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INTRODUCTION

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NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

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CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

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- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

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WEBSITES

- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

PARADIGM SHIFT IN TEACHING AND LEARNING: BOTSWANALISATION OF THE LEARNING ARCHITECTURE BASED ON COLLABORATIVE CONSTRUCTIVISM

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ABSTRACT

The study seeks to explore and enhance the Learning Architecture based on Collaborative Constructivism (LACC). It has been noted in this research that with the dynamism of learning environments, the learning styles seems to follow the dynamic trends that affect learners' learning styles. In the research, we divided the work into two stages; the first stage seeks to explore the learning styles of student studying IT at Botho College in Francistown and analyze if they really follow the Kolb's experiential learning theory. The second stage was to conceptualize the LACC which has been used at NIIT programs since inception in 1997 and enhance it so that it fully benefits Batswana learners. In carrying out the first stage, we applied Kolb's Learning Styles Inventory (LSI) test to 168 learners. The learners' tested are both the new entrants and the second years. From the data analysis, the data proposed a new structure for the LACC, which is based on the identification of the learners learning behavior. Hence being the "Botswanalization" of the LACC.

KEYWORDS
assessment, LACC, Kolb's learning cycle, curriculum.

INTRODUCTION

Teaching and learning in tertiary education have never been static ever since the introduction of the first classrooms. With the introduction of technology, teaching and learning are no longer confined to the classroom. Many people are experimenting with online education (Speece, 2012).This evolution suggests changes in learning styles too. It is not difficult to suspect that a student that has been groomed to be entertained by modern technology such as television, computers and the latest versions of this technology acquires a modified learning style. This suspected dynamic change in learning styles has motivated this study.

Power (2010b) indicated that the incorporation of employability into the higher learning curriculum is now another dimension that needs to be considered. There is an emphasis on the alignment between the curriculum and the teaching methods to support employability in the current higher education policy/environment, especially in computing courses. Yorke (2006a) stresses the importance of creating the right learning environment. There is a pertinent question that needs to be asked about how learners learn. A lot of researchers have theorised about how the learning happens. Kolb in McLeod (2010) introduced his 4 stage model in which model he claims that in claims that there is no learner that has a combination of "watch and do"; "think and feel". This argument is countered by Dangwal and Mitra (1999); McLeod (2010) who argue that there is need to accommodate the "processing continuum and perception continuum"; suggesting that Kolb's model does not accommodate all learning styles. Dangwal and Mitra (1999) went on to modify Kolb's model with their LACC model, which unfortunately inherited the same defects that they were attacking. Since the LACC model is a derivative of Kolb's model, it carries some of the challenges that are associated with Kolb's model. This has impelled us to investigate further how LACC accommodates the different types of learners and its applicability and suitability in Botswana.

An initial study will begin by seeking for the existence of the students with the argued combination and investigate the category of learning where they belong. There are claims in the local press in Botswana that private teaching institutions are doing little to transform the lives of Batswana learners. Therefore, we want to investigate the teaching methodology that is used by Botho College in view of such perceptions. We also want to find ways that can be used to improve the approach to learning.

The study focuses on collaborative constructivism as a learning style and its use at Botho College. This study is bound to help Botho University tutors in building their capacity to deliver lectures effectively. This paper will contribute to new questions that are raised concerning learning styles. The questions that will be answered will include:

- What are the learning styles of the Batswana learners?
- Does LACC teaching and learning model work in Botswana?
- What are the challenges of the implementation of the LACC model in Botswana?
- Would an active learning environment assist the student in learning under the LACC model?

REVIEW OF LITERATURE

This research seeks to start answering the research questions by introducing some key terms which will guide the understanding of this research. Learning architecture based on collaborative constructivism (LACC) is a derivative of the Kolb's experiential learning style. The original Kolb's (1984) theory acknowledges that there are four learning stages. The scores in Kolb's Learning style can be interpreted by considering 4 learning stages such:

1. Concrete Experience (CE) – use feelings

2. Reflective Observation (RO) learn by watching
3. Abstract Conceptualization (AC) – Learn by thinking
4. Active Experimentation (AE) – learn by doing

These stages results in 4 learning styles which is seen as the four combinations of learning styles:

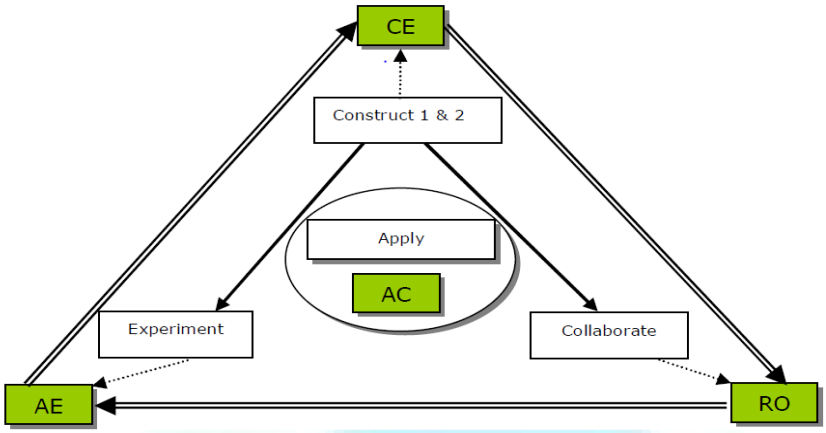
a) Diverger (feel and watch)
b) Accomodator (feel and do)
c) Assimilator (think and watch)
d) Converger (think and do)

LACC is an extension of Kolb's model but classifies teaching-learning interactions into 3 broad categories:

- Interactions, where the teacher or external resource creates the learning experience
- Interactions, where the teacher or external resource creates or constructs the learning, in collaboration with learners
- Situations, where the learners create their own learning experiences.

LACC is therefore a teaching method which exposes the student to 4 activities/stages and the theory behind being that this is the best practice in enhancing the depth of learning. The first stage introduces the learner to new concepts by way of exposing the student to theory. The second component makes it possible for a learner to have a contextual familiarity of the subject through collaborative learning. The third gives the learner exposure whilst the fourth provides an environment of the learners to develop conceptual clarity. These stages can be seen as the base of a triangle as illustrated in fig 1 below:

FIG 1: LACC MODEL



The LACC methodology derives its essence from four components: the construct, collaborate, experiment and apply. A trained person is brought into the classroom to bring his experiences of the subject. It is assumed that the trainer has had the right exposure and his concrete experience can be shared by the students. The construct creates a foundation which allows the student to move to the next Kolb's state. The stage is delivered in two sessions. The learner is now expected to go through a reflective session which is usually captured in case study, scenarios/problem statement and best practices. This is the stage at which students collaborate and the teacher's role is to merely give directions and allow the students to freely collaborate. This stage of LACC coincides with the Kolb's Reflective observation. The third component of the LACC model takes the student through experimentation where the students experiment with their newly discovered abilities. Apply stage, which coincides with Kolb's abstract conceptualization, sees the learner putting the learnt information into practice. The learner, "learns, refers, compares, thinks and applies their entire knowledge spectrum and creates solutions for a real life case study".

EXAMPLES WHERE LACC IS USED

LACC is currently unique to the NIIT brand and Botho College has adopted this methodology. Botho College uses NIIT resources. At Botho College, the curriculum which is in use was designed in such a way that the instructor is given clear guidelines on the tasks to be done throughout the entire LACC stages (components). Learners are given concrete experience by an expert instructor through two constructs (Lessons). At this stage, power point teaching aid is prevalent bringing an improvement to the traditional teaching methods. Unfortunately, the use of such presentation can sometimes create a boring environment and the students are de-motivated to learn especially given the time constraints because there is usually too much information to be handled.

It can be seen that LACC takes aboard the need to have an expert instructor and the collaboration element. This makes a model a strong model. But a lot of the questions arise which we need to address in this research. After whatever teaching has taken place and assessments have been conducted, we are not sure whether the assessment results that have been forthcoming are a result of this approach or there are unknown variables at play. We may have to conduct a follow up test to investigate the variables that affect our results.

BENEFITS AND LIMITATIONS OF LACC

- LACC accommodates all these types of learners. This makes it a powerful tool which acknowledges the different needs of the learners (categorized by Kolb's).
- The concepts introduced in the construct stage are reinforced in the entire cycle, thereby assisting the students to clearly master the concept. It is essential that the learning environment created assist the students in the two initial sessions of the cycle to be actively involved in the lesson.
- Currently traditional teaching methods embraced with power point presentations are still prevalent as this core stage; this could be one of the challenges of the LACC. Enhancement of the LACC could be done by effectively consider using the principles of active learning (Stern and Huber, n.d.).

ACTIVE LEARNING

One way of improving the LACC model could be to effectively consider using the principles of active learning. Stern and Huber (n.d.) observe that definition of active learning differs with individuals but that one kind of active learning strategy gives individual students more control over the pace, sequence, and monitoring of their own work. Briggs (2005) Claims that an active learning environment improves student grades, comprehension, and satisfaction with the course. Many studies also claim that active learning is indeed a common technique used to improve students' comprehension retention of material. In his study, Briggs (2005) demonstrated how a novel lab experience and other classroom modifications can create an active learning environment and lead to an improvement in student outcomes. A study done by Ratcliffe et al in Briggs (2005) concludes that most Computer science students are active and visual learners. They arrived at this conclusion after administering Felder-Silverman Index of learning styles. The conclusion is relevant in an effective learning environment for any computer science students. Briggs (2005) Conclude that in schools we therefore need an active learning environment. Stern and Huber (n.d.) state that preparation for lifelong learning at work necessitates a kind of initial education that fosters curiosity and the capacity to manage one's own learning agenda.

Employers say they want workers who can take initiative and solve problems, not only in managerial and professional positions, but also in production and clerical jobs.

ACTIVE LEARNING TECHNIQUES

There are a number of active techniques that could be used in the classroom. This includes problem solving, some games, peer review, paired programming, and small group solving etc. Briggs (2005) argues that small breaks in the flow of lectures have effective results on the students. The breaks enable students to share and enable weak students to learn from their colleagues and enable most students to get better engagement with the material. This goes to show that there is need to improve what the learning environment currently on the ground. There is also a need to do a primary study to explore what needs to be done.

LEARNING STYLES

Fry, Ketteridge and Marshall (2003) acknowledge that the use of learning styles presents a lot of problems since there are many models with differing categorization. The practical application of these models is that different individuals have differing preferred learning styles. Studies done by Neumann (2001) suggest that preferences differ with different disciplines. All the scholars involved indicate that most of the claims have not been proved by any academic research. Fry, Ketteridge and Marshall (2003) conclude that "students in particular disciplines may have considerable difficulty in developing, for example, employability skills that relate to a different quadrant (e.g. numeracy by humanities students or team working by mathematicians)". Learning styles assist learners in managing and coping with different learning styles. They are useful in conscientizing students about their own learning needs.

Botho College inherited the system from NIIT due to their close relationship ever since 1997. The NIIT curriculum is designed using the LACC methodology which follows a study conducted by Dangwal and Mitra (1999. Dangwal and Mitra (1999) installed an internet-based PC in some expected place in order to observe how children behave and learn. It was observed that children are capable of teaching each other. The experiment was replicated elsewhere with the same results. These results challenge some aspects of formal education. This project demonstrates that, "even in the absence of any direct input from a teacher, an environment that stimulates curiosity can cause learning through self-instruction and peer-shared knowledge". This became the basis of the LACC model.

Given this important model, we would like to understand how it incorporates some important aspects of learning in as far as a Motswana student is concerned. We attempt to answer the question concerning the learning styles of learners in Botswana.

Speece (2012) argues that "learning styles may differ substantially across cultures". This is an important starting point for the Botswanalisation of the LACC. We need to agree that each culture has its unique needs. Given that one would like to how universal LACC is? It appears that nobody has taken any serious steps to analyse the Batswana learners learn. This is contrary to the evidence on the ground which appears to suggest that indeed Batswana learners have unique needs which need to be addressed as a matter of urgency. Speece (2012); Wikipedia counters the importance of studying learning styles and appear to suggest that learning styles are only important in as far as building one's competitive advantage and have nothing to do the learning outcomes. This argument fails to explain why people from different cultures learn differently. Dangwal and Mitra (1999) show the importance in that "learning styles could be used to predict what kind of instructional strategies or methods would be most effective for a given individual and learning task". This will be effective if the learning style is matched with the learning environment.

In fact it is ridiculous to suggest that one's learning style has little or no bearing on the learning outcome. Kolb's learning styles model basically works with two major variables, experience (perception) and how one processes this experience. This, by the end of the day determines the level of learning one decides to acquire. How you approach a problem determines the outcome! This can be easily observed in real life situations.

IMPORTANCE OF THE STUDY

There is a lot of debate concerning the learning that takes place in private institutions in Botswana. Some stakeholders believe that there is little learning taking place. This study will help alleviate some of these fears; especially that TEC and BOTA are involved in the quality management of courses and private institutions.

STATEMENT OF THE PROBLEM

There has been an increase in the number of students failing to complete their tertiary education in Botswana despite the opportunity the government avails to the students through sponsored repeats. The preliminary observations have revealed that most of these students who are failing to complete their programmes are not interested in doing so for various reasons which include lack of motivation among other reasons. This is evidenced by a sizeable number of students who opted to drop out from school at diploma level.

Student motivation is one of the key elements with substantial influence on the study approach and eventually the conceptualization and understanding of the subject. Despite the fundamental role played by motivation in learning, teaching and assessment, there is not much evidence on what motivates students at tertiary level in Botswana.

OBJECTIVES

Given that there is not much evidence or literature on student motivation at tertiary institutions in Botswana, the study seeks to fill the gap. The study aims at identifying the factors that influence student motivation at tertiary education using cross sectional data and coming up with suggestions on what can be done by tertiary institutions and policy makers to ensure that the students are adequately motivated to study and learn.

HYPOTHESIS

In an endeavour to understand better the importance of motivation and factors that motivates the students to learn, the study investigates in detail influences attributable to the teacher such design of learning material and the teaching methods applied, the learning environment, the assessment methods and the general institution environment as well as external factors such as socio-economic factors on student motivation, thus the study hypothesis that student motivation is influenced by classroom environment, lecturer's enthusiasm, student's past experiences, nature and quality of feedback, assessment system, lecturer's knowledge of the subject, students' curiosity about the subject. Systems are also considered to be attributing to high failure rates.

SCOPE OF THE STUDY

- This is work in progress, this is an exploratory study.
- Other models have to be used to measure the learning styles of the students apart from Kolb's Learning Style inventory.
- There are a lot of variables that need to be considered to produce conclusive results.
- The study of this nature requires more time than we used.
- More institutions need to be studied if the Botswanalisation of models is to be realised.

RESEARCH METHODOLOGY

RESEARCH DESIGN

The study is a triangulation of both qualitative and quantitative approaches because of the advantages that accrue from such an approach. This approach suits the exploratory study as it can easily enable the researchers not to be bound by any impending rules.

POPULATION OF STUDY

At the time of study, 311 students were enrolled to study computer science at the Francistown branches. The program has three components which include Mathematics for Computing, Introduction to Computers and Communication Study Skills (CSS) for Botho first year. The second year have almost similar subjects but at an advanced level. In CSS students learn language and communication skills. This generally makes our population of study be in a position to interpret the questionnaire.

POPULATION AND SAMPLE SIZE CONSIDERED

TABLE 1

	BSc Computing Botho 1st Year	BSc Computing Botho 2nd Year	NIIT Computing 2nd Year	**Total**
BSc Computing Botho 1st Year	BSc Computing Botho 2nd Year	NIIT Computing 2nd Year	**Total**	261
117	49	95	261	

STUDY SAMPLE

The sample was randomly selected basing on the faculty willing to give spare 5 min for completion of our questioner during their session.

This resulted in a sample of 163 out of 311 Students. Three responses were rejected due to failure to fill in the questionnaire according to the instructions Participation of these students was voluntary.

DATA COLLECTION PROCESS

During the administering of the questioners, they was always a researcher available to assist students in interpretation of the questioner since the Kolb learning inventory has difficult terms derived from Jung study which appear to be challenging for most learners unless if they have gone through a psychology course, these terms could be hard for Computing students to interpret.

QUESTIONNAIRE

The questionnaire was derived from Kolb's Learning Inventory and it consisted of 12 questions. Each question has got four alternative answers that a student could rank from 1 to 4, where 1 stands for least preferred and 4 being the most preferred answer.

DATA ANALYSIS

Initially we analyzed the data by using the key provided by Kolb and we used 2 best scores for each student to categorise them as divergers, accommodators, assimilators and convergers. When we realized that the analysis was not enough we further subjected the data to one way ANOVA to confirm our results

RESULTS & DISCUSSION

Below are the results of the studies that were conducted:

ANALYSIS OF STUDENTS LEARNING STYLES

TABLE 2

Learning styles			
		n	***%***
N=163	Converger	42	25.77%
	Diverger	5	3.07%
	Assimulator	22	13.50%
	Accomodator	21	12.88%
	Unknown (RO & AE)	63	38.65%
	Unknown (CE & AC)	10	6.13%

The results show that 25.77% of the respondents are convergers, 3% divergers, 13.5% are assimilators, 12.88% are accommodators, and those with strange combinations thus CE & AC and RO & AE constitute of the 6.13% and 38.65 % respectfully. Those with the majority fall of our students fall within this unknown segment.

TABLE 3: NO. OF STUDENTS FITTING IN MORE THAN ONE CATEGORY

	Converger	Diverger	Accomodator	Assimulator	1 and 3	2 and 4
Converger			1			6
Diverger				1		
Accomodator		1		1		1
Assimulator					2	3
1 & 3						
2 & 4						

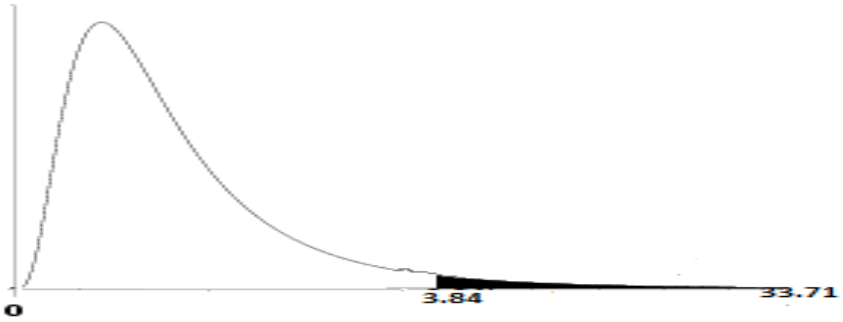
The LSI results outlined that they are some learners who fall within two categories .The data is presented as above. Of essence is that in the unknown category they are up to 12 learners, who fall in another category as the results are equivalent for both categories.

A concern was raised given such a case can these students be comfortable with another learning style or let us say we compared the unknown with other learning styles.

TABLE 4: COMPARISON OF THE LSI SCORES BEFORE CONSIDERING THEIR COMBINATIONS

		DF	***SS***	***MS***	***F***
source	Factor	3	6549.29	64.77	33.71
	Error	448	41971.93	2183.1	
	Total	451	48521.23	2247.87	
Level		***N***	***MEAN***	***STDEV***	
	CE	163	25.48	5.79	
	RO	163	30.61	8.03	
	AC	163	28.87	6.03	
	AE	163	34.27	11.17	

GRAPH 1: RESULTS SHOWING REJECTION OF F FOR THE OF THE LSI SCORES BEFORE CONSIDERING THEIR COMBINATIONS

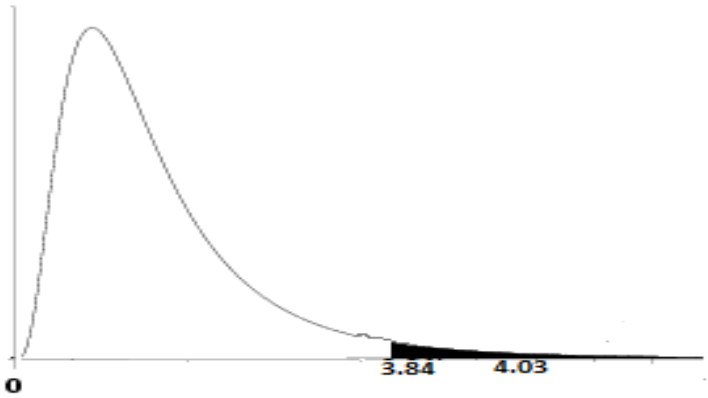


In table V above, we compared the average of the individual categories of the entire sample. Graph 1 depicts that students fail in the area of rejection thus the average is not the same, meaning that students have different learning styles.

TABLE 5: COMPARISON OF THE MEAN SCORES OF CE AND RO OF THOSE LEARNERS WHICH FALL IN THE UNKNOWN

		DF	***SS***	***MS***	***F***
source	Factor	1	3604.66	53.8	4.03
	Error	132	1953.22	14.58	
	Total	133	5557.88	68.38	
Level		***N***	***MEAN***	***STDEV***	
	CE	67	23.48	3.13	
	RO	67	33.85	3.86	

GRAPH 2: RESULTS SHOWING REJECTION OF CE AND RO OF THOSE LEARNERS WHO FALL IN THE UNKNOWN



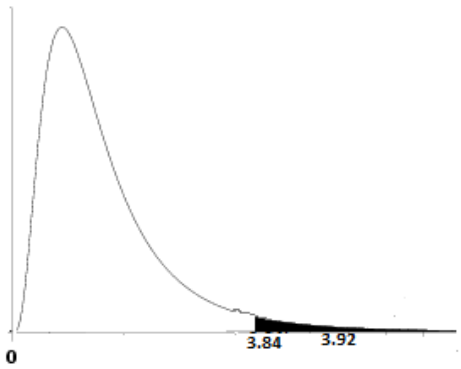
A comparison of the unknown category to the CE and RO was done using the ANOVA. It appears that some students who fall in the unknown CE & RO. So we had to compare the unknown combination thus we have to verify if those students cannot be shifted to a known learning style. We tested the value of CE and we verified if there is a significant difference of their value in RO. This was to verify if there was need for combination of RO & AE to be considered as they do not fall in another category.

The results presented show that the value of *F* (4.03) falls in the rejection region. We conclude that there is a significant difference in the categories of CE and RO. These learners cannot be categorised as accommodators. The same analysis was done for these unknown learners to verify if they can be categorised as convergers as shown in Table VI below:

TABLE 6: COMPARISON OF THE MEAN SCORES OF AC AND RO OF THOSE LEARNERS WHICH FALL IN THE UNKNOWN

		DF	***SS***	***MS***	***F***
source	Factor	1	1620.57	48.9	3.92
	Error	132	1670.78	12.47	
	Total	133	3291.35	61.37	
Level		***N***	***MEAN***	***STDEV***	
	AC	67	33.85	3.86	
	RO	67	26.9	3.18	

GRAPH 3: RESULTS SHOWING REJECTION OF AC AND RO OF THOSE LEARNERS WHO FALL IN THE UNKNOWN



The value of *F* value of 3.92 was calculated. This was a comparison of the value of RO and AC of those students who fall in the unknown. The Fig 3 clearly shows that the *F* value falls in the rejection region. This shows that the students cannot be categorised as convergers.

The learners with the combination CE and AC were not further analysed since the number is insignificant for the current study and that 2 out of 5 fall within another category.

It appears that the learning styles recognised by Kolb have been expanded and two more are been suggested from the results. This suggests that certain specific learning styles can be peculiar to certain environments. This is consistent with Dangwal and Mitra (1999) findings that 'the process of learning is critically important and understanding the way individuals learn is the key to educational improvement'. Learning styles are indeed culture specific. LACC teaching method appears to have very encouraging components which when applied rigorously may result in an improvement in the grades.

The new categories that we got are the same combinations that most writers believe are unattainable. Taking into consideration the various arguments presented by many other authors that it is impossible to get those kinds of learning style, this presents a new challenge in that majority of the respondents are in the undefined zone. This surely shows a lot of work needs to be done. We cannot just dismiss the results. The results may probably be as a result of lack of understanding of the instrument that was used. The future research, we may have to translate the Kolb's Learning Inventory to investigate whether indeed the learners were saying exactly what they intended to say. It's possible that the challenges came from most of the words that are used in the instrument. The words are based on Jung's psychology research and an ordinary IT student may find it very difficult to decipher a language in psychology.

We feel our findings are substantive, because they challenge the usual findings. Why would we get such a substantive result (38%) and an additional 6% of the students in the sample who belong to the undefined group? The results are so inconsistent that, on its own, suggests that a bigger study be done to explore the learning styles in Botswana as whole.

The findings seem to suggest the LACC methodology is not meeting the expectations of an ordinary student at Botho College. The intentions of meeting multiple learner types might not be easily attained if we take into consideration the various learners type that are not taken into account the Kolb's Learning styles models. (Note: 44% of the respondents have got no known learning styles, yet Kolb's experiential model is premised on the 4 learning styles.)

Our conclusion is that Batswana learners indeed fall under six categories of which those with the combination CE and AC still require further analysis. With this understanding it is required that the LACC should consider these learning styles for it to present a methodology which will suit the Batswana learners

FINDINGS

We carried out a survey within the Botho Students in Francistown applying a questionnaire on the students learning style by Kolb in 1984. Nobody has ever tested the applicability of these models on the Botswana type of learners.

We believe that students are not benefitting much from the constructs that are proposed by the LACC model. This is because traditional learning styles are still being used. It appears that there is nothing wrong with LACC methodology because it is designed to make the students go through the Kolb's learning cycle. The researchers intend to investigate if active learning environment is being used during the construct. Research question: what is the best way of imparting the expert knowledge to the learner? There is challenge, therefore, in the way teachers are dealing with the construct stage. This paper tends to present the methods which can be employed to enhance leaner involvement during the construct stage.

On the construct the learning environment must take into account the different learning styles. The problem is LACC seems not to cater for all learning styles in Botswana.

It appears that the learning styles recognised by Kolb have been expanded and two more are been suggested from the results. This suggests that certain specific learning styles can be peculiar to certain environments. This is consistent with Dangwal and Mitra (1999) findings that 'the process of learning is critically important and understanding the way individuals learn is the key to educational improvement'. Learning styles are indeed culture specific. LACC teaching method appears to have very encouraging components which when applied rigorously may result in an improvement in the grades.

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The findings seem to suggest the LACC methodology is not meeting the expectations of an ordinary student at Botho University. The intentions of meeting multiple learner types might not be easily attained if we take into consideration the various learners type that are not taken into account the Kolb's Learning styles models. (Note: 44% of the respondents have got no known learning styles, yet Kolb's experiential model is premised on the 4 learning styles.)

RECOMMENDATIONS/SUGGESTIONS

Suggest further analysis of the learning styles at Botho University. The study is now questioning the validity of the learning components of LACC. This is especial concerned with the construct component. Two construct elements are offered one after the other and are too long to deal with. It is even worse if one also considers the expertise that is required by this model. The definition of the expert required is not so clear. Probably if experience of the lecturer is the most determining factor, it is understandable. How about when we have a new lecturer fresh from university? It would appear that this model will work well if the teachers are taken through appropriate teacher training programs like the Post Graduate Certificate in Higher Education (PGCHE) which Botho University has started offering to its faculties.

CONCLUSIONS

From the research findings, it can be concluded that student motivation to study is influenced many factors which are, life goals, nature and quality of feedback, reasons for choosing a programme of study, the school environment, assessment systems and the student's abilities to master the subject content. This means that the tutor, the student and the tertiary education system has to work together to achieve full the objectives of education which is transformation of an individual, thus employability.

SCOPE FOR FURTHER RESEARCH

The study was not exhaustive though it brought out some of the pertinent issues with regard to student motivation at higher education. There is need to subject the finding to empirical test by trying all the recommendations such as the mode of delivery and tutor training and then measure the level of student motivation. Further research can be done on the process of motivation and the effectiveness of different teaching methods on student motivation.

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BEHAVIORAL STUDY OF RELIABILITY CHARACTERISTICS OF A SYSTEM MODEL WITH BIVARIATE EXPONENTIAL FAILURE AND REPAIR TIMES

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ABSTRACT

A system model consisting of two subsystems 1 and 2 is investigated and analyzed. In subsystem 1 there are two units A and B and both unit should work for the subsystem to work while in subsystem 2 there is only one unit C. Subsystem 2 fails in two ways one is natural failure and other is catastrophic failure. Subsystem 1 is given preference in operation. Failure time distribution of subsystem 2 is assumed to be negative exponential and repair time distribution is general. Failure and repair times for the units of subsystem 1 and 2 are assumed to be correlated random variables having bivariate exponential distribution.

KEYWORDS
availability, bivariate exponential distribution, catastrophic failure, , mean time to system failure, Reliability.

1. INTRODUCTION

A large number of researchers in the field of reliability have analyzed system models with catastrophic and common cause failures. Different authors have used different techniques for analyzing such system models.Goel and Gupta (1984) analyzed a system models having two parallel units with partial and catastrophic failures and preventive maintenance using regenerative point technique. Dhillon and N-Yang carried out reliability and availability analysis of a warm standby system with common cause failures and human error using supplementary variable techniques. Hidakka (1992) obtained the reliability of r-out of-n (F) system with common cause failures and maintenance.

In the present paper we discuss a system consisting of two subsystems 1 and 2.In subsystem 1 there are two units A and B and both unit should work for the subsystem to work while in subsystem 2 there is only one unit C. Subsystem 2fails in two ways one is natural failure and other is catastrophic failure. Subsystem 1 is given preference in operation. Failure time distribution of subsystem 2 is assumed to be negative exponential and repair time distribution is general. Failure and repair times for the units of subsystem 1 and 2 are assumed to be correlated random variables having bivariate exponential distribution of the form.

$$f_{X_iY_i}(x,y) = \alpha_i\beta_i(1-r_i)e^{-(\alpha_i x_i+\beta_i y_i)}I_0\left(2\sqrt{\alpha_i\beta_i r_i x_i y_i}\right)$$

$$\alpha_i, \beta_i,\ x_i, y_i > 0, |r_i| < 1$$

Where,

X_i ≡ r.v. denoting the time to failure of i[th] unit of subsystem 1

Y_i ≡ r.v. denoting the time to repair of i[th] unit of subsystem 1

r_i ≡ correlation coefficient (x_i, y_i)

and $I_0(z) = \sum_{K=0}^{\infty} \frac{(z/2)^K}{(K!)^2}$ is modified Bessel's function of type one and order zero.

Using regenerative point technique following measures of system effectiveness have been obtained.

(1) Reliability and mean time to system failure (MTSF)
(2) Pointwise and steady state availability of the system.
(3) Expected up time of the system and expected busy period of the repairman during (0, t)
(4) Expected numbers of repairs during (0,t).
(5) Net expected profit incurred by the system during (0, t) and in steady state.

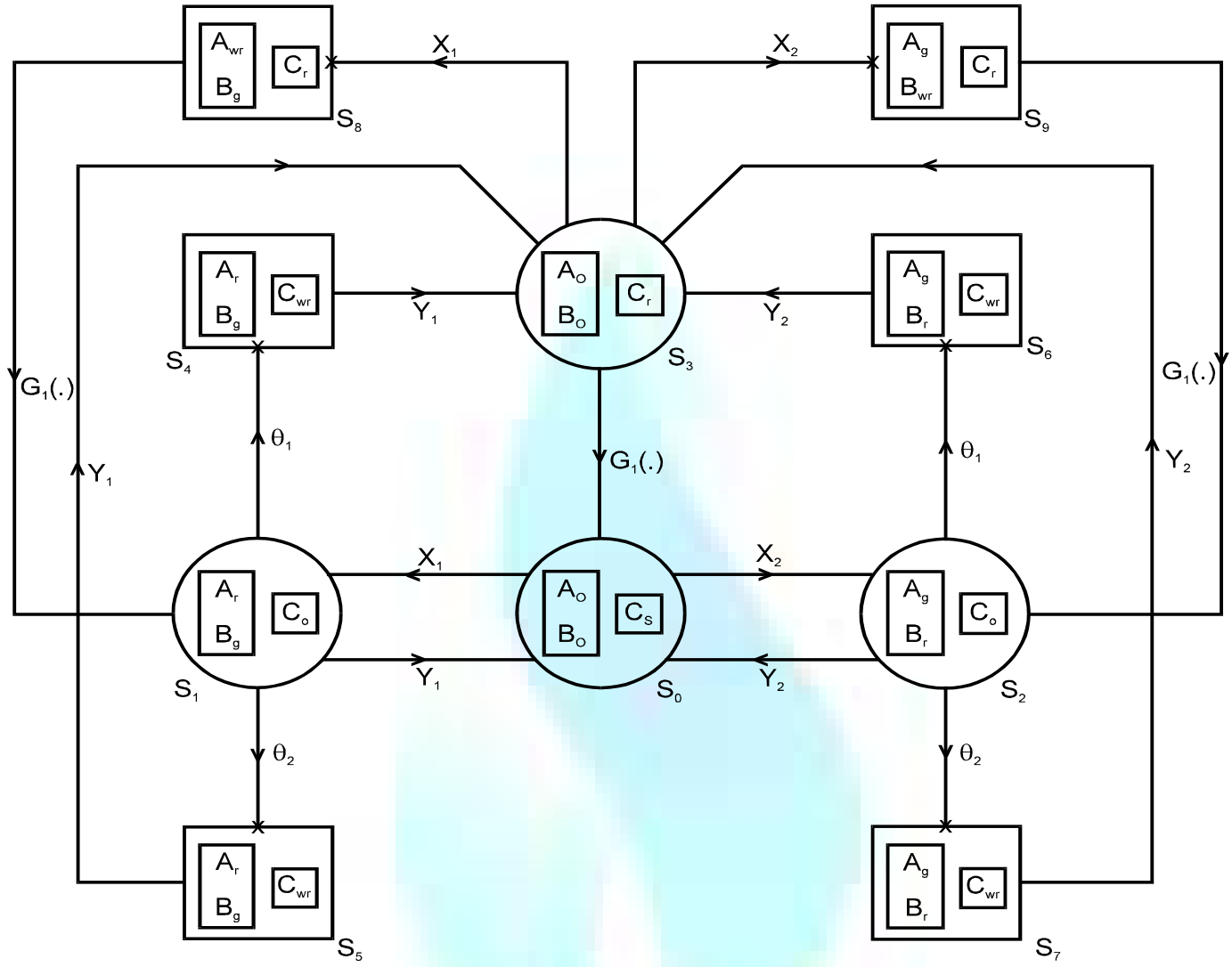
2. SYSTEM DESCRIPTION AND ASSUMPTIONS

The system is analyzed under following practical assumptions:-

(i) The system comprises of two subsystems, subsystem 1 and 2 which work independently. Subsystem1 consists of two non- identical units arranged in series whereas subsystem 2 consists of one unit only.
(ii) Initially subsystem 1 works and subsystem 2 is kept in cold standby.
(iii) Subsystem 1 is given preference in operation over subsystem 2 which is used in case either units of subsystem 1 fail.
(iv) Subsystem 2 can fails in two ways: first it may fail naturally and second it may fail catastrophically.
(v) Failure and repair times for the units of subsystem 1 are assumed to be correlated random variables having bivariate exponential distribution.
(vi) Failure time distribution of subsystem 2 is assumed to be negative exponential and repair time distribution is general.
(vii) A single repair facility is available to repair the failed units.
(viii) Service discipline is FCFS
(ix) A repaired unit works as good as new.

