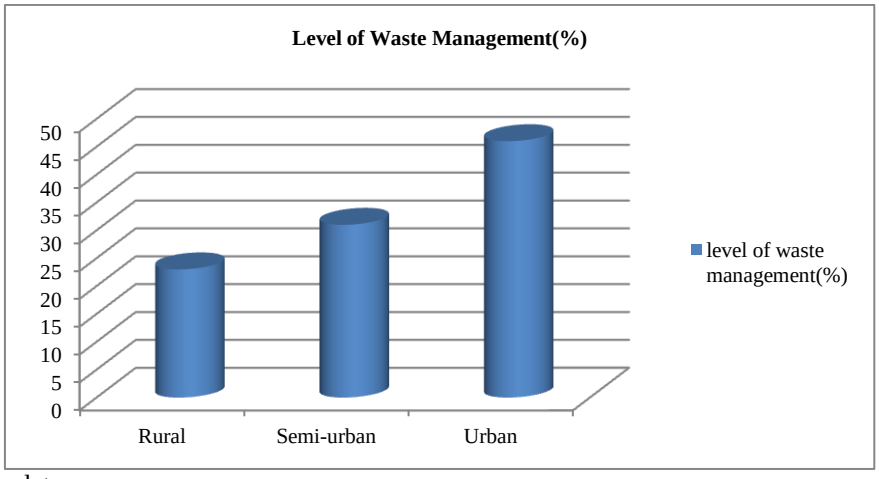
Size of hospital	Level of waste Management (%)
small	19
medium	33
Large	48
Total	100



Source: Primary data

Inference:
It's a clear indication that there exists a positive relation between size of the hospital and level of importance given to waste management. In the large hospitals there will be separate department for waste management and proper repeated training will be provided to employees in handling it, but in case of generation of waste in small and medium sized hospitals are relatively less in the same time scope for handling the waste in hospitals are also less.
H2: There is a positive relationship between the location of hospital and the level of importance given to waste Management.

Location of Hospitals	Level of Waste Management (%)
Rural	23
Semi-urban	31
Urban	46
Total	100



Source: Primary data
Inference:
Awareness about handling the waste, managing it in a appropriate way can be seen more in urban areas than rural and semi urban places. It is a clear indication that location of the hospital and level of importance given to the waste management are positively correlated.
Impatient treatment, consultation for out patients, laboratory, and dispensary are the major services provided by the hospitals to the public. Most of the hospitals do not maintain the track record of waste generators in each units and it is difficult to get the exact track record of waste generators from different health care centres. Waste generated (Bio-medical waste) &(General Waste) by the OT in health care centers and in Hospitals range between 0.40-1.20 kgs/day/bed.

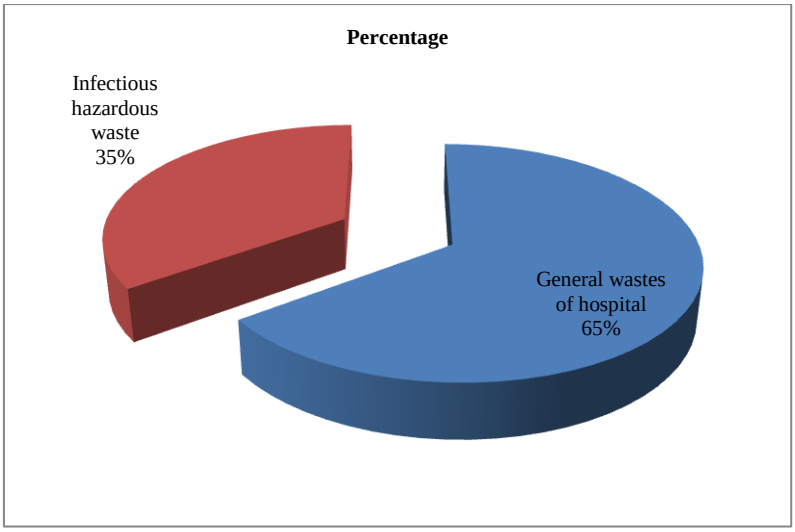
Average waste generated in hospitals/day/bed (in kgs)

Type of waste	Minimum	Maximum
Biomedical waste	0.20	0.80
General waste	0.20	0.40
T0tal	0.40	1.20

Source: Primary data
Waste segregation is very essential task of the hospitals. There are mainly two types of hospital waste they are risk leading waste and non-risk leading waste. The process of segregation (separating risk waste from non-risk waste) has to be done at the source to minimize the injury or chances of infection. The person or group of people is to be trained properly for segregating the waste in a systematic way. Waste segregation techniques are followed by majority of the large hospitals. Techniques are colour coding and labeling.

Type of Wastes	Percentage
General wastes of hospital	65
Infectious hazardous waste	35

Source: Primary data



Around 80% of the hospitals follow colour coding to segregate the wastes in the hospitals. Different colour bins are used in the hospitals. Red and white are generally used colours to segregate the wastes. White color coding is for general waste and red is for hazardous infectious wastes. All the hospitals need to follow colour coding to segregate hazardous waste from general waste as per the Bio-medical waste rules guideline (1998).This method would help the handlers to avoid the mistakes. Efficient handling of waste in the hospital is an indication of proper training to waste handlers in the organization. Puncture proof cans were used in the major hospitals to carry sharps. Infection Control measures are adopted to put off cross or infection contamination between patients and staff. Changes in infection control and advances in technology have resulted in the increased use of disposable medical products, which have in turn increased waste treatment/disposal volumes. When clinical waste is appropriately handled and contained through good work practice and the use of protective apparel, the risk of infection is minimized. It is essential to correctly segregate waste to ensure that safe work systems protect all workers. The most significant risk associated with clinical waste is transmission of a blood borne virus from a needle stick The harmful impacts on the environment of augmented disposable items have incorporated pollution and the reduction of non-renewable natural resources. The adoption of waste minimization practices should reduce environmental deprivation, without compromising
Infection control standards.
Segregation can be achieved best all the way through

- Providing education and training programs to all staff that generate waste.
- Establishing identifiable Colour coding, labelling, postures.
- Provide suitable containers in suitable locations.
- Incorporating fast, well-organized waste disposal methods into patient care measures.
- Mobile Garbage Bags and trolleys should be used while transporting waste to decrease spills, minimize collector contact with waste and minimize manual handling. Loads contained in trolleys should be less than 50kgs.

Trolley after the usage should be rinsed in cold water and should wash in hot water, drained and left for dry and waste water may only be sidetracked to the sewer. Waste management is the responsibility of all the employees and employers of the organization. Detailed and appropriate training is needed for waste generators as well as waste handlers in the organization. Specific training on waste management helps to avoid the injuries as well as minimize the risk. Education and training should be given to employees during the time of induction. Awareness programmes should be conducted in the organization about the uses and risks of waste management and mismanagement.

IX. Findings

- Effective waste management can be seen in large hospitals against medium and small hospitals of the city.
- Awareness about the handling the waste and proper management is more in urban areas.
- Conclusion.
- Waste generation in hospital is 0.40-1.20 kgs/day/bed.
- Out of total waste generation 65% comprises general and non hazardous waste and 35% comprises hazardous waste.
- Infection control measures are adopted.

- Color coding system is adopted in majority of the hospital to segregate the biomedical waste from general waste.

X. Suggestions

- Employees who involved in generation of waste need to be educated on the consequences of improper waste management in the small and medium hospital, this work can't not be done overnight, continuous training and motivation from the management is required.
- Biomedical waste or risk involved waste has to be segregated from the general waste to avoid the life threat.
- It is a collective effort of the each individual of the organization, to promote the public health.

XI. General suggestions

- Organizations should develop strong policies and procedures on waste management.
- Develop an infrastructure for the safe disposal and recycling.
- Hospitals/Organizations should concentrate and take decisions in investing on waste management equipment and technologies.
- Ensure workers safety through continuous education on waste management and handling the equipments.
- Provide secure collection of waste and safe transportation.

XII. Conclusion

Proper collection and segregating of waste is a preliminary and utmost important task of the organization. In the hospital segregation of biomedical waste is very essential since there is no much information on medical waste management technologies. Arrangement of proper training programmes both for urban and rural hospital staff and health professionals are essential. Mainly for the better health of the society hospital need to manage the waste.

Annexure

Visited hospitals are categorized based on

No of beds in the hospital	**Type of hospital**
Less than 50	Small
50-100	Medium
More than 100	Large

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ROLE OF MICROFINANCE AND MICROFINANCE INSTITUTIONS MODELS IN IMPROVING QUALITY OF LIFE - A CRITICAL REVIEW

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Abstract*: With globalization of microfinance models, it accrues a lot of financial services to the needy like saving programs, agricultural housing, credit for microenterprises, education and consumer purchases, insurance, training, and other financial based transactions. Moreover, all Micro Financial Institutions (MFI) worldwide don't function in a uniform manner, rather they differs when it comes to ownership, structure of organization, rendering of financial services, lending criteria and sources related to funding. In this respect, there are some institutions where clients themselves own but functions as per the prescribed rules by community members. Again, there are some institutions which come under the purview of Governments, NGOs or banking entities. In spite of variation in ownership and structure, poor has the access to avail loans and to repay the same. The present paper critically reviews the role of microfinance and microfinance institution models in enhancing quality of life. This review restricted on how Microfinance and Microfinance Institution models addressed the development rather than its impact from MFI.*

Keywords*: Microfinance and Microfinance Institutions Models, Quality of Life*

I. Introduction

Gross National Happiness concept has developed over a period of time from emphasising insufficiencies of conventional theories of economics for measuring development and ascertaining the development policy's direction and putting forward *'four pillar'* objective approach (*Balanced Equitable Development, Environment Conservation, Preservation, Promotion of Culture and Heritage and Good Governance*) consistent with millennium development goal in an attempt to accomplish functions of the same with introduction of indicators of measurement. Indicators were populations' health, living standard, education, vitality and diversity of ecosystem, good governance, time use and balance, cultural vitality and diversity, vitality of the community and emotional well being (Hulme, 2000[13]). Microfinance's universal appeal originated from its potential to reach the poor without collateral and begetting almost full recovery rates (Camp and Spiedel, 1987[5]). Recognising microfinance's significance, major actions have already been taken by World Bank in developing this sector (Awaworyi, S.K., 2014[2])

II. Microfinance and Microfinance Institution Models

A. Grameen Bank Model of Bangladesh

Model of Grameen Bank (GB) is designed through participation of five volunteers to form a small group with an aim to support one another at the time of furnishing of collateral as per the requirement of traditional banks (Mahanta et al., 2012[22]). In this context, women had also the leverage of accessing financial services in initial stage of this model. However, interesting fact here was that women proved themselves as trustworthy entrepreneurs. In due course of time, conventional banking practice of GB has undergone change where there is no need of furnishing the collateral formalities; rather it is developed with the theme of accountability, mutual trust, participation and creativity (Imai and Azam, 2012[14]).

Credit for finding Grameen Bank goes to Professor Yunus, who has given some insights over the availability of credit by the poor. As per his views, credit is the potent weapon for poor to deal with inequalities in society and to join in the mainstream. However, curtailment in this respect was collateral to which Grammen Bank dealt successfully (Khandker, 2005[18]). Nonetheless, Prof. Yunus had different views as far as the conventional banking system was concerned. According to him, there were many liabilities like anti-poor, anti-women, and anti-illiterate associated with conventional banking leading to no change in the social status between the rich and poor (Yunus, 2006[39]). For this reason, microcredit acts as panacea to deal with various issues while providing impetus to set up micro enterprises.

B. The MC2 Model

The MC2 model basically stands for rural development micro-banking. The concept of this was developed by a community with responsibility of management to maintain their local tradition. Brain child behind this concept was Dr. Paul K. Fokam. The reason was that he was very much inspired by the Einstein's famous formula:

Victory over Poverty (VP) is possible if the Means (M) and the Competences (C) of the Community (C) are combined. Thus, accordingly, formula of VP = M x C x C =MC2

MC2 model has its fundamental approach in micro banking executed by a community. Those who are in need of this model should depend on their own contribution to generate wealth for better quality of live on progressive basis. There are two versions which come under the purview of this model: one is rural (MC2) and other one is urban (MUFFA). Women are the only beneficiary as far as second version of the model is concerned. Study report in this regard reflects that women from the urban conglomerates are the most vulnerable to poverty (Fotabong, 2011[9]). Concept of MUFFA, is, therefore comes handy to avail financial services on the part of women in order to kick start any business venture (Fotabong, 2011[9]).

One of the major drawbacks of MC2 model is that it requires a longer period to become financially self reliant as well as to have enough resources. Thus, to fulfill social dimension objective, it might require another 10-15 years. As a result, various activities of this model don't blossom to reality as needed by its members.

C. Rotating Savings and Credit Associations Models

This model is very popular where people from a community were responsible to contribute certain amount on regular basis to raise funds to be utilized in cycle by any needy member; is generic way of savings and credit (Harper 2002). Group from the community comprises of friends, neighbours, closely related community etc. (Manimekalai and Rajeshwari, 2001[23]). This type of group is also known as Merry-go-rounds or Self-Help Groups. As per the study by Rajasekhar, 2001 the banks exist in villages are community based to raise funds and to avail credit through the help of NGOs where they assist in creating self help groups for the necessary financial services.

D. Grameen Solidarity Group Model

Pressure from peers within the group also leads to creation of Grameen Solidarity Group Model. In this model, four to seven members of a group could seek loan assistance and is ensured by themselves. If the group wants to seek further loan assistance, then it would be decided as per their repayment of the first loan. As per generic guidelines, payments are disbursed on weekly basis. Financial services by solidarity groups are very much fruitful to deal with the defaulters of loan repayment as per the microfinance model (Puhazhendhi and Satyasai, 2001[29]).