FIG.1

TRANSITION DIAGRAM



3. NOTATION AND STATES OF THE SYSTEM

X_i : random variable representing failure time of the ith unit of subsystem1

Y_i : random variable representing repair time of the ith unit of subsystem 1

$f_{X_iY_i}(x,y)$:the joint p.d.f. of X_i and Y_i i.e.

$f_{X_iY_i}(x,y) = \alpha_i\beta_i(1-r_i)e^{-(\alpha_i x_i+\beta_i y_i)}I_0\left(2\sqrt{\alpha_i\beta_i r_i x_i y_i}\right)$,

$\alpha_i, \beta_i,\ x_i, y_i > 0, |r_i| < 1$

$g_i(x)$: marginal p.d.f of X_i i.e$g_i(x) = \alpha_i(1-r_i)e^{-\alpha_i(1-r_i)x_i}, i = 1,2$

$k_i(y_i|x)$: conditional p.d.f of $(Y_i|X_i = x)$ i.e

$k_i(y_i|x) = \beta_i e^{-(\alpha_i r_i x_i+\beta_i y_i)}I_0\left(2\sqrt{\alpha_i\beta_i r_i x_i y_i}\right), i = 1,2$

p_{ij} : steady state probability of transition from regenerative state S_i to S_j

$p_{ij}^{(k)}$: steady state probability of transition from regenerative state S_i to $S_j$via non- regenerative state S_k.

ψ_i : mean sojourn time in state S_i .

$Z_i(t)$: probability that the system sojourns in state S_i up to time t.

Symbols for the state of the system

$A_o/B_o/C_o$: Components A, B, and C are operative

A_g/B_g : Components A and B are good

$A_r/B_r/C_r$: Components A, B and C are under repair

$A_{wr}/B_{wr}/C_{wr}$: Components A, B and C are waiting for repair

Possible states of the system are:

$S_0=\begin{pmatrix}A_o, B_o\\ c_s\end{pmatrix}$, $S_1=\begin{pmatrix}A_r, B_g\\ c_o\end{pmatrix}$, $S_2=\begin{pmatrix}A_g, B_r\\ c_o\end{pmatrix}$, $S_3=\begin{pmatrix}A_o, B_o\\ c_r\end{pmatrix}$, $S_4=\begin{pmatrix}A_r, B_g\\ c_{wr}\end{pmatrix}$

$S_5=\begin{pmatrix}A_r, B_g\\ c_{wr}\end{pmatrix}$, $S_6=\begin{pmatrix}A_g, B_r\\ c_{wr}\end{pmatrix}$, $S_7=\begin{pmatrix}A_g, B_r\\ c_{wr}\end{pmatrix}$, $S_8=\begin{pmatrix}A_{wr}, B_g\\ c_r\end{pmatrix}$, $S_9=\begin{pmatrix}A_g, B_{wr}\\ c_r\end{pmatrix}$

4. TRANSITION PROBABILITIES AND SOJOURN TIMES

First we find the following direct and indirect steady state probabilities of transition:

$p_{ij} = \lim_{t\to\infty} Q_{ij}(t) = \lim_{s\to 0} \tilde{Q}_{ij}(s)$

and

$p_{ij}^{(k)} \quad \lim_{t\to\infty} Q_{ij}^{(k)}(t) = \lim_{s\to 0} \tilde{Q}_{ij}^{(k)}(s)$

Thus

$p_{01} = \alpha_1(1-r_1)\int e^{-[\alpha_1(1-r_1)+\alpha_2(1-r_2)]u}du = \frac{\alpha_1(1-r_1)}{\alpha_1(1-r_1)+\alpha_2(1-r_2)}$

Similarly,

$p_{02} = \frac{\alpha_2(1-r_2)}{\alpha_1(1-r_1)+\alpha_2(1-r_2)}$

Conditional steady state probabilities of transitions are:

$p_{10|x} = \int dK_1(u|x)e^{-(\theta_1+\theta_2)u} = k_1^*[(\theta_1+\theta_2)|x]$

Similarly,

$p_{10|x} = k_1^*[(\theta_1+\theta_2)|x]\,, \qquad p_{26|x} = \frac{\theta_1}{\theta_1+\theta_2}\{1-k_2^*[(\theta_1+\theta_2)|x]\}$

$p_{27|x} = \frac{\theta_2}{\theta_1+\theta_2}\{1-k_2^*[(\theta_1+\theta_2)|x]\}\,, \qquad p_{13|x}^{(4)} = \{1-k_1^*[(\theta_1+\theta_2)|x]\}$

$p_{13|x}^{(5)} = \frac{\theta_1}{\theta_1+\theta_2}\{1-k_1^*[(\theta_1+\theta_2)|x]\}\,, \qquad p_{43|x} = p_{63|x} = p_{81|x} = p_{92|x} = 1$

Unconditional steady state probabilities of transition are

$p_{10} = \int p_{10|x}\, g_1(x)dx = \beta_1(1-r_1)[\beta_1(1-r_1)+\beta_2(1-r_2)]^{-1}$

$p_{13}^{(4)} = \theta_1[\beta_1(1-r_1)+\theta_1+\theta_2]^{-1}\,, \quad p_{13}^{(5)} = \theta_2[\beta_1(1-r_1)+\theta_1+\theta_2]^{-1}$

$p_{23}^{(6)} = \theta_1[\beta_2(1-r_2)+\theta_1+\theta_2]^{-1}\,, \quad p_{23}^{(7)} = \theta_2[\beta_2(1-r_2)+\theta_1+\theta_2]^{-1}$

$p_{20} = \beta_2(1-r_2)[\beta_2(1-r_2)+\theta_1+\theta_2]^{-1}\,, p_{30} = g_1^*\{\alpha_1(1-r_1)+\alpha_2(1-r_2)\}$

$p_{38} = \frac{\alpha_1(1-r_1)}{\alpha_1(1-r_1)+\alpha_2(1-r_2)}[g_1^*\{\alpha_1(1-r_1)+\alpha_2(1-r_2)\}]$

$p_{39} = \frac{\alpha_1(1-r_1)}{\alpha_1(1-r_1)+\alpha_2(1-r_2)}\left[1-[g_1^*\{\alpha_1(1-r_1)+\alpha_2(1-r_2)\}]\right]$

It can be easily verified that

$p_{01}+p_{02} = 1, \qquad p_{30}+p_{31}^{(8)}+p_{31}^{(9)} = 1, \quad p_{10}+p_{13}^{(4)}+p_{13}^{(5)} = 1$ **(1-5)**

$p_{20}+p_{23}^{(6)}+p_{23}^{(7)} = 1, \quad p_{43} = p_{53} = p_{63} = p_{73} = p_{81} = p_{92} = 1$

Let the random variable T_i denotes the sojourn time in state S_i then mean sojourn time in that state is given by

$$\psi_i = \int P[T_i > t]\,dt$$

The conditional mean sojourn times are

$\psi_{1|x} = \int \bar{K}_1(u|x)e^{-(\theta_1+\theta_2)u}\,du = \frac{1}{\beta_1+\beta_2}\{1-k_1^*[(\theta_1+\theta_2)|x]\}$

$\psi_{2|x} = \frac{1}{\beta_1+\beta_2}\{1-k_2^*[(\theta_1+\theta_2)|x]\}$

$\psi_{4|x} = \psi_{5|x} = \int \bar{K}_1(u|x)du, \qquad \psi_{6|x} = \psi_{7|x} = \int \bar{K}_2(u|x)du,$

and unconditional mean sojourn times are

$\psi_0 = [\alpha_1(1-r_1)+\alpha_2(1-r_2)]^{-1}, \qquad \psi_1 = [\beta_1(1-r_1)+\theta_1+\theta_2]^{-1}$

$\psi_1 = [\beta_2(1-r_2)+\theta_1+\theta_2]^{-1}, \qquad \psi_3 = [\alpha_1(1-r_1)+\alpha_2(1-r_2)+\theta_1]^{-1}$

$\psi_4 = \psi_5 = \frac{(1+\alpha_1 r_1 x)}{\beta_1}, \qquad \psi_6 = \psi_7 = \frac{(1+\alpha_2 r_2 x)}{\beta_2}$

5. ANALYSIS OF RELIABILITY AND MTSF

Let the random variable $T_i$denotes the time to system failure when the system starts from state $S_i \in E(i = 0,1,2)$. Then the reliability of the system according to its definition is given by

$R_i(t) = P[T_i > t]$

To determine $R_i(t)$,we regard the failed states of the system as absorbing. Using probabilistic arguments recursive relation among $R_i(t)$can be easily developed and taking L.T. of the relations and solving for $R_0^*(s)$,we get

$R_0^*(s) = \frac{N_1(s)}{D_1(s)}$ **(6)**

where,

$N_1(s) = Z_0^* + q_{01}^* Z_1^* + q_{02}^* Z_2^*$

and

$D_1(s) = 1 - q_{01}^* q_{10}^* - q_{02}^* q_{20}^*$

where, $Z_0^*, Z_1^* and\ Z_2^*$ are the L.T. of

$Z_0(t) = e^{-t[\alpha_1(1-r_1)+\alpha_2(1-r_2)]}\,, \qquad Z_1(t) = e^{-t(\theta_1+\theta_2)}\bar{K}_1(t|x)$

$Z_2(t) = e^{-t(\theta_1+\theta_2)}\bar{K}_2(t|x)$

Taking the inverse Laplace Transform of (7) we get the reliability of the system To get MTSF, we use the well known formula

$E(T_0) = \lim_{s\to 0} R_0^*(s) = \quad N_1(0)/D_1(0)$ **(7)**

where,

$N_1(0) = \psi_0 + p_{01}\psi_1 + p_{02}\psi_2$

and

$D_1(0) = 1 - p_{01}p_{10} - p_{02}p_{20}$

6. AVAILABILITY ANALYSIS

Let $A_i(t)$ denotes the probability that system is up at epoch t when it initially starts from regenerative state S_i .Using the definition of $A_i(t)$, the recursive relations among $A_i(t)$ (i = 0,1,2,3) can easily be developed, taking their L.T. and solving for$A_0^*(s)$ we get

$A_0^*(s) = \frac{N_2(s)}{D_2(s)}$ **(8)**

where,

$N_2(s) = Z_0^*\left[1 - q_{32}^{*(9)}\left(q_{23}^{*(6)} + q_{23}^{*(7)}\right) - q_{31}^{*(8)}\left(q_{13}^{*(4)} + q_{13}^{*(5)}\right)\right] + Z_1^*\left[q_{01}^*\{1 - q_{31}^{*(9)}\left(q_{23}^{*(6)} + q_{23}^{*(7)}\right)\}\right] + Z_2^*\left[q_{02}^*\{1 - q_{31}^{*(8)}\left(q_{13}^{*(4)} + q_{13}^{*(5)}\right)\}\right]$

$+Z_3^*\left[q_{01}^*\left(q_{13}^{*(4)} + q_{13}^{*(5)}\right)\right] + \left(Z_1^* q_{02}^* q_{31}^{*(8)} + Z_2^* q_{01}^* q_{31}^{*(9)} + Z_3^* q_{02}^*\right)\left(q_{23}^{*(6)} + q_{23}^{*(7)}\right)$

and

$D_2(s) = 1 - q_{32}^{*(9)}\left(q_{23}^{*(6)} + q_{23}^{*(7)}\right) - q_{31}^{*(8)}\left(q_{13}^{*(4)} + q_{13}^{*(5)}\right) - q_{02}^* q_{10}^* q_{31}^{*(8)}\left(q_{23}^{*(6)} + q_{23}^{*(7)}\right) - q_{02}^* q_{10}^*\left[1 - q_{31}^{*(9)}\left(q_{23}^{*(6)} + q_{23}^{*(7)}\right)\right] - q_{01}^* q_{20}^* q_{32}^{*(9)}\left(q_{13}^{*(4)} + q_{13}^{*(5)}\right)$

$-q_{02}^* q_{20}^*\left[1 - q_{31}^{*(8)}\left(q_{13}^{*(4)} + q_{13}^{*(5)}\right)\right] - q_{01}^* q_{30}^*\left(q_{13}^{*(4)} + q_{13}^{*(5)}\right) - q_{02}^* q_{30}^*\left(q_{23}^{*(6)} + q_{23}^{*(7)}\right)$

The steady state probability that the system will be up is given by

$A_0 = \lim_{t\to\infty} A_0(t) = \lim_{s\to 0} sA_0^*(s) = N_2(0)/D_2(0)$ **(9)**

It can be easily seen that $D_2(0) = 0$
so by using L'Hospital rule, we have
$A_0 = N_2(0)/D_2'(0) \quad = N_2/D_2$
where
$N_2 = \psi_0[1 - p_{31}^{(9)}(p_{23}^{(6)} + p_{23}^{(7)}) - p_{31}^{(8)}(p_{13}^{(4)} + p_{13}^{(5)})] + \psi_1[p_{01}\{1 - p_{31}^{(9)}(p_{23}^{(6)} + p_{23}^{(7)})\} + p_{02}p_{31}^{(8)}(p_{23}^{(6)} + p_{23}^{(7)})]$
$+\psi_2[p_{02}\{1 - p_{31}^{(8)}(p_{13}^{(4)} + p_{13}^{(5)})\} + p_{01}p_{31}^{(9)}(p_{23}^{(6)} + p_{23}^{(7)})] + \psi_3[p_{01}(p_{13}^{(4)} + p_{13}^{(5)}) + p_{02}(p_{23}^{(7)} + p_{23}^{(6)})]$

and
$D_2 = 1 - p_{31}^{(9)}(p_{23}^{(6)} + p_{23}^{(7)}) - p_{31}^{(8)}(p_{13}^{(4)} + p_{13}^{(5)}) - p_{02}p_{10}p_{31}^{(8)}(p_{23}^{(6)} + p_{23}^{(7)})$
$-p_{01}p_{10}[1 - p_{31}^{(9)}(p_{23}^{(6)} + p_{23}^{(7)})] - p_{02}p_{20}[1 - p_{31}^{(8)}(p_{13}^{(4)} + p_{13}^{(5)})] - p_{01}p_{30}(p_{13}^{(4)} + p_{13}^{(5)}) - p_{02}p_{30}(p_{23}^{(6)} + p_{23}^{(7)})$
The expected up time of the system during (0,t) is given by
$\mu_{up}(t) = \int_0^t A_0(u)du$ **(10)**
so that
$\mu_{up}^*(s) = A_0^*(s)/s$
(11)

7. BUSY PERIOD ANALYSIS

Define $B_i(t)$ as the probability that the repairman is busy in the repair of failed unit when the system initially starts from regenerative state S_i. Using probabilistic arguments, relations among $B_i(t)$can be set up, taking their L.T. and solving for $B_0^*(s)$, we have
$B_0^*(s) = N_2(s)/D_2(s)$ **(12)**
where,
$N_3(s) = [q_{01}^*\{1 - q_{31}^{*(9)}(q_{23}^{*(6)} + q_{23}^{*(7)})\} + q_{02}^*q_{31}^{*(8)}(q_{23}^{*(6)} + q_{23}^{*(7)})] + Z_2^*[q_{01}^*q_{31}^{*(9)}(q_{13}^{*(4)} + q_{13}^{*(5)})\{1 - q_{31}^{*(8)}(q_{13}^{*(4)} + q_{13}^{*(5)})\}]$
$+Z_3^*[q_{01}^*(q_{13}^{*(4)} + q_{13}^{*(5)}) + q_{02}^*(q_{23}^{*(6)} + q_{23}^{*(7)})]$

In the long run, the expected fraction of time for which the repairman is busy in the repair of the failed unit is given by
$B_0 = \lim_{t\to\infty} B_0(t) = \lim_{s\to 0} sB_0^*(s) = N_3/D_2$ (say) **(13)**
where,
$N_3 = \psi_1[p_{01}\{1 - p_{31}^{(9)}(p_{23}^{(6)} + p_{23}^{(7)})\} + p_{02}p_{31}^{(8)}(p_{23}^{(6)} + p_{23}^{(7)})] + \psi_2[p_{02}\{1 - p_{31}^{(8)}(p_{13}^{(4)} + p_{13}^{(5)})\} + p_{01}p_{31}^{(9)}(p_{23}^{(6)} + p_{23}^{(7)})] +$
$\psi_3[p_{01}(p_{13}^{(4)} + p_{13}^{(5)}) + p_{02}(p_{23}^{(7)} + p_{23}^{(6)})]$

The expected busy period of the repairman during (o, t) is given by
$\mu_b(t) = \int_0^t B_0(u)du$ **(14)**
So that
$\mu_b^*(s) = B_0^*(s)/s$
(15)

8. EXPECTED NUMBER OF REPAIRS

Define$V_i(t)$ as the expected number of repairs of the failed unit during the interval (0,t) when the system initially starts from the regenerative state S_i . Using elementary probabilistic arguments, recursive relations among$V_i(t)$ can be set up, taking their L.S.T.and solving for $\tilde{V}_0(s)$,we get
$\tilde{V}_0(s) = \frac{N_4(s)}{D_2(s)}$ **(16)**
Where,
$N_4(s) = \tilde{Q}_{01}\tilde{Q}_{10}[1 - \tilde{Q}_{32}^{(9)}(\tilde{Q}_{23}^{(6)} + \tilde{Q}_{23}^{(7)})] + \tilde{Q}_{02}\tilde{Q}_{10}\tilde{Q}_{31}^{(9)}(\tilde{Q}_{23}^{(6)} + \tilde{Q}_{23}^{(7)}) + \tilde{Q}_{20}\tilde{Q}_{01}\tilde{Q}_{32}^{(9)}(\tilde{Q}_{13}^{(4)} + \tilde{Q}_{13}^{(5)}) + \tilde{Q}_{02}\tilde{Q}_{20}[1 - \tilde{Q}_{31}^{(8)}(\tilde{Q}_{13}^{(4)} + \tilde{Q}_{13}^{(5)})]$
$+\tilde{Q}_{30}\tilde{Q}_{01}(\tilde{Q}_{13}^{(4)} + \tilde{Q}_{13}^{(5)}) + \tilde{Q}_{30}\tilde{Q}_{02}(\tilde{Q}_{23}^{(6)} + \tilde{Q}_{23}^{(7)})$
In steady state expected number of repairs per unit of time is given by
$V_0 = \lim_{t\to\infty}[V_0(t)/t] = \lim_{s\to\infty} s^2\,\tilde{V}_0(s) = N_4/D_2$ (say) **(17)**
Where,
$N_4 = p_{01}p_{10}\{1 - p_{32}^{(9)}(p_{23}^{(6)} + p_{23}^{(7)})\} + p_{01}p_{02}\,p_{31}^{(8)}(p_{23}^{(6)} + p_{23}^{(7)}) + p_{01}p_{30}(p_{13}^{(4)} + p_{13}^{(5)})$
$+\,p_{01}p_{20}\,p_{32}^{(9)}(p_{13}^{(4)} + p_{13}^{(5)}) + p_{02}p_{20}\{1 - p_{31}^{(8)}(p_{13}^{(4)} + p_{13}^{(5)})\} + p_{01}p_{20}\,p_{32}^{(9)}(p_{13}^{(4)} + p_{13}^{(5)})$

9. PROFIT FUNCTION ANALYSIS

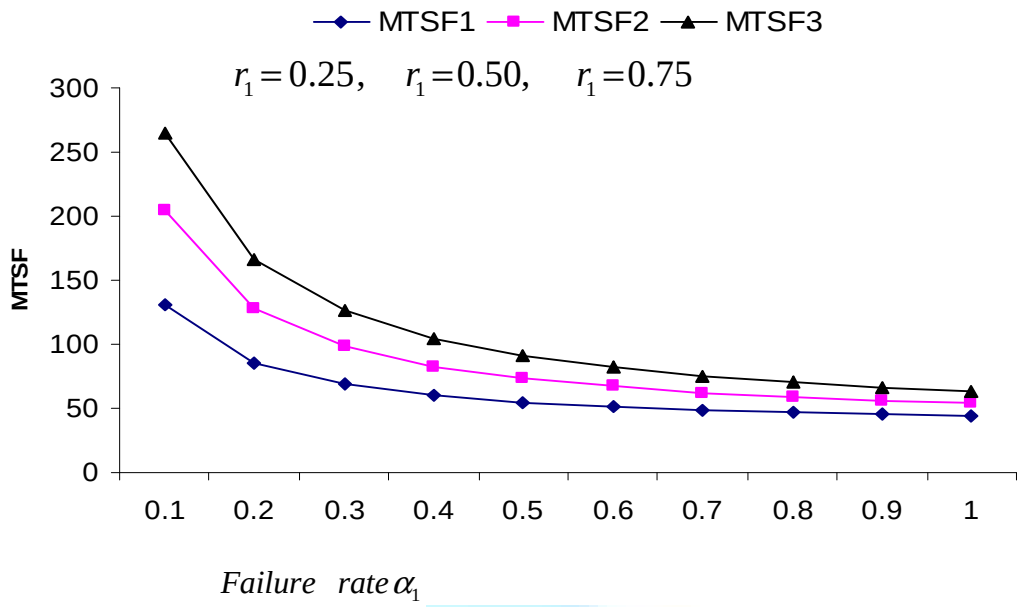
Considering the mean up time, expected busy period of the repairman and expected number of repairs per unit of time, the net expected profits in the interval (0,t) are
$P_1(t) = K_0\mu_{up}(t) - K_1\mu_b(t)$ **(18)**
$P_2(t) = K_0\mu_{up}(t) - K_2V_0(t)$ **(19)**
The expected total profits per unit time in steady state are
$P_1 = \lim_{t\to\infty}[P_1(t)/t] = \lim_{s\to 0} s^2\,P_1^*(s)$
$P_2 = \lim_{t\to\infty}[P_2(t)/t] = \lim_{s\to 0} s^2\,P_2^*(s)$
So that
$P_1 = K_0A_0 - K_1B_0$ **(20)**
$P_2 = K_0A_0 - K_2V_0$ **(21)**
Where K_0 is the revenue per unit up time and K_1 and K_2 are the costs of repair per unit time for the system and per unit repair cost of the system respectively.

10. GRAPHICAL STUDY OF THE SYSTEM MODEL

For a more concrete study of system behaviour, we plot the graphs of MTSF and profit functions w.r.t. the failure parameter α_1 for three different values of the correlation coefficient $r_1 = 0.25, r_2 = 0.50, r_3 = 0.75$ when the other parameters are kept fixed as $\alpha_2 = 0.04$, $\beta_1 = 0.04, \beta_2 = 0.03, \gamma_1 = 0.4, \gamma_2 = 0.4$, $\theta_1 = 0.05$, $\theta_2 = 0.03, K_0 = 1000$, $K_1 = 300$, $K_2 = 400$.
Fig.2, shows the variation in MTSF in respect of α_1 for three different values of correlation coefficient $r_1 = 0.25, r_2 = 0.50, r_3 = 0.75$.It is observed from the graph that MTSF decreases with the increase in the failure parameter α_1 and increases with the increase in the values of the correlation coefficient r_1.
Fig.3, represents the change in profit functions P_1 and P_2 w.r.t. varying values of α_1 for three different values of correlation coefficient $r_1 = 0.25$, $r_2 = 0.50$, $r_3 = 0.75$. From the graph it is seen that both the profit functions decrease with the increase in the failure rate α_1 and increase with the increase in r_1. It is also observed that profit function P_2 is always higher as compared to profit function P_1 for fixed values of α_1 and r_1.

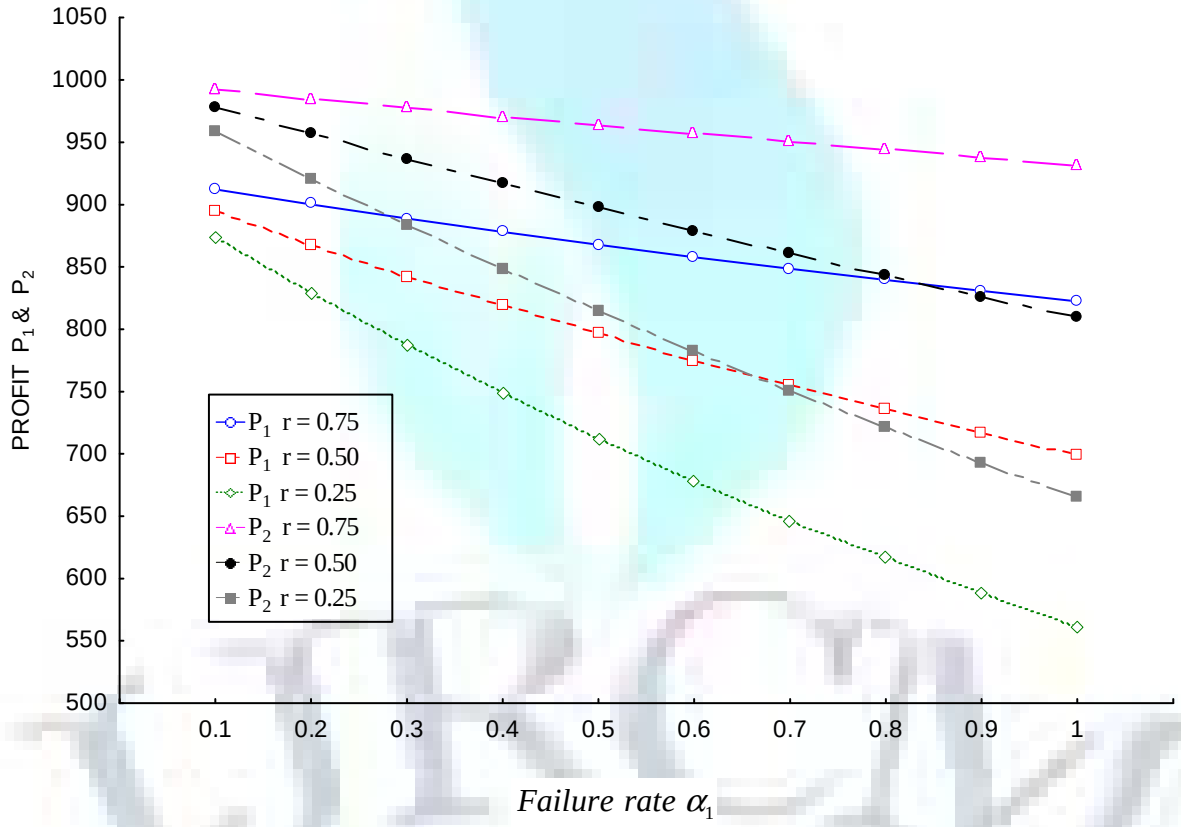
BEHAVIOUR OF MTSF W.R.T α_1 FOR DIFFERENT VALUES OF r_1

FIG. 2



BEHAVIOUR OF PROFIT FUNCTIONS P_1 and P_2 W.R.T. α_1 FOR DIFFERENT VALUES OF r_1

FIG. 3



11. CONCLUSION

In this paper a system model consisting of two subsystems has been considered for its analysis .Various reliability characteristics like mean time to system failure, availability, busy period of the repairman and profit incurred by the system have been obtained. The graphical behavior of some of the characteristics w.r.t. failure rate for different values of correlation coefficient between failure and repair has been studied.

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TEACHING – IS IT A PROFESSION OR PROCESSION?

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ABSTRACT

Today, the craze for teaching is coming down among our young age band. Not even a single student is standing in the class room to show his real fascination and obsession for teaching when the teachers ask. But when they understood the real pulse of this profession teaching somebody may get a warm interesting towards it. Now a days, the film stars, celebrities, defense persons, even laymen getting doctorates from various enormous universities. Teaching is the profession or the process with which somebody is getting transformed from something to someone. It can be the darkness to light. Years back, the most important problem in connection with the profession teaching was the less income. The salary of teachers was very poor and pathetic. But the situation has changed. The central government has introduced the best salary package for the teachers. Now when we think about the profession of teaching it is the process to educate somebody to come up. About education Aristotle, great Philosopher, has said "The roots of education are bitter but the fruit is sweet". The root meaning of the word education is to lead forth. In a sense education is self-realization. It helps a person in achieving excellence at all levels – Physical, mental, moral, emotional and Intellectual. Thus education leads to the integration of Personality and formation of motivators for the students. In the Society, we can't see a person who is not wishing to become a motivator. But actually have you ever thought "who is the motivator and what is motivation". According to our Purana Stories, Lord Krishna was the first motivator. Now, is teacher a motivator? If the answer is yes, what type of motivation that he should give for the students. Democracy means for the people, by the people and of the people. The teacher with motivator should always be for the students, by the students and of the students. In this context it will be better to give a little look in classrooms consisting of teacher or motivator and students and this study let it be a real worth for checking whether the job teaching is a profession or a procession.

KEYWORDS
teaching, education.

INTRODUCTION

It is a well known fact that our country can't successfully tackle its unsolved problems without a rapid progress in the educational scenario. Even for the preservation of Political democracy, citizens must be educated, if they are to exercise intelligence and constant vigil which is the price of liberty.

The constitution advocates the principles of liberty, equality and fraternity. But there exists a wide gap between the have's and have not's. When India celebrates her 66th year of Independence, the number of illiterate individuals is on the increase. Illiterate is closely linked to poverty and exploitation.

The areas of the world with a concentration of poverty, illiteracy and hunger are those which for many centuries have undergone slavery and exploitation under the colonial rule. Colonization and Industrial revolution on the west meant degradation in the east. A world system thus emerged dividing the very rich and very poor nations. The people of developing countries were denied all forms of education, both formal and informal.

A literate population is always an asset to any developing society. Literacy accelerates the pace of development in any society. It promotes self – respect of an individual and makes one confident of his own capabilities. It results in better health awareness and care and increase people's participation in the making up of a nation. For making a nation, first of all, the people who are belonging to that nation must be motivated in its peak. And also it should be started in their schooling itself. It reveals the significance and role of a teacher in the formation of a customary nation. So it is inevitable to form a group of teachers in the society for forming the civilians beneficial for the nation.

IMPORTANCE OF THE STUDY

In the point of view of C B Mamoria, well known HRM scholar, "Motivation is a function which kindles a burning passion for action ". Actually the writer tells us the penetrating power of pieces of advice delivering by the motivator. To what degree and intensity the words, delivering by the motivator, enable to drill the brain to fill it with full of knowledge and action. In other words motivation is the uplift of persons from darkness to light. Let us now think "Is there any distinction in between teaching and motivation ". For arriving at the answer, the comparative analysis of two terms viz Sensation and Perception will be better. Sensation is only the data collection from the observed events. No further analysis is going on there in the process of sensation. But in the case of perception, the persons are thinking more or analyzing with the collected data for having an excellent output. The later case should be happened in the classrooms. The students should perceive everything through sensation. In other words, each and every class rooms should be a laboratory with full of equipment and experiments. The various subjects teaching in the classrooms must be in the form of various equipment and experiments in the laboratory. In the science laboratory, nobody is studying anything, but everybody is experiencing and getting understood on the observed things. Likewise students must take each and every subject as in the way that they are taking pipette and burette in the Chemistry lab to perceive the ideas and inputs. When the students are taking equipment, the teacher can act in the roles of a pioneer, helper, observer and controller. In each of these roles, a Teacher must take care on the students' grasping power , excellence in efforts , the areas where they are frustrating . On the analysis of all these , a Teacher can make a student or a learner , or a perceiver and thereby forming some analysts for the future . So, indeed, teaching is not a single event as such but it can be a process consisting of sufficient and defined steps.

REVIEW OF LITERATURE

This research paper provides an overview of the research findings concerning effective teaching. The term 'effective teaching' is used in this article in a much broader sense than simply teacher behavior, or what teachers are seen to do in the classroom. Instead, this article considers the managerial and organizational aspects of effective teaching, as well as the pedagogical processes. The article divides the research findings broadly into three categories: 'teaching effects'; 'models of teaching' and 'artistry'. While it is accepted that these are rather crude distinctions, it provides a means of summarizing the vast literature on the subject. This review does not claim to be comprehensive or definitive but is intended as a guide to the most important and influential research findings on effective teaching.

RESEARCH METHODOLOGY

OBJECTIVES

1) To understand more about the trustworthiness of the profession teaching.
2) To understand all about the efficiency level of the teachers.
3) To analyze all about the qualifying criteria for the appointment of a teacher.
4) Give suitable suggestions for improving the profession teaching.

HYPOTHESIS

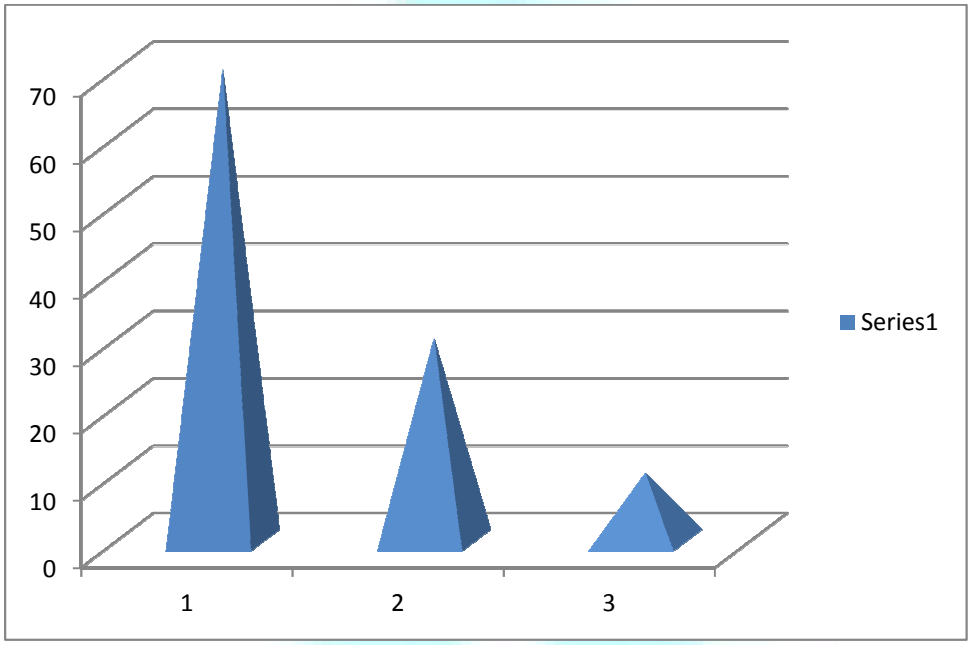
H01: Teaching profession is not attractive in the society.
H02: Teacher has no enormous roles to form a society.
H03: Teachers are not the real worth in the society to shape and mold a group of people.

RESEARCH METHODOLOGY

POPULATION: Any person who belongs to a Govt/Private schools /colleges in Kerala.
DATA: Data are primary in nature for the reliability of the readers.
SAMPLING TECHNIQUE: Simple random sampling method was used.
SAMPLE SIZE: 150 persons were interviewed for collecting the data by means of structured questionnaires, Observation, One- to- One interview etc.
DATA ANALYSIS: The study mainly focused on four different factors viz education development, societal development, creativity of the students, growth of the nation to understand the role and significance of the profession teaching. For making the results, Chi-square test has practiced for testing the hypotheses.

RESULTS AND DISCUSSIONS

	The nation will develop	The nation will not develop	Total
With the eminent teachers	70	10	80
With the eminent councilors	30	14	44
With the eminent mentors	10	16	26
Total	110	40	150



CHI – SQUARE TABLE

SL No.	O	E	(O-E)	$(O-E)^2$	$(O-E)^2 / E$
1	70	58.66	11.34	128.59	2.19
2	30	32.26	2.26	5.10	.15
3	10	19.06	9.06	82.08	4.30
4	10	21.33	11.33	128.36	6.01
5	14	11.73	2.27	5.15	.43
6	16	19.06	-3.06	9.36	.49
					13.57

Here the dependent factor is education development and the independent factor is teaching. Chi – square test was practiced at 5 per cent level of significance. From the analysis of chi-square the following discussions were carried out.

First of all, rejected the null hypotheses at 5 per cent level of significance since chi square calculated value (13.57) is greater than the chi square tabled value (5.99) on 2 degrees of freedom. This decision by means of chi Square testing implies and reminds the importance of the independent factor teaching in the education development.

FINDINGS

Forty seven per cent of the total respondents opined that the nation will develop only through the hands of eminent teachers. The invaluable suggestions of the teachers are actually the strategies to cope up with the difficult life situations. Spread of education is the only road to development. India is noted for unity in diversity. Naturally we are facing innumerable Problems in all fields – Political, Social, religious and economics. There is no doubt that spread of literacy is an active catalyst to controlling the social evils. There is a steady increase in the number of illiterates due to the population explosion. The link between literacy development and population is irrefutable.

Primary education plays a key role in controlling the rapidly increasing population of our country. It makes people more aware of the problems of our population, health problems and problems relating to environment. It makes them realize that increasing population produces a variety of impediments in the developments of future generations. Indian society is deep rooted in superstitious beliefs and only a literate population can overcome these beliefs and bring about total development and transformation.

According to Lincoln, Democracy is a Government of the People, for the People, by the People. Participation of the people in the political field has a lot to do with developments. The success of democracy depends on many factors like the People's love and commitment for democracy, enlightened citizenship and sound education.

SUGGESTIONS

It is a known fact that corruption and malpractices are there in the electioneering process of our country. This is engineered by a section of the population who tend to exploit a vast majority of the under privileged. As the majority is illiterate, elections, seem to have lost significance. So fulfillment of one's duties and consciousness of the rights should be the gift that every individual needs.

Our industrial sector also suffers from illiteracy. The workers and the Laborers who are ultimately responsible for the manufacture of goods get the minimum share of the surplus they earn. They get the minimum of wages, live in slums and earn not enough to satisfy their hunger. This exploitation makes them least motivated in their work and as a result their Contribution to productivity declines. In this context, it will be better to think the role of a motivator or a teacher and in what degree they can help these persons in their work atmosphere through their continuous council ling and process of work.

Now a days, in a motivation, the attitude of a motivator is very relevant than the knowledge of him. In the case of a doctor, he or she should be a good advisor and motivator for the patients. The patient wants the sweet presence of the doctor. In the same way every teachers are in the position of a doctor to treat mentally the students. In a meaning every students are patients and they are searching for the best treatment. These searching by the students are nothing but the educational institute where they would like to do the course. The students would like to form their future in such a way that it should be fit enough to compete in their societies and thereby they satisfy their societal needs. For forming the characters, fist of all, every students is concentrating in their teachers and his or her characters. They give only a little attention in their parents and greats. So without any analysis, we can argue that the first and foremost motivator for a student is their teachers. The teacher is assisting the students in the formation of their mental abilities and growth. Through the motivation, the teacher is becoming a good seer by understanding the emotions, feelings and calibers of various students. They can envisage the efforts that the students can put in their assignment in future. The conducive nature of a motivator, here the teacher, should be a splendor for the students in the areas where they can't proceed. The words, delivered by the motivator, should have the capacity to penetrate the hearts and brains of the students. In the classrooms, teachers must act in the role of a mediator among students to their number of ambitions. And the motivator, he or she should be a good controller. In other words teachers should be a good gap analyst. The gap in between the present and standard knowledge level of every student must be evaluated by the motivating teachers. By doing so the motivating teachers are standing in the role of a good controller before the students. Also the teacher, in the role a motivator, can act in the following roles for strengthening the knowledge level of students.

a) Motivator : One who is Molding the Students
b) Mentor : One who is Measuring the Students
c) Mediator : One who is Mingling with the Students
d) Counselor : One who is Carrying the Students
e) Consultant : One who is Caring the Students
f) Controller : One who is Creating the Students
g) Observer : One who is Orienting on the Students

CONCLUSIONS

This is an era of internet and information technology. There is hardly any domain where science and technology doesn't play a vital role. Whether it is on food front or defense, clothing or the organization of leisure, technological innovations make man's life comfortable, effective and meaningful. Culture is the art of developing the intellectual and moral faculties and it can be nourished only through education.

Today communalism and regionalism pose a grave threat to our nation. We need an educated lot who can come out of selfish and narrow boundaries and put the nation in the right track of progress.

Therefore lack of education is a stumbling block in the developmental process. A demand for literacy is to be evoked in the way hunger creates a clamor for food or the way employment agitates a person for job. In fact India's future lies in her educated citizens. The educated citizens are being formed in the classrooms itself.

Let me first conclude the meaning of a classroom on my own vision. Classroom is just like a production department consisting of raw materials, machines and operators. In this production department, let each and every faculty members become in the role of an operator. These operators can start-up their operation by using the row materials viz students in the different machines like modernized teaching aids. Actually in the classroom students should be transferred from thinking of theory to doing of experiments as in the same way of the transshipment of row materials to finished goods. For setting students as changed, the teacher must motivate them . The teacher should focus on the number of caliber, traits, character of the students in the classroom itself by giving those chances to express these qualities. The teacher, in the classroom, in the role of a motivator must assist them to find a suitable path for achieving their number of targets in the life. Also the motivating teacher must help the students to make a box of strategies. Let these strategies either be the different types of paths of ethics or roles to be played by them in their future assignments. And at the end of the curriculum let them be studied how to practice these weapons to tackle in their life.

At last, the letters of the word "TEACHER "must follow the words as below.

T : Terrific
E : Efficient
A : Attractive
C : Creative
H : Honest and Hardworking
E : Esteemed
R : Reliable

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CONSUMER PREFERENCES TOWARDS CONSTRUCTED HOUSES IN INDORE CITY

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ABSTRACT

Real estate in Indore is one of the thriving sectors of the Indore economy. Indore is indisputably known as the commercial capital of Madhya Pradesh. Being one of the fastest growing Tier-III cities of India, it is the single largest business centre of the state commanding most of the volumes in trade, industry and services over cities in Madhya Pradesh. The real estate in Indore is quite upbeat. On residential segment, we see the development of townships besides the construction of apartment houses, condominiums, bungalows, villas etc. at several locations. The city has already attracted a number of leading builders for various construction projects. Building contractors in Indore are contributing in the expansion of the city horizontally as well as vertically. Latest housing in Indore let people experience world-class living style within the boundaries of their city itself. The reason behind making this paper is to study about the constructed houses Indore. This paper will provide the information about the status of constructed houses in Indore. Further it will give an overview of mentality of the people living in Indore or further planning to have their own house in Indore.

KEYWORDS
Real Estate, Constructed houses.

INTRODUCTION

"Everybody is still looking India from the point of residential projects. We are the only company that is bating in India's strong consumption theme that clearly makes us unique and differentiate us from the other real estate developer"

Manish Kalani, Indore owner of Treasure Island

Real Estate Indore is one of the thriving sectors of the Indore economy. One of the forerunners of the booming real estate industry in Indore, the Indore Development Authority (IDA) was established by the government of Madhya Pradesh as per the regulations of the Madhya Pradesh Town and Country Planning Act of 1973. The objective of this council was to provide spacious, well designed and comfortable apartments and residential housing complexes for the citizens of Indore at affordable prices. The property dealers and real estate agents assist the potential buyers and sellers in all property related matters that include the purchase, sale and lease of all types of property all across the Indian subcontinent. The Madhya Pradesh Housing Board was established as a body corporate under the Madhya Pradesh Griha Nirman Mandal Adhiniyam, 1972 which replaced the earlier similar Act of 1950. The objective of Madhya Pradesh Housing Board is to deal with and satisfying the need of housing accommodation and for matters connected there-with.

PRICE TRENDS OF REAL ESTATE MARKET FOR CONSTRUCTED HOUSES IN INDORE CITY

According to sources, rates of residential land in ward numbers 10, 36, 33, 39, 40, 41, 42, 48, 49 and 62 have been hiked by 50-100 per cent while rates in the central part of the city have been raised to some extent. The maximum hike in rates has been affected in eastern and southern areas of the city. Citizens were baffled when they learnt about the rates revised in the guideline released on Wednesday. On the basis of the Immovable Property's Guideline from the year 2001-2002 to 2009-10 say that the prices increased @ the of Residential properties are valued in square foot using mean and median price. These industrial units and educational Institutes have forced the builders in India to develop large-scale housing and residential property in Indore. The commercial properties segment of Indore consists of small retail markets to sprawling shopping malls, amusement parks and entertainment hubs. The office spaces in Indore prime in areas like M G Road, Siyaganj, Hamilton Road and Jawahar Marg. Despite of such an astonishing rate of real estate developments, property prices and rates in Indore are quite nominal and thereby attracting potential investors to reap high capital gains once the real estate market in Indore is fully recognized.

Municipal Corporation of Indore came into being in order to provide essential civic infrastructure facilities in the city. Indore Municipality is also responsible for maintaining heritage buildings and evaluating environmental effects on them. Indore has seen some major real estate developments in the past. Residential group housing has paved its way into the housing markets in Indore, while the commercial properties are registering a rise in the number of state-of-the art shopping and business centers within the city limits. On residential segment, we see the development of townships besides the construction of apartment houses, condominiums, bungalows, villas etc. at several locations.

Indore Development Authority was incorporated by the Government of the State of Madhya Pradesh in 1973 in the place of city Improvement Trust (formed in 1924 under the British Rule) under the Madhya Pradesh Town and Country Planning Act of 1973. The major task of Indore Development Authority Indore is construction of residential / housing societies.

The main function Indore Development Authority (IDA) is to implement the master plan made by Town and Country Planning Office, Bhopal. Indore Development Authority is entrusted with the development of the city according to the master plan. IDA Development projects are well planned by their Architects and cater to upper & middle class in accordance with their needs and budget.

RESEARCH OBJECTIVES

- To find out the growth rate of Real Estate market in Indore City.
- To Analysis of Current scenario for constructed houses in Indore City.

RESEARCH METHODOLOGY

Both primary as well as secondary data from various journals, magazines, newspaper and websites of companies. Data is collected to analyse the data to relate current scenario, The study is empirical based on the data collected through questionnaire

Type of Paper: The paper is of exploratory type research.

SAMPLE PLAN

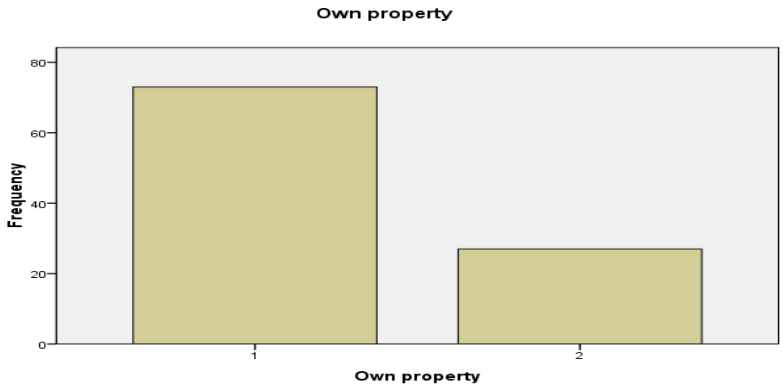
Universe: INDORE (M.P)

Sample size & Sampling techniques: A sample of 100 people was taken on the basis of convenience. The actual consumers were contacted on the basis of Simple random sampling.

DATA INTERPRETATION AND DATA ANALYSIS

Q.1 Do you have your own property?

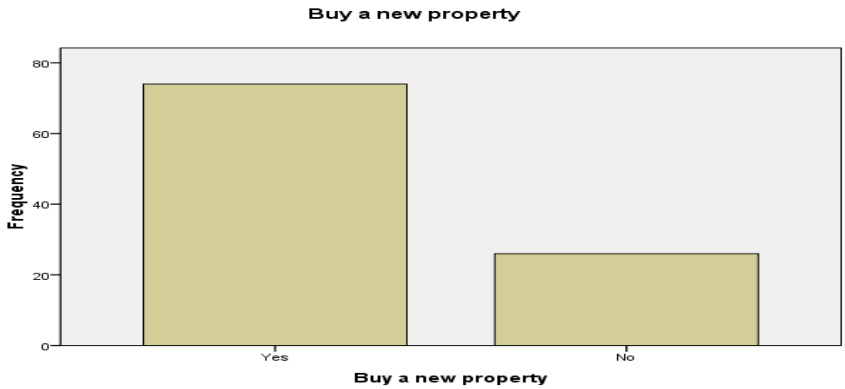
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	73	73.0	73.0	73.0
	No	27	27.0	27.0	100.0
	Total	100	100.0	100.0	



Interpretation: This graph and table show that there are 73% of people having own property and remaining 27% are not having their own property

Q.2 Are you planning to buy a new property?

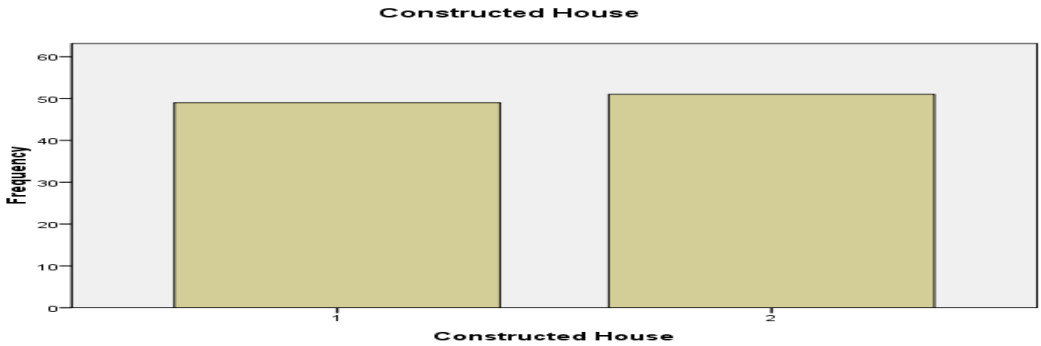
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	74	74.0	74.0	74.0
	No	26	26.0	26.0	100.0
	Total	100	100.0	100.0	



Interpretation: According to the graph and table 74% people are interested to buy a new property and 26% are not interested.

Q.3 Do you prefer constructed house?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	49	49.0	49.0	49.0
	No	51	51.0	51.0	100.0
	Total	100	100.0	100.0	



***Interpretation**:* By analyzing this graph and table 49% people interested in constructed house and remaining are not interested.

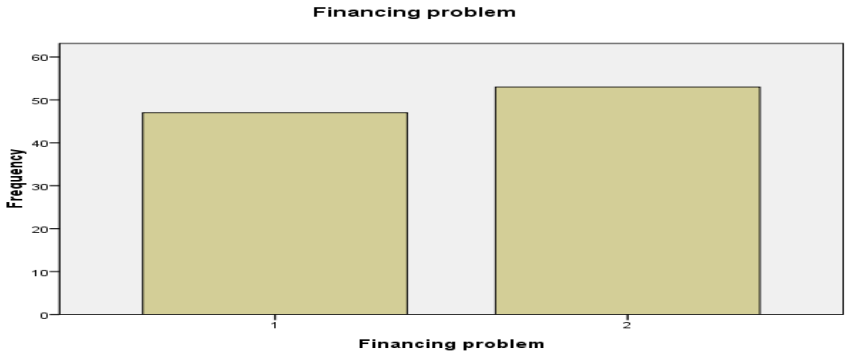
Q.4 Do you prefer furnished constructed house?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	48	48.0	48.0	48.0
	No	52	52.0	52.0	100.0
	Total	100	100.0	100.0	

Interpretation: 52% people are not required furnished house.

Q.5 Is financing is a problem for you to purchase constructed houses?

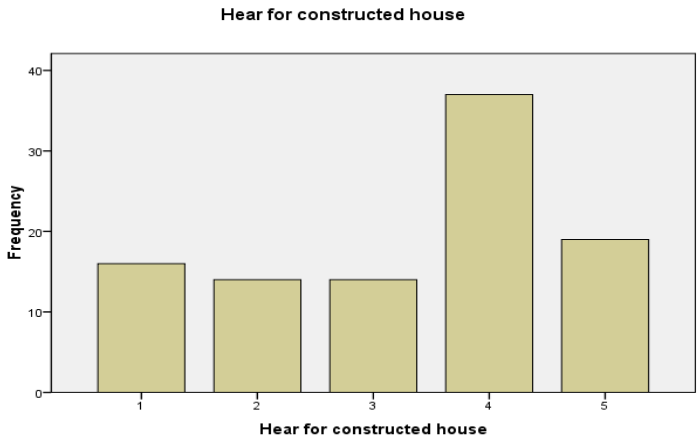
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	47	47.0	47.0	47.0
	No	53	53.0	53.0	100.0
	Total	100	100.0	100.0	



***Interpretation**:* 47% people in Indore are not ready to invest due to facing financial problem.

Q.6 How did you hear about the constructed houses?

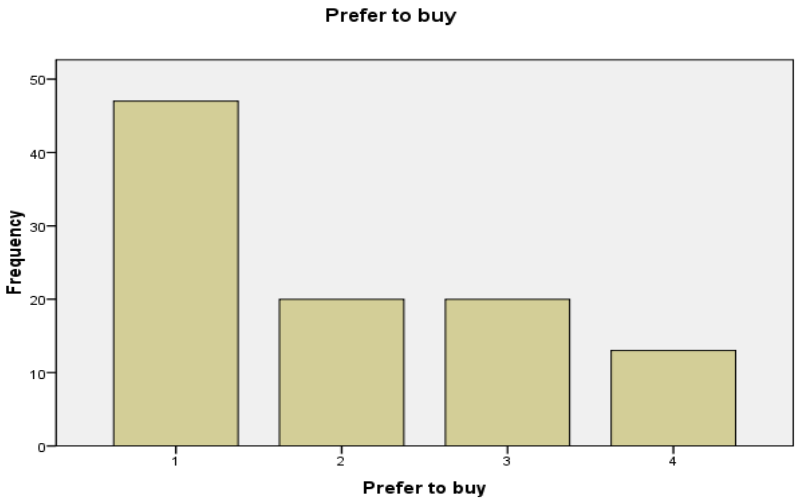
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Prior of experience	16	16.0	16.0	16.0
	Interest search	14	14.0	14.0	30.0
	Word of mouth	14	14.0	14.0	44.0
	Broker	37	37.0	37.0	81.0
	Other	19	19.0	19.0	100.0
	Total	100	100.0	100.0	



Interpretation: Most of the people having information through the broker of the city i.e. (37%), prior of experience are (16%), internet search and word of mouth having same ratio (14%), and (19%) people having information from the other sources.

Q.7 What is your preference towards buying/purchasing constructed house?

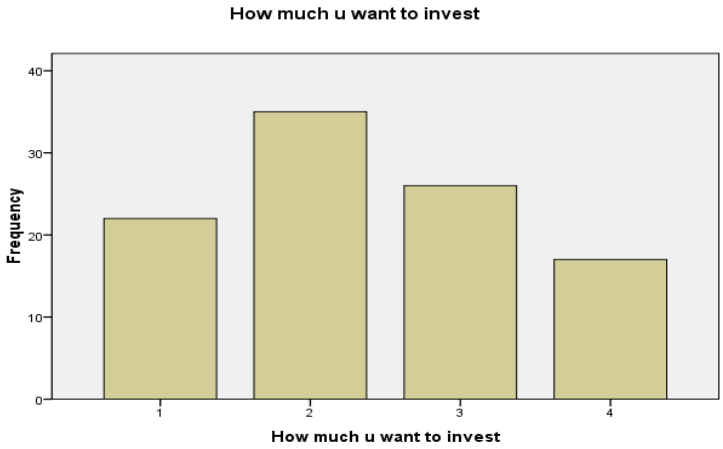
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	> 0 to <=10 lakh	22	22.0	22.0	22.0
	>10 lakh to <=20 lakh	35	35.0	35.0	57.0
	>20 lakh to <=30 lakh	26	26.0	26.0	83.0
	> 30 lakh	17	17.0	17.0	100.0
	Total	100	100.0	100.0	



Interpretation: By the help of graph and table we understand that there are maximum people want to purchase plot/land and 20% people required row house/duplex as flats requirement and remaining 13% prefer bungalows.

Q.8 How much would you like to pay for having your own residence as constructed house?

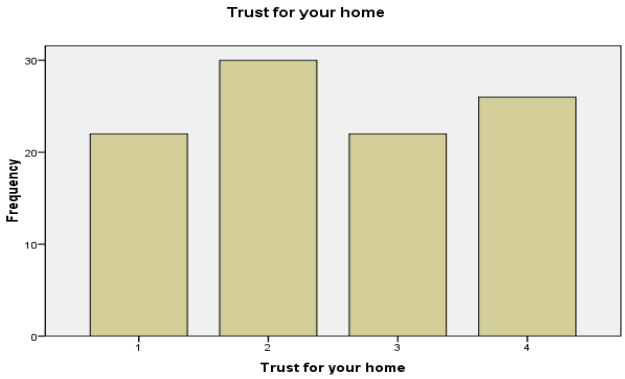
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Plot / Land	47	47.0	47.0	47.0
	Row House / Duplex	20	20.0	20.0	67.0
	Flats	20	20.0	20.0	87.0
	Bunglows	13	13.0	13.0	100.0
	Total	100	100.0	100.0	



Interpretation: There are four category of investment 22% people are prefer 0 to Rs. 10,00,000. and 35% who want to invest more than Rs.10,00,00. and less than or equal to Rs.20,00,000 are comes in second category and 26% want to invest more than Rs. 20,00,000. or less than equal to Rs.30,00,000 And last category for more than Rs. 30,00,000

Q. 9 Whom would you like to trust for constructed house?

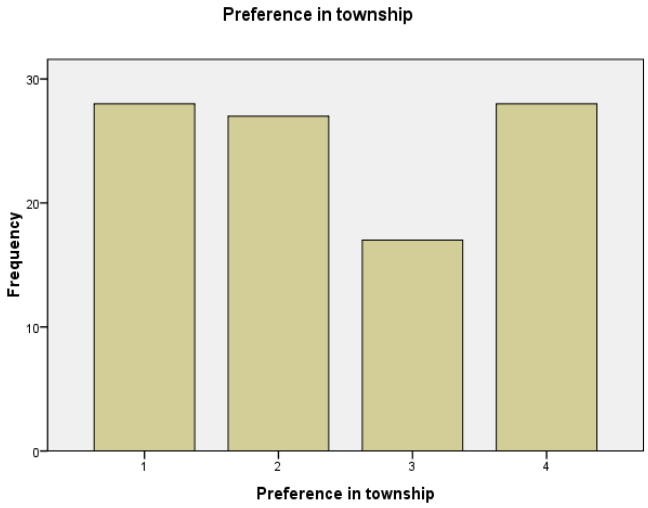
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Townships	22	22.0	22.0	22.0
	Own	30	30.0	30.0	52.0
	Local Builders	22	22.0	22.0	74.0
	Others	26	26.0	26.0	100.0
	Total	100	100.0	100.0	



Interpretation*:* The graph shows trust of investor for property we observed that most of the people (30%) didn't trust on any one that's why they done their business self and 44% like to invest in townships and local builder both ratio's are same and equal and remaining 26% depends on other resources like media, advertisement, magazines etc.

Q.10 What is your preference in a township?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Flats	28	28.0	28.0	28.0
	Town house	27	27.0	27.0	55.0
	Terrace House	17	17.0	17.0	72.0
	Duplex	28	28.0	28.0	100.0
	Total	100	100.0	100.0	



Interpretation: Here we discuss about what kind of property people prefer in township graph clarify to us that maximum number of people (28%) want duplex same as flats and less have other choice like town house (27%) and small number of people (17%) required terrace house.

RESULTS AND FINDINGS

Real estate is a growing business in Indore city. People in Indore are more interested to invest in land comparatively constructed houses. Central Indore is most preferable area to invest money in real estate. Real estate prices are growing up day by day, that's why people are more interested to invest in real estate.

CONCLUSIONS

Indore has also emerged up as education hub of the central India with Indian Institute of Management (IIM) & Indian Institute of Technology (IIT) leading the trail of colleges for professional studies. Indore is indisputably known as the commercial capital of Madhya Pradesh. Being one of the fastest growing Tier-III cities of India, it is the single largest business centre of the state commanding most of the volumes in trade, industry and services, over other cities in Madhya Pradesh like Bhopal, Jabalpur and Gwalior. On residential segment, we see the development of townships besides the construction of apartment houses, condominiums, bungalows, villas etc. at several locations. The city has already attracted a number of leading builders for various construction projects. All these development works are preparing the ground for the real estate boom to arrive in the city, which is not too far now. Hence, it seems the right time to invest in Indore properties according to the Industry experts. In such a scenario, the work of real estate agents in Indore gets more significant, as they are the people who set the trend of property development in a city.

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DATA MINING IN HIGHER EDUCATION: A SURVEY

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ABSTRACT

The main objective of higher education is to make our students self-sufficient and enable them to do what they want. And the higher education which is being given to our students is relevant or not. So, one way to achieve highest level of quality in higher education system is by discovering knowledge hidden among the educational data set and to make future prediction using data mining techniques. The knowledge pertains to admission of students in a particular course, classroom teaching model, detection of unfair means and prediction about students' performance and so on. This paper shows the capabilities of data mining techniques in context of higher education and presents a survey of research in this field.

KEYWORDS

Association rule, Clustering, Classification, Data mining, Outlier detection.

INTRODUCTION

One of the biggest challenges that higher education faces today is to predict the paths to be followed by the students .Educational data mining (EDM) is an emerging discipline that focuses on applying data mining tools and techniques to educationally related data. Institutions would like to know which students will enroll in particular course programs, which students will need assistance in order to graduate, and others who are likely to get transfer. The discipline focuses on analyzing educational data to develop models for improving learning experiences and improving institutional effectiveness. One way to effectively address these student challenges is through the analysis and presentation of data, or data mining. Data mining enables organizations to use their current reporting capabilities to uncover and understand hidden patterns in vast databases. These patterns are then built into data mining models and used to predict individual behavior with high accuracy. As a result of this insight, institutions are able to allocate resources and staff more effectively. This paper addresses the capabilities of data mining and its applications in higher education. A literature review on educational data mining follows, and gaps in the current literature and opportunities for further research are presented.

THE DATA MINING PROCESS

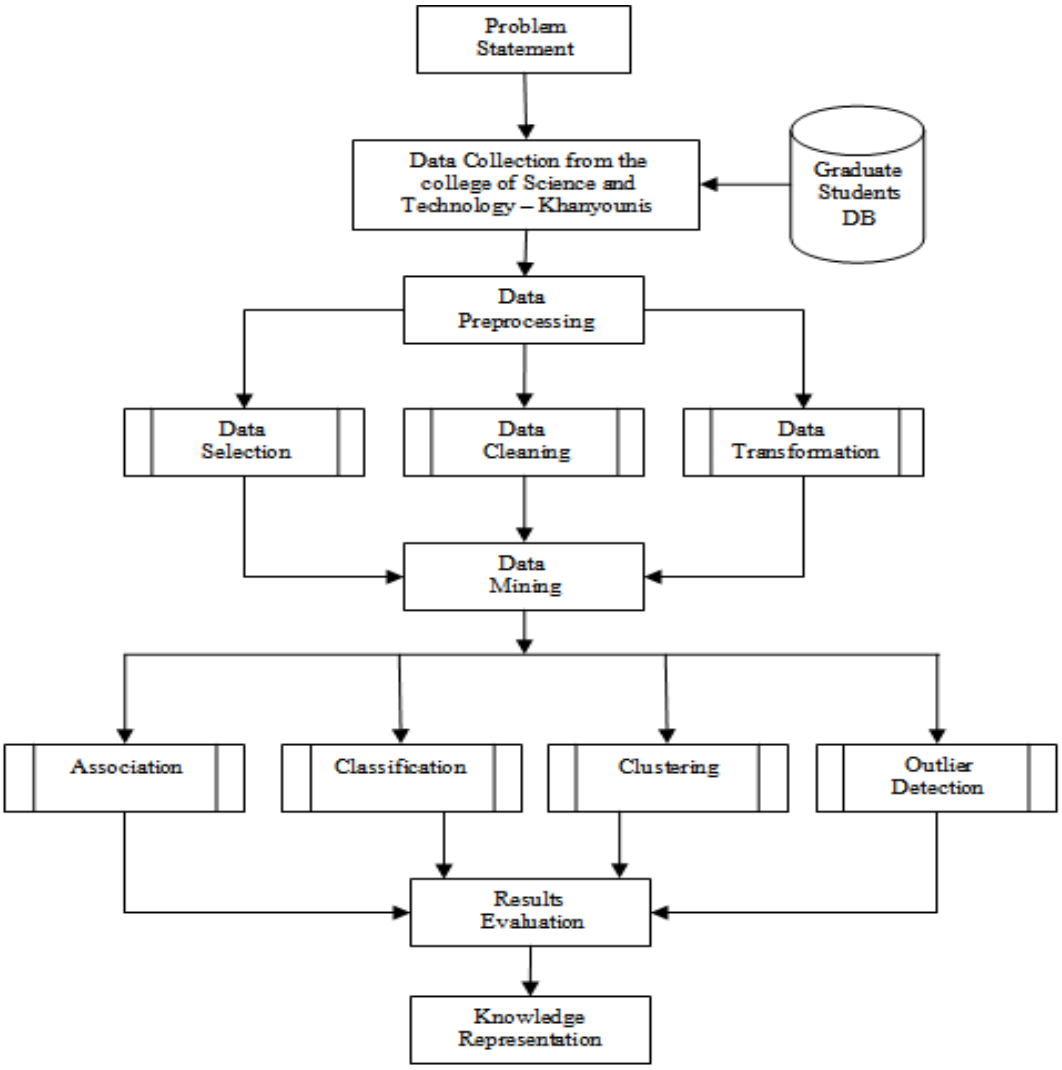
Big data is a term that describes the growth of the amount of data that is available to an organization and the potential to discover new insights when analyzing the data. Organizations have a challenge of sifting through all of that information, and need solutions to do so. Data mining uses a combination of an explicit knowledge base, sophisticated analytical skills, and domain knowledge to uncover hidden trends and patterns. These trends and patterns form the basis of predictive models that enable analysts to produce new observations from existing data.

Data mining can assists organizations with uncovering useful information in order to guide decision-making 1.(Kiron, Shockley, Kruschwitz, Finch, & Haydock, 2012). Data mining is a series of tools and techniques for uncovering hidden patterns and relationships among data 2. (Dunham, 2003). Data mining is also one step in an overall knowledge discovery process, where organizations want to discover new information from the data in order to aid in decision-making processes. Knowledge discovery and data mining can be thought of as tools of decision-making and organizational effectiveness.

There are a variety of different data mining techniques and approaches, such as clustering, classification, and association rule mining. Each of these approaches can be used to quantitatively analyze large data sets to find hidden meaning and patterns. Data mining should be performed on very large or raw datasets using either supervised or unsupervised data mining algorithms. Note that data mining cannot occur without direct interaction with unitary data. Data mining is different from other searching and analysis techniques as Data mining is highly exploratory, whereas other analyses are typically problem-driven and confirmatory.

Data mining, also popularly known as Knowledge Discovery in Database, refers to extracting or "mining" knowledge from large amounts of data. While data mining and knowledge discovery in database are frequently treated as synonyms, data mining is actually part of the knowledge discovery process. The knowledge discovery process consists of the following steps:

FIG. 1



Various algorithms and techniques like Classification, Clustering, Regression, Artificial Intelligence, Association Rules, Decision Trees, Nearest Neighbor method etc., are used for knowledge discovery from databases. These techniques and methods in data mining need brief mention to have better understanding.

A. Classification

Classification is the most commonly applied data mining technique, which employs a set of pre-classified examples to develop a model that can classify the population of records at large. This approach frequently employs decision tree or neural network-based classification algorithms. The data classification process involves learning and classification. In Learning the training data are analyzed by classification algorithm. In classification test data are used to estimate the accuracy of the classification rules. If the accuracy is acceptable the rules can be applied to the new data tuples. The classifier-training algorithm uses these pre-classified examples to determine the set of parameters required for proper discrimination. The algorithm then encodes these parameters into a model called a classifier. For example : we can use a classification method to determine whether the student is excellent, very good, average or poor in his studies based on his marks secured.