E. Village Banks Models

Banks which operate out in rural areas are managed by a community where NGOs assist to form self help groups for the necessary financial services involving credit and savings in order to assist its members (Teng et al., 2011[37]). Operational of this bank started in mid-1980s and continues to deliver the financial services till date. Those in the low income categories have the opportunity to raise their living standard through various self-employment activities with a group comprising 25 to 50 members. Members of the group are responsible for overall functions of the bank including selection of office bearers, formulating by-laws, aspect of loan sanction and repayment of the same. Here, approval of loan is on the basis of moral collateral; it is a kind of undertaking where needy get support of rest of the members. There is a MFI in this regard makes sure the village bank gets capital loan which in turn is utilized by members of a group as per the loan amount requirement. Since collective guarantee is the procedure to avail the loan; it requires all members' written consensus on agreement paper. Again, it is expected from the members to oblige to the standard procedure of saving twenty percent of the availed loan amount in a cycle (Kaboski and Townsend, 2012[15]). The amount deposited by the members that goes into savings is utilized to sanction loans and for initiating various activities which will fetch them income. As a result, members have to be under the purview of village bank. However, members are entitled to get certain amount of profit through the re-lending activities of village banks (Banerjee, 2013[4]).

F. Individual Lending Model

Issue involving in this model is that an individual could seek loan even without any membership formality which usually happens in other lending models. In this model, borrower can avail the micro-loan directly as per the practice prevalent. However, banking institutions need to remain in touch with individual client on frequent basis to provide customized financial products (Ayuub, 2013[3]). The procedure involving lending is most suitable and lucrative to initiate business in urban areas. There are some funding organizations like Bank Rakyat of Indonesia, Senegal of Egypt, Association for the Development of Micro-Enterprises (ADEMI) in Dominican Republic and Self-Employment Women's Association in India who follow this model to render financial products (Hiatt and Woodworth, 2006[12]).

G. Credit Unions and Co-operatives

As far as credit unions are concerned, it works on the governing principle of its own without any profit motive. In the co-operative society, they are the proprietors and clients as well and in some circumstances originated by the people having identical region or professional with common interest (Kiran and Samarpreet, 2010[19]). The usual notion is that co-operatives provide its members the details of banking and financial services. The major decisions are taken by the members themselves through electoral measures prescribed in order that the co-operative gets some personnel to supervise and to look after administrative works. Only members are eligible to avail the loans.

H. Microfinance Models - Indian Context

In Indian context, two prominent players are Microfinance Institutes (MFIs) and Self-Help Groups Bank Linkage Programme (SBLP) having root in SGH Bank Linkage Model, SKS and Non Banking Finance Company and Microfinance (Patnaik, 2012[28]). There is a need to solidify the bond between banks and poor through the assistance of NGOs for which the role of the SBLP Reserve Bank of India and National Bank for Agriculture and Rural Development is highly significant. In India, SBLP has managed to reach the maximum number of clients, successfully (Sriram, 2004[36]). Another pivotal role played in this regard is the microfinance institutions. In due course of time, the MFI required involvement of more number of clients, where it was behind the approach of the SBLP. However, over the last years, it has gained momentum and appears as if it will compete well with the SBLP.

All most all the countries like China, India, Malaysia, Philippines, Sri Lanka, Thailand and Vietnam have adopted the Grameen Banks lending model. The concept of the Self-Help Group model prevalent in India was developed by nongovernmental organizations and most of the MFIs and banks follow suit its principles. In Indian scenario, those MFIs interested in earning revenue profitable could follow the models of NBFCs. This is the reason, profit motive MFIs are following the NBFC route. Capital market provides the necessary capital to these institutions with the expectation that lending to the poor is a trustable and profitable venture without the relying on low cost funds for lending. Another opinion in this regard is that there is a need for huge amount of money where the financial markets are the major players to raise the necessary resources. This reflects about the resources need to be accumulated at the rates of interest prevailing in the market. Debts and mezzanine assets are well utilized by these institutions. These institutions for the financing the micro projects depend on the capital markets investment and borrowings from commercial banks as well (Rao, 2008[31]). These funds in turn are made available to the poor for their various business activities further downgrades their living condition

I. Islamic Microfinance Models

Findings of research observed the fact that, those who are into banking services, at least at the foundation level, have the issue of credit crunch (Dusuki, W. A., 2008[8]). Muslims from the Middle East are having this problem; this is the reason, they are in search of such institutions having the feature of interest-free borrowing (Smolo and Ismail, 2010). Majority of the Muslim population is reluctant to accept interest-based financing; the prime reason is, it further aggravates their poor economic condition (Karim et al., 2008[16]). As per research study done by Islamic Development Bank, it is revealed that maximum number of Muslims resides in the six countries in India, Indonesia, Pakistan, Bangladesh, Egypt and Nigeria. These people estimated to be more than half a billion (628 million) and for their livelihood is something shocking, they are maintaining their daily requirements with less than $2 (Lawai, 1994[21]). Research study conducted off late aids some interesting fact that most of the Muslims have no access to banking services and its products; if it is estimated in terms of exclusion rate; it stands at 80% in India. Survey report in this regard reveals that 40% of Muslims have no interest to avail the loans on religious grounds. Thus, it provides impetus to interest-free microfinance institute to explore to have the giant market. There is no doubt that Islamic Finance is progressing at higher pace, but the number of Muslims in this regard are very negligible. Hence, 'Islamic Finance' is the right initiative to address this issue as their population is near about half of the Muslims in the world. Poorest of the poor don't come under the purview of microfinance institution as they require basic needs like food and health security. Hence, they are counted as borderlines of poor as per the poverty line of CGAP. There are some people who have all the means of quality of life with the entrepreneurial knacks, but no access to finance (Sofi, 2012[35]). Due to flexible features of microfinance, it could be moulded as per the need of the local people and financial circumstances in any environment (Khan et al., 2012[17]). Therefore, those countries having various bottlenecks also infuse the mechanism of microfinance to get the due leverage even in the countries where the practice of Islamic finance is prevalent.

J. Value-Based Hybrid Model of Islamic microfinance

Sofi (2012) had proposed a theory on *'A Potential Value-Based Hybrid Model of Islamic microfinance for financing Microenterprises'*. There was an attempt to develop a Shari'ah-complaint model to execute the functions of Islamic microfinance. This microfinance comprises of three Shari'ah-based modes namely; Ijarah wa Iqtina, Mudarabah partnership, and Bai'al-Istisna. Thus, it could assist the poor for their endeavor towards various micro entrepreneurial activities, as most of the times they don't get the adequate support. As a result, the poor no longer depend on the middlemen who charge exorbitant interest rate for rendering loans, which is actually a way of exploiting. Moreover, this Islamic microfinance makes utmost effort to bring a qualitative change to various micro financial activities and assists for long-term growth, and rendering due marketing and technical inputs as per the requirement (Remenyi and Quinones, 2000[32]).

K. Joint Liability Group (JLG Model)

As far as this model is concerned, the agents make earnest effort in persuading women to form group with 4-5 members with the responsibility of giving the nod of approval while seeking loan by a member. But the way bonding or relationships exist in SHG was lacking in this model. The levy of interest rate is between 12-18 percent in JLG by MFIs; whereas, the charge of SHG operated through PSU banks stood at 18-24 percent. The interest rate charged by MFIs remains under shroud as there are some hidden charges along with the processing

fees and penalties which is more than 27 percent. The main concern of this model is to ensure MFIs make profit. Since the bonding among the members is not firm, the rate of repayment remains at low. The actual production doesn't exceed the credit generation. It has been claimed reportedly by the MFIs that their lending activities is towards the purpose of income generation; however, in actual the purpose differs. Hence, it clearly reflects that the purpose of lending doesn't meet the reality and indirectly encourages borrowing to meet some other requirements. As a result, the borrowers ultimately suffer and pay the price which is known as microfinance crisis (Ahmed et al., 2011[1]).

L. Self Employed Group (SEG) Model

The main theme of this model is sharing of profit and loss. The emphasis of this model is on credit generation. Poverty mitigation is possible, provided the unemployment issues get reduced for which the need is to have distribution of production in decent (Durrani et al., 2011[7]). MFIs are reaping the dividends due to the policy of charging higher interest rate which leads it goes against the poor and fall prey to debt trap (Vetrivel and Kumarmangalam, 2010[38]). This model functions in a way the cooperative societies do. Be it group formation or any plausible business interest, MFIs render due insights for best of the result. Business opportunities could be categorized as farming and non-farming and put into practice both in rural and urban conglomerates in India (Marban, 2010[24]).

Feasibility of the Model

Since MFIs and SEG group members bear the onus of risk factors and high return also accrues, this model is very much reliable. The model SHG and JLG are dipolar, as one model is concerned about attaining the social objective while putting the self sustainability of MFIs at stake. On the contrary, another model in this regard primarily aims at making profits at the cost of not paying attention to social concern. The aim of this model is to have growth on sustainable basis and functions with its own set of prescribed rules without having the credit burden. Model makes sure to deal with the issues of all groups within the village. Moreover, basic amenities of the village were also paid high attention which further boosted the attributes of trust and loyalty among the villagers.

III. Basic Microfinance Centre

SEGs get due assistance through these units with the mechanism of control in place. The professionals who are associated with development programmes get the compensation through fixed salary and incentives in context to their performance. Moreover, the SEGs get the requisite training and consultancy insights through these centers.

Musharaka Programme

The aspect of entrepreneurship is promoted by MFIs promote on profit and loss sharing basis as per the guidelines of the programme. The motive behind is to leverage the advantages of savings to the villagers. There are certain Musharaka business units like poultry; dairy farm, etc. get the contribution from MFI and SEG members which in turn induce profit to them through sharing. Moreover, SEG members also receive the compensation due to their operational contribution; MFIs too receive the same for their contribution in terms of consultancy and operational assistance rendered. National Small Industry Corporation (NSIC), a government organization is also taken into account for its contribution to the MFIs if required; moreover, it also assists in promoting small scale industries.

Mudaraba Programme

As per rules laid down in this programme, both the MFI and group members invest. The former ensures 100 percent investment and the later through the application of skills and labour. The potential of this programme is that the villagers get maximum employment opportunities. Those having without any skills get the training through Basic Microfinance Centres (BMC) with an aim to utilize the funds for the necessary economic activities. When it comes to repayment, the installment option is there involving weekly and monthly basis to which the SEG group members comply. Moreover, district polytechnic colleges might also impart training and skills as per the requirement. This programme is responsible for creating skilled work forces like dairy farming, food processing, poultry farming, independent services like auto mechanic, barber, tailor etc. which comes under the purview of SMEs.

Kafala Programme

There are two prominent things of MFIs which get high attention in this programme: consumption needs and social security of villagers. In addition to these, other focused things are basic amenities, food and health security, hygienic conditions, education, electrification, etc. All these things ensure the attributes of the loyalty, trust and commitment among the villagers. MFIs work with an aim to attain certain objectives like sustainable development which is ensured through this programme. However, funds are required to achieve the objective this programme, where MFIs and group members ensure mandatory 2.5 percent investments along with voluntary contribution.

Ijara Programme (Leasing Finance)

Be it farming activities or non farming, both require requisite equipments and machines. This programme ensures these things to the ready. Lease or selling on credit are the two options to avail various machines and equipments like tractors, harvester, thresher, grinding machines etc. at reasonable price is ensured through this programme to the villagers.

IV. Solidarity

Repayment is one aspect where it requires motivating the members to be in strong bonding with others and to encounter the aspect of liability as well. Consider the case of village banks where the focus is on income generating activities for the loans financed. When an individual is granted loan through groups, it sounds unconventional. Reason is that banks don't believe in a policy where members of the group will meet the collateral requirements. Mutual trust is the base that urges the group members to assist the borrower. To avail the loan, there is no such secured thing to recover the amount in the case of a defaulter. Rather the group has the responsibility to repay loans. This basis of microcredit is replicated as it exists in the Grameen Bank of Bangladesh (Lathif, 2001[20]).

Group formation is the theme prevalent in solidarity group lending. The onus of repayment is on the group where all members make it sure to standby for an individual's loan. Thus, a conventional loan requirement has the perfect alternative as briefed above. It needs to be seen how it assists the lenders' in case of joint liability lending. It has the authority for transferring default risks from the institution to the borrower, at reduced charges involving in order to render small loans in huge numbers (Panda, 2009[26]). Best part of this methodology is that women clients get the opportunity to participate in various financial activities to create solidarity through paying emphasis on shared visions and goals in order to have collective strengths. To have the requisite change in social perspective on continuous basis, this methodology could be used as an effective tool due to the fact of critiques of cultural ideologies dominant in the society. Women clients come to aware of the advantages and how it empowers them in society (Mohindra et al., 2008[25]).

V. Liquidity

In context to need of more savings on the part of the rural poor, aspect of liquidity and low transaction attains high attention as compared to alluring interest rates. Reliable options are in need by the financial institutions in order to avail liquid funds immediately as per the requirement including to have secure investment with more liquid funds at minimal returns. Mandatory savings from the clients is collected by MFIs on weekly or monthly basis, before making further loan disbursement. Once loan is disbursed, client gets the net amount minus the payment for first installment. This reflects, lender has already taken the first installment immediately after loan transaction. Clients have the opportunity to withdraw, once loan term ends as per the time period prescribed otherwise their termination from membership.

The past decades have witnessed so many policy initiatives. Still there is no favorable result as far as the growth of small-scale industry in Bangladesh is concerned (Parvin, 2012[27]). Liquidity problem is the reason for this dismal growth. There are so many factors which have been taken into account apart from liquidity to assess the dismal performance of large scale enterprise having origin from the micro-enterprise sectors. The factors responsible for this sordid growth of enterprises are: poor infrastructure, lack of effective entrepreneurial and management skills and minimal access to machinery and materials. The hindrances for the expansion of the micro-enterprise sector are lack of access to have enough credit and financial services of the financial institutions as well. For this reason it becomes incumbent on the part Medium and Small-scale Entrepreneurs to depend on family and informal moneylenders. The radical change in microfinance movement happened in the 1990s with the inception of group-lending methodology. In recent times, this approach has gained significance to deal with the issues involving supply-led lending methodology in context with high transactions costs, low repayment rates, risk, poor targeting, and sustainability. Many considered the '*new world of microfinance'* as savior due to its potential in rendering credit assistance to the poor on a large scale through various financial services. Gaps are evident in credit market in spite of microfinance institutions succeeding in their efforts in context to supply led policies and financial liberalizations. Another drawback in this respect is the difficulty in gaining enough access to credit facilities as felt by some enterprise and entrepreneurs (Rutherford, 1998[33]).

Thus, field of microfinance has the reason to probe into the nature of liquidity which is encountered by the entrepreneurs (Cheston and Khun, 2002). There are so many suggestions in this respect to address the liquidity problems encountered by the MSE. Those are: risk aversion, issue of repaying the loan leading to loss of possessions, a hesitant to guarantee other people's loan, inability and reluctance on the part of members to attend meetings on weekly basis and rejection of '*poorest of the poor'* by wealthier group members (Harper, 2002[11]; Hamdani and Naeem, 2012[10]).

VI. Conclusion

The present study aimed to critically review the role of Micro Finance and its impact over the quality of life which is measured in termed of income, expenditure, patterns, saving, health, empowerment, entrepreneurship and literacy. In general, these micro finance serves are the financial service that supports lower-income group of business sector or the entrepreneurs with lower income business activities. It remains a matter of debate that in what context the study defines the above mentioned theories. First thing in this respect is to assess how the living standards and savings of poor people got shaped by the concepts of microfinance. Loans are being provided to the poor by the MFIs with an aim to raise the income and mobilize their savings as well. Poor people could live a secure life through mobilizing savings. This leads to income and savings of those in the poor

community who has garnered more attention to ascertain the cause. In addition to these, factors responsible for contributing towards human development like education, medical amenities and overall empowerment become the theme of fact-finding probe as these variables are linked to the basic program and methodology of microfinance. Poor have participated in various microfinance programmes. Therefore, effort was made to assess the standard of living to poor people in the line of any improvement in this situation or the status quo. Base of microfinance is attributed to the fact of requisite solidarity. Theory provides insights about the role of solidarity in getting the synergy of microfinance. It is evident from previous studies that, microfinance counts solidarity is a powerful tool to minimize the risk and to have the secure capital. The emerging entrepreneurs having the aim to establish medium scale business encounter with the major problem of crunch in liquidity. The exact nature of the liquidity problem needs to be investigated through observations involving the range of initial capital sought as loan from MFIs by the people.

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Stress Analysis of a Rectangular Plate with Circular Hole Using Three Dimensional Finite Element Model

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Abstract*: Geometric irregularities such as holes, notches, keyways, shoulders provided on shafts etc. are common features provided in machine members. But such irregularities often lead to stress concentration near the irregularity due to which the stress near the irregularity is higher than the average stress in the whole member. In this study, a rectangular plate with circular hole at center is analyzed by using three dimensional finite element analysis. The plate is subjected to tensile loading and the effect of ratio of thickness of plate to hole diameter ie. T/D on the stresses and displacements is studied. Further, the stress concentration factor for different T/D ratios is calculated theoretically and is compared with stress concentration factor computed by using ANSYS.*

Keywords*: Finite Element Analysis, Aluminium 7075 alloy, T/D ratio, ANSYS*

I. Introduction

Machine elements are generally provided with geometric irregularities such as holes, notches, keyways etc. Due to such irregularities in machine parts, the stress distribution around the irregularities is disturbed and the elementary equations of stress cannot define the state of stress in the stress concentrated regions in machine elements. Various methods of stress analysis include experimental methods such as photoelasticity, brittle coating, electrical strain gauges etc. and numerical or analytical methods like Finite Element Analysis, Boundary element analysis and Complex Variable Approach[1]. In this study, stress and displacement behaviour of a rectangular plate with circular hole at center under tensile loading is studied by developing a three dimensional Finite Element model of the problem.

Lightweight aluminium alloys like Al 7075 finds many structural applications in aerospace and automobile due to their excellent mechanical properties and light weight. Generally a rectangular plate with a central hole is a common appearance in structures. But stress concentration around the hole makes the member highly prone to failure across the hole region. Many solutions to decrease the stress concentration includes providing relief holes, notches etc.

Gunwant and Singh [2] analyzed a rectangular plate wih elliptical hole using analytical and FEA and studies the effect of aspect ratio (ratio of minor to major diameter of the ellipse) on the stress concentration factor and conclude that as the aspect ratio increases, the stress concentration factor goes on deceasing. Also it was found out that irrespective of the aspect ratio, maximium stress occurs at the corners of the ellipse. Nagpal et al. [3] studies the effect of D/A ratio(ratio of diameter of hole to plate width) using FEA on a rectangular plate having circular hole and concluded that as the D/A increases, the stresses in X , XY and von mises stress also goes on increases but stress in Y direction does no follow the same trend. Studies shows a decrease in SCF on increasing D/A ratio.SCF was mitigated by providing relief holes at optimized position and size. Nagpal et al.[4] derived an equation to calculate the size, position of the auxiliary hole. Mitigation curves were also suggested to optimize the V notch position. A mathematical analysis of the isotropic plates subjected to in plane loading is performed by Peterson [5] to calculate stress concentration factors. Kawadkar et al.[6] studied the effect of different orientations of the geometric irregularities on stress concentration using experimental and Finite element method. Different hole profiles such as rectangular, circular and triangular were studied. They draw the conclusion that the stress concentration increases with increase in the orientations of the holes.

II. Problem Description

In this research work, the effect of T/D ie. ratio of thickness of the plate to diameter of the hole on stresses induced and the displacements produced due to the applied load. The plate material is aluminium alloy Al 7075. The material is assumed to be isotropic and the Young's modulus for the material is 72000Mpa and the Poisson's ratio is 0.33. The analysis is carried out on five T/d ratios which are 0.1, 0.2, 0.3, 0.4 and 0.5. Stress concentration factor for a rectangular plate of finite width and centred circular hole is given by the following equation ([5],[7]).

$$K_{th} = \sigma_{max} / \sigma_{nom} \quad (1)$$

where σ_{max} is the maximum stress which is likely to occur near the irregularity whereas σ_{nom} is the nominal stress in the member. σ_{nom} is calculated by using elementary stress equations[8] i.e.(σ= F/A) where F is the force which is calculated by multiplying the pressure load (in MPa) by the area on which it is applied, ie.(W*T). The area considered in calculating the nominal stress is net cross sectional area i.e. ({W-D}*T) which is area considering the irregularities such as hole in this study. The stress concentration factor also depends on the ratio 2R/W (R=radius of hole) and can be calculated by the following relation.[9]

$$K= 3.00-3.13(2R/W)+3.66(2R/W)^2-1.53(2R/W)^3 \quad (2)$$

III. Finite Element Analysis

Finite element analysis of the problem is performed in popular FEA package ANSYS 13. Model of the geometry is generated and analysed in ANSYS. The plate is fixed at one end and a tensile load of 8 Mpa is applied on the other end of the plate. The model is meshed with SOLID186 element. This element has 20 nodes per element and 20 degrees of freedom at each of the node. This element has the capabilities like plasticity, creep, stress stiffening, large deflections etc. It is also suitable for modeling irregular meshes.[10]. The mesh is refined near the hole. The plate geometry and the FE model of the plate are shown in the Fig.1 and 2 respectively.

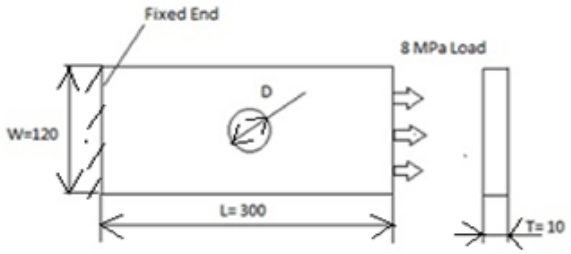


Fig. 1 Plate geometry(All dimensions are in mm)

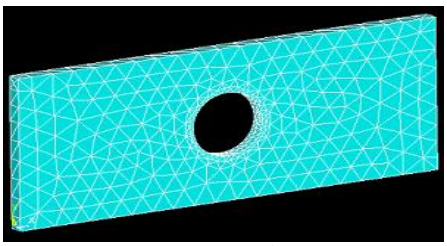


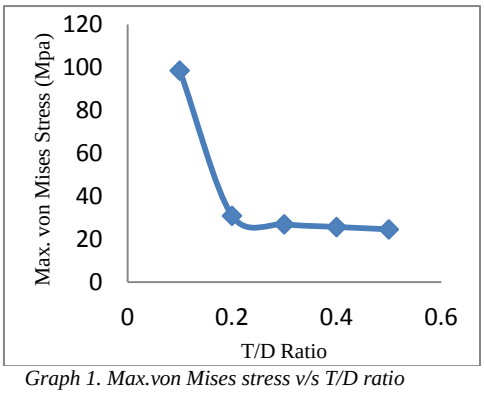
Fig. 2. 3-D FE model of the plate with hole

IV. Results and Discussion

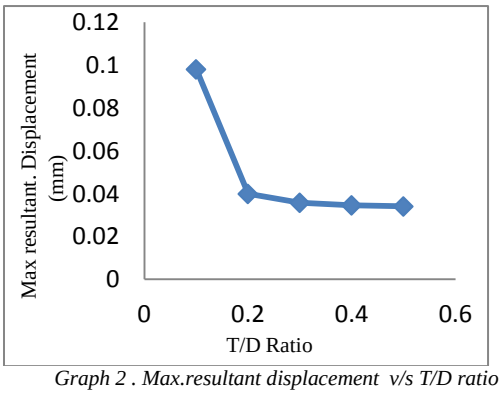
The various stress and displacement values are shown in the Table 1. By studying the table, it is clear that as the T/D ratio increases the maximum von Mises also increases. Same is the case with stress in X direction. But the stress in Y direction increases from T/D ratio 0.1 to 0.4 and decreases slightlier further. The displacements (resultant, X and Y directions) decreases as the T/D ratio increases which is highly expected because as the T/D ratio increases, the hole diameter gets reduced, material in the plate increases which makes it more strong to restrict the deformation induced due to loading. The variation of von Mises stress and resultant displacement with T/D ratio are graphically represented in graphs 1-2 and stress concentration around the hole and displacement plots are shown in the Figures 3-7.

S.No	T/D Ratio	Max. von Mises Stress (Mpa)	X component of stress (Max. Value in Mpa)	Y Component of stress(Max. Value in Mpa)	Max Resultant Displacement (mm)	X Component of displacement (mm)	Y component of displacement (mm)
1	0.1	98.5025	99.976	6.74203	0.098023	0.098021	0.054961
2	0.2	30.8862	31.444	6.97365	0.039919	0.039918	0.006138
3	0.3	26.9271	27.3621	7.09829	0.035792	0.035769	0.003695
4	0.4	25.6535	26.4661	7.14378	0.034584	0.034535	0.003001
5	0.5	24.5474	25.9444	7.12384	0.03405	0.033987	0.002692

Table 1 Stress and displacement results for various T/D ratios from FEA



Graph 1. Max.von Mises stress v/s T/D ratio



Graph 2 . Max.resultant displacement v/s T/D ratio

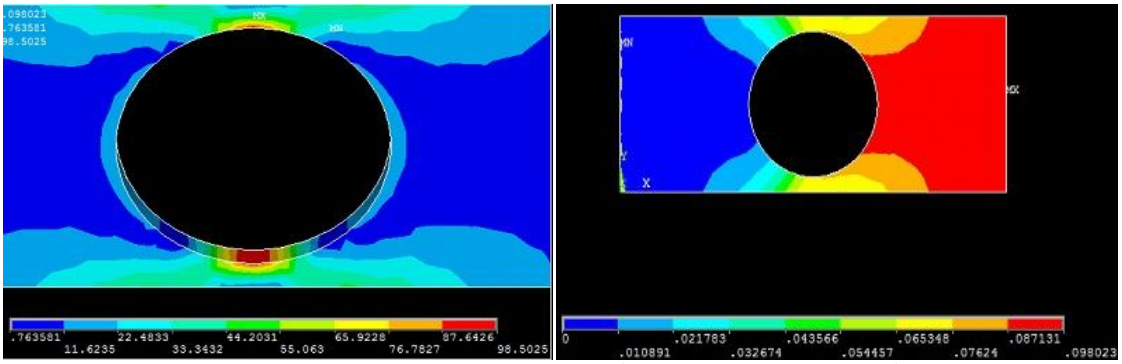


Fig. 3 Stress concentration (von Mises) around the hole(left) and displacement plot(right) for T/D =0.1