B. Clustering

Clustering can be said as identification of similar classes of objects. By using clustering techniques we can further identify dense and sparse regions in object space and can discover overall distribution pattern and correlations among data attributes. Classification approach can also be used for effective means of distinguishing groups or classes of object but it becomes costly so clustering can be used as preprocessing approach for attribute subset selection and classification. Clustering is often confused with classification, but there are differences. In classification the objects are assigned to predefined classes, where as in clustering the classes are also to be defined. Clustering methods may be divided into two categories based on the cluster structure which they produce hierarchical cluster and partitioning cluster.

C. Prediction

Regression technique can be adapted for prediction. Regression analysis can be used to model the relationship between one or more independent variables and dependent variables. In data mining independent variables are attributes already known and response variables are what we want to predict. Unfortunately, many real-world problems are not simply prediction. Therefore, more complex techniques (e.g., logistic regression, decision trees, or neural nets) may be necessary to forecast future values. The same model types can often be used for both regression and classification. For example, the CART (Classification and Regression Trees) decision tree algorithm can be used to build both classification trees (to classify categorical response variables) and regression trees (to forecast continuous response variables). Neural networks too can create both classification and regression models.

D. Association rule

Association and correlation is usually to find frequent item set findings among large data sets. This type of finding helps businesses to make certain decisions, such as catalogue design, cross marketing and customer shopping behavior analysis. Association Rule algorithms need to be able to generate rules with confidence values less than one. However the number of possible Association Rules for a given dataset is generally very large and a high proportion of the rules are usually of little (if any) value. By making use of support and confidence parameters we can find out the hidden association among the variables.

E. Decision Trees

Decision tree is tree-shaped structures that represent sets of decisions. These decisions generate rules for the classification of a dataset. Specific decision tree methods include Classification and Regression Trees (CART) and Chi Square Automatic Interaction Detection (CHAID).

F. Outlier Detection

This method is used to detect outliers in the student dataset. Distance-based approach identifies the number of outliers in the given data set based on the distance to their k nearest neighbors, and the result of applying this method is to flag the records either to be outlier or not, with true or false value [10].Density-based approach computes local densities of particular regions and declares instances in low density regions as potential outliers.

RELATED WORK

Although, using data mining in higher education is a recent research field, there are many works in this area. That is because of its potential to educational institutes.

Romero and Ventura [5], have a survey on educational data mining between 1995 and 2005. They concluded that educational data mining is a promising area of research and it has a specific requirements not presented in other domains. Thus, work should be oriented towards educational domain of data mining.

Han and Kamber [3] describes data mining software that allow the users to analyze data from different dimensions, categorize it and summarize the relationships which are identified during the mining process.

El-Halees [5], gave a case study that used educational data mining to analyze students' learning behavior. The goal of his study is to show how useful data mining can be used in higher education to improve student' performance. He used students' data from database course and collected all available data including personal records and academic records of students, course records and data came from e-learning system. Then, he applied data mining techniques to discover many kinds of knowledge such as association rules and classification rules using decision tree. Also he clustered the student into groups using EM clustering, and detected all outliers in the data using outlier analysis. Finally, he presented how can we benefited from the discovered knowledge to improve the performance of student.

Baradwaj and Pal [6], applied the classification as data mining technique to evaluate student' performance, they used decision tree method for classification. The goal of their study is to extract knowledge that describes students' performance in end semester examination. They used students' data from the student' previous database including Attendance, Class test, Seminar and Assignment marks. This study helps earlier in identifying the dropouts and students who need special attention and allow the teacher to provide appropriate advising.

Shannaq et al. [7], applied the classification as data mining technique to predict the numbers of enrolled students by evaluating academic data from enrolled students to study the main attributes that may affect the students' loyalty (number of enrolled students). The extracted classification rules are based on the decision tree as a classification method, the extracted classification rules are studied and evaluated using different evaluation methods. It allows the University management to prepare necessary resources for the new enrolled students and indicates at an early stage which type of students will potentially be enrolled and what areas to concentrate upon in higher education systems for support.

Chandra and Nandhini [8], applied the association rule mining analysis based on students' failed courses to identifies students' failure patterns. The goal of their study is to identify hidden relationship between the failed courses and suggests relevant causes of the failure to improve the low capacity students' performances. The extracted association rules reveal some hidden patterns of students' failed courses which could serve as a foundation stone for academic planners in making academic decisions and an aid in the curriculum re-structuring and modification with a view to improving students' performance and reducing failure rate.

Ayesha et al. [9], used k-means clustering algorithm as a data mining technique to predict students' learning activities in a students' database including class quizzes, mid and final exam and assignments. These correlated information will be conveyed to the class teacher before the conduction of final exam. This study helps the teachers to reduce the failing ratio by taking appropriate steps at right time and improve the performance of students.

Bray [4], in his study on private tutoring and its implications, observed that the percentage of students receiving private tutoring in India was relatively higher than in Malaysia, Singapore, Japan, China and Sri Lanka. It was also observed that there was an enhancement of academic performance with the intensity of private tutoring and this variation of intensity of private tutoring depends on the collective factor namely socio-economic conditions.

CONCLUSION & FUTURE WORK

This paper showed how data mining can be used in higher education particularly to improve graduate students' performance. The data mining techniques can be used to discover knowledge. We can use classification to predict the Grade of the graduate student and cluster the students into groups using K-Means clustering algorithm, outlier detection can be used to detect all outliers in the data. Each one of these tasks can be used to improve the performance of graduate student.

The future work include applying different data mining techniques like neural nets, genetic algorithms, k-nearest Neighbor, etc. and also apply these on huge data set with more distinctive variables to get more accurate results.

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EFFECTS OF INTERNATIONAL BUSINESS ON DEVELOPING COUNTRIES

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ABSTRACT

The majority of WTO members are developing countries, and over the years, trade openness has contributed considerably to enhancing developing countries' participation in the global economy and these countries are heavily depend on exports of primary products with attendant risks and also on imports (typically of machinery, capital goods, intermediate producer goods, and consumer products). In an era of growing competition and globalization developing countries are deeply indulging in international trade via various ways to find a space in the global marketplace and help in strengthening their competitive advantage. International Trade is one of the major strategy for growth of the economy, it creates number of positive aspects for the developing economy but there are some weaknesses also attached with this concept.

KEYWORDS

Developing Countries, International Trade, Trade Liberalization, Unequal Exchange, WTO.

INTRODUCTION

The expression international business refers to commercial activities performed to promote the transfer of technologies, goods, services, resources, people, and ideas across national boundaries. International business takes place under many different formats, from the movement of goods from one country to another (exporting and trade); to contractual agreement giving firms in foreign nations legal permission to use products, services, and processes from other nations (franchising, licensing, subcontracting production); to companies setting up sales, manufacturing, research and development, and distribution facilities in foreign markets.

ADVANTAGES OF INTERNATIONAL BUSINESS

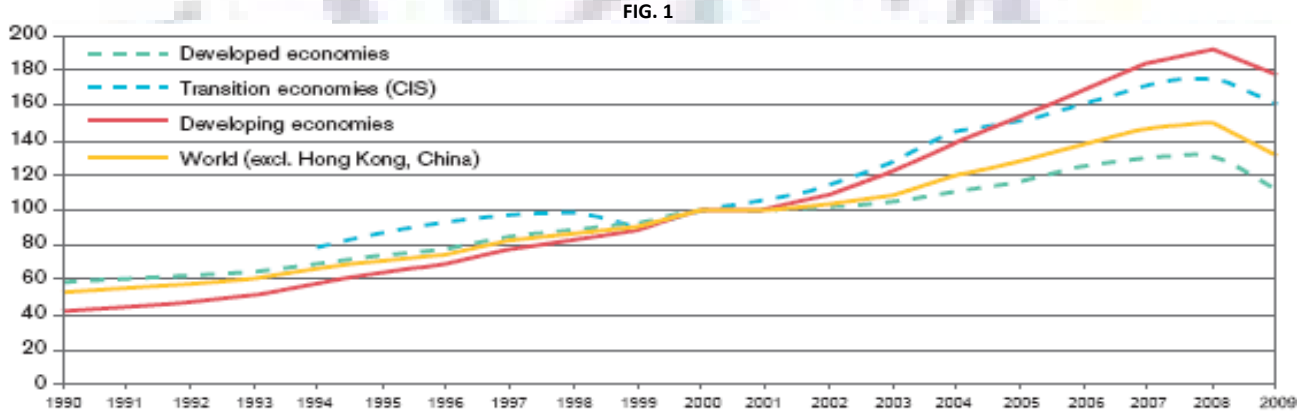
- **Nation:-** At the nation-state level, participation in international business activities helps countries take advantage of national expertise in commerce to deliver goods and services into the international marketplace. It also increases the varieties of goods and services available in national markets and exposes consumers to new lifestyles and ideas. Over time, these exposures affect national cultures including their political and economic institutions, and impact a society's behaviors, attitudes, and lifestyles. Governments have major effects on international business activities in determining how open (or closed) national economies are to external influences such as trade and investment.
- **Company: -** For companies, international business increases competition in domestic markets and opens up new opportunities abroad. Global competition forces firms to be more innovative and efficient in their use of resources.
- **Consumer: -** For consumers, international business brings increased varieties of goods and services into the world marketplace and enhances living standards. Just as important, open borders means increased exposure to new ideas, technologies, and ways of doing things.

DEVELOPING COUNTRIES AND INTERNATIONAL BUSINESS

Developing countries greatly depend on exports of primary products with attached risks and also on imports. These developing countries suffer from chronic deficits on current and capital accounts which deplete their reserves, causes currency instability, and a slowdown in economic growth. Importances of exports to developing nations are very significant. Exports of LDCs are much less diversified than those of developed countries. The neoclassical model of international business is suggest that all countries gain from trade, such as world output increases with trade, indulging countries will tend to specialize in products that use their abundant resources intensively, International wage rates and capital costs will gradually tend toward equalization, Returns to owners of abundant resources will rise relatively and all these factors will stimulate economic growth. Furthermore international trade promotes international and domestic equality and this trade will also promotes and rewards sectors of comparative advantage. On the whole outward-looking international policy is superior to isolation. Rich-nation's economic, commercial policies and Tariff and non-tariff barriers matters to LDC exports.WTO has in reality worked hard to clear the path of international trade for the developing nation via. Doha Development Round 2001 which has tilted the focus on the needs of the developing world.

The greater part of WTO members are developing countries, and From 1990 to 2008, the volume of exports from developing countries increased consistently faster than exports from developed countries or the world all together, as did the share of developing countries' exports in the value of total world exports. For example, between 2000 and 2008 the volume of developing countries' exports roughly two folded, whereas world exports increased by only 50 percent.

FIG. 1



Source: WTO

OBJECTIVES OF THE STUDY

- To understand the concept of international business.
- To study the effects (both positive and negative) of international trade on different developing countries of the world.

- To understand the various aspects of International trade in today's competitive world.

RESEARCH METHODOLOGY

This research paper includes study of various research papers which are being printed in various journals of the world. This paper is based totally on secondary data and no primary research is conducted for compiling this report.

REVIEW OF LITERATURE

Balassa (1984); "Trade Between Developed And Developing Countries': The Decade Ahead".

The study aims to define the interests of the developed and developing countries in the liberalisation of their mutual trade. Possible approaches to harnessing these interests for promoting North-South trade in the decade ahead are also analyzed. Having reviewed changes over time in international trade between developed and developing countries, the author in his paper has considered the interests of the two groups of countries in the liberalisation of their mutual trade. Proposals have further been put forward for a strategy that may be followed in regard to the modalities and the content of trade negotiations. No attempt has been made, however, to provide detailed recommendations on 'the conduct of the negotiations or to examine the impact of trade liberalisation on individual countries within the two groups. While the paper has concentrated on the gains developed and developing countries may derive from reciprocal trade liberalisation, one should emphasize the interests of the developed countries and of the newly industrializing countries in liberalizing their own imports. In fact, the governments of these countries could utilize the opportunity provided by the proposed North-South trade negotiations to overcome domestic protectionist pressures. This is analogous to the case where reformers in developing countries rely on the World Bank and the IMF to demand the implementation of policies they favor. At the same time, the existence of an asymmetry between the developed and the developing countries should be noted. As the developing countries spend all of their foreign exchange earnings on goods imported from the developed countries, trade liberalisation by the latter group of countries would not adversely affect their payments balances. In turn, in liberalising their trade, the developing countries would have to find markets for their exports so as to pay for the increased imports. Correspondingly, while their national interest, as well as the interests of the world economy, demands that the NICs reduce their trade barriers, they would have to be provided with security of market access in the developed countries. This fact, then, puts a particular responsibility on the developed countries to take adjustment measures that would permit liberalising their trade.

Nogues (2002); "Unequal Exchange: Developing Countries In The International Trade Negotiations".

The study explains that how the political economy forces operate to influence, for the good and for the bad, unilateral and multilateral trade policies. The history of the first rounds of multilateral trade negotiations shows that the exchange of market access concessions was a process characterized by reciprocity and mutual benefits among participating countries. In these negotiations, developing countries did not achieve the degree of reciprocity expected from the previous history of the trading system.

This outcome has been explained in part by increasingly aggressive demands by industrial countries and in part, by the lack of adequate resources of least developed countries. These and other "structural factors" such as lack of negotiating experience and inadequate knowledge on economic impacts weaken the negotiating capacity of developing countries and suggest that in multilateral or regional trade negotiations with industrial countries, they are at a disadvantage. The thesis of this paper is that these exchanges of concessions are most likely to be "unequal exchanges".

According to the study unequal exchanges result in unbalanced outcomes and this can have serious consequences for developing countries and the trading system. For developing countries, an unbalanced outcome as measured by the difference between the value of concessions given and received has two economic costs:

(a) The costs associated with a degree of access to foreign markets that is lower than the one that would have resulted from balanced negotiations and,

(b) The costs associated with the weakening of their bargaining power implied by "excessive concessions" given in past negotiations.

The paper also illustrates the significant gains that efficient agricultural producers could reap in international negotiations; author has also taken up the Uruguay Round as an example of a negotiation characterized by an unbalanced outcome explained in part by an "unequal exchange" process. And he also explained some of the elements that help to understand why some trade negotiations are likely to result in "unequal exchanges". It starts by presenting some of the "structural factors" that help to understand the weak negotiating capacity of developing countries. The problems associated with this weakness are compounded by industrial countries´ "aggressive unilateral policies" and their ability to prevail in the definition of the negotiating agendas.

The conclusions developed by the author are:

- Developing countries bring to the negotiating table, what appears to be serious structural weaknesses. In some cases, they simply don't have the resources that are necessary even to attend the discussions. This extreme example of "unequal exchange capacity" characterized the situation of several least developed countries during the Uruguay Round negotiations (Blackhurst, Lyakurwa and Oyejide, 1999). Apparently, these countries were asked to sign by the cross and were told that at a later date they would receive technical assistance explaining them what it was all about.
- The more advanced developing countries are in a better resource position, however, they are also handicapped from what appears to be other weaknesses associated with their development stage and lack of experience. A closer look suggests that there is some room for improvements including management structure and arrangements for the international trade negotiations.
- A third area to look at is the linkages between the private and public sector, which also represents a barrier for negotiating effectively. Reforms have to be supported politically and for those induced by trade negotiations, this requires an efficient public sector-private sector consultative mechanism which many developing countries must still develop.

Spanu (2003); "Liberalization Of The International Trade And Economic Growth: Implications For Both Developed And Developing Countries".

The debate over trade liberalization is part of a larger debate that deals with the impact on the economic growth of free movement of goods, capital and labor force across borders. Most economists agree that trade liberalization could positively affect economic growth, but the differences are at what stage of development a country should open its market. The paper describes different views that form the world trade policy mosaic. This study addresses the changes, in the last year or so, within international organizations regarding trade liberalization policies. There is more understanding in the world now that industrialized countries' protectionist trade policies are on the expense of developing countries, in particular of the least developed countries. International organizations started to shift their focus from imposing liberalization of trade in developing countries to eliminating tariff and non-tariff barriers in developed countries, especially in Quad countries—Canada, the EU, Japan, and the United States.

The observed theory suggest that most economists agree that trade liberalization could positively affect economic growth, but the differences are at what stage of development a country should open its market. So far, the liberalization of trade has been pushed by international organizations mostly towards developing countries through structural adjustment loans conditionalities of the World Bank and IMF, within the World Trade Organization negotiation framework. A higher role is envisioned for academia, that along with social groups, representatives of international organizations that are concern of trade policies should engage in public debates more actively. An important step in transforming the international trade in a tool for economic growth for developing countries could be the engagement in debates policy makers from the industrialized countries. Conferences, open TV debates are among ways how to make alternatives views heard. The next WTO ministerial meeting in Cancun would show how open are industrialized countries to make policy changes in favor of development for poor countries. Before and after Cancun there is still a long way to go to transform international trade into a development tool that would benefit all and each trade partner.

Arbache, Dickerson and Green (2004); "Trade Liberalisation And Wages In Developing Countries"

The study reviews the effects of trade liberalization on wages in developing countries, and presents new evidence for Brazil. The experience of trade liberalization in developing countries has been quite varied, and understanding the effects of increasing openness on their wage structures is a complex task. Some recent empirical studies show that trade liberalization can be associated with an increase in the returns to higher levels of education, similar to that observed in some developed countries. These studies are reviewed in the paper.

The findings of the author are consistent with theories which imply that trade liberalization unleashes a period of intensified competition and technical innovation that is complementary with high-level skilled labor. Trade and technology are thus intimately linked as sources of change in wages in the case of developing countries.

The study has examined the experience of Brazil in some detail. Brazil is a large developing country which undertook a concentrated bout of trade reform in the early 1990s. The data show that wages tend to be lower in traded industries than in non-traded industries, mainly because the traded industries employ workers with lower average education. The authors have investigated both the returns to skill, which turned out to be relatively high in Brazil as previous studies have found, and their interaction with sectoral wage differences, on the grounds that trade reform is also likely to signal increased product and labor market competition, and therefore lower rents.

Their main conclusions in respect of trade liberalization and wages in Brazil are:

(i) Overall, allowing for education and experience, wages in the traded sector were lowered substantially by increasing the degree of openness following liberalization, consistent with the view that the reforms raised the degree of competition in traded industries and thereby reduced rents. Wages were also lowered (though by less) in the non-traded sector, indicating either a degree of spill-over, or the effects of other changes such as privatization or deregulation that took place later in the 1990s. Nevertheless, since education levels also rose, the average economy- wide wage level barely changed over the 20 year period under investigation.

(ii) The increasing openness had differential effects across education groups and within sectors. Across the whole economy, the marginal returns to education were lower in the post-liberalization than the pre-liberalization period, except for college-educated workers for whom the marginal re-turn increased. Within the traded sector, increasing openness was associated with lower wages but the downward impact of openness on wages was insignificant at the highest two education levels.

The importance of this finding is in relation to the policy implications of future trade reforms in other countries. To the extent that they can be generalized to other developing economies at a broadly similar stage of development, they suggest that trade reforms generate reductions in rents where they exist (and hence wage reductions), while highly educated workers are likely to be protected by an increasing demand for their expertise in transferring and utilizing incoming technology.

Nissanke and Thorbecke (2005); "The Impact Of Globalization On The World's Poor: Transmission Mechanisms"

The study presents a summary of main findings from the papers presented at the first Project meeting in Helsinki, October 2004. This meeting focused on conceptual and methodological issues with a view of discerning channels and transmission mechanisms through which the process of globalization affects different aspects and dimensions of poverty in the developing world. The paper examines how these numerous channels interact and the net effects on poverty depend on the relative strength of the positive and negative forces of globalization.

Nissanke and Thorbecke (2005) examine the "growth" channel by scrutinising the causal chain openness-growth-inequality-poverty link by link. Openness through trade and financial liberalization increases the flow of goods and capital across national borders and can contribute significantly to economic growth (the openness-growth link). However, the direction of causality in this link is still being debated as well as how trade and capital flows may be interlinked into a virtuous circle. Furthermore, the positive openness-growth link is neither automatically guaranteed nor universally observable.

Heshmati (2005) takes a rather different, aggregate approach to assessing the impact of globalisation on poverty. Heshmati finds a weak and negative correlation between globalisation and income inequality and poverty, as very little of the variance in inequality and poverty outcomes can be explained by globalisation operating through these four channels.

Rather his results show that the regional variable plays an important role in the explanation of a variation in inequality and poverty, which makes the globalization coefficient insignificant. This suggests that regional characteristics play a dominant role in how poverty and inequality are affected by the four globalisation components. His results generally confirm that initial endowments and the degree and nature of integration into the international economy largely determine the distributional effects of globalisation.

Kalwij and Verschoor (2005) examine the impact of globalization on poverty, focusing on the responsiveness of poverty to aggregate changes in income distribution. For this purpose, they decompose poverty trends into an income effect and an a distribution effect over the period 1980-98, under the assumption of a log-normal income distribution for six major developing regions: East Asia, Eastern Europe and Central Asia, Central and Latin America, Middle East and North Africa, South Asia, and Sub-Saharan Africa. Their estimates of income and inequality elasticities of poverty vary considerably across regions.

Ravallion (2005) examines more specifically the relationship between trade openness and poverty, using three different lenses and techniques: 1) a macro aggregate cross country regression of the impact of trade on poverty; 2) a macro time series analysis of China; and 3) a micro lense based on a Computable General Equilibrium model scrutinizing, respectively, the impacts on households of WTO accession in China and cereal de-protection in Morocco. Ravallion also shows that the link between trade liberalization and poverty is tenuous and that it is difficult to ascertain that trade openness is a powerful force for poverty reduction in developing countries. A valuable lesson from Ravallion's paper is the crucial importance of the pattern of growth (the sectoral composition of growth) on the extent of poverty reduction. His results point to the importance of combining trade reforms with well-designed social protection policies.

Bardhan (2005) also emphasises the complex and context-dependent nature of the openness-poverty relationships by examining the various processes through which openness to foreign trade and long term capital movements affect the lives of the rural poor. Bardhan argues that opening up the product markets internationally without doing anything about the weak and distorted factor markets or poor infrastructural services may be a sub-optimal policy for the poor. Furthermore, protectionism in the industrialized world and subsidisation of farm and food products severely restricts export prospects for poor countries. He argues for pro-active public programs to help poor farmers adjust and coordinate, and suggests that international agencies *that* preach the benefits of free trade have an obligation to contribute to such programs with financial, organizational and technical assistance.

Jenkins (2005) focuses his analysis on the impact of integration of the global economy (rather than trade policies as such) on the poor in their role of as producers. His central question about the impact of globalisation on employment and income opportunities for poor people is addressed through case studies of three value chains horticulture, garments, and textiles- in four countries, Bangladesh, Kenya, South Africa and Vietnam. In the context of analysing the comparative performance among case-study countries, he proposes to make a clear conceptual distinction between "non-globaliser" and "unsuccessful globaliser" and he categorises Kenya as a unsuccessful globaliser, while Vietnam is successful in integrating in terms of outcome though remaining relatively closed in terms of policy.

On the whole, he concludes that even in those cases that have been successful in developing labour-intensive exports, the overall impact of globalisation on poverty has been relatively small. The majority of the poor are not engaged in global production and other strategies are required to reach them. Clearly, integration with the global economy is not a substitute for an anti-poverty strategy.

Panitchpakdi (2005); "Developing Countries In International Trade 2005: Trade And Development Index"

In the current economic environment of globalization, trade plays an increasingly important role in shaping economic and social performance and prospects of countries around the world, especially those of developing countries. This new series, Developing Countries in International Trade (DCIT), aims to analyze key trade and development issues facing developing countries on an annual basis. To organize the analytical work, an attempt has been made to develop a conceptual framework to account for the complex interaction of factors affecting trade and development. This interaction is expressed in terms of the Trade and Development Index (TDI).

The Heads of State and Government at the 2005 World Summit reaffirmed their commitment to ensure that trade plays its full part in promoting economic growth, employment and development for all.

The TDI identifies three sets of such determinants, referred to as dimensions— namely, structural and institutional factors; trade policies and processes; and, finally, level of development. Each dimension is composed of a number of components, which are derived from a set of indicators. In addition to the construction of the TDI for developing countries, similar indices are prepared for two other groups of countries: the TDI for the OECD group is taken as the long-term trade and development benchmark for developing countries, while that for the newly acceded EU10 group of countries as the medium- to longer- term

benchmark for developing countries, against which progress in trade and development performance will be assessed. The selection of appropriate indicators and methodology was central to the construction of the TDI. An extensive review of literature was undertaken to help choose the most relevant indicators. A similar review was conducted in respect of available methodologies, including those employed by a number of UN system organizations. The main reason for employing principal components analysis is that it makes it possible to define a synthetic measure that is able to account for interactions and interdependence between the selected set of components making up the TDI.

The results indicate that the top 20 are all developed countries, except Singapore (rank 15). Denmark leads the pack, followed by the United States and the United Kingdom. The TDI scores of Sweden, Norway, Japan, Switzerland and Germany are particularly close. The countries of southern Europe members of the EU are at the bottom of the top 25. Only three developing countries are in the top 30. Besides Singapore, they include the Republic of Korea (rank 25) and Malaysia (rank 28). This partly indicates that only a handful of developing countries have been able to come close to the trade and development performance of developed countries. Within the developing countries group, the top 10 ranking countries include mostly newly industrializing economies of East and South-East Asia, and some Latin American and Caribbean countries. After Singapore, the Republic of Korea and Malaysia, Uruguay ranks fourth among all developing countries, and scores highest among the Latin America and Caribbean countries.

An overall analysis of the TDI components reveals that the EAP countries' lead is due to relatively high average scores for physical infrastructures and financial environment, and to some extent market access indicators. As to SOA and SSA countries, they are lagging behind for most components. This is particularly true for the social development component, the financial environment component and the physical infrastructure component.

Lee and Vivarelliint (2006); "The Social Impact Of Globalization In The Developing Countries"

This paper is one of the outcomes of a four-year economic research programme (2001-2005), funded by the Department for International Development (DFID) of the UK and developed at the International Labor Office (International Policy Group). The general aim of the project is to fill a gap in understanding - both theoretical and empirical – the impact of globalization.

The authors have discussed only the consequences of globalization (as defined above) on DCs over the last two decades. Although there is much wider economic literature available on the impact of globalization in developed countries, but here they only focus on DCs. Here the adopted methodology was only economic, with particular attention devoted to the applied approaches.

Only some particular aspects of the social consequences of globalization in DCs were treated, namely the impact of increasing trade and FDI upon domestic employment, within-country income inequality (WCII) and poverty reduction.

The findings are:-

- Increasing trade seems to foster growth and absolute poverty alleviation. While FDIs seem to be neutral in terms of their impact on income distribution and poverty, financial liberalization seems to have adverse effects on relative poverty.
- The positive outcome of increasing trade on poverty reduction is mediated by increasing economic growth. Since overall trade (import-export) is neutral in terms of income distribution and fosters economic growth, the final outcome is an overall reduction in poverty.
- On the whole, the level of economic and human development does matter in shaping the direction and the impact of the current wave of globalization. For instance, the role of the physical and human infrastructures within a DC is crucial in maximizing the positive employment and distributional effects of increasing trade and FDI. Conversely, bottlenecks in the supply of educated and skilled labor and in public and private investments (including R&D) may condemn a country to marginalization, exploitation and high levels of domestic unemployment and income inequality.

Cate (2009); "The Impact Of International Trade On Less Developed Countries''

According to the author the purpose of his paper is not to re-define the technological advances, or the advantages of investment in less developed countries. They are less developed, as was pointed out, because they were (or are) unable to harness their natural resources, attract technicians and sophisticated work force to manage building an economy; because there was an unstable political climate, because Western nations sought I to impose their morality, ethics, tradition, and means of doing business on LDCs.

There were some recommendations given by the author of this paper:-

1. All the industrialized nations who earn a surplus from trade should join together to pledge a percentage of that surplus into a fund for improving conditions in the LDCs. A special commission, other than under UN auspices, could be set up to administer this fund, free from political pressures.
2. An international version of America's Peace Corps would be formed. Instead of military service in various nations, for example, a tour of duty in emerging nations would be substituted. Organizations, such as Medicines sans Frontiers, (who were awarded this year's Nobel Peace Prize) would be encouraged to expand with grants provided.
3. Under the aegis of the current United Nations, a regulatory commission must be set up to oversee the domestic political policies of the LCDs, when such governments interfere with the growth opportunities of these nations.
4. The human rights activities of the UN, as now constituted, is a waste of time and money.
5. Special tariff- and tax-free zones should be established in the wealthy nations for goods from the LDCs. A moratorium needs to be established that eliminates any import duties from African and Asian poverty-stricken countries.
6. Labor leaders from wealthy nations should develop task forces that can build craft guilds and cooperatives in LDCs, helping to organize labor in order obtain fair wages, establish contracts work, and raise working and safety standards.
7. Governments and private philanthropic organizations must create scholarships for study at leading educational facilities the West, ON THE CONDITION that the recipients return to their native countries to implement what they learned.
8. The media is not doing enough to alert the world about economic deprivation in LDCs. A concerted effort for a fair appraisal (not scare tactics on exploitative programming) of the world situation is needed.

Sun and Heshmati (2010); "International Trade And Its Effects On Economic Growth In China"

The study suggests the role of international trade in China's economic growth. It starts with a review of conceptions as well as the evolution of China's international trade regime and the policy that China has taken in favor of trade sectors. In addition, China's international trade performance is analyzed extensively. This paper then evaluates the effects of international trade on China's economic growth through examining improvement in productivity. Both econometric and non-parametric approaches are applied based on a 6-year balanced panel data of 31 provinces of China from 2002 to 2007. For the econometric approach, a stochastic frontier production function is estimated and province specific determinants of inefficiency in trade identified. For the non-parametric approach, the Divisia index of each province/region is calculated to be used as the benchmark. The study demonstrates that increasing participation in the global trade helps China reap the static and dynamic benefits, stimulating rapid national economic growth. Both international trade volume and trade structure towards high-tech exports result in positive effects on China's regional productivity. The eastern region of China has been developing most rapidly while the central and western provinces have been lagging behind in terms of both economic growth and participation in international trade.

The conclusion drawn by the author is that foreign trade exerts great positive effects upon China's economic growth. China, however, is facing some serious problems such as low domestic absorptive capability, deterioration of the terms of trade, the negative impact of trade on the environment, trade friction with partners and uneven development across the country. All of them may impose negative impacts on the sustainable development of China's foreign trade. Therefore, to achieve sustained economic growth, China should pay more attention to the proper and appropriate trade strategies and policies.

SUGGESTIONS

- Firstly, China should develop strategies to promote exports and high-tech trade. This study showed that the rise in net export volume and improvement in trade structure towards high-tech products could increase the efficiency of provincial production. A large amount of exports imply greater openness which could help domestic sectors adopt new production technology and in turn increase productivity.

- Secondly, the Chinese government should strengthen the competitiveness of export sectors by combining the imports of foreign high-technology and domestic independent research. The technological know-how could be imported by direct buying or indirect FDI. However, the domestic absorptive ability in China is very weak. Therefore, on one hand, the Chinese government should try to import appropriate technology which can easily be absorbed and acquired by domestic firms with their corresponding capability. On the other hand, it is important to develop strong domestic sector of competitive firms that can assimilate and disseminate imported technologies and to improve their own innovative capacities.
- Thirdly, policymakers should take notice of the unbalanced development pattern in the provincial area. In the future, on one hand, the Chinese government should provide support to the western and central regions, which are lagging behind both in economic development and trade performance, and help them achieve a higher level of openness for efficient development.
- Finally, China should take an active part in the global trade rulemaking process and in solving trade frictions. The multilateral trade rules of GATT/WTO have weakened the role of government administration and intervention in trade. The government providing support to domestic industries should know at which point their protection should be withdrawn. However, the rules of global trade play an increasingly imperative role in resolving trade frictions between countries.

In sum, from this research, it is concluded that China's outstanding performance in economic growth can be traced back to its increasing involvement in global trade and dynamic trade policy. China's rapid economic growth has made the country target the world as its market. The increasing participation in the global market helps China reap the static and dynamic benefits from trade, facilitating the rapid national economic growth. The static benefits from international trade result from importing capital goods which embody high technology. And the dynamic effects of trade refer to the improvement in the TFP through learning by doing and accumulation of human capital.

In addition, the productivity of China's processing sectors is enhanced significantly because of the accessibility to technology-intensive intermediate goods. Consequently, China's specialization in processing industries has driven the improvement of domestic technological capability. However, there are still some problems that China is facing now, such as the lack of independent intellectual property, low domestic absorptive capability and unbalanced development pattern.

Drahos; "Developing Countries And International Intellectual Property Standard-Setting"

The study draws on the analytical framework developed by Braithwaite and Drahos in Global Business Regulation (GBR).[1] GBR ranged across more than 15 different areas of business regulation, including intellectual property. It found that regulatory globalisation is a process in which different types of actors use various mechanisms to push for or against principles. More than 500 people were interviewed for GBR. The study also draws on a forthcoming book by Drahos and Braithwaite (Information Feudalism: Who Controls the Knowledge Economy?) dealing with the globalisation of intellectual property rights. Further interviews were undertaken for the purposes of the study, including interviews at WIPO and the WTO.

The study briefly describes the impact of developing countries in the international standard-setting process pre-TRIPS. The main conclusion is that as developing countries came to be influential within fore such as WIPO by virtue of their number, the US embarked on a strategy of forum shifting.

The paper evaluates the TRIPS negotiations using a theory of democratic property rights. The theory argues that efficiently defined property rights are more likely to emerge if at least three conditions are met.

- All relevant interests have to be represented in the negotiating process (the condition of representation).
- All those involved in the negotiation must have full information about the consequences of various possible outcomes (the condition of full information).
- One party must not coerce the others (the condition of non-domination).

The study concludes that the TRIPS negotiations did not meet these conditions of democratic bargaining.

RECOMMENDATIONS

- Developing countries should use the Council for TRIPS to create a practice of asking states to explain bilateral departures from multilaterally agreed IP standards.
- Developing countries should use the WTO Trade Review Policy Mechanism to review distortions in trade being caused by excessively high intellectual property standards.
- Trade policy bodies/institutes within developing countries should investigate the feasibility of forming a developing country Quad along the lines suggested in the paper.
- An independent review of WIPO's current private sector income and development spending should be undertaken with a view to assessing the possibility of WIPO playing a role in the UN Programme of Action for the Least Developed Countries for the Decade 2001-2010.
- Developed countries should review the operation of the policy advisory committees that advise their patent offices with a view to significantly increasing the participation of members of civil society in those committees.
- Developed countries should assess their conduct of trade negotiations with developing countries with a view to ensuring that development objectives remain a priority during those negotiations.
- Developing countries should review their participation in the WIPO standard-setting process with a view to increasing their participation in the expert groups and broadening the range of experts they send to WIPO meetings to include, for example, experts in health, environment and agriculture.
- Developed countries could assist by funding aid projects aimed at establishing.