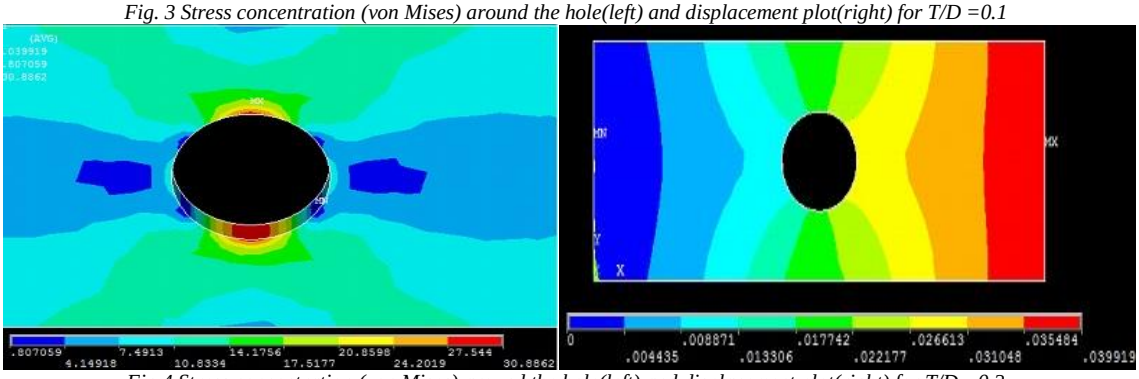


Fig.4 Stress concentration (von Mises) around the hole(left) and displacement plot(right) for T/D =0.2

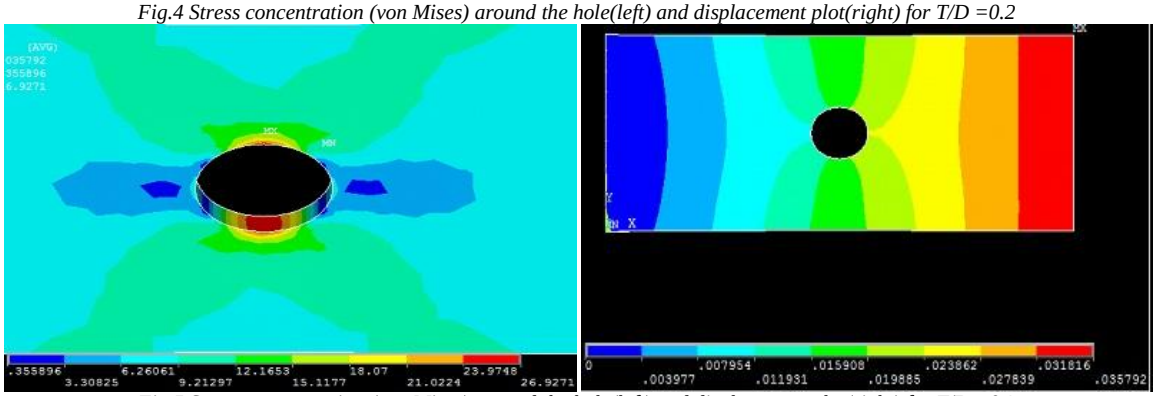


Fig.5 Stress concentration (von Mises) around the hole(left) and displacement plot(right) for T/D =0.3

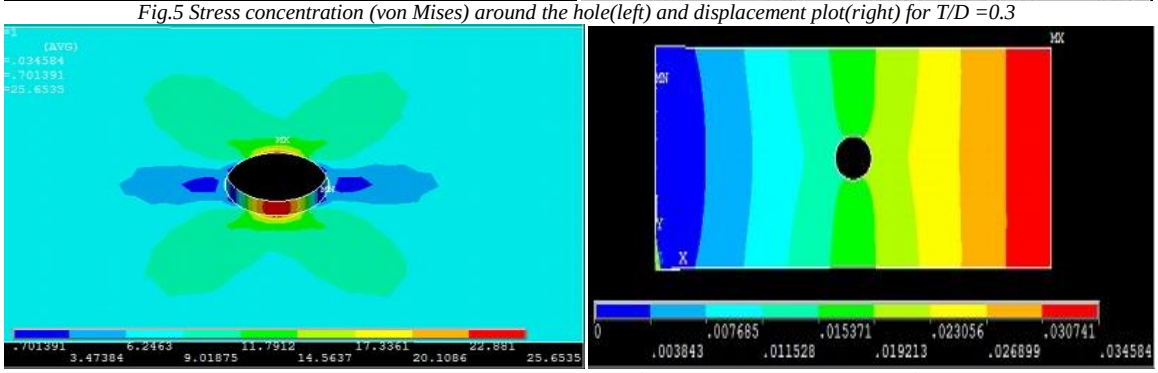


Fig.6 Stress concentration (von Mises) around the hole(left) and displacement plot(right) for T/D =0.4

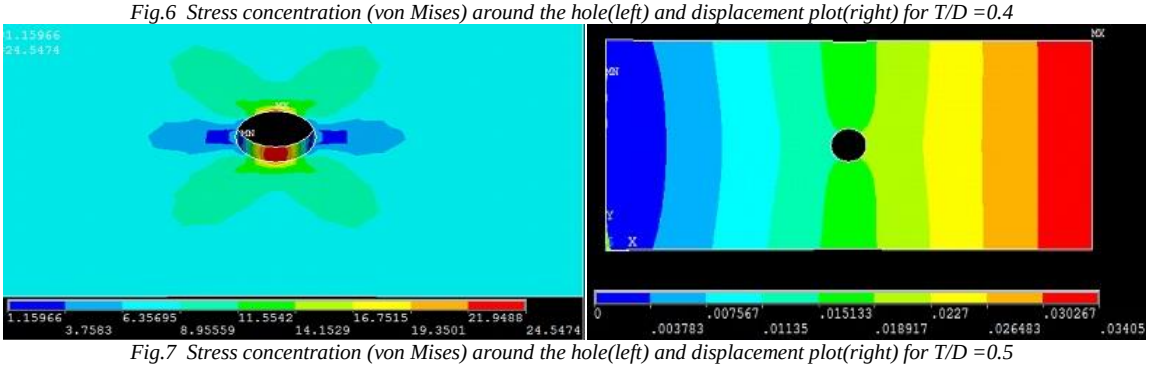
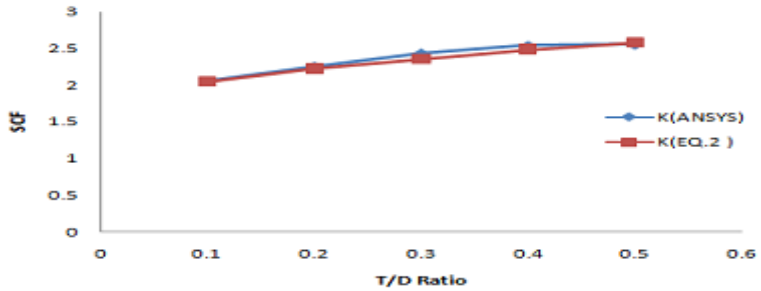


Fig.7 Stress concentration (von Mises) around the hole(left) and displacement plot(right) for T/D =0.5

For various T/D ratios, the stress concentration factors are calculated based on results of ANSYS (eq. 1) and theoretically (eq.2). The SCF values increases as the T/D ratio increases and this indicates an increase in SCF for reduction in diameter. The values of SCF based on eq 1 and 2 are compared and % error is calculated and the data is plotted in the Table. 2. Graph 3 shows the graphical representation of the experimental (from ANSYS) and theoretical values (eq.2) of SCF.

S No.	T/D Ratio	Max. von Mises stress, σ_{max}	Nominal stress $\sigma_{nom}=F/A$	S.C.F,K_{ANSYS}	S.C.F, $K_{eq.\ 2}$	% Error
1	0.1	98.5025	48	2.052	2.048	0.175
2	0.2	30.8862	13.714	2.252	2.221	1.376
3	0.3	26.9271	11.07	2.432	2.354	3.207
4	0.4	25.6535	10.11	2.537	2.483	2.128
5	0.5	24.5474	9.6	2.557	2.573	0.622

Table 2. Comparison of SCF values obtained from FEA(eq. 1) and equation 2.



Graph 3.Comparison of different SCF values obtained

V. Conclusion

In this study, a rectangular plate with circular hole in center is analyzed with FEA and effect of T/D ratio on stress and displacement is studied. Also, effect of T/D ratio on the SCF is studied and the SCF values obtained with FEA and relation (eq. 2) were compared. Following conclusions can be drawn from the study.

1. Maximum stress occurs at the corners of the hole irrespective of the T/D ratio. Also, von Mises stress decreases with increase in T/D ratio.
2. The resultant displacement in the plate decreases with increase in the T/D ratio.
3. The SCF increases with increase in the T/D ratio. The SCF values obtained from FEA results are in a good agreement with the values obtained with the relation (eq. 2) with a maximum error of 3.207%. From these results, it can be concluded that Finite Element analysis is a valuable tool to study stress concentrations in structural and machine elements.

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A Modified Power Gating Technique for Ground Bounce Noise Reduction in CMOS Adder Circuit

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Abstract: *As technology is continuously scaling down, leakage current is increasing exponentially. Power gating is a very effective technique to reduce the leakage current and leakage power by using sleep transistors to turn off the functional blocks when they are not in use. But when circuit transition goes from sleep to active mode, abrupt transitions introduces Ground Bounce Noise in the circuit which disturbs the normal working of any circuit and tends to give wrong output and also reduces the reliability of circuit. In this paper, we have presented a new power gating technique which uses stacking power gating along with an additional wait mode to reduce ground bounce noise in an adder circuit. A comparison analysis between existing and proposed power gating techniques has been done which shows that the proposed technique reduces leakage by 70.40 and ground bounce noise by 14.02% as compared to existing power gating techniques. We have performed simulations using Cadence Spectre 180nm standard CMOS technology at room temperature with supply voltage of 1V.*
Keywords: *Ground bounce noise, leakage current, sleep to active mode transition, Sleep Transistors*

I. INTRODUCTION

One of the most important issues in VLSI design is leakage current in standby mode with continuous down scaling in advanced CMOS technology. As the dimension of MOSFET is continuously scaling down, the supply voltage and the threshold voltage (V_{th}) of integrated circuits is also scaling down to maintain reliability of devices. Low threshold voltage however leads to an exponential increase in sub-threshold leakage current and hence leakage power [1,2,3]. Power gating is one of the popular leakage power reduction strategies applicable to idle circuits [4]. In power gating technique, high threshold voltage (*high*-$|V_{th}|$) sleep transistors (header and footer) are used to cut off the power supply or the ground connection to the idle low threshold voltage (*low*-V_{th}) circuit blocks as shown in figure 1.

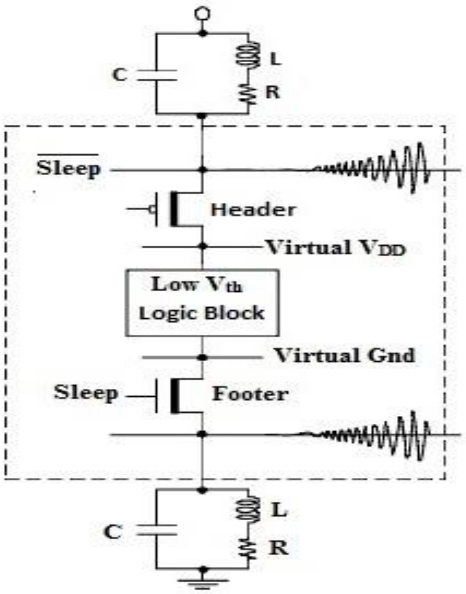

Figure 1 Power and Ground bounce noise generated in Conventional CMOS circuit

While operating the circuit in the *active* mode, the sleep transistor is turned on to perform the desired functionality of the circuit. In the *sleep* mode, the sleep transistor is turned off, due to which the source nodes of the transistors in the functional block float, thus cutting off the leakage path to the ground. The only path that is left for the leakage current to flow is the parasitic capacitances of the transistor shown in Figure 2.Thus the leakage current starts charging up the parasitic capacitances of the transistors. When the circuit is turned on, these capacitances need to be discharged to get the circuit back to the normal mode of operation. This sudden

discharge of current causes voltage fluctuations in the circuit. This sudden voltage fluctuation is known as Ground Bounce Noise [5].This ground bounce might cause performance degradation or even worse, functional failures in the adjacent units. Transistors may stuck into a meta-stable state causing failure of the circuit operation and it can results in increase of power dissipation and leakage current [6].

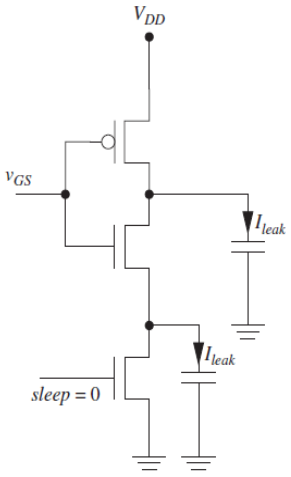

Figure 2 Parasitic capacitances in a inverter circuit being charged up by the leakage current when the sleep transistor is off.

Ground bouncing phenomenon in CMOS 1-bit adder circuit is evaluated in this paper as adders are heart of computational circuits and many complex arithmetic circuits are based on the addition, this is why building low leakage adder cells are of great interest. A novel stacking power gating with additional wait mode structure is presented in this paper to effectively suppress the ground bouncing noise during mode transition (sleep to active mode transition) and leakage current during standby mode in adder circuits. The remainder of this paper is organized as follows. In section II, full adder circuit with stacking power gating technique and its equivalent circuits are discussed. In section III, analysis of the stacking power gating technique with wait mode has been done and its equivalent circuit is explained. In section IV simulation results of conventional CMOS full adder cell and full adder cell with stacking power gating circuits are explained. Then the paper is summarized in section V.

II. PROPOSED STACKING POWER GATING TECHNIQUE WITH WAIT MODE

Stacking power gating technique with wait mode (shown in Fig. 3) has been introduced in this section to further reduce the activation noise and standby leakage current. In this technique high threshold sleep transistors (N_1, N_2 and P_1) are used to reduce leakage current effectively. Transistor stacking is an effective way to reduce leakage current so two high threshold NMOS transistors (N_1 and N_2 are used in stack. An additional wait mode is being introduced between sleep and active mode so that discharging of virtual ground voltage (V_{GND1}) during sleep to active mode can be divided into two parts using wait mode which will reduce peak of ground bounce noise efficiently. Delay ΔT is provided between the activation of two transistors (N_1 and N_2). This delay isolates the ground for a short period of time during the mode transition. An additional capacitor C_2 is inserted in the intermediate node V_{GND2} to control the drain current flowing through the second sleep transistor N_2 in mode transition. Forward body biasing voltage (V_{bias}) has been applied to wait transistor so that more virtual ground voltage get discharged during sleep to wait mode transition. Detailed analysis has been done in Section III.

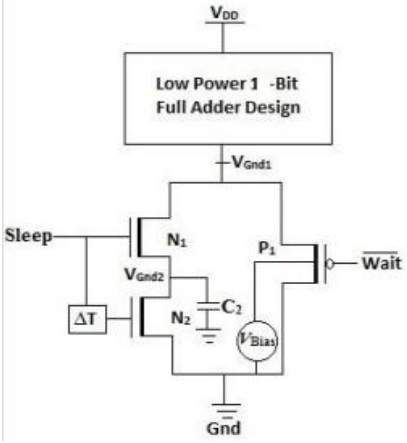

Figure 3 Stacking Power gating with wait mode

III. ANALYSIS OF STACKING POWER GATING TECHNIQUE WITH WAIT MODE

This power gating technique works on two strategies: (A)Strategy for standby leakage current reduction and (B)Reduction of Ground bounce noise (GBN) during mode transition.

A. Strategy for Standby Leakage Current Reduction

In this technique the leakage current is reduced by turning OFF the transistors N_1, N_2 *and* P_1 in standby mode. The expression for the sub threshold leakage current is [3]

$$I_{sub} = Ae^{\frac{q}{nkT}(V_{gs}-V_{th0}+\gamma V_{bs}+\eta V_{ds})}(1-e^{\frac{-qV_{dc}}{kT}})$$

$$A = \mu_n C_{ox}\frac{W}{L}(\frac{kT}{q})^2 e^{1.8} \quad (1)$$

Where V_{th0} is the zero bias threshold voltage, γ is the body effect coefficient and η is the DIBL coefficient, C_{ox} is the gateoxide capacitance and μ_n is mobility. V_{gs}, V_{bs} and V_{ds} are the gate to source, bulk to source and drain to source voltages respectively. Equation (1) shows that the sub threshold leakage current will reduce exponentially if body effect is increased (negative V_{bs}) and drain-to-source voltage V_{ds} is decreased. The stacking structure [7] is shown in Fig. 4. When sleep transistors are turned OFF in standby mode then the voltage of the intermediate node V_{GND2} raises to the positive values due to small drain current of the sleep transistor N_1. Further, due to this positive potential at the intermediate node the drain-to-source potential (V_{ds}) of N_1 decreases which results in negative body-to source potential (V_{bs}) of N_1 causes more body effect. This will reduce leakage current effectively.

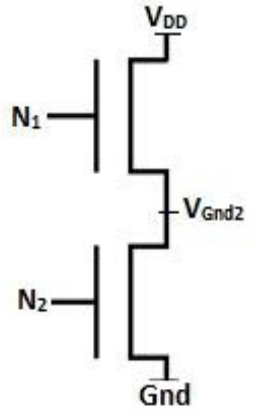

Figure 4 Stacking Power Gating

B. *Strategy to Reduce Peak of Ground Bounce noise During Mode transition*

Ground bounce noise can be reduced by limiting the large transient current flowing through the sleep transistors during mode transition. When sleep transistor is turned ON, voltage of virtual ground goes down sharply which causes fluctuations in ground rail. The voltage of the virtual ground line is maintained at V_{DD} during the sleep mode. Before the activation of the circuit, the P_1 transistor is turned on while transistor N_1 *and* N_2 is maintained in cut-off. In this situation the circuit transits to the intermediate wait mode. Body biasing has been done for wait transistor so that threshold voltage of wait transistor can be reduced without increasing the width and more virtual ground voltage can discharge during transition from sleep to wait mode [8]. The virtual ground line is discharged to the threshold voltage of the wait transistor V_{tp} and then transition from wait mode to active mode takes place. Due to two-step transitions from the sleep mode to active mode through wait mode voltage swings on ground rail get suppressed which leads to ground bounce noise suppression [9,10]. To complete the reactivation process from wait to active mode, the stacked transistors N_1 *and* N_2 are subsequently turned on. The transistor P_1 is turned off. By isolating the ground for small duration during mode transition and turning ON the N_1 transistor in linear region instead of saturation region ground bounce noise will reduce effectively. During wait to active mode transition, transistor N_1 is turned ON and transistor N_2 is turned ON after a small duration of time (ΔT). The logic circuit is isolated from the ground for a short duration as the transistor N_2 is turned OFF. During this time, the ground bounce noise can be greatly reduced by controlling the intermediate node voltage V_{GND2} and operating the transistor N_1 in triode region. The intermediate node (V_{GND2}) voltage can be controlled by (1) Inserting proper amount of delay, that is less than the discharging time of the N_1 transistor, and (2) Proper selection of the capacitance C_2.

Since the voltage across the capacitor does not change instantaneously, the voltage across capacitors C_1 and C_2 remain same by instantaneously turning on the sleep transistorN_1. Now the equivalent circuit for stacked transistors during wait to active mode is shown in Fig. 5.

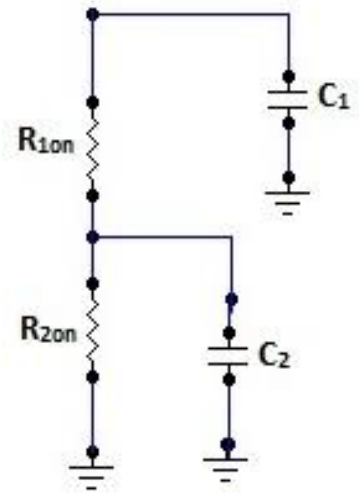

Figure 5 Equivalent circuit of stacking sleep transistors during wait to active mode transition

Here R_{1on} is the ON resistance of sleep transistorN_1, C_1 is the internal capacitance at virtual ground node V_{GND1} and C_2 is the external capacitance at intermediate node V_{GND2}.The voltage across the capacitor $C_1 \approx V_1$, and the voltage across the capacitor $C_2 \approx V_2$. When $\Delta T > t > 0$, the capacitor C_1 having voltage V_1 will begin to discharge, and the capacitor C_2 will be charging by the amount with which C_1 is discharging. This process will continue until both the capacitances have the same potential. From above point of view by controlling the capacitor C_2 and ΔT we will be able to control the intermediate node voltage V_{GND2} so that both the transistors (N_1 *and* N_2)can be turned on in triode region and hence voltage swing at ground rail during wait to active mode transition can be controlled and ground bounce noise will reduce effectively.

IV. RESULTS AND DISCUSSIONS

In this section, we have performed simulation of our conventional 28 T and modified 28T adder (adder with stacking power gating technique) on Cadence Virtuoso Tool and SPECTRE Simulator at 180 nm Technology.

A. Active Power

The Active power is dissipated by the circuit when the circuit is operation state. Here we will calculate the active power of the circuit at basic of voltage and temperature for the 180 nm technology .The Active power consumption of CMOS circuit is consumed by the following equation.

$$P_{active} = P_{dynamic} + P_{static} \quad (2)$$
$$= P_{switch} + P_{short} + P_{leak}$$
$$P = F_C V_{DD} + I_{short} V_{DD} + I_{leak} V_{DD} \quad (3)$$

Where F_C = Clock frequency,V_{DD} = Power supply,I_{short} =Short circuit current, I_{leak} =Leakage current.

As shown the table I, in the case of modified 28T adder with stacking power gating active power is reduced as compared to conventional 28T adder. The reduction is almost 44% at voltage 1.8 V and temperature 27℃.

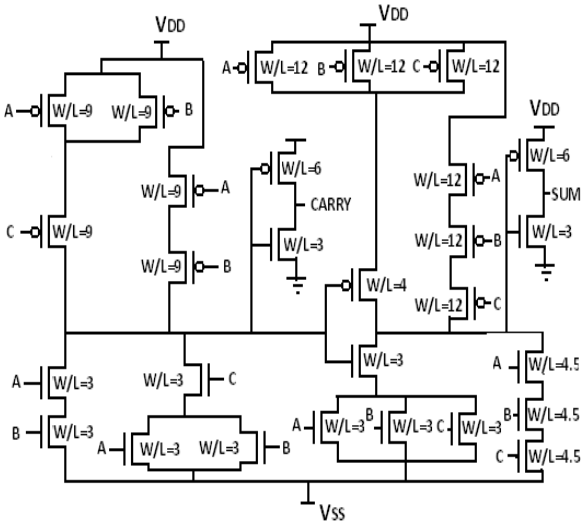

Figure 6 Conventional 28T adder circuit

Table I Active Power Dissipation of 28T Adder

Circuit	Conventional Adder(nW)	Modified adder(nW)
	1.8V,27℃	1.8V,27℃
Active Power	108.67	61.84

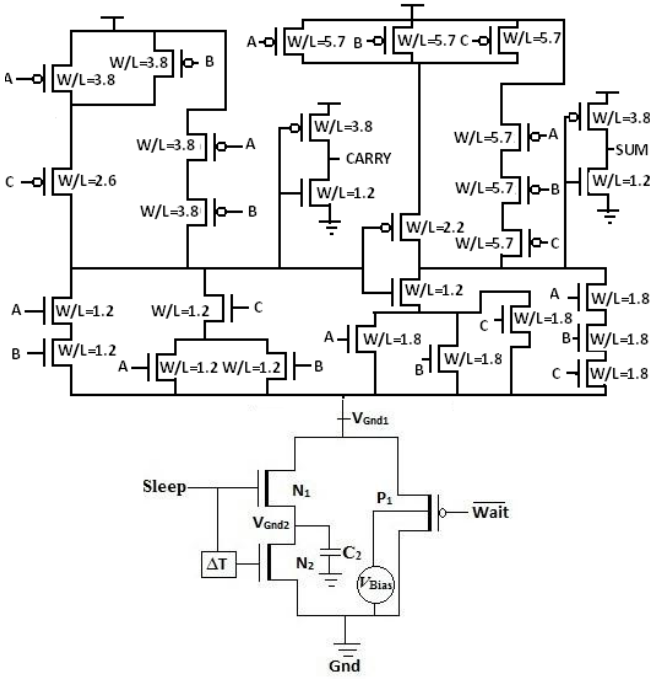

Figure 7 Modified Adder circuit

B. Stand By Leakage Current

The stand by leakage is obtained when the circuit in idle mode. When we measure the leakage current in stacking power gating then both sleep transistors are off. The basic equation of stand by leakage is [11]:

$I_{leak} = I_{sub} + I_{ox}$ (4)

Where, I_{sub} =Subthreshold leakage current, I_{ox} =Gate oxide current

Stand by leakage current is measured by at 1.8V and 27 ℃. It is greatly reduced almost 80% in modified 28 T adder with stacking power gating .The table II shows the leakage current at various voltage and various temperature .

C. Leakage Power

The stand by leakage power is measured at the time of idle mode. Here measured the leakage power when the sleep transistor is off. Basically the stand by leakage power is the product of the leakage current and supply voltage [12]. The basic equation of leakage power is

$P_{leak} = I_{leak} V_{DD}$ (5)

Table II The stand by Leakage Current and power due to Voltage variation

Voltage (V)	Leakage Current(nA)		Leakage power(nW)	
	Conv. Adder	Modified Adder	Conv. Adder	Modified Adder
0.7	31.8	4.3	36.9	17.7
1.0	53.7	18.8	79.4	41.1
1.5	76.8	43.7	101.5	69.3
1.8	102.6	54.9	133.8	98.2

Table III The stand by Leakage Current and power due to Temperature variation

Temp. (℃.)	Leakage Current(nA)		Leakage Power(nW)	
	Conv. Adder	Modified Adder	Conv. Adder	Modified Adder
27	102.6	54.9	133.8	98.2
47	103.1	65.7	135.7	126.7
67	103.7	69.1	139.4	139.4
87	104.2	77.8	143.5	152.3

The table II and table III shows leakage power is reduced almost 30% in various voltages and temperatures after applying stacking power gating.

D. Ground Bounce Noise

During mode transition of the circuit an instant current pass from sleep transistor, which operates in saturation region at that time and causes a sudden flow of the current. Because of self inductance of the off- chip bonding wires and parasitic inductance on chip power rails , results an increase in voltage level in the circuits ground rail depends on input / output buffers and internal circuitry[13]. The noise depends on the voltage. All the below mentioned results have been simulated under the condition that the all logical inputs of full adder circuit are held at logic 1 for ground bounce noise calculation (worst case for peak ground bounce noise).The ground bounce noise model [14] is shown in Fig.8.

As shown in the Table IV & V the ground bounce noise is reduced up to 90 % in to various voltage and temperature. The ground bounce noise is measured at 1.8V and 27℃. It is greatly reduced almost 90 % in modified 28T adder with stacking power gating and also shown in the table IV & V at various voltage and various temperature. As sleep input is given to transistor N_2 after a delay ΔT , so peak of ground bounce noise also vary with respect to ΔT Variation in Ground Bounce Noise with respect to delay ΔT is shown in figure 9.