CONCLUSION

The overall conclusion which can be drawn after reviewing all of the above mentioned research papers and the published material, is that globalization/ international business have both the positive and the negative impacts on the developing countries in the present day world environment. And the effects of international trade are not independent of the internal economic factors prevailing in the developing economies; rather we see a mix of effects of different trade policies on different economies. So we cannot blame only the international business factors/ policies, but the developing countries own trade policies have a great impact on whether they have gained out of internationalization or have incurred losses out of it. Lastly we can say that those economies which have been able to manage their resources and policies effectively, have gained a lot out of international business.

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SPICE ROUTE INDIA

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ABSTRACT

India has been known from prehistoric times as the land of spices. This led to the landing of the Portuguese navigator, Vasco da Gama at Calicut in 1498. India still continues to be the largest producer, consumer, and exporter of spices in the world. Indian spices flavour foods in over 130 countries and their intrinsic values make them distinctly superior in terms of taste, colour and fragrance. The USA, Canada, Germany, Japan, Saudi Arabia, Kuwait, Bahrain and Israel are the main markets for Indian spices. During the crop year 2009-10 the country produced about 4015.9 thousand tons from 2463.7 thousand hectares of area under spices. About 10-12% of this is exported annually. The demand for organic products is steadily increasing in the western markets at 20-25% every year India's total spice export in 2010-2011 has been 525750 matric tons in quantity and Rs. 6540.70 crores in value. An estimated 500,000 tones of spices and herbs valued at 1500 million US dollars are now imported globally every year. An impressive 46% of this supply comes from India. Even though we were dominating in the export of whole spices by early seventies we started exporting value added products such as oleoresins and concentrates. Now India is a leading exporter of curry powders, oils, oleoresins, encapsulated flavors, paprika colors, cumin etc. As value added products hold a premium price over whole spice, it improves average earning as well as it creates more employment opportunities. From traditional commodity exports, Indian Spices have evolved into a state-of-the-art industry. Absorbing technology, broad basing its products range, developing value added products, identifying niche markets, forging strategic alliances clinching global collaborations and joint ventures.

KEYWORDS
spice route, India.

INTRODUCTION

Spices are aromatic substances of plant origin, used in small quantities as food additives or in drinks, for taste, smell, color, as preservative or anti-bacterial agents, or as refreshing or invigorating agent. Some of these have a strong, pungent smell and taste; some others have hotter and sharper taste. Some are enchantingly fragrant; some are mildly sweet and in charming colors.

A spice is a dried part of a plant as its bark or leaves, root, fruit, or seed. It might be grated into a powder form, are mashed into a paste. It may even be used un-dried and eaten as a vegetable, like basil, or in another form as in cosmetics or perfumery. Some seeds like mustard seeds, or cardamom or cumin are used as it is, or in powder form.

HISTORY OF SPICE TRADE THAT CHANGED THE WORLD

The first authentic records about spices, though fragmentary, belong to the pyramid age of Egypt approximately 2600 to 2100 B.C. There are plenty of historical evidences asserting the significance of south India as a source of high quality spices even from the periods of Babylon and Assyrian civilizations. Until the beginning of the Christian era the source of spices was a mystery to the western world.

Spices were an important component of ancient commerce in 13th century, but was monopolised by Middle Eastern and North African middlemen who guarded the Asian provenance of their valuable sources closely and became extremely wealthy for it.

Europe was at the far end of the trading chain for spices, without access to eastern sources or the power to contest exorbitant prices. At one point, when tariffs were at their highest, a pound of nutmeg in Europe cost seven fattened oxen and was a more valuable commodity than gold. So, by the 1400s, when navigational equipment had improved, the kings and queens of Europe set out to change the world trade by funding spice-hunting missions of their own.

First came Christopher Columbus who, in searching for a quicker route to India, bumped into the Americas instead. Also looking for spices, Vasco de Gama was the first to 'round Africa, and a crew led by Ferdinand Magellan fully circumnavigated the globe.

CURRENT SCENARIO

India still continues to be the largest producer, consumer, and exporter of spices in the world. Indian spices flavour foods in over 150 countries and their intrinsic values make them distinctly superior in terms of taste, colour and fragrance. The USA, Canada, Germany, Japan, Saudi Arabia, Kuwait, Bahrain and Israel are the main markets for Indian spices. North America (USA and Canada) and Western Europe are the most important regions having the import demand for many of the spices. Mexico continues to be the major importer of cinnamon and cassia while Saudi Arabia, Bahrain, Kuwait and Israel are the major markets for green cardamom, black pepper, ginger and turmeric.

Tellicherry Garbled Extra Bold (TGEB) pepper, Alleppey Green Extra Bold (AGEB) cardamom, Cochin Ginger (low fibre content), Alleppey Finger turmeric (AFT) etc. have established deep roots in the cookery of many countries. We have near monopoly in seed spices and spice oils and oleoresins. Indian spices have obtained geographical indicators such as Malabar pepper, Alleppey Green Cardamom, Coorg Green Cardamom and Naga chilli.

The medicinal value of spices is getting attention. Value added spices like encapsulated spices; oils and oleoresin are assuming significance in view of convenience. With the reported use of spices oils and oleoresins in soft drinks, food and medicines demand for Indian spice oils and oleoresins is bound to shoot up. India possesses many innate advantages over other spice producing countries - its large genetic base, varied soil and climatic conditions, and skilled human power.

Health conscious consumers in developed countries prefer natural colours and flavours of plant origin to cheap synthetic ones. Thus, spices are the basic building blocks of flavor in food applications. The estimated growth rate for spices demand in the world is around 3.19%, which is just above the population growth rate. There are about 109 spices listed by International Organization for Standardization and India grows about 60 of these spices. Almost all the States in the country produce one or other spices. During the crop year 2009-10 the country produced about 4015.9 thousand tons from 2463.7 thousand hectares of area under spices. Of the total production, nearly 12% was exported.*

DIVERSIFICATION OF USES

Indian spices occupy a special niche in the World spice market. Even though we were dominating in the export of whole spices by early seventies we started exporting value added products such as oleoresins and concentrates. Now India is a leading exporter of curry powders, oils, oleoresins, encapsulated flavors, paprika colors, curcumin etc. As value added products hold a premium price over whole spice, it improves average earning as well as it creates more employment opportunities.

Spices and herbs have tremendous importance in everyday life as ingredients in food, alcoholic beverages, medicine, perfumery, cosmetics, colouring and also as gardening plants.

**** Indian institute of spice research***

Value added products including spice oils and oleoresins, mint products, curry powder/paste/ condiments, and spice powders contributed around 58% in value towards the total export earnings. During 2009-10, 14,300 tons of curry powder blends valued at `189.2 crores has been exported to UK Saudi, UAE and USA. Export of spice oils and oleoresins has recorded an all time high of 6750 tons valued at ` 708.7 crores in 2009-10. Major spice oils exported are pepper oil, nutmeg oil, mustard seed oil, clove oil, celery seed oil and ginger oil and in case of oleoresins, paprika oleoresin followed by capsicum, pepper, garcinia and turmeric oleoresins are exported. USA is the major importer of spice extracts followed by Germany, UK, South Korea and China. Mint products account for 21% of the total spice export mainly to USA, China, Singapore, Germany, UK, Netherlands and Brazil.

INDIA's SPICE EXPORT TRADE WITH OTHER COUNTRIES

India exports its spices to more than 150 countries in the world. But, few countries dominate the importers list for Indian spices by virtue of the quantity imported.

TABLE 1: TOP 20 SPICE IMPORTING COUNTRIES FROM INDIA

	2006-07		2007-08		2008-09		2009-10	
Country	Qty in MT	Value in Lakh RS.	Qty in MT	Value in Lakh RS.	Qty in MT	Value in Lakh RS.	Qty in MT	Value in Lakh RS.
ARGENTINA	335	589.62	298	643.14	389	674.65	392	945.38
PERU	233	183.56	167	746.98	1063	1183.65	1496	1642.48
VENEZUELA	120	241.39	214	352.23	440	656.84	474	597
ESTONIA	268	269.04	580	983.17	460	1026.69	327	827.87
UKRAINE	273	426.91	99	85.15	607	538.83	181	323.49
SWITZERLAND	316	878.3	148	644.28	103	719.98	136	704.73
CHILE	160	303.88	430	540.08	553	924.32	563	714.35
TRINIDAD	171	113.31	211	173.74	342	291.65	298	382.64
GREECE	556	491.54	475	476.19	482	510.02	397	448.67
FINLAND	144	463.16	138	313.44	116	334.26	179	507.76
NORWAY	315	478.66	331	645.14	196	649.28	150	397.29
IRELAND	146	337.57	220	370.12	140	320.75	187	444.41
ECUADOR	186	149.73	374	453.05	491	564.63	1331	1538.74
BULGARIA	176	196.93	191	256.63	386	536.53	370	457.55
BENIN	213	309.24	389	582.85	142	555.14	200	812.62
KENYA	136	141.7	214	212.85	347	441.58	354	431.66
FIJI	229	127.95	193	141.62	203	183.97	289	262.27
HONDURAS	244	205.76	133	159.45	212	250.9	575	657.74
MALDIVES	409	319.44	751	452.81	449	382.21	469	407.11
ALGERIA	345	125.89	688	523.74	2254	1607.39	1658	834.94

Source: Spice Board of India

MAJOR SPICES EXPORTED FROM INDIA

Within the past one decade the international trade in spices has grown by leaps and bounds. An estimated 500,000 tonnes of spices and herbs valued at 1500 million US dollars are now imported globally every year. An impressive 46% of this supply comes from India. India's exports of spice extracts have shown spectacular growth attaining over 50 percent of the global market within a short span. Over the past decade, the Indian Spices industry has made quality the cutting edge of its global game plan. In recent years, export of Indian Spices has been taking giant leaps. This remarkable achievement is born of a sea change in the industry scenario. From traditional commodity exports, Indian Spices have evolved into a state-of-the-art industry. Absorbing technology, broad basing its products range, developing value added products, identifying niche markets, forging strategic alliances clinching global collaborations and joint ventures.

TABLE 2: EXPORT OF SPICES FROM INDIA DURING APRIL - MARCH 2011 - 12 COMPARED WITH APRIL - MARCH 2010 - 11

	2011-12		2010-11		% change	
Item	qty in tons	value in lakh Rs.	qty in tons	value in lakh Rs.	qty in tons	value in lakh Rs.
PEPPER	26,700	87,813.45	18,850	38,318.50	42%	129%
CARDAMOM(S)	4,650	36,322.28	1,175	13,216.25	296%	175%
CARDAMOM(L)	935	6,830.00	775	4,462.90	21%	53%
CHILLI	241,000	214,408.00	240,000	153,554.00	0%	40%
GINGER	21,550	20,420.02	15,750	12,131.25	37%	68%
TURMERIC	79,500	73,434.40	49,250	70,285.18	61%	4%
CORIANDER	28,100	16,401.85	40,500	16,663.23	-31%	-2%
CUMIN	45,500	64,442.05	32,500	39,597.75	40%	63%
CELERY	3,650	2,340.05	3,750	2,585.89	-3%	-10%
FENNEL	8,100	7,209.20	7,250	6,588.25	12%	9%
FENUGREEK	21,800	7,275.20	18,500	6,548.10	18%	11%

Source: Spice Board of India

Even though there is decline in the total export performance from the country during FY 2011-12, the Spices export sector attained an all time record both in terms of quantity and value during the said period. Spices exports have registered substantial growth during the last five years, registering an annual average growth rate of 21% in value and 8% in quantity and India commands a formidable position in the World Spice Trade

The details of Indian spices export is given below:

TABLE 3

Year	2007	2008	2009	2010	2011
Spice export Qty in tons	482800	614860	673870	663210	749030
Spice Export value in Lakh Rs.	3158	4315	6338	6157	7870

Source: Spice Board Of India

FIG. 1

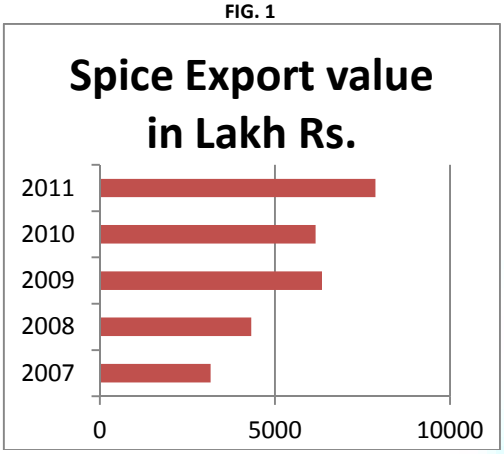
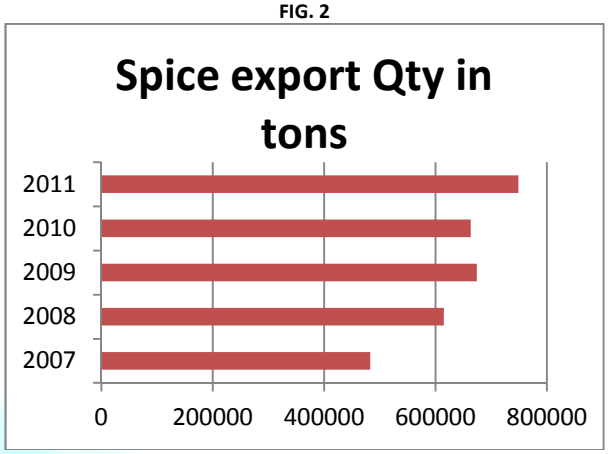


FIG. 2



The total estimated export of Spices from the country during 2011-12 has crossed US$ 2000 Million mark. During this period a total of 5,75,270 tons of spices and spice products valued Rs.9783.42 crore (US$2037.76 Million) has been exported as against 5,25,750 tons valued Rs.6840.70 crore (US$ 1502.85 Million) in 2010-11, registering an increase of 9% in quantity and 43% in rupee terms of value. The increase in dollar terms over the previous year is 36%. The total export of Spices during 2011-12 has also exceeded the target in terms of both quantity and value. Compared to the target fixed 5,00,000 tons valued Rs.6500.00 crore (US$1450 million) for the financial year 2011-12, the achievement is 115% in terms of quantity and 151 % in rupee and 141% dollar terms. During this period, the achievement in export earning is high and mainly due to the rigorous focus and initiatives taken by the Board for value addition and higher end processing of Spices. The better unit price of most of the Spices during the year also helped for achieving the all time record in the export earning.

PROBLEMS OF SPICE PRODUCTION & EXPORT IN INDIA

In many of the spice crops productivity is low in India. Yield in black pepper (260 kg ha-1), small cardamom (174 kgha-1), ginger (3583 kg ha-1) and turmeric (4382 kg ha-1) are low compared to Malaysia (2925 kg ha-1 in black pepper) and Guatemala (250 kg ha-1 in small cardamom). Poor soil fertility, use of low level of inputs like manures, fertilizers and crop protection chemicals, high labour cost and crop loss due to diseases, lack of resistant varieties and post harvest losses are the major reasons for low productivity.

India is facing stiff price competition from other major spices producing countries like Vietnam, Guatemala, China etc. in the export of different spices. In the case of Pepper, being the largest producer and having higher productivity, Vietnam is in a position to offer their produce at a lower price as compared with Indian pepper. Similarly for Cardamom, being the largest producer and having negligible domestic consumption, Guatemala is selling their produce at a lower price. China also now offers Chilli at a lower price than the Indian produce.

The biggest handicaps that Indian spices face in the international market are the high cost of the product and high level of microbials including mycotoxin and toxic chemicals in the finished product. India will need to make concerted efforts to produce clean spices at competitive prices.

ACTION PLAN

India can withstand competition only by increasing productivity and reducing cost of cultivation leading to low cost per unit of production. Considerable efforts will have to be made to improve the present post harvest processing and storage systems and in educating the farmers and traders in handling/processing the produce hygienically. Higher productivity, clean spices through improved post harvest techniques and reasonable threshold price affordable to food industry are the keys to future spice trade and promotion of spices in consumer packs, ethnic foods or ethnic medicine. Spices are high value and low volume commodities of commerce in the world market. All over the world, the fast growing food industry depends largely on spices as taste and flavour makers.

Government has approved establishment of Spice Parks to establish common infrastructure facilities in the major spices growing centres for cleaning, processing, colour sorting, grading & packing facilities etc, primarily to empower the spice farmers through value addition and quality improvement of spices. At present two spice parks viz. Chhindwara in Madhya Pradesh and Puttadi in Idukki district of Kerala have started functioning. Spice Park at Jodhpur in Rajasthan has been inaugurated on 7.4.2012.

Beside the Quality Evaluation Laboratory already functioning in Head Office of Spices Board, Cochin, Government has approved establishment of seven Regional Quality Evaluation Lab-cum-Training centre in major Port cities of the country for testing and evaluating the quality of Spices being exported from the Country at Mumbai (Maharashtra), Guntur (Andhra Pradesh), Chennai and Tuticorin (Tamil Nadu), New Delhi, Kandla(Gujarat) and Kolkata(West Bengal).

New initiatives of Spices Board –

a. Electronic auction facility for cardamom to be launched by Spices Board. This will bring transparency in the bidding process.
b. Regional quality control laboratories proposed at Guntur, Mumbai, Chennai and Delhi.
c. Spices park proposed at Chhindwara (MP), Idukki (Kerala), Erode (TN), Guntur (AP), Barabanki (UP), Kota/Jalore (Rajasthan)
d. Total expected investment for building of infrastructure in this sector during the 11th Plan is around Rs.1000 crores.

CONCLUSION

India has been known from prehistoric times as the land of spices. This led to the landing of the Portuguese navigator, Vasco da Gama at Calicut in 1498. India still has a virtual dominance in the international spices trade. India still continues to be the largest producer, consumer, and exporter of spices in the world. Thus we can still say that spice route still passes from India.

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CHALLENGES FACED BY HORTICULTURE BUSINESS IN JAMMU AND KASHMIR STATE

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ABSTRACT

Horticulture Sector has witnessed a drastic and rapid growth in a very limited period of time throughout the globe. Most of the countries have recognized a huge level of opportunities that could be carved out with this sector. Today Horticulture is practiced from the individual level in a garden up to the activities of Multinational corporations from satisfying the demand of millions. It provides a wide range of products such as food, medicinal, environmental and other social products which are fundamental to develop and maintain human health and well-being. Horticulturists are regularly applying their skills and knowledge to develop best category products. Their work involves plant propagation, cultivation maintaining nutritional values reducing environmental stresses etc. Horticultural scientists on the other hand focus on developing new and modern ways to develop horticulture sector. A collective effort from science and social science has brought a remarkable change in Horticulture Sector. Jammu and Kashmir State is also one among the leading states of India in Horticulture Business. It is famous for production of wide variety of delicious fruits which are served worldwide. The most famous among them includes delicious apples, Walnuts, Other dry fruits etc. Present study seeks to identify various challenges faced by horticulturists in Jammu and Kashmir State. The study also focuses on the issues that must be addressed immediately and could greatly affect the sustainability of this sector. The study further recommends various tools and strategies which could be implemented to generate a level of competitive advantage for Jammu and Kashmir Horticulture sector with rest of the world.

KEYWORDS

Horticulture Business, Competitive Advantage, Horticulturists, Sustainability.

INTRODUCTION

The Horticulture Sector has witnessed a drastic change in recent years with the development of modern products that are satisfying augmented needs of masses throughout the globe. The industry is making the countries self sufficient by generating highly nutritive level products with rich varieties. The Govt. of India is making heavy efforts to promote this factor through the development of effective and sustainable strategies to exploit the growing demand and spread the business to the national, state and regional level. In a similar way Govt. of Jammu and Kashmir state is also devising regular level of effective and capital strategies to serve the market demand efficiently. But it has been accessed that Horticulture Industry of Jammu and Kashmir is sever to multiple challenges which are harming the horticulture business. Some of the challenges that have been identified are seasonal variations, poor storage, Lack of training and guidance, poor level of site selection, financial support, irregular demand, lack of marketing opportunities, heavy logistics and transportation cost, poor access to modern equipments etc.

Despite of all these challenges the Horticulture Industry is grooming with regular pace and achieving new heights of excellence and development. Govt. as well as private agencies have now a day's realized the importance of this sector and are focusing on the development and implementation of new strategies. The objectives of these new strategies have been accessed as promotion of Horticulture Business of Jammu and Kashmir, Expansion of existing projects and establishment of new projects, Identification of feasible sources of finance and investment, Development of supporting infrastructure for Horticulture, establishment of linkages with other industries, mobilization of human resources etc. The proper implementation of strategies with the above stated objectives will surely come up with better yield in near future.

OBJECTIVES

1. To determine the nature and patterns of Horticulture Business in Jammu and Kashmir.
2. To identify various challenges faced by Horticulture Sector in Jammu and Kashmir State.
3. To analyze the level of impact of each factor on Horticulture Business.
4. To determine the challenges which highly affect Horticulture Industry of J&K?
5. To recommend strategies which could improve the business in Horticulture sector in Jammu and Kashmir State?

MATERIAL AND METHODS

Present study has been worked out with the help of both secondary as well as primary data. The secondary data used in this study have been collected from various reports, schedules, articles etc written on Jammu and Kashmir Horticulture Industry and also from the offices of various district officers of Horticulture. The primary data has been collected with the help of a pretested questionnaire from two hundred and twelve respondents involved in Horticulture business. The data and information collected from various sources has been analysed statistically and various cartographies have been used to determine the reality of Horticulture business in Jammu and Kashmir State.

RESULT AND DISCUSSION

There are various challenges which have been identified as affecting the performance of horticulture business in Jammu and Kashmir State. The impact of all these identified factors varies from site to site and area to area. The impacts of various challenges as per the respondents have been given as follows:

A) SEASONAL VARIATIONS

The values for factor "Seasonal Variations" have been given in Graph 1 and also tabulated in table 1. The analysis of values reveals that a total of 56% respondents believe that this factor acts a major challenge to Horticulture business in Jammu and Kashmir while 18% respondents have no decided opinion. Moreover a total of 26% respondents don't consider this factor as a major challenge.

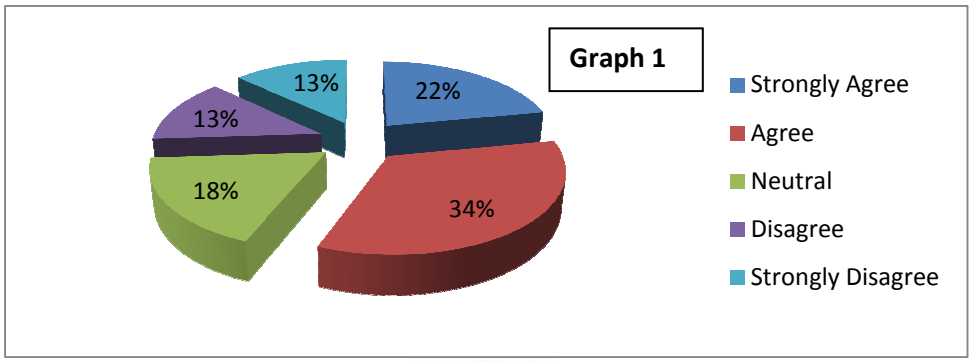

TABLE 1: SEASONAL VARIATIONS

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
46	73	39	28	26
22%	34%	18%	13%	13%

B) LACK OF MARKETING TOOLS

The values for factor " Lack of Marketing Tools" have been given in Graph 2 and also tabulated in table 2. The analysis of given values shows that a total of 29% respondnets are in favour of considering this factor as a challeneg while 49% respondnets have a neutral opinion. Moreover a total of 22% respondnets consider this factor as invalid for its consideration as a challenege to horticulture industry of Jammu and Kashmir.

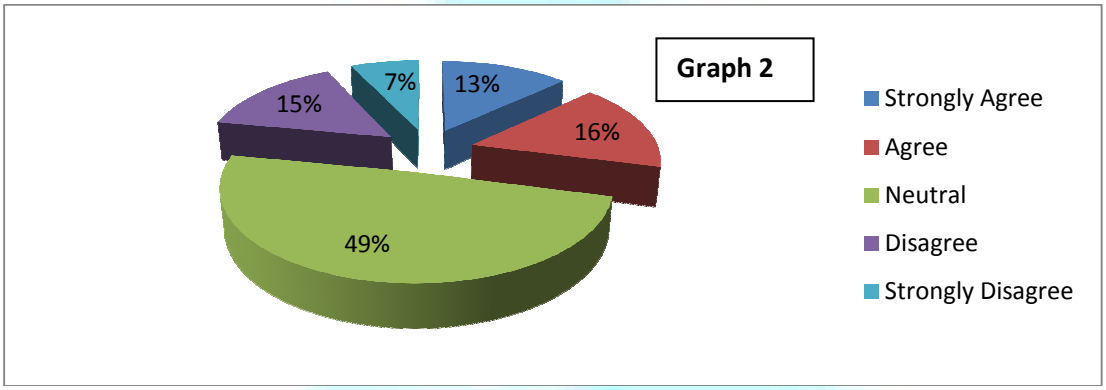

TABLE 2: LACK OF MARKETING TOOLS

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
28	33	103	31	17
13%	16%	49%	15%	7%

- **POOR STORAGE**

The analysis of values for factor " Poor Storage " have been given in table 3 and also shown in Graph 3. The analysis of values reveals that 16% respondnets believe this factor as a challeneg while 20% have no decided opinion. However a big percentage of respondents i.e. 64% don't consider it as a challenge.

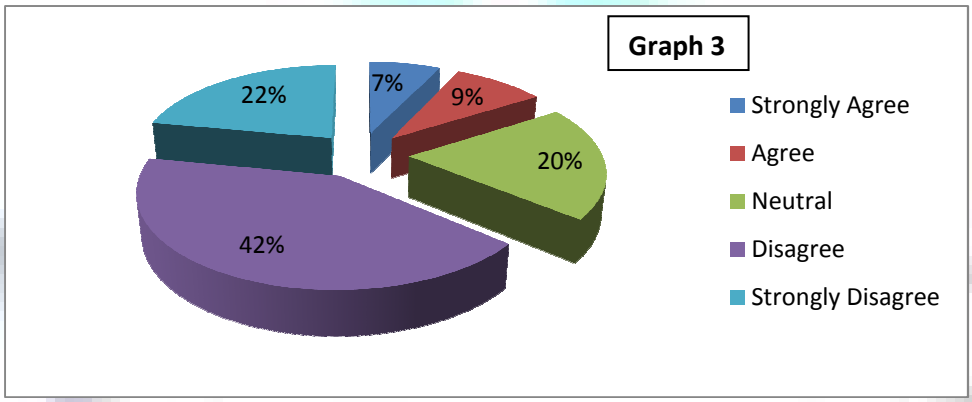

TABLE 3: POOR STORAGE

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
17	19	41	88	47
7%	9%	20%	42%	22%

- **LACK OF VARIETY**

The values for factor " Lack of Variety " have been tabulated in table 4 and also in graph 4. The analysis of values shows that only 12% respondnets condiesr the validity of this factor to be considered as a challenge while 21% have no decided opinion. Moreover a total of 68%respondnets are having a totally opposite opinion.

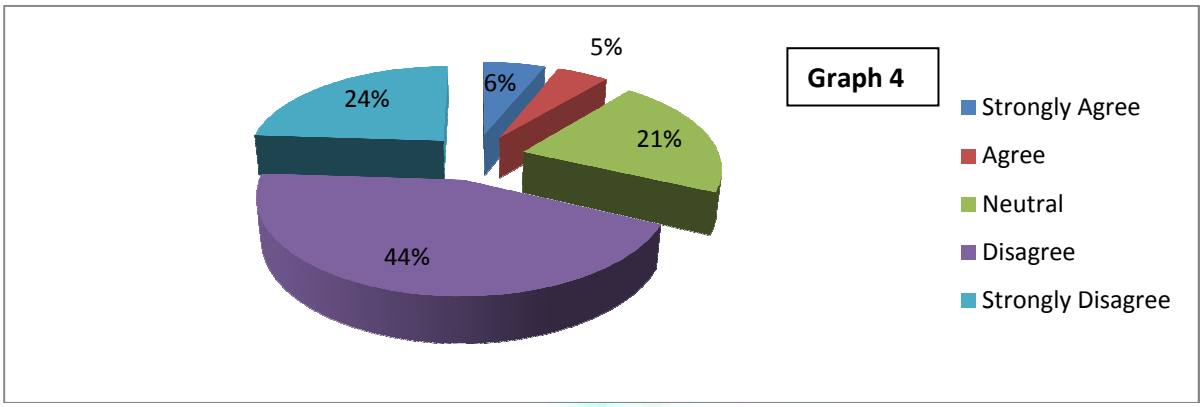

TABLE 4: LACK OF VARIETY

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
12	11	44	94	51
6%	5%	21%	44%	24%

- **TRANSPORTATION COST**

The values for this factors reveals that only 12% respondents consider this factor as a challenge while 17% have a neutral opinion. Moreover 71% respondents have the opinion that this factor cannot be considered as a challenge to Horticulture business in Jammu and Kashmir.

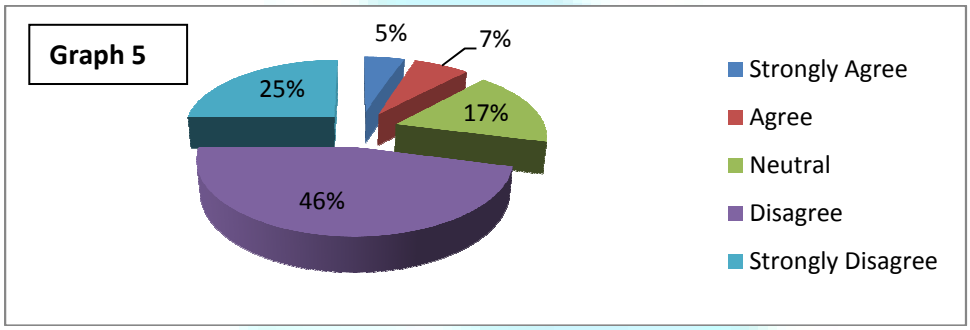

TABLE 5: TRANSPORTATION COST

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
11	15	35	99	52
5%	7%	17%	46%	25%

- **FINANCIAL SUPPORT**

The values collected for factor " Finaicial Support" have been given in table 6 and also shown in graph 6. The analysis of table values reveals that 65% respondnets consider this factor as a challenege while 16% have no decided opinion. Moreover 19% respondnets believe that this factor could not affect the functioning of Horticulture Business in Jammu and Kashmir.

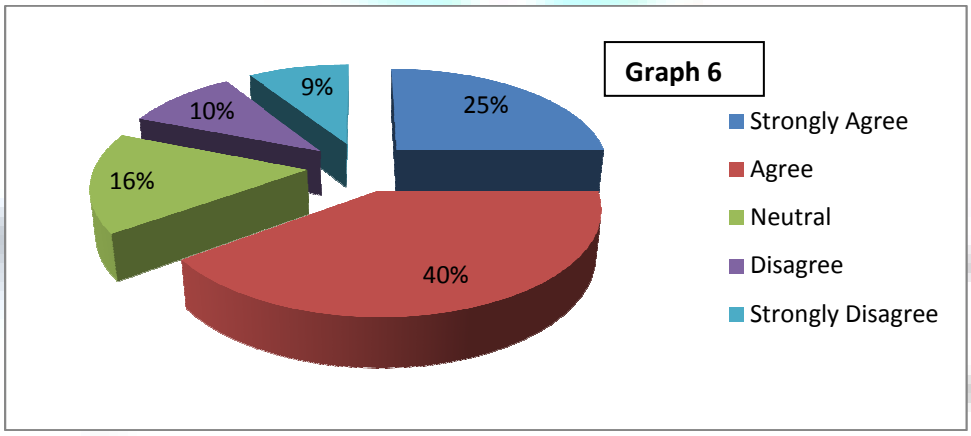

TABLE 6: FINANCIAL SUPPORT

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
52	85	34	21	20
25%	40%	16%	10%	9%

- **TRAINING/GUIDANCE**

The values for factor "Training/Guidance" have been tabulated in table 7 and also shown in graph 7. The analysis of values reveals that a total of 55% respondents consider that this factor could highly affect Horticulture business while 17% respondents have a neutral opinion. Moreover a total of 28% respondents don't consider this factor as a challenge.

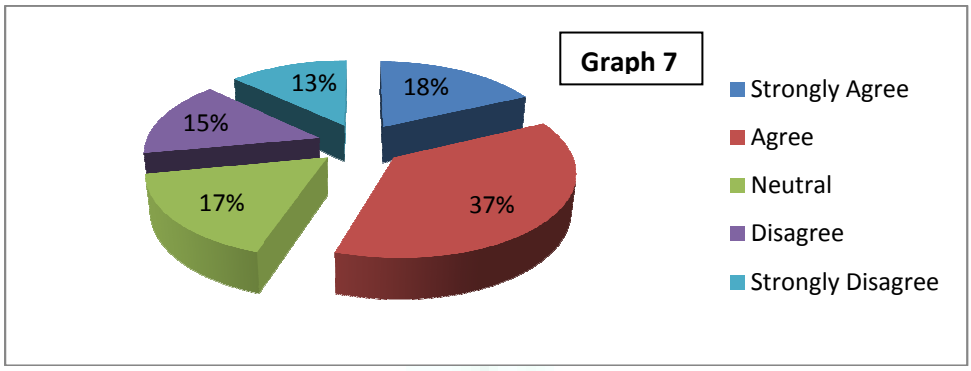

TABLE 7: TRAINING AND GUIDANCE

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
38	81	35	31	27
18%	37%	17%	15%	13%

- **SOIL PREPARATION AND FERTILIZATION**

The values for factor "Soil Preparation and Fertilization" have been tabulated in table 8 and also sketched in graph 8. The analysis of values reveals that a total of 30% respondents have considered this factor as a challenge while 46% have no decided opinion for this. Moreover a total of 24% respondents don't consider this factor as a challenge.