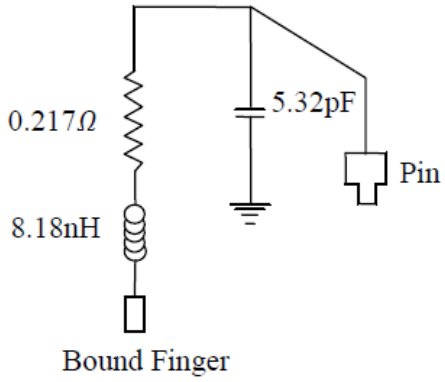

Figure 8 DIP-40 package pin ground bounce noise mode

Table IV Ground Bounce Noise for 28T Adder

Voltage (V)	Ground Bounce Noise	
	Conventional (uV)	Modified (uV)
0.7	9.7	0.39
1.0	19.5	0.97
1.5	27.3	1.7
1.8	34.6	4.1

Table V Ground Bounce Noise for 28T Adder

Temperature (℃.)	Ground Bounce Noise	
	Conventional (uV)	Modified (uV)
27	34.6	4.1
47	45.7	5.7
67	59.1	6.3
87	67.8	6.9

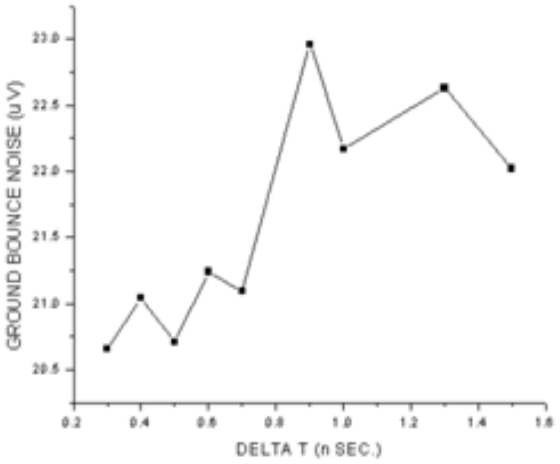

Figure 9 Variation of Ground Bounce Noise with respect to ΔT

V. CONCLUSION

In this paper we proposed a modified 28T Adder for arithmetic logic circuits with low ground bounce noise and reduce leakage power. Here we have used high performance power gating technique to reduced active power, leakage power, leakage current and ground bounce noise. The leakage current up to 80% and leakage power up to 30%. The ground bounce noise is reduced to up to 90% and active power is reduced up to 44 %.The proposed modified 28T adder is operated at various voltages and various temperatures.

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Reengineering the Speed of Internationalization

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Abstract: *Whereas Firm internationalization process is considered as dynamic, the dimension of speed has rarely been the chief focus of research. The appearance of the study of international entrepreneurship has established the role of speed; however, this has usually been measured in terms of the time lag between a firm's foundation and its initial international action, with little attempt at defining and explaining the speed of the process once it is under way. This study reviews the concept of speed from an internationalization point of view. With the new definition, a model is presented of how the speed of international process is influenced by enabling forces.*

I. Introduction

A lot of research in the internationalization literature over the past five decades has focused on firms' internationalization processes, its speed and diffusion– which we take as the foundation for this study– has concentrated on examining such processes along three main dimensions: extent, process and speed [1, 29]. Nonetheless, while knowledge on internationalization processes has progressed, two main questions still deserve more attention. First, even though internationalization has always been theorized as a dynamic process [9, 27], the concept of speed was not contained in the literature until the mid-1990s, following the development of international entrepreneurship concept [15, 20, 29, 6], which evaluated development by contrasting static observations [18]. Second, speed has mostly been theorized as the time elapsing between the company's foundation and its first international scheme [22, 25, 29], and therefore copes more with the pre-internationalization than the internationalization process for itself, which we argue still remains under-investigated. As Autio et al. (2000, p. 909) mentioned research has not adequately differentiated between two intimately related but different issues: first, the time lag between the founding of a firm and its initiation of international operations [14, 15] and, second, the speed of a firm's following international growth. Prashantham and Young (2011) postulated that the difference between initial speed of internationalization (related to the time between a firm's founding and its first international action) and post-entry speed (time between the first and subsequent international activities) is particularly essential for the success/failure international ventures.

II. Literature Review

Internationalization: The literature defines internationalization as a process through which a firm enhance its level of participation in foreign markets during the time [27], and conventionally considered it as a series of events that happen over time [9], i.e. as Jones and Coviello (2005, p.7) mention: 'by definition, internationalization behavior occur during the time, demonstrate in a time sequence in which events occur'. Mathews and Zander (2007, p.398) perceive a firm's internationalization as operating not through a severe series of 'stages', but via pathways that expose entrepreneurial observations and strategic actions in a 'stage model' approach.

Furthermore, Liesch and Knight (1999) defined internationalization readiness as "being a function of its state of awareness on foreign market(s) and the means for entering them" [31, 32].

Speed and internationalization process: The notion of speed associate to the length of time over (or within) which particular aims are attained, and is mostly measured as an amount between a particular disparity and a specific unit of time. Thus, speed links two basic components: the first is change within a specific dimension, the second a specific pointer of time.

III. Analyzing Models and Axioms

Recognizing concepts of the speed of internationalization processes (in terms of the relationship between patterns of events and time) require a finer-grained consideration of such elements as the multidimensionality of international actions, and the concept of concurrent but different 'types' of time.

A. Multidimensionality of internationalization process

Internationalizing behavior incorporates an extensive range of decisions and events that affect both an organization's externally visible aspects and its internal profile. Welch and Luostarinen (1988) detect some of these features in noting: (1) the method of operation (how); (2) the target of the sale (what); (3) target markets (where); (4) organizational capacity; (5) personnel; (6) organizational structure; and (7) finance; whereas Zahra

and George (2002) differentiate three noticeable issues of internationalization: (1) scope; (2) process; and (3) diffusion. However speed is the subject of this study, we have also sum up their first two dimensions below.

A.1. ***Scope*** (or extent) denotes to the level of the firm's commitment to its foreign expansion, and it is likely to classify two various attitudes towards this concept. The first refers to the commitment to foreign sales [29], and frequent studies have concentrated on examining exporting intensity, taking the firm's exports as a portion of its total sales turnover [4, 5, 6]. Sullivan (1994) used this variable as an pointer of the degree of a firm's internationalization, whereas other research have taken a more wide view of this commitment by contemplating the proportion of foreign sales (the sum of its exports and its foreign subsidiaries' sales) to the multinational company's entire sales turnover [26]. The second measure of the extent of a company's commitment to internationalization is founded on resources that it makes available for the process [16, 6], with those having foreign production plants and subsidiaries manifesting their greater involvement to internationalization by assigning a larger proportion of their resources beyond their national frontiers.

A.2. ***Process*** (or mechanism) is defined as the range of locations where the company establishes its business [29], covering the markets and/or countries where it sells or manufactures its products and services [27]. Firm internationalization can be computed by the number of countries to which it exports its products, the number in which it owns subsidiaries, the divergence of its foreign markets, and the physical and/or cultural distance between those countries where it is active. The traditional consecutive approach considers that firms inception their internationalization process in just a few countries that are both physically and culturally close to their own domestic markets, and increasingly go in more and more distant countries as their internationalization processes enhance [1, 9, 12, 6]: therefore, the number, distance and variety of countries can be used as index of the degree of the firm's internationalization [7, 6].

A.3. ***Diffusion*** (or speed) can be considered as the rate of change in either of the two past dimensions, and it is likely to determine three 'types' of speed in the internationalization process [26 29, 6]. The first two associate to the intensity of a firm's internationalization, whereas the third refers to its degree. These three types of speed are: (1) the speed of the growth in a firm's international commercial strength; (2) the speed of its upsurge in commitment of resources overseas; and (3) the speed of the change in breadth of its international markets.

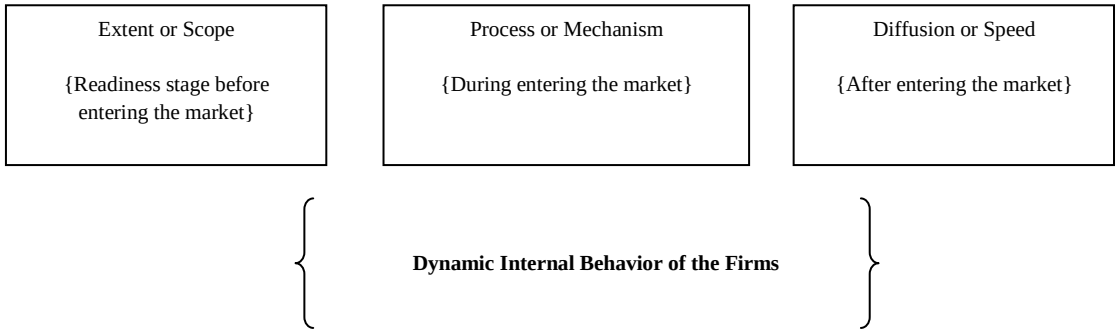

Figure 1: Types of speed in the internationalization process [6]

- Speed of international strength (exporting intensity) can be described as the growth of the proportion of company sales derived from foreign countries over a specific period of time. In the case of exporting companies, speed can be assessed as the growth of its exporting intensity between two specific moments in time [4]. Whereas companies have foreign subsidiaries, this measurement becomes more complicated, as it is essential to understand the proportion of the group's income derived from foreign subsidiaries at two points in time, and then assess the growth of that proportion [26, 6].

Axiom 1: Speed of international growth is a type of speed in internationalization process.

- Speed of increased commitment of resources to foreign activity [9, 13, 6] can be determined by various simple indicators, such as increases in the proportion of company assets held abroad or of its workers employed in foreign firms [26]. A firm's foreign market entries can also be appropriate index of this type of speed – the numbers of new subsidiaries established overseas, of foreign production plants installed or of foreign companies obtained by the company between two specific moments again tell of the speed of change in its commitment of resources abroad over that period [3].

Axiom 2: Speed of increased commitment of resources to foreign activity is a type of speed in internationalization process.

- Speed of the dispersion (growth in breadth) of international markets is described as the increase, over time, in the number, variety and distance of the countries where a company is active [3, 15, 29], and can be evaluated through different factors: the number of new countries to which the firm exports or in which it makes capital investment (subsidiary outlets, production plants); the increase in the geographical divergence of its sales; or the mean physical and/or cultural distance of those countries from its home base [26, 30]

Axiom 3: Speed of the dispersion of international markets is a type of speed in internationalization process.

B. **International entrepreneurship:** International business scholars Wright and Ricks (1994) emphasized on international entrepreneurship as a new emerging research ground. International entrepreneurship is a mixture of innovative, proactive, and risk-seeking behavior that crosses national borders and is intended to make value in organizations [19, 6]. International entrepreneurship is the discovery, enactment, evaluation, and exploitation of opportunities—across national borders—to create future goods and services.

C. **A Model of Internationalization Speed**

Figure 2 shows a model of factors on the speed of entrepreneurial internationalization. As shown, there are three critical aspects to such speed. First, there is the time between the discovery or enactment of an opportunity and its first foreign market entry. Second, is the speed with which country scope is increased. That is, how quickly do entries into foreign markets gather and how fast are countries entered that are psychically distant from the entrepreneur's home country? Third is the speed of international commitment.

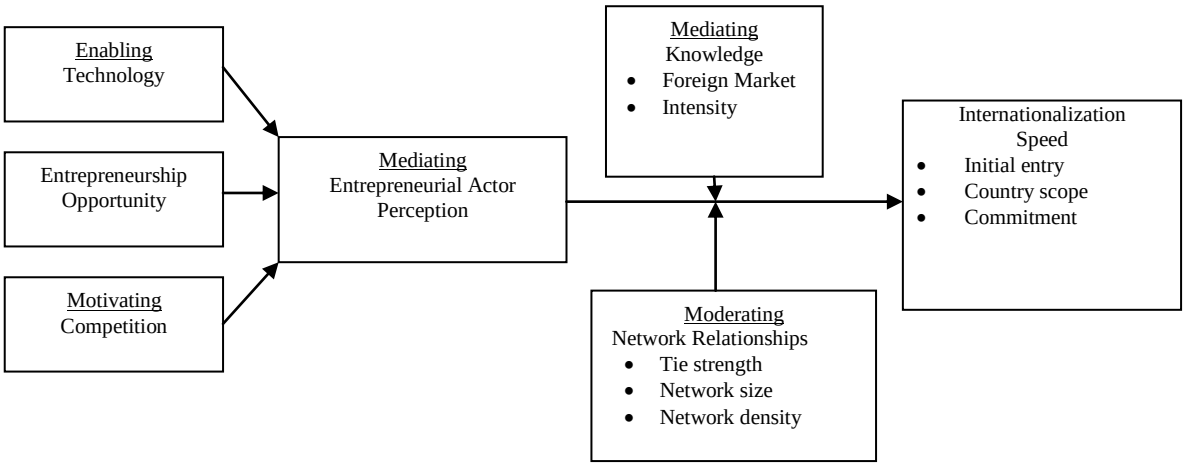

Figure 2: Model of influential forces on Internationalization Speed [6]

The process of entrepreneurial internationalization in our model starts, as shown in Figure 2, with a potential entrepreneurial opportunity. We will plainly suppose here that an entrepreneurial actor somehow discovers or enacts such an opportunity due to the fact that our focus is not on the nature of the discovery or enactment, but on the speed with which that opportunity is internationalized. Most important, our model depicts that the speed of entrepreneurial internationalization is verified by four types of forces: (1) enabling, (2) motivating, (3) mediating, and (4) moderating.

The quicker, or the *enabling* force, makes fastened internationalization possible [23]. Faster and more efficient transportation among multiple foreign countries has brought down costs for foreign trade and investment. Transportation, communication, and digital technology seem to be the foundation enabling rapid internationalization of such an entrepreneurial opportunity.

The second general force effecting on the speed of internationalization is the *motivating* force of competition. Where technology enables quicker internationalization, competitors inspire or even force it upon entrepreneurs.

The entrepreneurial actor is the third, the *mediating* force. The person or group that discovers or enacts an opportunity is dominant to the dynamics of international exploitation. Through the lens of their personal characteristics (e.g., years of international experience) and psychological traits (e.g., risk-taking propensity), entrepreneurs detect and explain the potential of the opportunity, the potential of communication, transportation, and computer technology to enable internationalization, and the degree of threat from competitors [24].

IV. Results and Conclusion

Given the complexity of the concept, because of its multidimensionality and different time scales, we develop the research aimed at understanding how the different dimensions of speed discussed above connected to each other, both from a theoretical viewpoint and also in terms of how they might be applied to empirical studies [3]. This brings up questions, three of which are most significant. First, we need to understand whether companies that internationalize rapidly in their early stages – the so-called 'born global' firms or international new ventures – internationalize equally rapidly in subsequent stages [2, 6]. Second, we have little comprehension of how internationalizing speed associates to entry modes that demand greater commitment of resources (such as foreign direct investment) and the diversity of markets that the company prefers to enter, or of the affiliation between these two variables and international commitment as reflected in the proportion of the company's sales attributable to its foreign activities. Third, we demand to work with dynamic profiles to gain profound understanding of the variability of speed over time.

The classic literature on the internationalization process contains a rich stream of studies on the determinants of entry mode and country selection, which made a large work between the 1960s and the 1990s. This literature deems that decisions on both these choices depend on the combined influence of different factors or enabling forces of technology, the motivating forces of competition, the mediating perceptions of entrepreneurs, and the moderating forces of knowledge and networks that collectively determine the speed of internationalization.

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Readiness for integrating sustainability issues in public procurement process of Bangladesh

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Abstract: *Recognizing the role of public procurement to support sustainable development due to its multiplier effects on the economy, the present study seeks to provide an assessment of readiness of integrating sustainability issues in public procurement process of Bangladesh by analyzing its incentives, barriers and needed supports. A semi structured questionnaire was used to collect primary data from randomly selected 60 public procurement practitioners of Bangladesh. The recorded data were analyzed using SPSS 17 computer package. The highest proportion of the respondents was middle aged and male. Majority of them were from engineering background and involved in the development of specification and tender document for their organization. Almost all of them were trained in public procurement but most of them did not get training on sustainable and ethical procurement and sustainable development. The highest portion of them define SP as procurement based on considering the environmental, social and economic impacts for achieving long term value for money. Improvement of environmental quality, higher labor standard, better health & safety condition of worker and optimize use of natural resources were regarded as highly ranked opportunities arise from addressing sustainability through public procurement. Lack of policy guideline, absence of political will in promoting sustainability and avoidance of complexity for secondary objectives of procurement were the common responses as a barrier. In addition to formulate a sustainable procurement policy, political willingness and a clear commitment is necessary form the government. Limitation with public sector, the proposed typology of sustainable procurement can serve as a basis to develop an emerging thought among policy makers and academic researchers to use procurement as important tool for sustainable development of Bangladesh and future research in this area.*

Keywords: *Sustainable development, Public procurement, PPR, Bangladesh.*

I. Introduction

Bangladesh is among the most densely populated countries in the world, vulnerable to natural disasters and increasingly affected by climate change. Bangladesh needs to balance economic, social and environmental requirements of development in order to ensure the needs of the present generation are met without compromising the ability of the future generations to meet their own needs (GED, 2013). Government expenditure is having a significant share of GDP's in each country because countries are using public procurement to pursue social goals such as reduce unemployment rate, raise labor standard, provide employment opportunities for disable persons and promote gender, racial and ethnic equality (McCrudden, 2004). Foundational to the role of government itself, procurement has been conceptualized as one of four major economic activities performed by government (Thai, 2001). Public procurement (PP) represents 18.42% of the world GDP (Mahmood, 2010). As a developing country, Government expenditure constitutes about 16 per cent of its GDP in Bangladesh. For sustainable development (SD), we should ensure best value for money (Mannan and Islam, 2013). Sustainability is driven by an incorporation of economic, environmental, and equity-driven values and policy aims-further defined as people, profit and planet (Weybrecht, 2010). Sustainable Procurement (SP) worldwide is heavily driven by public procurement agendas and is often viewed as a public sector initiative. While SP activities are common in many developed countries, the awareness and implementation is still comparatively low in most developing countries (Kamruzzaman, 2013). Potential barriers and challenges of implementing SPP have been mentioned mainly based on the European experience as clustered by GIZ (2013) such as economic, political, regulatory policies, cognitive and legal framework**.** Warner and Ryall (2001) found integration of environmental considerations only rated as moderately successful, with higher costs of green products emerging as the most commonly cited barrier in local authorities of England and Wales. Thomson and Jackson (2007) reported the main barriers to sustainable supply were a perceived lack of priority at senior level. Ning *et al.* (2003) identified that the initial higher cost of green building is than conventional buildings limited by the design and technology level is one of the significant challenges that face practice of SP. Islam and Siwar (2013) mentioned additional costs of more sustainable options, perceptions of inability to offset whole cost and lack of resources and budget to do anything other than what is conventionally expected. After

studied the implementation status of SP in LICs, GIZ (2013) found that there are currently no incentives to implement SPP in Bangladesh, since the enforcement of environmental regulations is weak. Other challenges refer to the level of poverty, low capacity of local contractors, lack of enforcement of the law in general, non-utilization of environmental/economic evaluation criteria in bidding processes and political influence in decentralized procurement.

Public procurement process of Bangladesh is governed by two principal legal instruments; the Public Procurement Act (PPA) 2006 and Public Procurement Rules (PPR) 2008 under the authority of Central Procurement Technical Unit (CPTU) of Ministry of Planning. The main objective of enacting PPA 2006 & introducing PPR 2008 was ensuring transparency, accountability, fair treatment in all public procurement for achieving value for money throughout the public sector organizations of the country. But these two legal instrument lacks special emphasis on all three aspects of sustainability in procurement process (Kamruzzaman 2013). Despite of limited scope to address sustainability, various economic, social and environmental criteria could be incorporated through specifications, selection criteria, awarding the contract and contract performance clauses within the existing framework of PPR. Recognizing this prospect, the objectives of this study are to identify key factors influencing successful incorporation of sustainability issues in public procurement and to assess the its readiness perception by analyzing challenges and needed support for its implementation in Bangladesh. This provides fresh input into the SP discourse to inform policy development at the government and organizational levels of Bangladesh.

II. Methodology

A semi-structured questionnaire was used to gain a better insight and understanding of barriers/opportunities/supports needed for assessing readiness of integrating sustainability issues through public procurement process from 60 randomly selected procurement professionals of various organizations. Both open end and close end questions were included. Two types of variables; independent and dependent were selected. Age, gender, background, education, years of experience, training, volume of procurement, major involvement in types of procurement, role in procurement process, knowledge of SP , their daily sustainable activities. General readiness perception was considered as dependent variable comprising 3 aspects of sustainable procurement; opportunities, barriers and needed supports. Respondents were asked to rank the barriers/opportunities/supports needed for addressing sustainability through PP in a scale of 1 to 10 (1=Least Important and 10=Most Important), a value above "5" would represent that factor is of importance. They were also given the opportunity to add others which would be of importance, but they did not do so. For this purpose, Barrier for Addressing Sustainability Index (BASI), Opportunities for Addressing Sustainability Index (OASI) and Support needed for Addressing Sustainability Index (SASI) were measured by using the formula as used by Rahman et. al. (2009).

BASI/OASI/SASI= P_1 x 1+ P_2 x 2 + P_3x 3+ P_4x 4+ P_5x 5+ P_6x 6+ P_7x 7+ P_8x 8+ P_9x 9 +P_{10}x 10.

Where, P_1= Percentage of respondents scoring the barrier/opportunity/support needed as 1; P_2=…..scoring as 2; P_3=…..scoring as 3; P_4= ..…scoring as 4; P_5= …..scoring as 5; P_6 = …..scoring as 6; P_7=….. scoring as 7; P_8=….. scoring as 8; P_9 = …..scoring as 9; P_{10} =…..scoring as 10.

Index for a category could range from 100 to 1000, where 100 indicated low barrier/opportunity/support needed and 1000 high barrier/opportunity/support needed. Collected data have been cleaned, edited, arranged and coded before statistical analysis. The analysis was performed by using SPSS 17. Descriptive analyses such as number and percentage, mean, standard deviation were calculated to find out the differences between selected item variables of the study. The correlation between dependent and independent variables were carried out to find the relationship and to measure the strength (Gomez and Gomez, 1984).

III. Result and Discussion

Reliability

Cronbach's alpha was calculated through SPSS 17 version for identifying the coefficient of questionnaire items and its consistencies (Table 1).

Table 1 The reliability testing of the questionnaire item

Variables	Items	Cronbach's Alpha value
Daily sustainable activities	10	0.679
Training	04	0.723
Opportunities	10	0.677
Barriers	13	0.694
Needed supports	09	0.742

***Age*:** Fewer young practitioners in the study might be due to the fact that young professional lacks experience and confidence to run procurement efficiently and effectively. Poorer participation of older persons in procurement might be related to their change of role from clerical/administrative to supervisory (Table 2).

***Years of experience*:** According to classification, Majority (47%) of the procurement practitioner were mid level professionals while 21 per cent and 32 per cent were young and senior professionals respectively.

***Gender*:** Lower representation of female might be due to the fact that procurement happens to be one of the vital areas, where women are usually deprived off. Less participation of women in public procurement process might reflect the lower representation of women's in government service of Bangladesh as a whole.

Background: The highest proportion of development budget has been allocated for various engineering divisions which might necessitate large numbers of engineering graduate in procurement activities by default of their allocation of business in Bangladesh.

***Level of Education*:** Most of the procurement practitioners (60%) had post graduate level education. Possession of some professional degree on procurement by some of the respondent is a positive aspect to develop and adopt best practice management in the country's procurement sector. This might be the outcome of the ongoing commitment of the government of Bangladesh to develop organizational human capital in procurement sector in association with Chartered Institute of Procurement and Supply (CIPS), UK.

***Annual volume of procurement*:** Based on the classification, about 40 per cent of the respondents were responsible for low volume, 43% medium volume and 17% high volume of procurement. Variation in volume of procurement might be due to their respective position and role within organisation, capability and managerial ability.

***Type of procurement*:** About half of the respondents were involved mainly in procurement of works. Another 47 per cent respondent highlighted their major responsibility for procurement of goods. Only 3 per cent mentioned that procurement of services constituted a major part of procurement activity for them. Variation in the proportion of goods, works and services might be due to the nature of job of their respective department.

***Training*:** Almost all of the respondents (92%) were trained on procurement of goods, works and services. CPTU in collaboration with World Bank providing trainings of various durations in different procuring entities which might explains the findings. Only 45 per cent were well familiar with sustainable development, 30 per cent for sustainable procurement and 25 percent for responsible procurement. Mannan and Islam (2013) found poor education and practices in honesty, morality and professional ethics were prevailing among human resources involved in public procurement. Such a scenario signals the importance of training on sustainable procurement for using PP as a policy instrument for sustainable development of Bangladesh.

***Place of Training*: A**ll of the respondents (98.3%) were trained on procurement in their professional life.

Major responsibility of the respondent in public procurement process

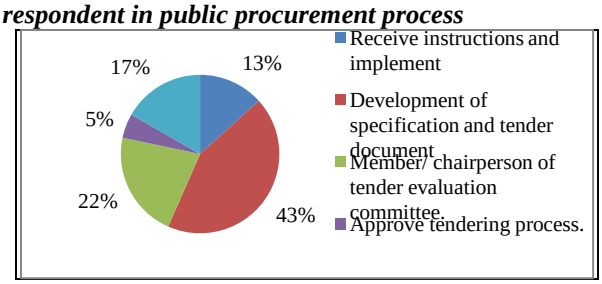

Figure 1 Role of respondent in public procurement process

Table 2 Selected characteristics of respondent involved in public procurement

Item	Category and scoring system	Respondents (N=60)		Mean	SD	Chi-Sq. (Asym. Sig.)	Observed range (Possible)
		No.	%				
Age of respondent (years)	Young (≤30)	6	10.0	40.10	7.71	22.8	28-57
	Middle (30-50)	36	60.0			(0.000)	(Unknown)
	Old (≥50)	18	30.0				
Years of Experience in Public procurement (years)	Young (≤7)	13	21.7	12.18	6.11	5.70	2-30
	Mid level (08-14)	28	46.7			(0.058)	(Unknown)
	Senior (≥15)	19	31.7				
Gender	Male (1)	53	88.3	1.12	0.32	35.26	1-2
	Female (2)	7	11.7			(0.000)	(1 or 2)
Background	Engineers (1)	42	70.0	1.30	0.46	9.60	1-2
	Non engineer (2)	18	30.0			(0.002)	(1 or 2)
Level of education	Graduate (1)	12	20.0	2.00	0.64	19.2	1-3
	MS/MBA (2)	36	60.0			(0.000)	(1 or 2 or 3)
	Professional degree (3)	12	20.0				
Training on Public procurement	Yes (2)	55	91.7	1.92	0.28	41.66	1-2
	No (1)	5	8.3			(0.000)	(1 or 2)
Training on Sust. development	Yes (2)	27	45	1.45	0.50	0.60	1-2
	No (1)	33	55			(0.439)	(1 or 2)
Training on Sust. procurement	Yes (2)	18	30	1.30	0.46	9.60	1-2
	No (1)	42	70			(0.002)	(1 or 2)
Training on ethical procurement	Yes (2)	15	25	1.25	0.44	15.0	1-2
	No (1)	45	75			(0.000)	(1 or 2)
Place of Training	University education(1)	1	1.70	1.98	0.13	56.07	1-2

	Professional life (2)	59	98.3			(0.000)	(1 or 2)
Annual volume of procurement	Low (≤99 million)	24	40.0	623.97	1451.83	47.20	8-8000
	Medium (100-500)	26	43.3			(0.002)	(Unknown)
	High (≥500 million)	10	16.7				
Type of procurement	Goods (≥50%)	28	46.7	43.15	27.41	--	0-50
	Works (≥50%)	30	50	47.42	30.05		(0-100)
	Services (≥50%)	2	3.3	9.35	11.83		
Daily sustainable activities	Least(≤19)	16	26.7	21.32	2.68	23.7	16-28
	Medium (20-24)	37	61.7			(0.000)	(0-30)
	High (≥25)	7	11.7				

Practice of daily sustainable activities of the respondents

Based on their extent of daily sustainable activities, respondents were classified into least sustainable (≤ 19), medium sustainable (20-24) and highly sustainable (≥25). Daily sustainable activities of about 62 per cent of the respondents were categorized as medium sustainable, 27% least and 12% highly sustainable. Variation in the extent of daily sustainable activities among the respondents might be due to their respective awareness and education level.