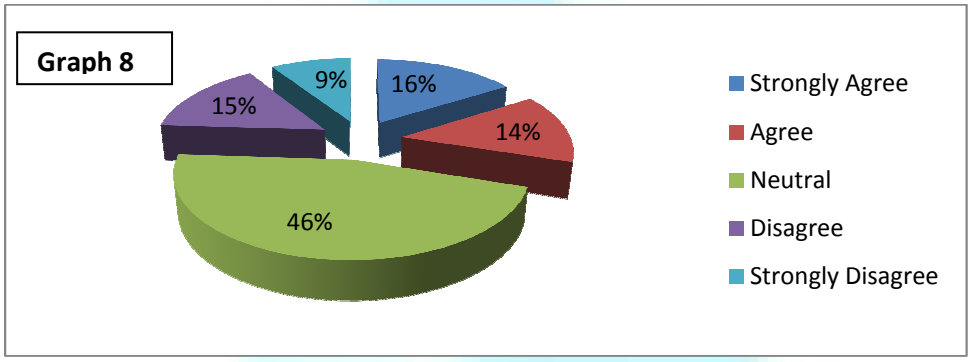

TABLE 8: SOIL PREPARATION AND FERTILIZATION

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
34	30	96	32	20
16%	14%	46%	15%	9%

- **MODERN EQUIPMENTS**

The values for this factor have been given in table 9 and also shown in graph 9. The collected values reveals that 66% respondents consider this factor as a big and emerging challenge while 23% respondents have a neutral opinion. Moreover a total of 11% respondents have the opinion that this factor could not affect the horticulture business of Jammu and Kashmir State.

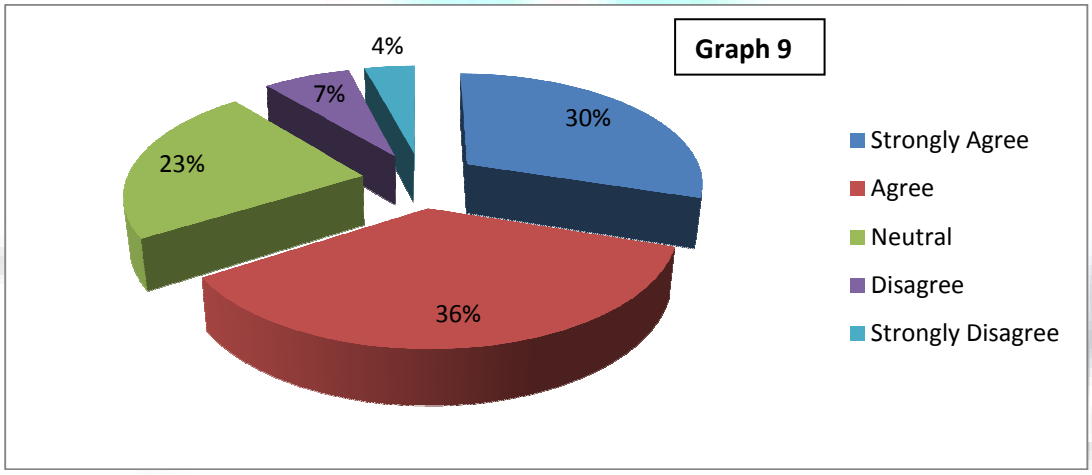

TABLE 9: MODERN EQUIPMENTS

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
63	76	49	14	10
30%	36%	23%	7%	4%

- **UTILITY ACCESS**

The values for factor "Utility Access" have been tabulated in table 10 and also shown in graph 10. The analysis of values reveals that a total of 56% respondents consider this factor as a challenge while 18% have a neutral opinion. Moreover a total of 26% respondents don't consider this factor as a hurdle in the development of Horticulture business of Jammu and Kashmir.

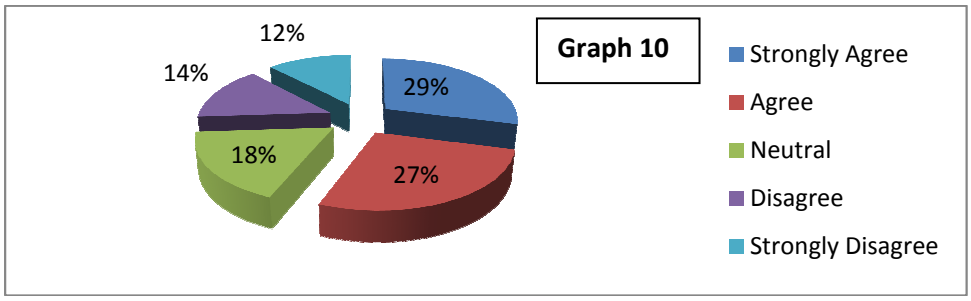

TABLE 10: UTILITY ACCESS

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
61	58	38	29	26
29%	27%	18%	14%	12%

- **MANPOWER DEFICIENCY**

The collected values for this factor shown in graph 11 and also in table 11 reveals that a total of 31% respondents consider this factor as a major challenge while 39% have no decided opinion. Moreover a total of 30% respondents don't consider this factor as a challenge.

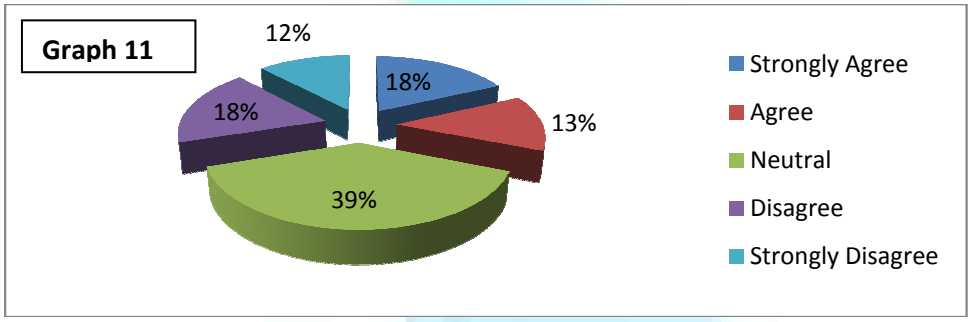

TABLE 11: MANPOWER DEFICIENCY

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
36	28	84	38	26
18%	13%	39%	18%	12%

- **SAFETY ASPECTS AND ISSUES**

The values for factor "Safety aspects and Issues" have been given in table 12 and also shown in graph 12. The analysis of values shown that a greater percentage of respondents i.e. 55% consider this factor as a challenge while 23% have no decided opinion. Moreover a total of 22% respondents don't consider this as a challenging factor.

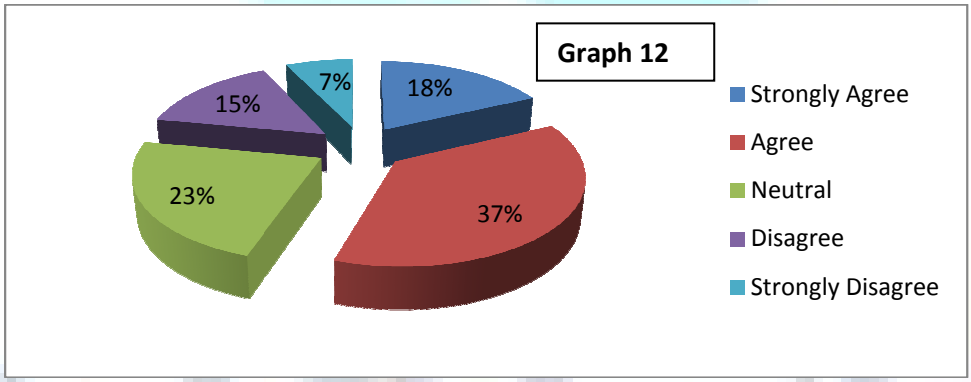

TABLE 12: SAFETY ASPECTS AND ISSUES

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
39	78	50	31	14
18%	37%	23%	15%	7%

- **SITE PLANNING**

The values collected for factor " Site Planning" have been given in table 13 and also shown in graph 13. The analysis of values shown that a total of 13% respondents consider this factor as a challenge while 7% have a neutral opinion. Moreover a greater percentage of respondents i.e. 80% don't believe this factor could act as a challenge to Horticulture Business.

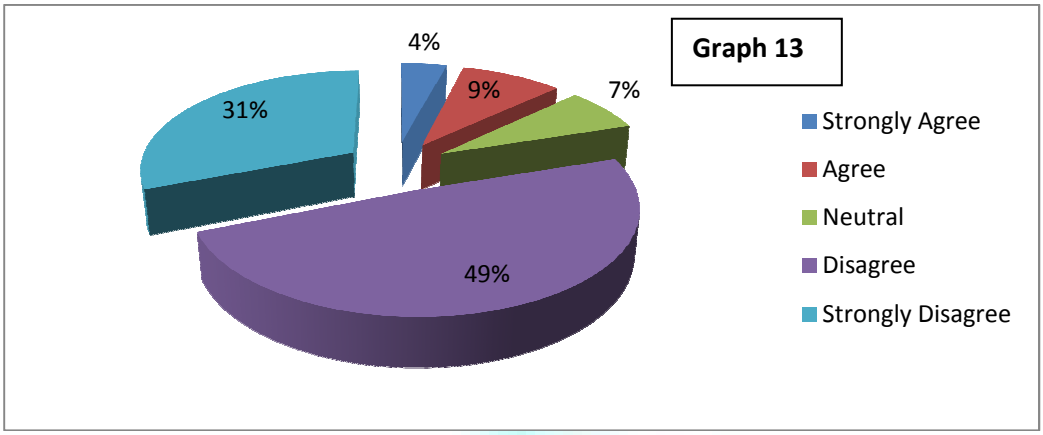

TABLE 13: SITE PLANNING

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
9	20	14	104	65
4%	9%	7%	49%	31%

CONCLUSION

Horticulture business in Jammu and Kashmir has a lot of opportunities and new ways to develop and increase its scope. But it is affected by a lot of challenges which affects its development. Various challenges have been identified as seasonal variations, lack of marketing tools, poor storage, lack of variety, transportation cost, financial support, training/guidance, soil preparation and fertilization, modern equipments, utility access, manpower deficiency, safety aspects and issues and site planning. The challenges which have a high level of impact on Horticulture business in Jammu and Kashmir are Seasonal variations, financial support, Training/Guidance, Modern equipments, Utility access and safety aspects and issues. The other challenges which have a mild level impact as per the respondents have been identified as poor storage, lack of variety, transportation cost and site planning.

RECOMMENDATIONS

1. There is a high need that Govt. and other agencies should come forward and provide financial support to people involved in Horticulture business as they are suffering from huge financial losses.
2. Proper selection of site is an important issue as each piece of land has its own characteristics and proper analysis of it is very difficult.
3. There is a need for organizing special programmes and training modules which could enhance the knowledge and abilities of horticulturists.
4. Big corporate firms should also come in this sector and by joining hands with already existing horticulturists they can increase the total yield in a very short span of time.
5. Marketing of Horticulture products is also a big issue these days so special marketing sites should be identified for this business and from time to time some events and displays must be arranged on regular intervals.
6. As the demand for horticulture products is seasonal, so special discounts and offers must be given to regular clients.
7. Infrastructural support to Horticulture business in Jammu and Kashmir is almost zero. Some strategies and plans must be devised and implemented which could arrange a level of infrastructure for this business.
8. A lot of opportunities are available in the market today as the demand for Horticulture product of Jammu and Kashmir State is very high and due to presence of small private investors they could also be a good source of capital.
9. Horticulture products are well known for their varieties and innovations and so a level of innovative and modern technology must be adopted so that new varieties of products could be grown.
10. There is also a need that the flow of Horticulture products from other states must be restricted so that the Horticulture products of Jammu and Kashmir get positioned in the minds of local customers.
11. Creating a communication value is very necessary now a day and there is a great need to get people aware about products. Some local channels and news papers must be involved to generate a communicating value.
12. It has also been accessed that sometimes due to drought or fire the products get damaged and there is no support from any govt. or private agency. There Govt. must depute some agencies which could look after the matter in such situations.
13. Electricity, water supply and other utilities are also accessed by these Horticulturists in the same way as a common man which is not sufficient. A regular mechanism must be adopted which could provide them special connections for greater efficiency.

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PERMANENT IDENTIFICATION OF SKIN MARKS (PISM): A HYBRID APPROACH FOR ROBUST FACE RECOGNITION

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ABSTRACT

Face or facial recognition is the identification of human by the unique characteristics of their faces. It is a biometric identification by scanning a person's face and matching it against library of known facts. Robust face recognition is a challenging goal because similarity of all human faces compared to large differences between face images of the person due to variations in lighting conditions, view point, pose, age, health and facial expression. The image may not always be verified or identified in facial recognition alone. This paper presents a method to use skin detail analysis and surface texture analysis for robust face recognition. Surface texture analysis uses skin biometrics, the uniqueness of skin texture to yield more accurate results. In this paper we propose a hybrid technique for robust face recognition the technique includes skin detail analysis and surface texture analysis. The method is being introduced as PISM (Permanent Identification of Skin Marks) approach.

KEYWORDS

PISM, face recognition, biometrics, skin detail analysis, surface texture analysis.

1. INTRODUCTION

An ideal face recognition system should recognize new images of a known face and be insensitive to nuisance variations in image acquisitions. But in most instances the images are not taken in a controlled environment. Even the smallest changes in light or orientation could reduce the effectiveness of the system, so they couldn't be matched to any face in the database, leading to a high rate of failure.

Thus, Robust face recognition is a challenging goal because similarity of all human faces compared to large differences between face images of the person due to variations in lighting conditions, view point, pose, age, health and facial expression.

Skin detail analysis exploit local skin irregularities as features for face identification. It is a methodology for detection and evaluation of skin marks to determine a person's identity based on only a few well chosen pixels.

The process, called Surface Texture Analysis, works much the same way facial recognition does. A picture is taken of a patch of skin, called a skinprint. That patch is then broken up into smaller blocks. Using algorithms to turn the patch into a mathematical, measurable space, the system will then distinguish any lines, pores and the actual skin texture. It can identify differences between identical twins, which is not yet possible using facial recognition software alone. According to Identix, by combining facial recognition with surface texture analysis, accurate identification can increase by 20 to 25 percent. This calls for an innovative approach for face recognition and verification.

2. LITERATURE REVIEW

Flook, 2013 [1], Alan and Clark, 2013 [2], Sahoo *et. al.,* 2012 [3] have reviewed different approaches for biometric identifications. According to Woodward *et. al* [4], biometric is any automatically measurable, robust and distinctive physical characteristic or personal trait that can be used to identify an individual or verify the claimed identity of an individual. Biometric identification is the automatic recognition of a person using distinguishing traits [5, 6, 7].

The *robustness* of a biometric refers to the extent to which the characteristic or trait is subject to significant changes over time. These changes can occur as a result of age, injury, illness, occupational use, or chemical exposure. A highly robust biometric does not change significantly over time while a less robust biometric will change.

According to Brian C. Lovell and Shaokang Chen, "Robust Face Recognition for Data Mining" [8], face recognition is a type of biometric software application that can identify a specific individual in a digital image by analyzing and comparing patterns. Facial recognition systems are commonly used for security purposes but are increasingly being used in a variety of other applications. Most current facial recognition systems work with numeric codes called face prints. Such systems identify 80 nodal points on a human face. In this context, nodal points are end points used to measure variables of a person's face, such as

- Distance between the eyes
- Width of the nose
- Depth of the eye sockets
- The shape of the cheekbones
- The length of the jaw line

According to Turk, M. and Pentland, A. (1991). Eigenfaces for recognition. Journal of Cognitive Neuroscience [9], face recognition techniques can be broadly divided into three categories: methods that operate on intensity images, those that deal with video sequences, and those that require other sensory data such as 3D information or Infra- red imagery.

According to Jean-Sebastien Pierrad, Thomas Vetter *Skin Detail Analysis for face recognition* [7], a novel framework is to localize in photograph prominent irregularities in facial skin, in particular nevi (moles, birthmarks). Their characteristic configuration over a face is used to encode the person's identity independent of pose and illumination. This approach extends conventional recognition methods, which usually disregard such small scale variations and thereby miss potentially highly discriminative features. The system detects potential nevi with a very sensitive multi scale template matching procedure. The candidate points are filtered according to their discriminative potential, using two complementary methods. One is a novel skin segmentation scheme based on gray scale texture analysis that developed to perform outlier detection in the face. Unlike most other skin detection/ segmentation methods it does not require color input. The second is a local saliency measure to express a point's uniqueness and confidence taking the neighborhood's texture characteristics into account.

3. RESEARCH GAP

The face recognition problem can be formulated as follows: Given an input face image and a database of face images of known individuals, how can we verify or determine the identity of the person in the input image?

Face recognition system is computer application for automatically identifying images for verification purpose. At present such approaches robust in nature as they largely rely on complete scanning of images in there all details consuming much of space, time, energy and resources. The biggest challenge in computer application in future would be to minimize the time and space consumed for such verification. Therefore the indentified research gap is how to reduce the time and scanning/ image space for identification and verification. This identified research gap could be reduced by hybrid approach for robust face recognition on the basis of concerning and relevant literature review we introduce the concept of hybrid approach PISM the acronym for permanent identification of skin marks.

4. RESEARCH DESIGN

In the present paper, Qualitative biometric research design is followed and this because the PISM approach is based on attributes that gives the permanent identification for skin marks.

5. PROPOSED METHOD

In this paper we propose a hybrid technique for robust face recognition the technique includes skin detail analysis and surface texture analysis.

Skin detail analysis is detection and validation of various small scale structures in the surface (wrinkles, scars) and the texture (nevi – a general term for pigment lesions like birthmarks and moles) that stand out from normal skin appearance and represent potentially valuable references for individual distinction. Their predictable appearance, also under changing illumination, facilitates detection. And their numerous appearance in conjunction with unique distribution patterns scales well with extensive galleries. Furthermore such marks require no abstract encoding, in contrast to most other facial features. This fact could be exploited to query a database without having to provide a sample face, e.g. "search all faces with a birthmark near the upper right lip".

In Surface Texture Analysis a picture is taken of a patch of skin, called a skin print. That patch is then broken up into smaller blocks. Using algorithms to turn the patch into a mathematical, measurable space, the system will then distinguish any lines, pores and the actual skin texture. It can identify differences between identical twins, which is not yet possible using facial recognition software alone. The surface texture analysis (STA) algorithm operates on the top percentage of results as determined by the local feature analysis. STA creates a skinprint and performs either a 1:1 or 1:N match depending on whether you're looking for verification or identification. In verification, an image is matched to only one image in the database (1:1).

For example, an image taken of a subject may be matched to an image in the Department of Motor Vehicles database to verify the subject is who he says he is. If identification is the goal, then the image is compared to all images in the database resulting in a score for each potential match (1:N). In this instance, you may take an image and compare it to a database of mug shots to identify who the subject is.

The steps involved in facial recognition are as follows:

Acquire the image of person in digital format. Get picture of patch of skin of a person for surface texture analysis.

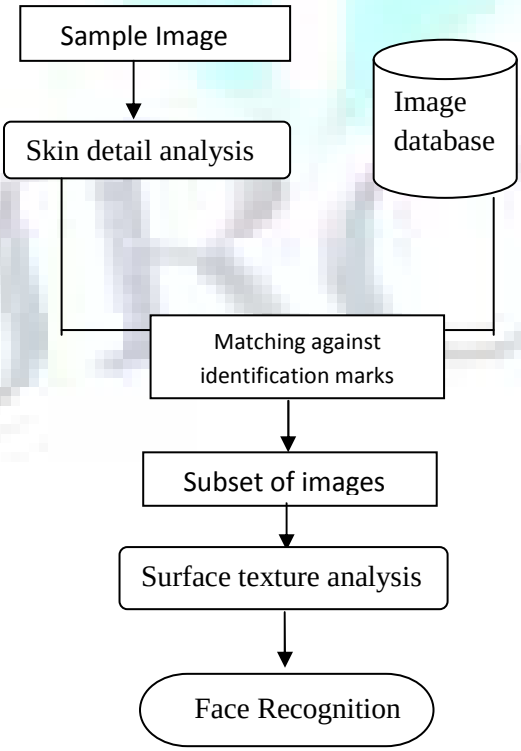
For performing skin detail analysis, analyze the picture taken to get the skin irregularities (marks) such as birth marks, moles or scars on face. This analysis will help us to localize the skin regularities in numerical terms.

Match the image against image database on the basis of localized marks this will give a subset of images matching the given criteria.

The resulting images are then subjected to surface texture analysis.

The final step is to determine whether any scores produced in step 4 are high enough to declare a match.

FIG. 1



6. RESULT

High identification accuracy can be achieved by PISM as the face recognition technique (surface texture analysis) is applied on the small subset of images obtained from the image database after skin detail analysis.

7. LIMITATIONS

Human faces carry skin marks by which identification and verification are made. The PISM approach is designed for such naturally occurred skin marks present for identification. In case of any make-up, manipulation or concealment of skin mark PISM approach will have certain limitations. However these limitations could be reduced by identification with original faces in the image or combining other approach for identification.

8. FUTURE ENHANCEMENTS

To cover up limitations PISM approach could be modified to identification of other approaches. Thus the future enhancement could be in terms of Integrated PISM i.e. I-PISM. Future work would comprise refinements in the comparison of local skin features (e.g. valuing the absence of salient moles as exclusion criterion) as well as fusion with other face recognition methods to support cases where no nevi (moles or birthmarks) are present.

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APPLICATION OF QUALITY CONTROL CHART IN MANUFACTURING INDUSTRIES USING A LOSS FUNCTION APPROACH

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ABSTRACT

The increasing use of Loss Functions in Quality Assurance has created a demand for realistic and representative loss functions. This knowledge is capable of providing alternative strategies for assessing and improving the process performance. This research work is focused on the use of Loss Functions based on the inverted Normal Probability Density Function (INPDF), known as the Inverted Normal Loss Function (INLF) in monitoring the loss of cigarette produced by an International Tobacco Company (ITC). BASIC programming language is used to determine the associated loss due to deviation of the cigarette weight from the target value, varying the maximum loss attainable at each end of the target value. The mean weight of the cigarette is monitored using the $\bar{x}$ *and the R charts, which is compared with those of Economic Loss chart varying the loss values. The Conventional chart and the Economic Loss Charts highlight different features of the production process and hence, the economic chart can therefore serve as a compliment to the conventional chart particularly when focusing on the economic aspect.*

KEYWORDS
Quality control chart, loss function approach.

INTRODUCTION

LOSS FUNCTION

Loss functions are used in decision theory applications and quality assurance settings, to quantify Losses associated with deviation from a desired target value. In decision theory, an action a and θ of interest, a loss is a function of a parameter and an action. A decision rule d, is a mapping of the range space of the relevant random variable x into the action space a.

$d : R_x \rightarrow a$

Then L (θ,d(X) is random variable and $R(\theta,d) = E_x L(\theta,d(X)) = \int L(\theta,d(x))f(x/\theta)dx$, When X is continuous, it called the risk of using the decision rule d when the true state of nature is θ.

In Quality Assurance setting, Loss Function are used to reflect the economic loss associated with variation about the deviations from the process target of the target value of a product characteristics (Spiring & Yeung, (1998)). In this work we focused on Quality Assurance Settings.

The most common loss function is the quadratic functions corresponding to a Gaussian noise mode with zero means, and a standard deviation that does not depend on the inputs. The Gaussian loss function is used because it has nice analytical properties. However, one of the potential difficulties of the quadratic loss function is that it received large contributions from outliers that have particularly large errors. If there are long tails on the distributions then the solution can be dominated by a very small number of outliers. The techniques that attempt to solve this problem are referred to as robust statistics (Huber, 1972).

Taguchi (1986) used a modified quadratic loss function to assess and illustrate losses associated with deviations of a product characteristics from target. This loss function take the following basic quadratic form $L(X,m)=k(X-m)^2$ where X is a measure of the product characteristics, L is the Loss in monetary terms, m is the point at which the characteristics is actually set, and k is constant that depends on the magnitude of deviation from target.

In response to some criticisms of the quadratic loss functions, Spiring (1993) proposed a loss function based on the inversion of normal probability density function.The resulting inverted Normal Loss Function (INLF) differs from the traditional quadratic loss, in that it is bounded and provides a more reasonable assessment of loss associated with deviation from target. Sun, Laramee and Remberg (1996) improved on the inverted normal loss function (INLF) further.

Chu, Keerth, & Ong (2001) proposed a unified non-quadratic loss function known as soft insensitive loss function (SILF) in solving regression problems. In his submission, obafemi etal (2013) concluded that the expected loss functions will continue to provide insights into optimal process settings and tracking opportunity.

MATERIAL AND METHOD

In Manufacturing, loss functions express the economic consequences associated with deviations from target, since different processes have different sets of economic consequences. A better approach to developing loss functions is therefore desirable.

The quality characteristics of cigarette measured by the quality control department of international Tobacco Company (ITC) are weight, circumference, length and pressure drop. The weight of cigarette here after denoted X, is the focus of this work.

Consider a situation where each stick of cigarette has a target weight of 1000mg. A stick of cigarette must be reprocessed if it is under-weight, while those on target of above the target weight are sent directly to the market. Under-weight therefore attracts more economic loss to the producer than over-weight. The

economic loss around the target therefore is asymmetric. There are many types of inverted loss function, which include: inverted gamma loss, inverted normal loss, inverted uniform loss function. However the normal loss function is adopted for this work because the data collected is approximately normal.

GENERAL CLASS OF LOSS FUNCTION

The general class of loss function is based on the inversion of common probability density functions. These classes if loss functions satisfy the criteria that the loss must always be positive, minimum at the target value, monotonically increasing as the process deviates from target and reaches a quantifiable maximum.

Let g (x,T) denote the probability density function (pdf) used in creating the economic loss function for the process and $f_{\bar{}}(x/\theta)$ the statistical distribution associated with the process measurements.

$f_{\bar{}}(x/\theta)$ where $\theta = (\mu, \sigma^2)$ is the statistical distribution of the process under study, which is normally distributed with mean μL and variance σ^2_L.

Where μ_L and σ_L refer to the parameter based on the sample taken from the process.

The general form of the inverted probability loss function (IPLF) is defined to be

$$L(x,T) = k\left(1 - \frac{g(x,T)}{m}\right) \qquad \forall X \in \Omega \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Where x denotes the process measurement, k the maximum loss, Ω the measurement space and T, the process target. If $f_{\bar{}}(x/\theta)$ denotes the probability density function associated with the behavior of process measurement x, the general form of the expected loss function associated with equation (1) will be

$$E(L(x,T)) = \int_{\Omega} k\left(1 - \frac{g(x,T)}{m}\right) f(x/\bar{\theta})\,dx$$

$$= \int_{\Omega} k\left(1 - \frac{g(x,T)}{m}\right) f(x/\bar{\theta})\,dx$$

$$= k\left(1 - \frac{1}{m}\int_{\Omega} g(x,T)\, f(x/\bar{\theta})\,dx\right)$$

INVERTED NORMAL LOSS FUNCTION

Consider a normal probability density function (pdf) to define g(x,T):

$$g(x,T) = \frac{1}{\sigma_L\sqrt{2\pi}}\exp -\frac{1}{2}\left(\frac{x-T}{\sigma_L}\right) \qquad -\infty < x < \infty,$$

Where T denotes the target and σ_L denotes a scale parameter and the supremum of g (x,T) in this case is $m = \frac{1}{\sigma_L\sqrt{2\pi}}$, achieved where x =T

Since $L(x,T) = k\left(1 - \frac{g(x,T)}{m}\right)$, the inverted normal loss function then becomes

$$L(x,T) = k\left(1 - \frac{\frac{1}{\sigma_L\sqrt{2\pi}}\exp -\frac{1}{2}\left(\frac{x-T}{\sigma_L}\right)^2}{\frac{1}{\sigma_L\sqrt{2\pi}}}\right)$$

$$L(x,T) = k\left(1 - \exp -\frac{1}{2}\left(\frac{x-T}{\sigma_L}\right)^2\right) \qquad -\infty < x < \infty,$$

Therefore, L(x, T)=K

In the case of an asymmetric situation for the general class of loss function

$$L(x,T) = \begin{cases} k_1\left(1 - \frac{g(x,T)}{m}\right) & \forall x < T \\ k_2\left(1 - \frac{g(x,T)}{m}\right) & \forall x \geq T \end{cases}$$

And for the inverted normal loss with a asymmetric situation

Where k_1, is maximum loss when weight is below the target and k_2 is the maximum loss when weight is above the target

$$L(x,T) = \begin{cases} k_1\left(1 - \exp -\frac{1}{2}\left(\frac{x-T}{\sigma_L}\right)^2\right) & \forall x \in (-\infty, T) \\ k_2\left(1 - \exp -\frac{1}{2}\left(\frac{x-T}{\sigma_L}\right)^2\right) & \forall x \in (T, \infty) \end{cases}$$

MONITORING THE WEIGHT USING THE CONVENTIONAL AND ECONOMIC LOSS CHARTS

The associated loss due to weight of cigarette is obtained using the inverted normal loss function. The data collected from the process shows that the weights of cigarette follow a normal distribution. The variance and standard deviation are then obtained as follows:

From the data, n = 200, $\sigma^2_{L(n-1)} = 77.469$, $\sigma^2_{L(n-1)} = 8.802$ Since the loss is taken to be asymmetric then,

$$L(x,T) = \begin{cases} k_1\left(1-\exp-\frac{1}{2}\left(\frac{x-1000}{\sigma_L}\right)^2\right) & \forall x \in (-\infty,1000) \\ k_2\left(1-\exp-\frac{1}{2}\left(\frac{x-1000}{\sigma_L}\right)^2\right) & \forall x \in (1000,\infty) \end{cases}$$

Where 1000mg is the target weight set by the organization. The $\bar{X}$ - chart for the weight of cigarette is shown in figure 3.1a and the corresponding R chart show in figure 3.1b.

A BASIC program is used to compute the various values of L(x,T) due to weight of cigarette. The programme is written such that if the value of weight of a cigarette is less than the target value (1000mg), it will use the loss value k_1 and when the value of weight is equal or higher than the target value it will use the loss value k_2 to multiply

$$\left(1-\exp-\frac{1}{2}\left(\frac{x-1000}{\sigma_L}\right)^2\right).$$

The resulting associated loss values and charts obtained with varying values of K_1 and k_2 and their corresponding range chart are shown in the table 3.1.1 to 3.1.3 and figure 3.1 to 3.3b, respectively.

TABLE 3.1.1: WEIGHT OF CIGARETTE IN MG

No.	Weight of cigarette in mg					R
1	985	1000	1003	1015	1008	30
2	1004	1009	1012	1050	1008	46
3	1000	1011	1030	1003	1000	30
4	1002	1008	1009	1003	986	23
5	1011	1025	1009	1008	1008	17
6	1013	1003	986	998	1003	27
7	992	1005	1000	1005	1015	23
8	1003	1004	1013	1008	993	20
9	1005	994	1000	1001	1003	11
10	1005	1012	1016	1006	1013	11
11	1013	1008	1001	1005	1003	12
12	994	1000	1015	1013	1009	21
13	1015	1005	1006	1002	1005	13
14	1001	1008	1001	1010	1012	11
15	994	1001	1011	1010	1008	17
16	1008	1009	1001	1000	1012	12
17	1001	1003	1001	1000	998	5
18	1000	1003	1005	1008	1008	8
19	1008	996	1008	1009	1003	13
20	1000	1003	1008	1001	1003	8

TABLE 3.1.2

No.	L(,T) with $k_1 = 5$, $k_2 = 2$					R
1	3.83	.00	.11	1.53	.68	3.83
2	.20	.81	1.21	2.00	.68	1.80
3	.00	1.08	1.99	.11	.68	1.99
4	.05	.68	.81	.11	3.59	3.54
5	1.08	1.96	.81	.41	.68	1.55
6	1.33	.11	3.59	3.03	.11	3.48
7	1.70	.54	.00	.30	1.53	1.70
8	.11	.20	1.33	.68	1.36	1.25
9	.30	1.04	.01	.01	.11	1.03
10	.30	1.21	1.61	.41	1.33	1.30
11	1.33	.68	.01	.30	.11	1.32
12	1.04	.00	1.53	1.33	.81	1.53
13	1.53	.30	.41	.05	.30	1.48
14	.01	.68	.01	.95	1.21	1.20
15	1.04	.01	1.08	.95	.68	1.07
16	.68	.81	.01	.00	1.21	1.21
17	.01	.11	.01	.00	.13	.13
18	.00	.11	.30	.68	.68	.68
19	.68	.49	.68	.81	.11	.70
20	.00	.11	.68	.01	.11	.68

TABLE 3.1.3

No.	L(,T) with $k_1 = 4$, $k_2 = 1$					R
1	3.06	.00	.06	.77	.34	3.06
2	.10	.41	.61	1.00	.34	.90
3	.00	.54	1.00	.06	.34	1.00
4	.03	.34	.41	.06	2.87	2.84
5	.54	.98	.41	.34	.34	.64
6	.66	.06	2.87	2.42	.56	2.81
7	1.35	.15	.00	.15	.77	1.35
8	.06	.10	.66	.34	1.08	1.02
9	.15	.83	.00	.01	.06	.83
10	.15	.61	.81	.21	.66	.66
11	.66	.34	.01	.15	.06	.65
12	.83	.00	.77	.66	.41	.77
13	.77	.15	.21	.03	.15	.74
14	.01	.34	.01	.48	.61	.60
15	.83	.01	.54	.48	.34	.82
16	.34	.41	.01	.00	.61	.61
17	.01	.06	.01	.00	.10	.10
18	.00	.06	.15	.34	.34	.34
19	.34	.39	.34	.41	.06	.35
20	.00	.06	.34	.01	.06	.34

For each of the table, as expected the associated loss values for varying value of k_1 and k_2 increases as deviation increases from the target value.