Table 3 Distribution of respondent according to their daily sustainable practices

Daily sustainable activities	Number of respondents			Mean	SD
	(3)	(2)	(1)		
DSA.a. Turned off electric fan, computer etc. after use	49	11	0	2.28	0.39
DSA.b. Buy energy saving electrical and IT equipment	40	19	1	2.65	0.52
DSA.c. Use less water for all activities	33	27	0	2.55	0.50
DSA.d. Avoided using plastic bags	7	49	4	2.05	0.43
DSA.e. Avoided buying products with lots of packaging and no biodegradable packaging	1	44	15	1.77	0.47
DSA.f. Thrown food and organic materials into waste bin	21	34	5	2.27	0.61
DSA.g. Used recyclable and renewable goods	3	45	12	1.85	0.48
DSA.h. Sharing knowledge of SD and how to make public procurement more social and environmental friendly	9	44	7	2.03	0.52
DSA.i. Buying recycled paper	3	38	19	1.73	0.55
DSA.j. Using or procuring vehicles running on alternative fuels	9	18	33	1.60	0.74

(Always=3; Sometime=2; Never=1)

Knowledge of Sustainable Procurement

***Sustainable public procurement is a process whereby public institutions meet their needs for goods, services and works in a way that achieves value for money on a whole life cycle basis in terms of generating benefits not only to the organization, but also to society and the economy, while minimizing damage to the environment* (DEFRA, 2006).**

The highest portions of the respondents (55%) were able to define SP in line with the definition of DEFRA (2006). Variation in the concept of sustainable procurement might be due to their different academic background and education level, cosmopoliteness and level of familiarity about SP.

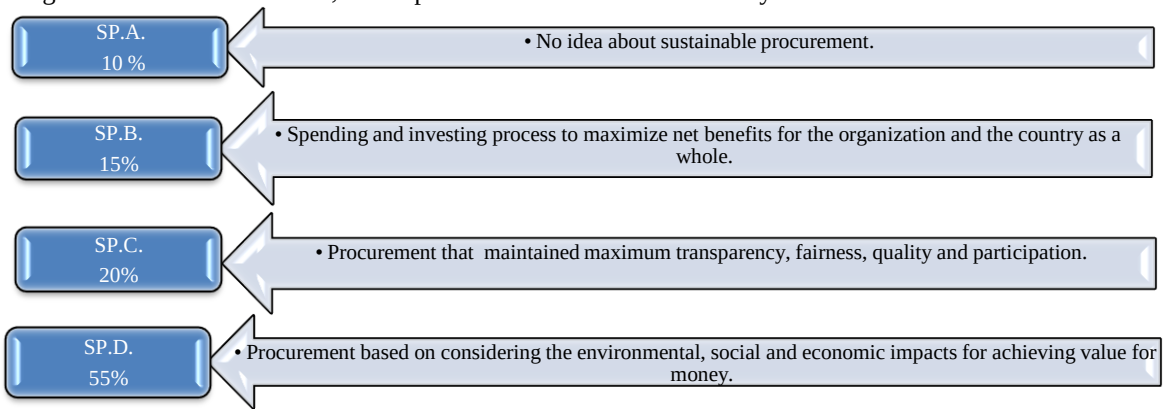

Figure 2Knowledge of Sustainable Procurement

Opportunity for Addressing Sustainability

The attractive factors, barriers and support needed of addressing sustainability through public procurement have been discussed by many previous researchers. Through public procurement, governments can "raise the bar" for the respecting of labor and environmental standards by all market operators, thereby facilitating sustainable development. Ten attractive factors for adopting SP were rated by the respondents (Figure 5). A value above "5" would represent that the reason for implementing sustainability issues through public procurement process of Bangladesh is of importance. The mean value for the attractive factors as rated by respondents ranged from

5.45 to 8.83.This observations has reflected that variation in their responses are relatively high which represents that responses are not consistent because of different understanding about attractive factors.

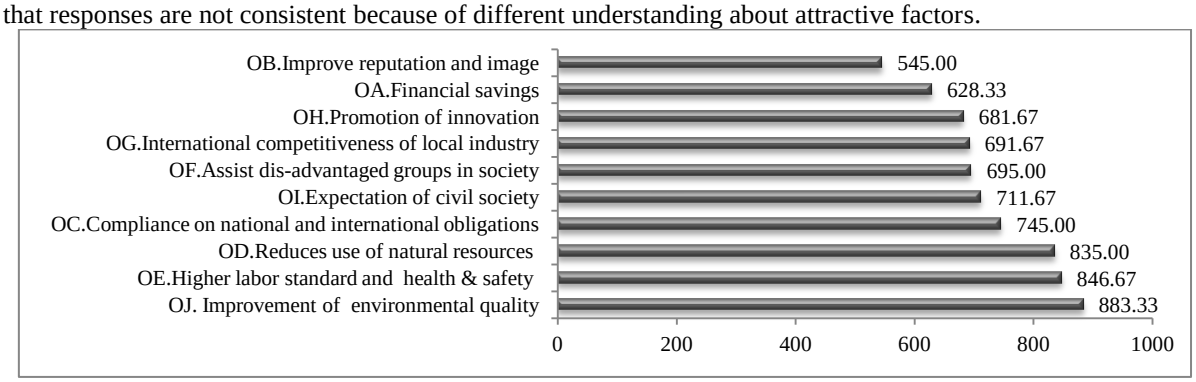

Figure 3 Ranking of opportunities based on OASI.

Barriers for Addressing Sustainability

Thirteen barriers for addressing sustainability through PP were rated by the procurement professionals with mean ranged from 5.78 to 8.98. In general, the barrier factors are rated higher by the respondents because considerations of country context factors are deemed to be more challenging. It also implies that respondents are not very much confident about practicing sustainable public procurement process.

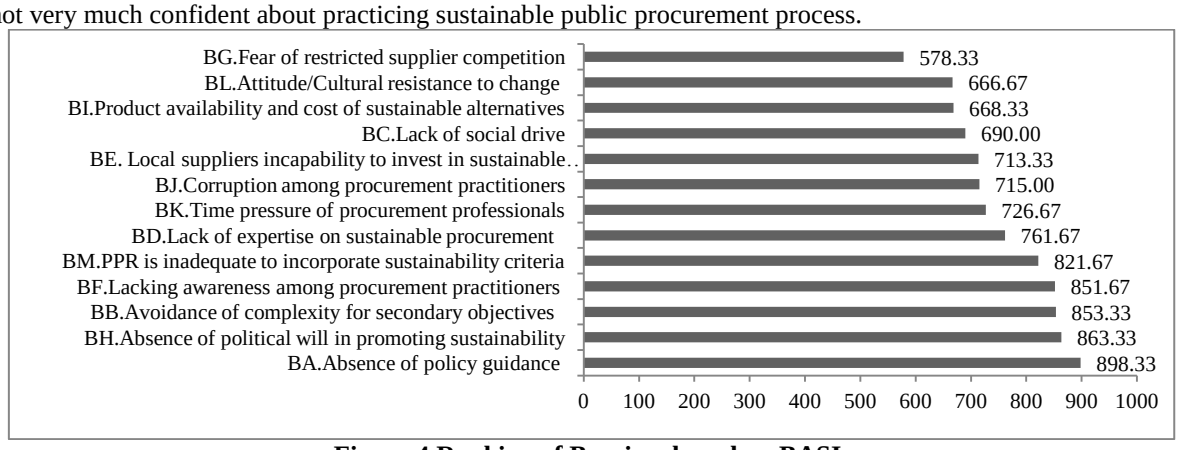

Figure 4 Ranking of Barriers based on BASI.

Support required for Addressing Sustainability

The mean values for the support factors as rated by respondents ranged from 5.95 to 9.05. This observation has reflected that the variation in their responses is relatively high. The finding shows that the respondents rated the support factors much more inconsistently with larger variation.

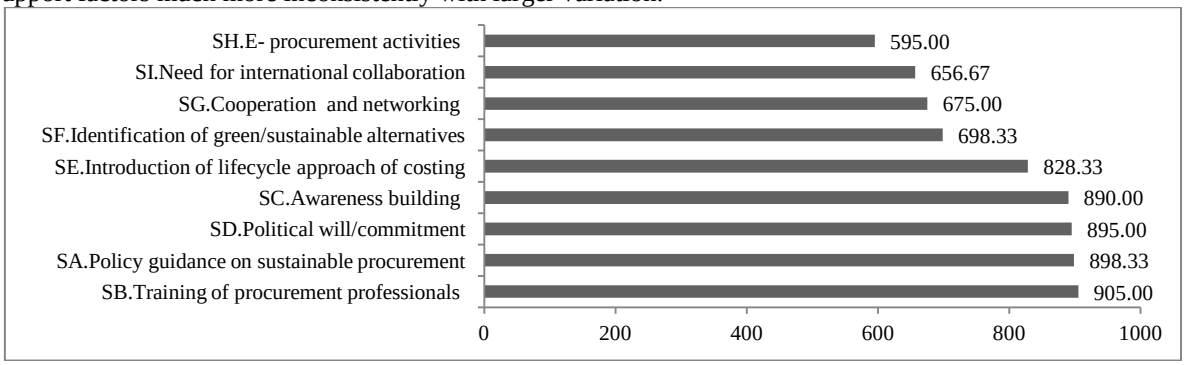

Figure 5 Ranking of supports needed based on SASI.

Relationship between the Selected Characteristics of Respondents and Their Perception of Opportunities, Barriers and Support needed for Addressing Sustainability in Public Procurement Process of Bangladesh.

The Pearson two-tailed correlation coefficient was used to ascertain the degree of association among the variables. Thirteen characteristics of the respondents were selected for exploring the relationship with their perception of opportunities, barriers and support needed for addressing sustainability through public procurement. It is revealed that respondent's age, education, years of experience, training, DSA and extent of knowledge on SP had significant positive relationships with their exploring / scoring of various opportunities. On the other hand, respondent scored higher barrier confrontation who had higher level of education, work

experiences and training. Age, years of experiences, role in the procurement process and DSA were positively correlated with the respondent's responses in scoring needed support for addressing sustainability in the public procurement process of Bangladesh.

Table 4 Relationship between the Selected Characteristics of Respondents and Their Perception of Opportunities, Barriers and Support needed for Addressing Sustainability

Variables	Computed R value		
	Opportunities	Barriers	Supports
.1Age	.274*	.240	.288*
.2Gender	-.017	-.050	-.076
.3Background	.028	.005	-.056
.4Education	.467**	.421**	.245
.5Years of Experience	.347**	.265*	.289*
.6Training	.380**	.270*	.200
.7Volume of procurement	.157	.170	-.031
Involvement in.8Goods Procurement	-.055	.077	-.038
Involvement in .9Works Procurement	-.064	-.175	-.016
Involvement in .10Service Procurement	.282*	.267*	.128
.11 Role in Public Procurement	.025	.060	.280*
.12DSA	.397**	.238	.336**
.13Knowledge of SP	.366**	.057	.249

* = Significant at 0.05 level of probability, ** = Significant at 0.01 level of probability

V. Conclusion and Recommendation

Having a multiplier effect and purchasing power of public sector to promote sustainability, the findings indicate that there are many actual or perceived barriers which need to be removed for making ready to integrate sustainability issues in public procurement process of Bangladesh. Improvement of environmental quality, higher labor standard, better health & safety condition of worker were regarded as highly ranked opportunity arise from addressing sustainability. Lack of policy guideline, absence of political will in promoting sustainability and avoidance of complexity for secondary objective of procurement were the responses as high barriers. Formulation of a national policy and awareness building is badly needed for addressing sustainability issues through public procurement. Based on the above conclusions some specific recommendations for addressing sustainability in an appropriate way are given below:

- Awareness campaign should be arranged focusing on how to take account of non-monetary benefits of SP. As part of CPTU's awareness programs, it should also highlight the necessity of addressing sustainability in public procurement process through a solid multi-stakeholder approach.
- There is the need for a higher degree of collaboration and engagement between all parties, such as the government, contractors and suppliers, who are found to be the member of supply chain.
- As engineers are mainly involved in procurement activities, all engineering degree should include a course on Contract and Procurement Management.
- The government should provide training to incorporate sustainable procurement techniques into ongoing training programs of CPTU. The key intervention points in the procurement process for sustainability are the same as with traditional procurement which might be applicable within the existing framework of PPR-2008.
- Public sector procurement professionals should be given clear direction from the top of their organizations with sustainability targets and performance measuring systems and progress monitoring.
- Procurement should be done by the full-time procurement professionals. Abrupt transfer and posting to other professional areas might affect their career plan as well as achieving professional competence for addressing sustainability imperatives through their practices.
- There is scope to further study about the sustainability issue. Advanced research needs to be conducted in order to get a deeper insight into the sustainability issue in relation to the public procurement of Bangladesh.

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