FIG. 3.1

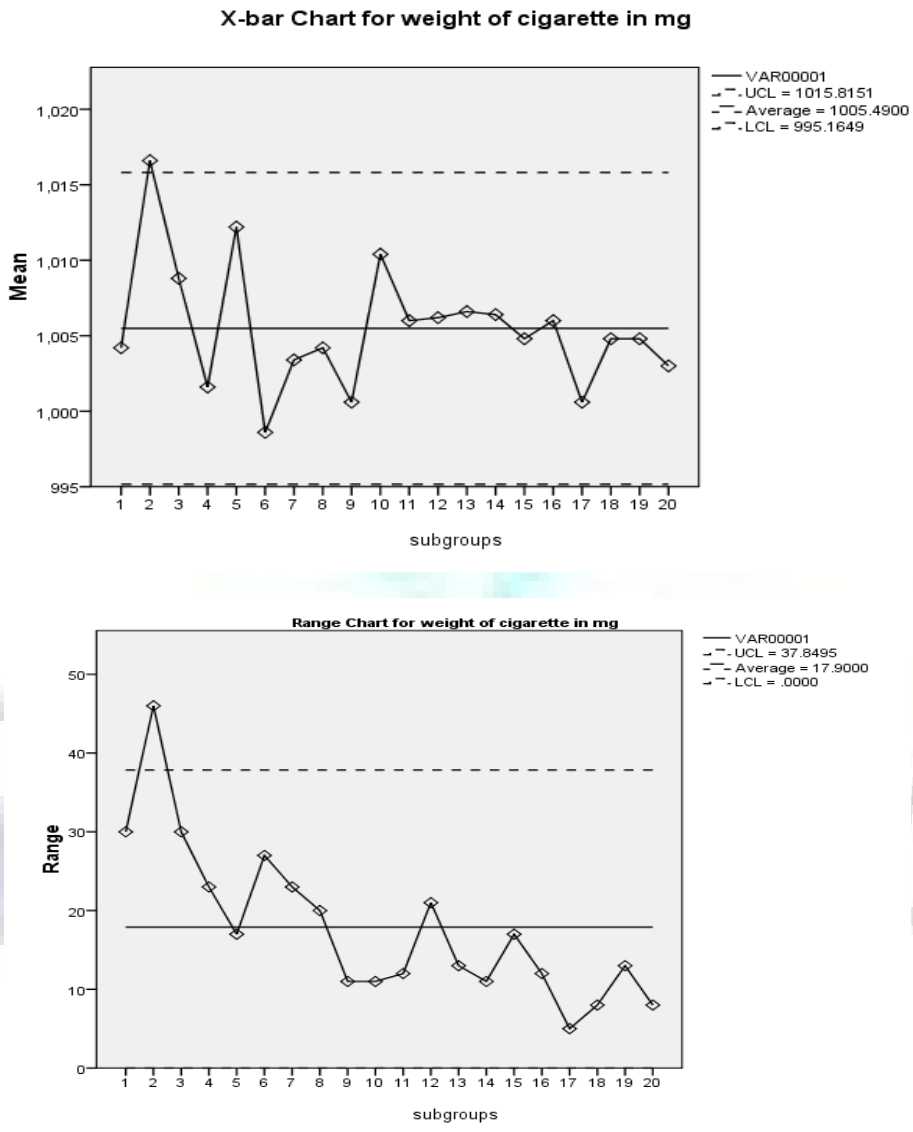
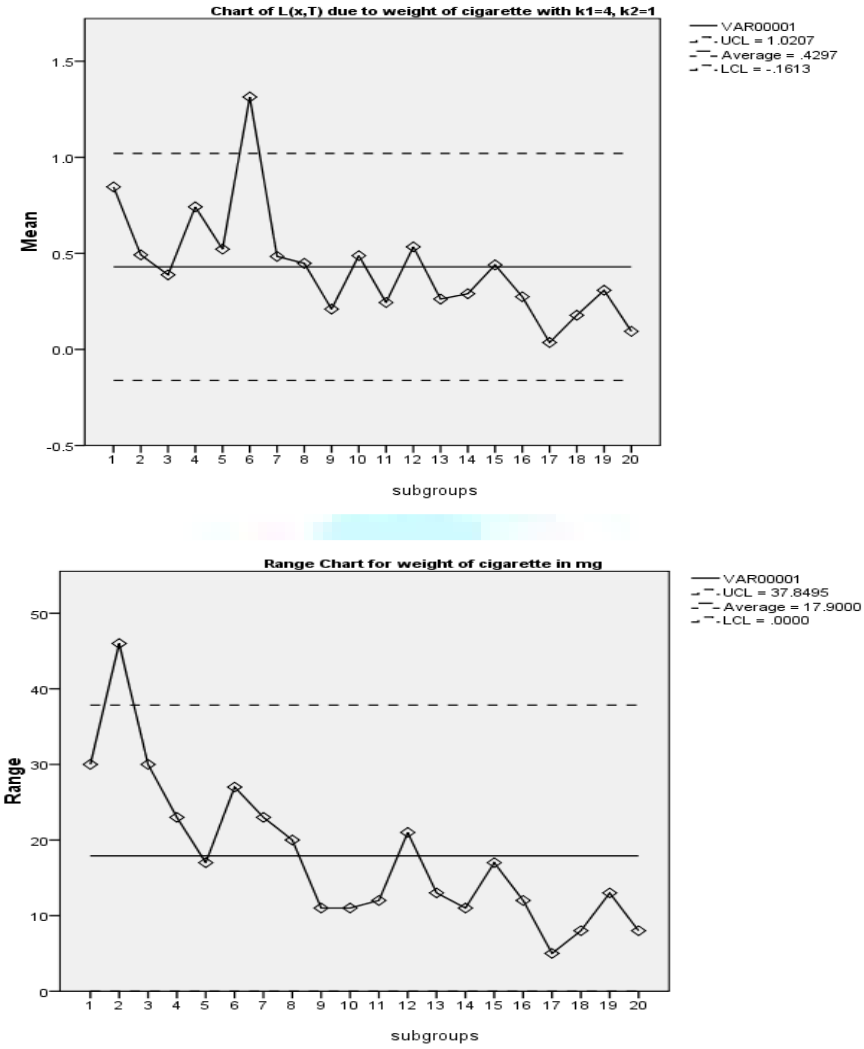


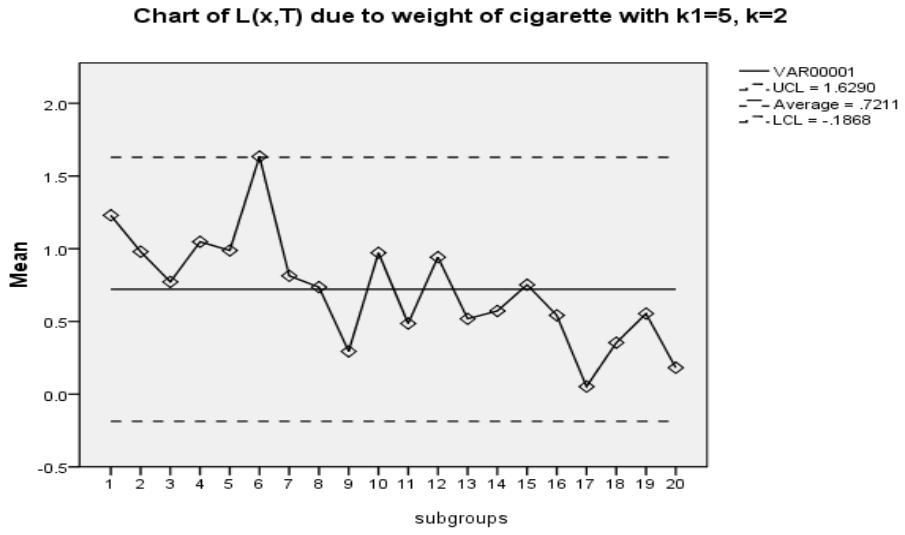
figure 3.1, above shows the $\bar{X}$ - chart of the weight of cigarette, the second sample point falls outside the upper control limit, which is also the case for its corresponding range chart in figure 3.1b above. There is then an indication that the weight of cigarette is out of control.

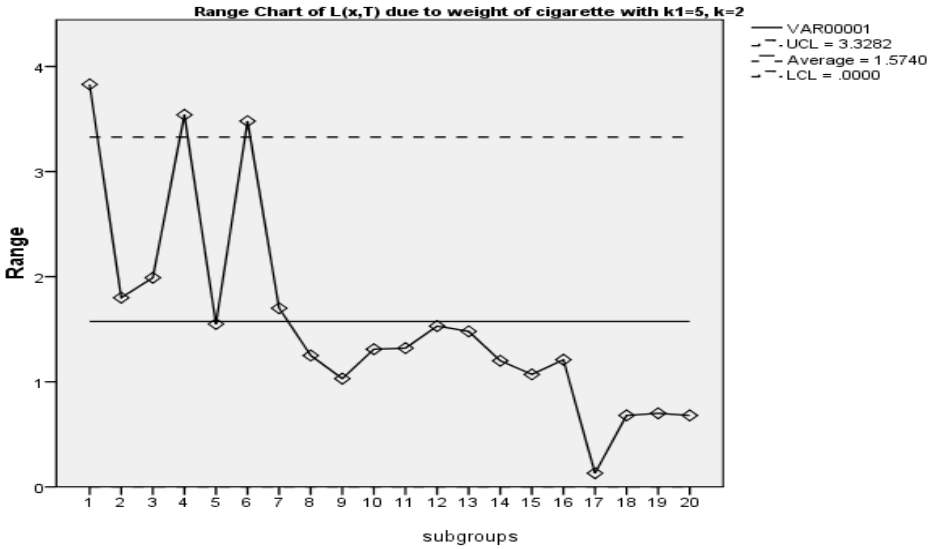
FIG. 3.2



The economic loss chart (L(x,T)due to weight of cigarette for k_1=4 and k_2 = 1 in figure 3.2a show that the sixth sample point is out of upper control limit which is an indication that the process is out-of-control. Also its corresponding range chart in figure 3.2b has the first, the fourth and sixth sample points out of the upper control limit, which is an indication that the process loss is out – of – control.

FIG 3.3





The economic loss chart due to weight of cigarette with maximum loss value k_1=5 and k_2 = 2 as show in figure 3.3a is out of control as one of the points is outside the control limits. The corresponding range chart in figure 3.3b also shows an out – of – control state. As three points fall outside the control limits.

SUMMARY OF RESULT

The economic loss associated with the weight of cigarette as obtained in this work has its loss values positive, minimum at the target value and increase proportionally with deviation of weight from the target value, as expected. Hence the inverted Normal Loss Function (INLF) satisfies the criteria of the loss associated to a product characteristic.

The $\bar{X}$ - chart and its corresponding range chart for the weight of cigarette shows an out-of control state. The economic loss chart with k_1=4 and k_2 = 1 and k_1=5 and k_2 = 2 with their corresponding range charts shows an out-control states of the process loss respectively.

CONCLUSION

The conventional control chart for the weight of cigarette and that of the associated economic loss charts highlight different features of the process. While the conventional control chart monitor the weight of cigarette manufactured the economic loss charts monitor the associated loss due to weight of cigarrette i.e. the economic consequences of the company. Since the economic loss and range charts for various values of k_1 and k_2 do not all follow the same pattern as the conventional charts; that is some charts are not indicating an out of control state while some other do stresses the fact that they may not be performing the same function absolutely.

Also for the facts that shift in process mean may be inevitable, the use of economic loss will go a long way in setting the process optimally.

Based on the results arrived at on this research works, the inverted normal loss function (INLF) provides practitioners with loss function that can accurately reflects process loss and the economic chart has the benefit of providing added economic loss performance of the company understood by the management. Adoption of the economic loss chart is therefore recommended to compliment the conventional control chart.

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CHALLENGES ON ICT IMPLEMENTATION AND RECOMMENDATIONS

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ABSTRACT

Implementation of information and communication technology (ICT) services and systems in organizations generally pose a lot of challenges that, if not properly addressed, lead to heavy investment without the corresponding organizational efficiency gains. This paper highlights the common challenges based on the experience of the author in working with various organizations and as ICT project manager, Systems Administrator, and Network Administrator. Moreover best practice recommendations to addressing the challenges are also given.

KEYWORDS
ICT, Systems Administrator, Network Administrator.

1. INTRODUCTION

There is a solid understanding that ICT can play an accelerating role in bridging the digital divide between developed and developing countries. And it is obvious that Developing countries are grappling with the challenges of the digital divide, a divide that denies immediacy of access to information and the ability and means to exploit it for beneficial economic and social use, leading to human development. Not only this at the organizational level, it is widely accepted (though not fully appreciated) that the integration of ICT in organizational functions is necessary for increased efficiency, cost-effectiveness, and competitiveness. The biggest challenge at the moment is to develop an ICT infrastructure, knowledge and skills that provide opportunities for sustainable development.But the greater challenges are found distributed in all the organization, mainly the executives.

2. AN APPROPRIATE ICT FRAMEWORK AND SOLUTION

First of all I would like to discuss about"**An Appropriate ICT Framework and Solution**".
In this section I will propose a framework that enables a more effective and appropriate design and implementation of ICT. The framework is founded in the traditional Systems Development Life Cycle (SDLC) that is used in Information Systems development, but extends it with tools and approaches that will guide the ICT solution to appropriateness.

1. **Definition:** Determine the goals, scope and requirements, Information Policy of the ICT solution
2. **Design:** Resolution of technical issues, selection of architecture and standards
3. **Construction:** Implementation of the design, testing and documentation of the system.
4. **Installation:** Roll-out of the services offered by the systems to the end-users, training.
5. **Operation/maintenance:** problem solving, user support, and incremental improvement through monitoring an evaluation focusing on the use of the services by the end-users.

As mentioned above, Appropriate ICT encompasses two perspectives: the product and process. In the framework this is expressed in four aspects: Policy, Hardware, Software and Change Management. Hardware and software result in a product, an ICT artifact. Policy and Change management establishes the process for the design, development, implementation, operation and **USE** of the ICT artifact.

3. ICT IMPLEMENTATION CHALLENGES AND BEST PRACTICE APPROACHES TO DEALING WITH THEM

Having the above highlight about how ICT is implemented and used now let's proceed to the challenges and implementation procedures. We argue that the following are the major challenges that hinder or lead to failure in the integration of ICT in organizations in the developing countries. Best practice approaches given for addressing each of the challenges.

4.1. LACK OF AWARENESS AND MINDSET

This is by far the greatest barrier, and it is the first one that must be dealt with before an organization can start moving forward. There tends to be some vague knowledge about ICT, interpreted as simply an advanced technology that requires a lot of expertise, a lot of money, and very advanced skills. It is not appreciated as a means of creating efficiency and cost-effectiveness.
Lack of awareness is indicated by one common answer: "It is too expensive, we cannot afford it". This ranges from the failure to purchase a computer of less than $1,000 to an integrated information system for a small organization costing $30,000. The same organization will, without hesitation, buy a four-wheel off-roader at $50,000 plus for the chief executive.
Lack of awareness goes along with mindset: "As it was, it is now, and evermore will be ". This is used lightly, but it cannot be put better. People tend to be stuck to the old ways of doing things. It is not uncommon to find an office where there is the standard secretary with a computer, and the "boss" with an even better computer – this later largely for show. The boss still calls in the secretary for dictation. The secretary still brings a printed draft for hand correction before the

final copy for signature is printed out. The secretary prints out the emails and puts them in the in-tray. They are transferred to the pending tray and, after about three weeks, the boss gets to them and calls in the secretary to dictate a reply.

The middle level and junior employees are not empowered to take decisions, even if they now have access to all the information and indeed have the capacity take the decisions. The person at the top takes all decisions – all other employees are there to simply push paper with recommendations up the decision pyramid. A long line of people is always to be found at the office of the boss – after all that is where decisions are taken. The pending paper work takes even longer, because the boss is engaged with people all the time. It is a sign of importance and a demonstration of how busy one is to have long lines of people waiting and huge piles of files on the desk. This, unfortunately, does typify many organizations, especially government, in developing countries.

The awareness and mindset problem in organizations is a four generation challenge, each of which requires a somewhat different approach (the age ranges below have overlaps):

The chief executive officers, ranging from 50 – 60 years are the biggest and most critical challenge. They grew up with the old methods, and yet they determine the direction and budgets of organizations. They have excellent understanding of organizational culture and dynamics as well as direction. They have the conceptual ability to think far and deep, looking at the organization as a whole. This is where the initial emphasis needs to be put.

The senior executives, ranging from 40 – 50 years. These tend to be more ICT aware while possessing many or all of the abilities of the chief executives, but they are also generally conservative and also stuck in the old ways. They make the recommendations and generally control the power (taken as influence) in organizations. This group must be on board if organizational change is to occur. It is also in this group that the necessary champions of change in the organization will be found – those people who combine the senior executive organizational knowledge and influence with a pioneering spirit and passion. The champions must be comfortable in dealing with both the highest and the lowest levels in the organization.

The junior executives, ranging from 30 – 40 years. This is the dynamic group that, if brought on board, will ensure things are actually done. They understand the organization, have reasonable people skills, and link easily to the youngest generation. They are comparatively easy to bring on board.

The young employees, ranging from 20 – 30 years. These really know it all, and will have a lot of bright ideas. They unfortunately have neither authority nor power. They also lack full knowledge of organizational culture as well as people skills. They tend to be very short on conceptual skills – and unfortunately most organizations do not have entrenched programs for developing them. Any organization will benefit greatly by giving them ear and free reign in most technical aspects, and helping them to develop their conceptual and people skills, but they still tend to be largely back room.

A key to addressing awareness and mindset is full involvement in the process, and getting key decision makers to visit other institutions, preferably within the same economic belt, where change has occurred and where benefits can be seen. More importantly, the proposed integration of ICT services and systems in the organization must be seen to be responding to real needs within the organization, rather than simply following a fad. Formally organized awareness workshops with demonstrations also help a lot in addressing awareness and mindset problems.

4.2. LACK OF TOP-LEVEL COMMITMENT

Major organizational transformation, like that inevitable when ICT is integrated in organizational functions, requires the ongoing commitment and involvement of the Chief Executive and her team. It will not happen otherwise, and we draw from our experience with various organizations to make this a categorical statement: We have seen real change and progress where there has been top-level commitment, and lack of progress and moving in circles where there is none. A committed chief executive will be able to cut through the bureaucratic red tape that will inevitably be thrown up in the face of any major organizational change.

This incidentally extends to countries: unless and until the executive head of government is dedicated to the change, it will not happen, and resources will be uselessly dissipated.

Convincing a chief executive officer needs to be addressed through the demonstration of real need, and visits to other organization. No real progress in ICT integration will be achieved unless and until either the Chief Executive changes, or is changed.

4.3. DEFINING THE ROLE OF ICT AS ONE OF THE TOOLS RATHER THAN THE PANACEA FOR ORGANISATIONAL TRANSFORMATION

ICT is not about technology, but about organizational transformation. The organization,and especially ICT professionals, need to understand this. If one is going to put in a newset of furniture, one should also maybe put in new carpet, a touch of paint, and change the curtains. Some of the paintings might have to go or be relocated to give a wholesome living area. Integration of ICT in an organization is like major surgery on an individual: it must be preceded by a full medical examination and an understanding of the medical history. Other interventions are likely to be necessary before major surgery.

ICT creates an opportunity for change. All the challenges of the organization need to be identified, and those challenges that will be responsive to the use of ICT can then be so approached. Such use must go hand in hand with other measures that will ensure organizational transformation.

It is part of the creation of ownership to get stakeholder groups to think through the shortcomings of the organization, and recommend where ICT can be taken on board as part of a complete package of organizational transformation.

4.4. MAKING ICT RESPONSIVE TO THE ORGANIZATIONAL VISION AND MISSION

ICT must never set the direction of the organization. The direction is defined by theorganizationalvision, mission and strategic priorities. ICT is therefore only relevant in so far as it is responsive to these. It is an observed fact that in many organizations, even now, there is only some vague conception of what the organization is about, without a clear and stakeholder owned definition of vision, mission and strategic objectives. Where this is the case, these must be addressed first.

4.5. DEVELOPING A SYSTEMIC METHOD OF IMPLEMENTATION

Integration of ICT in an organization's functions is a complex process. It therefore needs to be fully conceptualized and defined before implementation to avoid dissipation of resources through implementation of unrelated or uncoordinated projects.

The starting point needs to be quantified. It is the start of a major journey for the organization, and clear stock needs to be taken of the entire organization and the local environment. What is the extent of physical infrastructure? How many people in the different departments? For a university: How many students? What is the projected growth? What are the ICT services, systems and infrastructure already in place? What are the general and expert ICT skill levels in the organization? To what extent can the local environment support the organization in its ICT plans? Such taking stock also provides a baseline against which progress can be assessed later.

The organizational ICT policy needs to be defined and agreed. This sets the direction, functions, and boundaries as well as targets of ICT in the organization. It provides a framework for the development and implementation of specific projects aimed at increasing efficiency and cost-effectiveness.

In developing the policy, the core business of the organization as well as the main customers of the organization must take center stage: in a competitive environment, this is the only approach that will ensure that ICT services and systems give the organization a competitive edge. The support functions are then considered, including decisions about when these might be better outsourced.

In a university, for example, the core business processes are learning and research. Finance and human resource management are support functions. The main customer is the student. All policy developed must therefore be taken through the litmus test question: "Is it responsive to student interests as well as the learning and research functions of the university?" The same question is used in setting priorities in the implementation master plan.

Major ICT projects are very demanding on organizational resources, both human and financial. Added to the need to bring people on board, phased implementation is normally inevitable. The implementation master plan details the related sub-projects that must be implemented to deliver the contribution

of ICT to the achievement of the organizational vision and mission. It prioritizes and gives the costs the projects as well as the human resource requirements and the timeline.

A well-defined and owned ICT policy and master plan is a pre-requisite to successful mobilization of funds, both internally and externally, for implementation.

4.6. CREATING OWNERSHIP

Successful implementation of ICT services and systems involves literally all employees and customers of the organization. It is therefore critical that they own the policy and the plan, otherwise organizational inertia and deliberate obstruction will lead to failure.

The process of ICT policy planning is therefore as important as the output. Organization-wide consultations are time consuming, but they are a must if success is to be achieved. Stakeholders must be involved in the identification of the organizational challenges, and in proposing areas where ICT will be useful. They must contribute to and own the policy. They must agree on the projects to be implemented, including their role therein.

ICT creates fear, especially the fear of job loss. The policy and master plan must therefore reassure employees by catering for training and retraining and opening up new opportunities for them. They must be able to see computers as tools rather than as competitors for their jobs. They need to recognize that they are part of the information systems.

Creating ownership calls for a process of iteration in developing the policy: it needs to be referred to the same forum up to the final version for full acceptability.

A key issue in policy development and creating ownership is that this process must not be left to the ICT experts: they only give guidance, and are the mechanics and drivers who make sure the engine is working properly. The driver or the mechanic cannot tell the owner of the vehicle where it should go. This also becomes a challenge to the ICT professionals who may be hired to work as consultants for the process: they must have the fine judgment to know when to give guidance without taking over the process. The main role of the consultant is empowering the owners to think for the organization.

A related challenge is getting stakeholders in an organization to think for the organization, rather than the natural tendency of considering the interests of their particular departments: This is taking "the forty thousand foot view" of the organization. If this is not achieved, the policy planning process will generate controversy instead of a coordinated vision.

4.7. SUSTAINABILITY

Many organizations in developing countries tend to have the "head in the sand" approach to the challenge of sustainability. It is recognized as an issue, but there is some inherent assumption of faith that someone else will worry about the costs. It is important that the policy addresses the specifics of how sufficient funding will be raised to sustain services and systems.

The key recurrent cost elements that should be considered include: Cost of bandwidth (very high especially in Africa). Cost of maintenance of equipment and applications. Recurrent cost of software licenses (applications for the main information systems, specialized applications, database platforms, and desktop applications). Cost of replacement of equipment: a computer bought today must be replaced in three to five years time. Emoluments for ICT professionals – generally at levels that are likely to be higher than average because of competition for the same human resource by the private sector.

Issues of sustainability will impact on other decisions, like whether or not to use freeware and to develop internal capacity for software development (the policy on make or buy). It also impacts on the decisions of whether or not to outsource information resource management services.

A good guiding principle is that while development partners can be asked to support the initial capital costs, they should never be asked to support recurrent costs, unless it is in the very short term.

4.8. INFORMATION RESOURCE MANAGEMENT

Information resource management (IRM) is a relatively new professional area in ICT. Itfocuses on assuring availability and reliability of ICT services and systems while containing the overall costs that would otherwise escalate out of control. Technologically developed countries face this challenge, and it is even more critical in developing countries. ICT professionals are currently on high demand and are very mobile: consideration must be given to the minimum required staffing skills mixes and numbers.

Means of motivation (not the salary) must be well thought out. The age profile is also important – the younger generation (twenties to early thirties) will generally do a better job on the hard side of information resource management. Where the organization is an academic institution, full use should be made of students who are able, and also enjoy, running many of the services and at a very reasonable cost.

In developing countries where computer skills and awareness are limited, the IRM staff needs to develop people, public relations, and conceptual skills to a higher level than in developed countries. The IRM leaders need to combine the normal IRM leadership skills with a high level of organizational knowledge, conceptual ability, and a pioneering spirit.

4.9. APPRECIATING CRITICAL STAGES IN INFORMATION SYSTEMS IMPLEMENTATION

Information systems (IS) that sit on top of the infrastructure are the platform for creating organizational efficiency gains from ICT investment in the organizations. They also pose the biggest challenge and are the most likely area of failure. Many of the hurdles in IS implementation arise from the fact that people are the most critical part thereof. What people in the organization think must be taken on board: in implementing information systems, perception is often more important than reality.

The following two stages are critical for the successful implementation of IS, but they are unfortunately often mishandled.

4.9.1. MAKING REQUIREMENTS STATEMENTS

Requirements statements stipulate what the information systems should be able to do. They eventually lead to the Request for Proposals document.

The first challenge here is that many organizations think that these should be developed by professionals (consultants) to get the job done quickly. Many IS consultants unfortunately also support this approach. This is a recipe for IS failure. It is very important for ownership and success that it is the people who work in the organization who should be guided in generating the requirements statements. This leads to the second challenge: in generating requirements statements, people tend to state what they do as opposed to what should be done. A learning cycle is necessary and must be allowed for in the implementation timeline.

A related challenge arises from the fact that most organizations have over time grouped departments for administrative convenience, rather than around functions. People will insist on all departmental functions as functional requirements for the application.

4.9.2. SYSTEMS ANALYSIS AND BUSINESS PROCESS REDESIGN

This is probably the most challenging area. It requires a mindset change to accept new ways of achieving the same output from the same input, to accept the collapsing of the decision making pyramid. The redesign process and collapsing the decision making pyramid necessarily leaves out some tasks and offices: it is a threat to job security. It is easy to end up designing processes around people rather than staffing processes with people. The inevitable outcome is that in an organization that has been structurally static for a long time, systems analysis and business process redesign must necessarily lead to organizational restructuring – anathema to most workers.

Systems analysis and business process redesign must however be carried out regardless: Computerization of poor methods of work will only lead to faster failure of the organization. It is however important that a parallel process of creating new opportunities for workers through training and retraining must be part of the overall plan so that the process does not lead to poor output or destroy ownership.

4.10. DEVELOPING THE ORGANIZATIONAL INFORMATION POLICY

The organizational information policy is at a higher level than the ICT policy. It is good to consider it as a pre-requisite or at the worst a co-requisite, of organization wide implementation of ICT services and systems.

The bringing of corporate data and information on line will bring on line a whole range of new access points, with no defined rights and obligations. In a university, students, for example, will have access to their academic record at all times, as will staff to their personal files. The procedures, rights, obligations, exclusions, and sanctions of such access all need to be defined.

One of the key aspects of the ubiquitous availability of information is the assurance of its integrity, and prevention of abuse of access. This requires that the organization clearly defines the rights, privileges, obligations and sanctions that relate to the high levels of:

- ❖ Access
- ❖ Privacy
- ❖ Intellectual property

It is also necessary to define at a lower level the policies and procedures that relate to: Policy management

Ownership of different categories of data and information

- ✓ Processes and procedures
- ✓ Assurance
- ✓ Records and Archives

Without an organizational information policy, the lower level requirements of security and assurance of integrity will be ad hoc, inconsistent, and prone to failure.

5. CONCLUSION

This paper has discussed, through a down to earth and practical approach, what the author consider the key challenges of integrating ICT in organizations in the scenario of most developing countries.

While funding constraints are acknowledged, it is the conviction of the author that in the current international environment, a good plan will get the necessary support, provided there is clear provision for internal funding to support recurrent costs and therefore sustain the initiative.

The best practices given should not be interpreted as prescriptive: The best approach in each case must be tailored by the staff of the organization (not external consultants) to the prevailing conditions and culture of the organization. This is the challenge we leave to organizations of all kinds in developing countries: *Develop your own capacity*.

I consider that ICT facilities can be viewed on the following level hierarchy: ICT infrastructure, basic software, and dedicated information systems. And I always feel pity seeing organizations only at the second level of basic software(not even using that effectively), and talk and think that they have satisfactory ICT systems, only to find that they don't even have proper understanding of appropriate ICT solutions and dedicated information systems.

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AVAILABILITY OF POWER SUPPLY FOR INDUSTRIAL DEVELOPMENT IN NIGERIA: A CASE STUDY OF ODOGBE FARMS LTD.

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ABSTRACT

This research paper looked into the availability of power supply for industrial development in Nigeria economic. Odogbe Farms Ltd has multiple lines of production and operates a 24 hours production schedule; even during down time period. Data were collated from power house log book quarterly on the running hours of generator as well as when the public electricity utility is available for a period of seven quarters. It was discovered that for every one hour production cost on generator is above 51% of what it would have cost if it were to be on PHCN Conclusively, if profit margin is to be made constant, consumers will have to pay more culminating into impoverishment of the populace. Likewise public power supply is cheaper for production compared to the use of generators.

KEYWORDS
Power supply, Power outage, Profit margin, Transmission, Distribution.

INTRODUCTION

The technological and industrial development in any country is highly dependent on reliable electricity supply to industries and the public at large. In Nigeria, the electricity authority known as Power Holding Company of Nigeria (PHCN) is unable to supply the required amount of energy needed to industries which has lead to low production in industries and high cost of producing semi-finished and finished goods (Mukoser, 1973).

Some of the technical causes of power outages in power holding company of Nigeria are poor funding for purposes like major repairs, over haul, rehabilitation, mandatory maintenance of facilities, development and construction of new power plants and expansion of power transmission facilities (NEPA Review, 2002) and (NEPA Review, 1988).

Heavily over loaded power and distribution transformers, switches and auxiliary equipment have resulted to loss of power which often over-heat switches and subsequently burst into flames.

Poor forecast of the future load demand of an area and lack of reliable information on the actual power requirements of projects requiring electric power are constraints to effective planning. Also inability of supply to meet power demand of consumers has resulted to load shedding for even spread of the supply. Unforeseen interruptions in form of surges due to lightening strike on power lines; cracks on conductor support and insulators that usually result in flash over, are some of the problems (Usifo, 1998).

Vandalisation of power lines and equipment by unknown persons often lead to power outage as the vandalized lines can no longer feed the consumers and in most cases vandalisation even lead to total blackout of towns and cities. Damages are usually done to electric poles and other supply equipment by vehicles and road construction workers and short circuit lines by trees which fall on transmission lines and eventually collapse wooden poles eaten by termites, rain storm, fire or wind (Niger Power Review, 1999). The problems of power distribution are enormous because it cannot be totally explored.

AN OVERVIEW OF THE NIGERIA POWER SYSTEM

The yearn for reliable and stable power supply was enough reasons for decree No. 24 of 1st April, 1972 which established the National Electricity Power Authority Co-operation of Nigeria (ECN) and the Niger Dam Authority and Economic System of Electricity supply from all the nooks and crannies of the country.

At the inception of Nigeria Electric Power Authority (NEPA) in 1972 it operated through the existing four major power stations namely Delta thermal power station, Ijora thermal plant station, Afam thermal power station and Kanji Hydro power station, Interconnected through the nation and serving over two million Nigerians as at then (NEPA Review 1988, 2002).

As at 1998, the total number of power stations had increased to seven comprising Egbin, Delta, Sapele, Afam thermal power station, Kanji, Shiroro and Jebba hydro power stations with the total installed capacity of 5958 MW as against the minimum peak demand for the sustainability of the grid of 2446 MW (Niger Power Review 1999).

The Nigeria National Grid is a very large one comprising large numbers of distribution and transmission transformers that interconnect between power stations and consumers. The National Grid comprises of seven (7) power stations, twenty eight (28) major transmission stations, in 1998, the length of 330KV lines connecting the substation was 500Km while that of 132KV lines was 600Km.

The supply in Nigeria metamorphosed through various stages at various voltage level before getting to the consumers. The generated power is transmitted through the National Grid at 330KV to the National Control centers which interconnects and monitors the operations of the various power stations. This is achieved by connecting different types of relay, switches, communication and monitoring devices for smooth system running of the generation devices the National Control Centre (NCC) transmits at 132KV through power transformer and seconding transmission lines to various parts of the country before further stepping down the primary distribution system 33/0.415KV to the general consumers in line and phase values of 415V and 240V respectively. This is also achieved through 33/11KV step down transformer directly before distribution to the consumers through 11/0.415KV transformer.

In an attempt to unbound the Power Authority, the Government divided it into eighteen (18) companies and given a corporate name which is now Power Holding Company of Nigeria (PHCN). PHCN presently faces a lot of challenges in the areas of outages (planned or unplanned) as a result of high load demand, aging of equipment and environmental factors which affect power industries in the country.

METHODOLOGY

The methodology employed was to collate data from ODOGBE FARMS LTD using their power house/generator log book/reports on power outages from PHCN, and supply from generators, alongside with direct visit to PHCN located in Benin City (Irrua substation) and interaction was made with technical staff of the industries and PHCN to elicit information, ODOGBE FARMS LTD operate multiple line of production and its production is 24 hours of the day, when production activity is hindered as a result of breakdown of equipment the redundant lines are used in the production activity. The study spanned a period of twenty one months. Cognizance was given to both peak seasons and of peak reasons of power generation.

TABLE 1: PHCN AND GENERATOR COLLATED DATA FROM ODOGBE FARMS LTD. LOG BOOK (2011)

S/N	Month	PHCN supply (Hrs)	Generator supply (Hrs)	% of PHCN supply per month	% of Generator supply per month	Liters of Diesel consumed per month
1	Jan	338	400	7.85	11.53	35,000
2	Feb	430	224	9.99	6.46	19,600
3	March	402	332	9.34	9.57	29,000
4	April	510	193	11.84	5.56	16,887.5
5	May	220	300	5.11	8.56	26,250
6	June	402	217	9.34	6.26	18,987
7	July	409	252	9.50	7.26	22,050
8	Aug	349	198	8.10	5.71	17,325
9	Sept	402	218	9.34	6.28	19,075
10	Oct	225	390	5.23	11.24	34,125
11	Nov	283	385	6.57	11.10	33,687
12	Dec	336	360	7.80	10.38	31,500
Total		4306	3469			303,537

Source: From ODOGBE FARMS LTD Generator Log book (2011)

FIG.1 SHOWS THE PERCENTAGE OF PHCN AND GENERATOR SUPPLY FOR THE YEAR 2011 AS REFLECTED ON TABLE 1

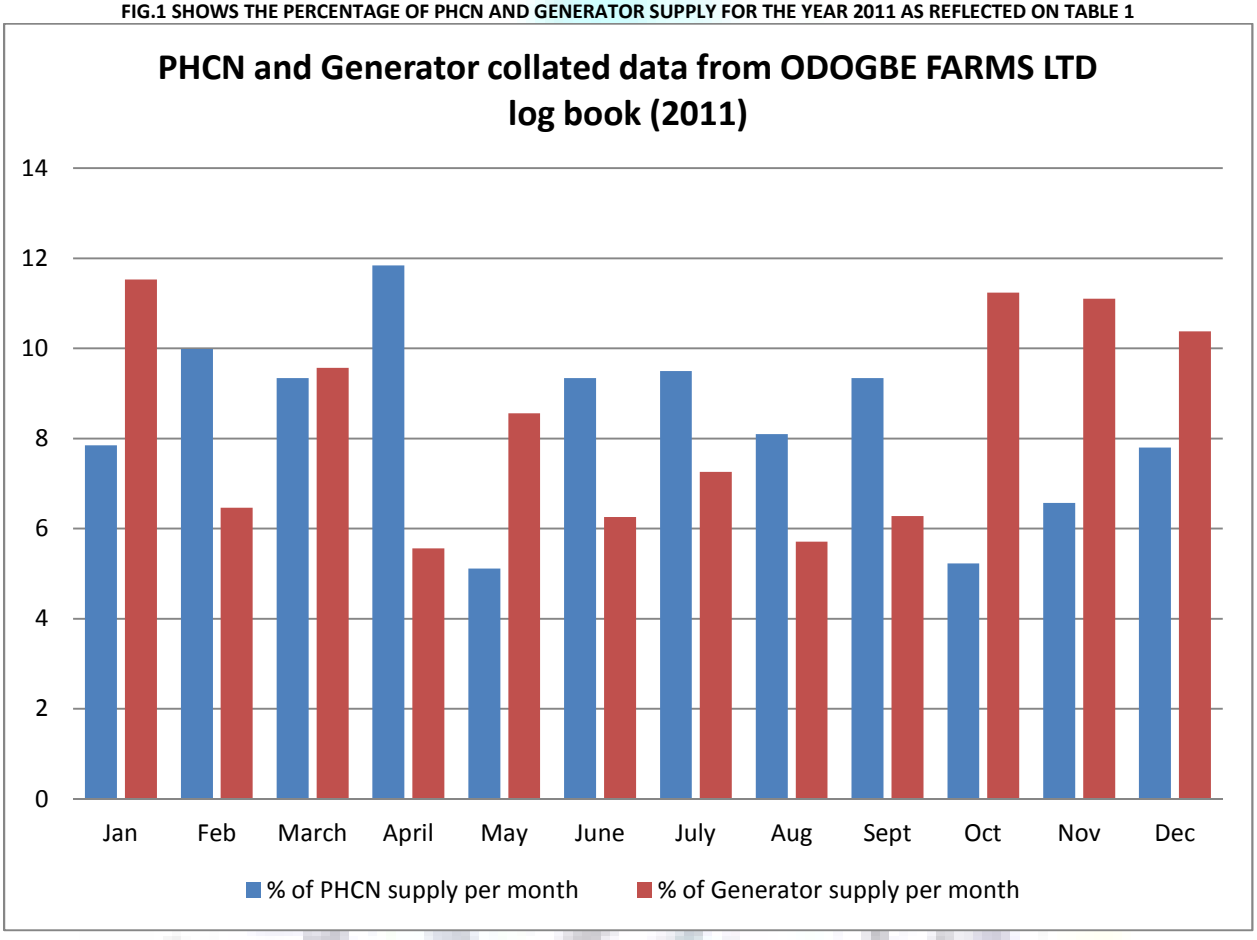
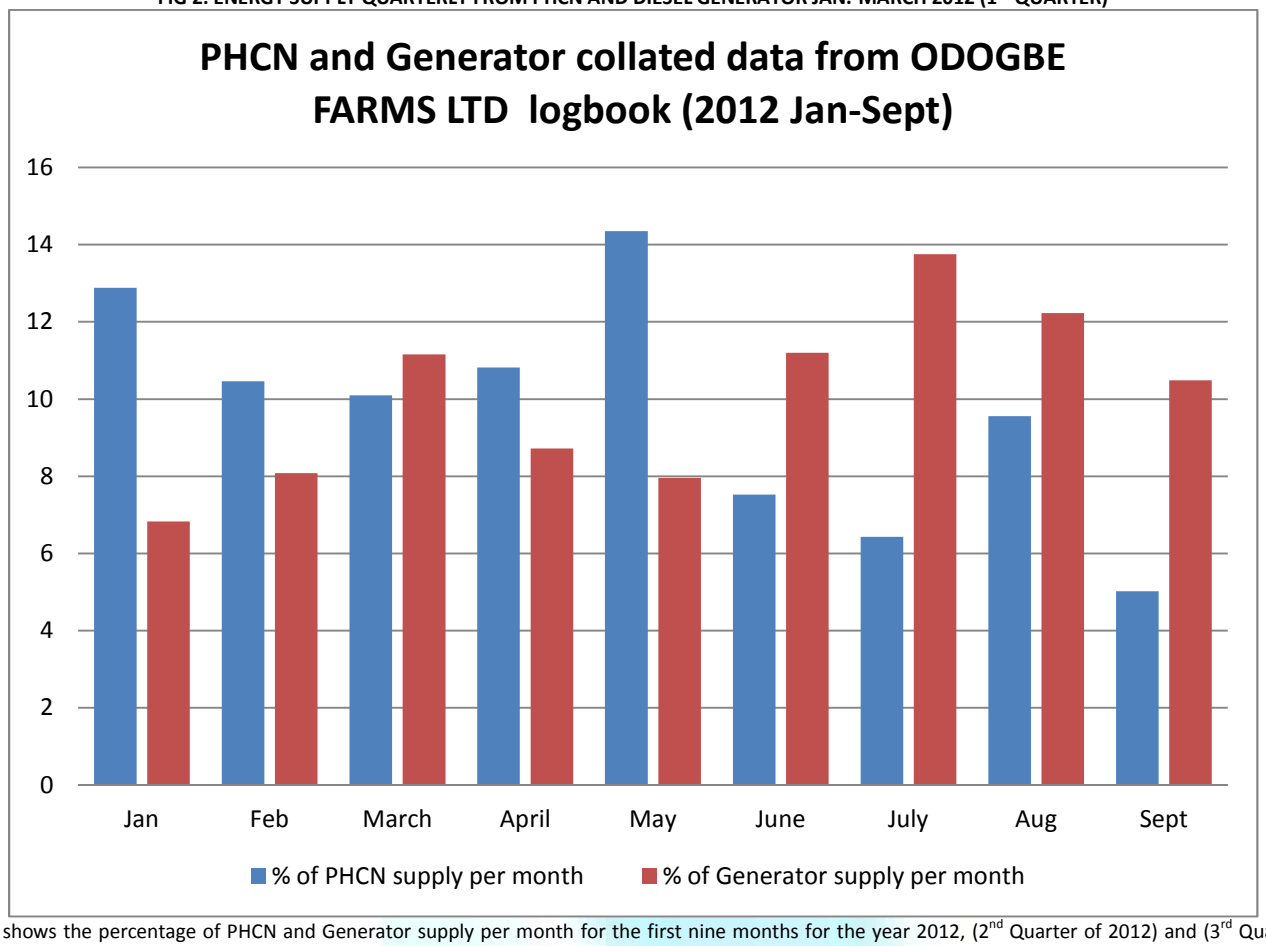


TABLE 2: PHCN AND GENERATOR COLLATED DATA FROM ODOGBE FARMS LTD. LOGBOOK (2012 JAN-SEPT)

S/N	Month	PHCN supply (Hrs)	Generator supply (Hrs)	% of PHCN supply per month	% of Generator supply per month	Litres of Diesel consumed per month
1	Jan	431	224	12.88	6.83	19,600
2	Feb	350	265	10.46	8.08	23,187.5
3	March	338	366	10.10	11.16	32,025
4	April	362	286	10.82	8.72	25,025
5	May	480	261	14.35	7.96	22,835.5
6	June	252	367	7.53	11.20	32,112.5
7	July	215	451	6.43	13.75	39,462.5
8	Aug	320	401	9.56	12.23	35,087.5
9	Sept	168	344	5.02	10.49	29,225
Total		2916	2965			258,562.5

Source: ODOGBE FARMS LTD generator log book (2012)

FIG 2: ENERGY SUPPLY QUARTERLY FROM PHCN AND DIESEL GENERATOR JAN.-MARCH 2012 (1ST QUARTER)



Figs. 2, shows the percentage of PHCN and Generator supply per month for the first nine months for the year 2012, (2nd Quarter of 2012) and (3rd Quarter of 2012)

DISCUSSION OF RESULTS

In other to arrive at the cost of operating the industry on diesel generator compared to public utility supply,using the equation

$X_p = T_r \times D_{lt} \times N_{Dlt}$ 1

Where X_p = cost of operation in the industry in naira

T_r = Generator running time in hours

D_{lt} = Volume of diesel consumed per hour in litres

N_{Dlt} = No of litres of diesel used for operation per hour.

In the same vein

$C_h = \sum N_{Dlt} / \sum T_r$ (per month).....2

= 87.5 litres per hour

Where

C_h = Diesel consumption for every hour of operation

Using the prevailing cost of diesel per litre @ #150.00

Then the cost of production for just one hour in the industry amounts to

87.5 X 150 = **#13,125.00 per hour of operation with generator**

Further investigation revealed that for a period of 338 hours of PHCN supply the electricity bill was N2,024,592.96

i.e. 338 hrs = N2,024,592.96

$$= \frac{N2,024,592.96}{338}$$

= **N5,989.29 per hour of operation with PHCN supply**

Thus from the analysis above the industry spends more on production cost when generator is utilized as the source of power compared to PHCN supply.

CONCLUSION

This paper analyses power outage in an industrial layout using micro soft excel for the plotting of graphs, the study shows that PHCN supply is grossly inadequate for the smooth operations of the industry as reflected in the number of hours of supply; added to this would have been a reduced cost of production at the ODOGBE FARMS LTD, leading to cheap and affordable products from the industry.

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A ROLE OF SMALL INDUSTRIAL DEVELOPMENT BANK IN THE DEVELOPMENT OF SMALL SCALE INDUSTRIES AT BANGALORE: AN EMPIRICAL STUDY

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ABSTRACT

The Small Industrial Development bank of India (SIDBI) was setup in 1990 under the SIDBI Act 1990, the main objective of SIDBI has been to work as a principal financial institution for the promotion, financing and development of industries in the small-scale sectors. In order to accelerate industrial development and giving more emphasis on balanced regional industrial development SIDBI has been setup to help industrial sectors. This study has been undertaken to understand how SIDBI playing an important role in the development of small scale industries, problem faced by SIDBI in providing funds to Small Scale Industries (SSI) and also how the Small Scale Industries has been benefited by SIDBI. This study is based on secondary datacollected from official websites with reference to funds received by Small Scale Industries from SIDBI of last five years, in this study we also tried to understand the correlation between funds provided by SIDBI and the level of development of Small Scale Industries, to understand the trend in the funds provided to SSI's and the development in SSI's.

KEYWORDS
SIDBI,SCI's Funds, Financial Institutions, Bank funds, loan.

1. INTRODUCTION

Small Industries Development Bank of India (SIDBI), set up on April 2, 1990 under an Act of Indian Parliament, is the Principal Financial Institution for the Promotion, Financing and Development of the Micro, Small and Medium Enterprise (MSME) sector and for Co-ordination of the functions of the institutions engaged in similar activities.

The business domain of SIDBI consists of Micro, Small and Medium Enterprises (MSMEs), which contribute significantly to the national economy in terms of production, employment and exports. MSME sector is an important pillar of Indian economy as it contributes greatly to the growth of Indian economy with a vast network of around 3 crore units, creating employment of about 7 crore, manufacturing more than 6,000 products, contributing about 45% to manufacturing output and about 40% of exports, directly and indirectly. In addition, SIDBI's assistance also flows to the service sector including transport, health care, tourism sectors etc.

SIDBI retained its position in the top 30 Development Banks of the World in the ranking of The Banker, London. As per the May 2001 issue of The Banker, London, SIDBI ranked 25th both in terms of Capital and Assets.

2. OBJECTIVES OF THE STUDY

Four basic objectives are set out in the SIDBI Charter. They are:

- Financing
- Promotion
- Development
- Co-ordination

For orderly growth of industry in the small scale sector; The Charter has provided SIDBI considerable flexibility in adopting appropriate operational strategies to meet these objectives. The activities of SIDBI, as they have evolved over the period of time, now meet almost all the requirements of small scale industries which fall into a wide spectrum constituting modern and technologically superior units at one end and traditional units at the other.

The main objective of this study is to focused on Financing aspect of SIDBI, Finance aspect includes the study based on the total amount of fund provided/Invested to Small Scale Industries at Bangalore from 1982-92

3. METHODOLOGY

- **Source:** The secondary data was collected from the website of SIDBI & www.ces.iisc.ernet.in
- ***Limitations of the study:*** The study is confined to the information provided in the SEDBI website and www.ces.iisc.ernet.in

3.1 TOOLS APPLIED FOR ANALYSIS

The data collected were carefully analyzed and processed. In this research the following test have been used:

a. Chi Square Test
b. Trend Analysis
c. ANOVA (One way)

3.2 ANALYSIS & INTERPRETATION

TABLE 3.2.1 : NUMBER OF UNITS & INVESTMENT IN SSI AT BANGALORE FROM 1982-92

Year	Units	Investment (Lakhs)	% Inc/Decrease in Units	% Inc/Decrease in Investment
1982-83	11368	14381.78	0	0
1983-84	13138	15589.10	15.57	8.39
1984-85	13127	15248.40	-0.08	-2.19
1985-86	15254	16942.11	16.20	11.11
1986-87	17185	19021.37	12.66	12.27
1987-88	18872	21106.14	9.82	10.96
1988-89	20520	23851.00	8.73	13.01
1989-90	22402	26783.42	9.17	12.29
1990-91	24303	30583.86	8.49	14.19
1991-92	27691	37102.85	13.94	21.32

Source : http://www.ces.iisc.ernet.in/energy/paper/energy_utilisation/industries.htm

a) CHI-SQUARE TEST

H_0 : There is no significance difference between the number of SCI established and Amount of investment made

H_1 : There is a significance difference between the number of SCI established and Amount of investment made

Degree of freedom=10

Level of significance (α) = 0.05

Interpretation:

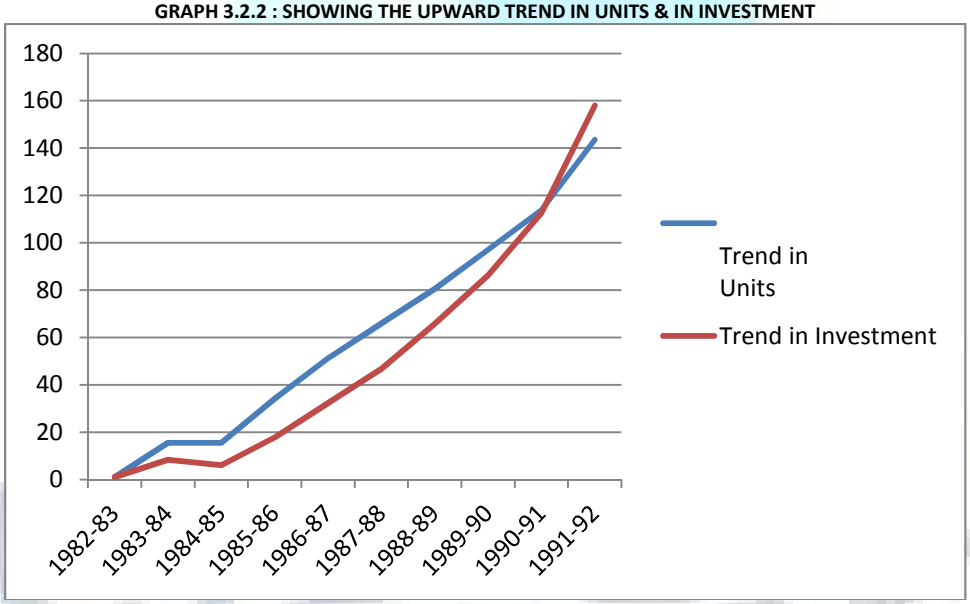
Applied chi-square test using STATTEXT software it is found that chi-square value is 417.57 which is more than the table value hence H_0 is rejected hence it is concluded that There is a significance difference between the number of SCI established and Amount of investment made

b) TREND ANALYSIS

TABLE 3.2.2 : TABLE SHOWING THE UPWARD TREND IN UNITS & IN INVESTMENT

Year	Trend in Units	Trend in Investment
1982-83	1.00	1.00
1983-84	15.57002	8.39
1984-85	15.47326	6.03
1985-86	34.18367	17.80
1986-87	51.16995	32.26
1987-88	66.00985	46.76
1988-89	80.50669	65.84
1989-90	97.06193	86.23
1990-91	113.7843	112.66
1991-92	143.5873	157.99

GRAPH 3.2.2 : SHOWING THE UPWARD TREND IN UNITS & IN INVESTMENT



Interpretation

In the above table units and investment of 1982-83 is taken a base year for analyzing trend and it is found that there a upward trend in both the number units installed and the invest made.

c) ANOVA TEST

BASIC STATISTICS

TABLE 3.2.3 : TABLE SHOWING THE MEAN , SD AND SE

SAMPLE	N	MEAN	SD	SE
1	2	12874.89	2131.06	1506.89
2	2	14363.55	1733.19	1225.55
3	2	14187.70	1500.06	1060.70
4	2	16098.06	1193.67	844.06
5	2	18103.19	1298.51	918.19
6	2	19989.07	1579.78	1117.07
7	2	22185.50	2355.37	1665.50
8	2	24592.71	3098.13	2190.71
9	2	27443.43	4441.24	3140.43
10	2	32396.93	6655.18	4705.93

OVERALL MEAN = 404470.03 / 20 = 20223.50

ONE-WAY ANALYSIS OF VARIANCE (ANOVA)

H0: NO DIFFERENCES BETWEEEN THE MEANS OF THE 10 GROUPS

HA: AT LEAST ONE OF THE MEANS IS NOT THE SAME AS OTHER MEANS

(ALPHA = 0.05)

SOURCE	SS	DF	MS	F	P(>F)
BETWEEN TR	739202119.21	9	82133568.80	8.69	0.001
WITHIN TR	94564487.86	10	9456448.79		
TOTAL	833766607.08	19			

Interpretation

Applied chi-square test using STATTEXT software it is found that P>F, H_0 is rejected hence it is concluded that AT LEAST ONE OF THE MEANS IS NOT THE SAME AS OTHER MEANS , REJECTED H0 AT ALPHA = 0.05

FINDINGS

- The spectrum of industries ranges from unorganized traditional sectors and modern small-scale sectors to large and medium scale industries.
- The traditional sector and small scale sector provides maximum employment (413.39 lakhs in 1989-90) and constitutes an important component of the economy.
- In terms of value added it is estimated to contribute 50% of the value added in the manufacturing sector.
- The uniform distribution and growth in this sector besides resulting in preponderance of self-employment and under dispersal of industrial and economic activities, ensures maximum utilization of both human and material resources.
- The economics of production is important in small-scale industries.
- Energy consumption plays a key and dominant role in the production economics of these industries.
- The small-scale industries sector plays an important role in the industrial economy of the state. It contributes substantially to the industrial production and in generating employment. These industries are dispersed all over the state; however there is disparity in regional distribution.
- The growth of small-scale industries in Karnataka since 1969-70; The growth in last decade is phenomenal as the number of industries has increased from 37,148 to 129,915 with a percentage annual growth rate of 15.01 % and percentage annual growth in manpower employed of 13.58%.
- The cumulative information of SSI's from 1982-83 to 1991-92 for each district. It is evident that the Bangalore district with 27,691 leads all other districts.
- The increase in the number of industries in the decade is given in.
- Belgaum has annual average growth of 18.61 % while for Bangalore it is 9.31 %.
- Information regarding the number of industries, investment, and manpower employed in the SSI sector at the end of financial year 1991-92.
- The percent number of units varies from a low value of 1.15% (for Kolar District) to a high value of 21.97% (for Bangalore district).

CONCLUSION

This study has made me to understand how different small sectors are benefited by SIDCS and also in the development in the SSI in Bangalore. But I found from the above analysis that there SIDCS could have done better in the development of SSI. SIDCS could have invested scientifically in Small Scale Industries by considering some of the factors like Inflation, demand for the product, need of the society etc.

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MVA AND EVA IN TOP TEN SOFTWARE COMPANIES IN INDIA: ANOVA

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ABSTRACT

Today India is home to some of the finest software companies in the world. The software companies in India are reputed across the globe for their efficient IT and business related solutions. With the huge success of the software companies in India, the Indian software industry in turn has become successful in making in the global arena. This industry has been instrumental in driving the economy of the nation on to a rapid growth curve. As per the study of NASSCOM the IT/TES industry recorded a growth of 4 – 7 percent in the year 2010. The IT/ITes sector has lead to employment opportunities, both direct and indirect, of nearly 2.8 million and around 8.9 million (direct and indirect) by 2015 and to around 30 million by 2030. The software industry has a strong future regardless of whether its products or as a service, or as a component or in packaged form. The software industry is going through a rapid and significant transition. India's domination in the IT and software sector and its growing reputation as one of the world's best outsourcing destinations have created good basis for future prospects. The key to creating wealth is adding value. Adding value is the way that all fortunes are made. In many studies relating to EVA and MVA, the twin wealth creation measures were established. Even though in the present study, most of the companies have observed negative and low positive EVA, their MVA performance is good. This implies that the wealth creation has the direct influence on market forces.

KEYWORDS
MVA, EVA, software companies.

1.1 INTRODUCTION

Today India is home to some of the finest software companies in the world. The software companies in India are reputed across the globe for their efficient IT and business related solutions. With the huge success of the software companies in India, the Indian software industry in turn has become successful in making in the global arena. This industry has been instrumental in driving the economy of the nation on to a rapid growth curve. As per the study of NASSCOM the IT/TES industry recorded a growth of 4 – 7 percent in the year 2010.

The IT/ITes sector has lead to employment opportunities, both direct and indirect, of nearly 2.8 million and around 8.9 million (direct and indirect) by 2015 and to around 30 million by 2030. The market size of the industry is expected to rise to USD 225 billion by 2020 considering India's competitive position, growing demand for exports, Government policy support and increasing global footprint. IT/ITes industry has led India's economic growth and this sector's contribution to the national GDP has risen from 1.2 per cent in 1997 – 98 to 7.5 per cent in 2011 – 12.

1.2 STATEMENT OF THE PROBLEM

The Indian IT sector has proved to be the country's fastest growing segment, even in troubled times. The software and services industry, a major component of India's IT sector, showed significant momentum, higher than that of other industries in the country. India continued to be a compelling investment destination, as leading companies either set up shop here or enhanced their existing infrastructure. The IT services sector has witnessed tremendous growth in the last decade fuelled by an increasing number of business expansion, acquisitions and green field projects funded both with domestic and foreign private investment. Some of the services typically rendered by the IT companies include Application Development (AD), Application management (AM), consulting and testing services performed either off shore (in India) or onsite (at the client location outside India). India has become one of the most favored destinations for outsourcing and IT Enabled Services (ITES).

- How were the movements of MVA & EVA of the selected companies?
- What are the factors influencing EVA & MVA?

1.3 OBJECTIVES OF THE STUDY

To gain an insight into the problem highlighted earlier, the following objectives have been framed for the study.

- To study the significance of income and cost variables in EVA, MVA & Value Addition.
- To find out the influence of select financial variables on EVA and MVA.
- To recapitulate the key findings and suggestions.

1.4 METHODOLOGY

The methodology followed to carry out the study has been presented below:

1.4.1 SELECTION OF COMPANIES

The companies selected for the present study are;

1. Tata Consultancy Services
2. Wipro
3. Infosys tech Ltd
4. Satyam Computer Services
5. Hindustan Computers Limited
6. Tech Mahindra
7. International Business Machines
8. Patni Computer Services
9. Mphasis
10. Larsen & Turbro infotech Ltd

1.4.2 STUDY PERIOD

The study pertains to a period of ten financial years from 2002 - 2003 to 2011 - 2012.

1.4.3 SOURCES OF DATA

The study is based on secondary data. Data were obtained from capital line database available in KSR Institute of Technology, Tiruchengodu. Company profiles and additional literature were collected from magazines, newspaper and various websites.

1.4.4 SELECTION OF VARIABLES

In the present study, a number of key financial variables have been identified for the purpose of analysis and they are: EVA, MVA, Accounting profit and Value Addition. Computation of these variables has been made for a period of ten years.

1.5 LIMITATIONS OF THE STUDY

- The study covers a decade from 2002 – 2003 to 2011 – 2012. It does not consider the changes that have been taken place before and after the study period.
- The study is based on financial accounting data; it is subject to the inherent limitations of accounting and accounting practices.
- The present study is confined to top ten software companies only. All other companies are not taken into account.
- Risk free rate of return can be taken either as Interest rate of Government Bonds or Average cost of time deposits of Scheduled Commercial Banks in India. In this study, average cost of time deposits of scheduled Commercial Banks in India is taken as risk free rate of return and it has been collected from "Bank of Baroda", Thindal Branch, Thindal, Erode, Tamilnadu.

2. RESEARCH METHODOLOGY

2.1 ZENG AND PING ANALYSIS ON EVA OF TOURIST INDUSTRY

Zeng and Ping (2010) performed a study on EVA of Tourist Industry. In this study, to overcome the limitations of the traditional indicators of business performance, shareholders performance evaluation method of EVA is used. In this paper, empirical, calculating the study in 2009 listed companies in China's tourist EVA, and comprising with the traditional accounting performance evaluation, through the empirical analysis of EVA used on operating performance of China's tourist listed companies, it is concluded that it convince more force than the net profit and net operating cash flow.

2.2 BHANAWAT, SHURVEER'S STUDY OF SHAREHOLDERS' WEALTH CREATORS AND DESTROYERS IN DIFFERENT SECTORS OF INDIAN MANUFACTURING INDUSTRY

Bhanawat, Shurveer's (2011) study made an attempts to measure the shareholders' wealth in terms of Economic Value Added (EVA) for different sectors of Indian manufacturing industry. The top five wealth creator and wealth destroyer sample units have been identified on the basis of five-year average amount of EVA generated by them during 2003-04 to 2007-08. The mean EVA generated by the Indian manufacturing industry during the study period is 929.14 cr. The cement industry showed very high fluctuations in EVA generation during the study period, while the FMCG industry reported consistency in the amount of EVA generation over the five-year span. ANOVA results show that there is no significant difference in the mean values of EVA of different sectors of Indian manufacturing sector. Hence, it can be concluded that the mean value of EVA of the selected sample units represent the mean value of the Indian manufacturing industry.

3. MVA & EVA ANALYSIS OF SELECTED COMPANIES

TABLE 3.1: MVA OF TOP 10 SOFTWARE COMPANIES (RS.IN CRORES)3.1 MARKET VALUE ADDED (MVA)

Year / company name	TCS	Infosys	Wipro	IBM	Tech Mahindra	Patni computer services	L&T info tech Ltd	Satyam computer services	Mphasis	HCL
2003	54,839.94	29,903.54	25,236.68	5,528.99	15,379.32	2,278.67	63.08	3,430.95	158.06	162.79
2004	58,517.42	29,654.92	28,132.53	9,234.91	6,313.46	1,837.27	128.90	6,701.04	1,570.86	639.87
2005	65,467.40	55,705.37	42,322.97	9,720.94	6,996.60	3,301	142.28	9,824.52	1,179.18	1,739.83
2006	88,051.03	75,241.81	73,207.50	21,942.92	8,967.92	4,274.67	166.13	23,216.83	2,821.15	1,065.28
2007	112,427.5	101,110.60	72,029.34	23,201.66	16,410.68	3,155.40	1,693.68	25,471.29	3,794.98	2,682.92
2008	68,450.72	68,313.97	50,544.91	15,548.95	7,350.13	538.82	2,706.99	19,096.16	3,193.89	2,890.84
2009	39,498.72	58,039.43	23435.73	-10,761.90	1,346.77	-871.07	1,535.09	3,106.69	2,992.80	3,739.19
2010	137,803.20	128,025	86,080.97	-4125.14	7,573.42	3,717.91	2,053.85	8,594.48	10,982.57	2,749.04
2011	211,961.90	161,337.50	96,074.19	-11,743.60	5,128.70	3,399.69	2,406.98	5,574.72	5,816.71	2,063.82
2012	203,817.40	134,757	83,586.90	-15.318.70	5,731.37	3,322.55	3,087.57	6,123.05	5,086.05	1,973.78

Sources: Secondary Data

Market Value Added (MVA) is the difference between the current market value of a firm and the capital contributed by investors. If the MVA is positive, the firm has added value. If it is negative, the firm has diminished value. The amount of value added needs to be greater than the firm's investors could have achieved investing in the market portfolio, adjusted for the leverage (beta coefficient) of the firm relative to the market.

Market Value Added = Market capitalization + Net worth

Table 3.1 explains the MVA performance of selected software companies during the study period from 2002 – 2003 to 2011 – 12. The MVA values of TCS, Infosys, Wipro, Tech Mahindra, L&T info tech Ltd, Satyam Computer services, Mphasis and HCL companies are found to be positive, because the increase in market capitalization could match the networth in those years.

MVA of IBM shows a highly fluctuating trend with MVA showing negative signs in four out of ten years of the study. Though MVA performance is quite encouraging from 2003 to 2007, it is as low as Rs. 5,528.99 Crores in 2003. MVA of Patni computer services shows a highly fluctuating trend with MVA showing negative signs in one out of ten years of the study. Though MVA performance is quite encouraging from 2004 to 2006, it is as low as Rs. 538.82 Crores in 2008.

ECONOMIC VALUE ADDED (EVA)

EVA stands as a unique tool amongst most others because it includes a change against profit for the cost of the entire capital that a company employs. This helps the management in producing much more wealth for shareholders, customers and their own selves.

Economic Value Added (EVA) = Net Operating Profit After Tax - Cost of Capital Employed

Table 3.2 highlights the EVA values of TCS shows a highly fluctuating trend with EVA showing negative signs in six out of ten years of study. Though EVA performance is quite encouraging in 2011 and it is as low as 5,031.07 in 2005.

The EVA values of Infosys, Wipro, IBM, Patni computer services, L & T info tech Ltd, Mphasis and HCL companies are found to be positive, because the increase in Net operating profit after tax could match the Cost of capital employed in those years.

EVA of Tech Mahindra shows a highly fluctuating trend with EVA showing negative signs in four out of ten years of the study. Though EVA performance is quite encouraging from 2009 to 2011, it is as low as 144.66 in 2004.

EVA of Satyam computer services shows a highly fluctuating trend with EVA showing negative signs in three out of ten years of the study. Though EVA performance is quite encouraging from 2004 to 2008, it is as low as 403.47 in 2005.

TABLE 3.2: EVA OF TOP 10 SOFTWARE COMPANIES (Rs.IN CRORES)

Year / company name	TCS	Infosys	Wipro	IBM	Tech Mahindra	Patni computer services	L&T info tech Ltd	Satyam computer services	Mphasis	HCL
2003	-363.17	397.45	1,322.10	4,408.85	-373.76	113.11	1,782.82	-415.09	5,612.17	1,012.15
2004	1,089.82	857.89	1,514.98	4,518.41	144.66	168.36	1,592.27	514.85	3,442.33	1,115.79
2005	5,031.07	1,352.91	2,070.46	3,492.80	-219.75	273.65	1,352.53	403.47	7,710.68	889.89
2006	-17,448.4	1,741.29	2,393.40	101,166	-88.24	190.13	986.76	680.47	6,190.42	914.54
2007	-22,891.2	3,454.58	2,647.09	2,890.36	-224.28	211.08	945	942.84	6,146.39	970.07
2008	62,935.18	6,190.18	7,374.41	11,613.84	1,137.47	684.68	868.42	2,309.30	11,249.33	1,026.64
2009	-82,616.4	4,887.34	3,287.04	3,034.91	289.48	510.97	376.60	-8,789.76	8,957.71	1,131.08
2010	-8,815.29	5,872.49	5,880.21	7,167.15	783.98	883.49	879.89	-225.64	12,093.28	1,273.99
2011	69,867.02	7,638.95	5,575.94	11,822.14	1,274.78	1,251.25	1,039.07	804.42	11,164.19	1,531.51
2012	-33,842.64	7,969.50	5,208.15	7,010.09	374.04	839.57	551.37	861.72	13,394.27	1,654.30

Sources: Secondary data

4. ANALYSIS OF VARIANCE (ANOVA)

One-Way ANOVA procedure to test the hypothesis that the means of two or more groups are not significantly different.
One-Way ANOVA also offers:

- Group-level statistics for the dependent variable
- A test of variance equality
- A plot of group means
- Range tests, pair - wise multiple comparisons, and contrasts, to describe the nature of the group differences
- The ANOVA test is conducted between the groups (EVA, NOPAT, MVA and Value Addition) which were formed on the basis of positivity of MVA. Value Addition is computed by the following rearrangement of the income statement as in Evraert and Riahi-Belkaou (1998):
- S-B = W + I + DP + T + R
  (or)
- S-B-DP = W + I + D + T + R
- Where
- R = Retained earnings
- S = Sales revenue
- B = Bought-in material and services
- DP = Depreciation
- W = Wages
- I = Interest
- D = Dividends
- T = Taxes
- VA= Value Addition

TABLE 4.1: CALCULATION OF VALUE ADDITION OF TCS

Year	Sales	Wages	Interest	Depreciation	Dividends	Taxes	VA
2003	4,914.70	1,012.70	15.2	92.9	283.02	220.5	3,290.38
2004	6,782.82	2,678.98	8.2	118.84	438.42	1.49	3,536.89
2005	8,051.10	3,967.52	10.4	133.22	552.13	280.76	3,107.07
2006	11,230.50	5,113.96	4.49	257.38	660.56	319.45	4,874.66
2007	14,939.97	6,186.85	3.43	343.41	1,125.39	410.8	6,870.09
2008	18,533.72	6,015.19	3.42	458.78	1,370.05	457.58	10,228.70
2009	22,401.92	7,370.09	7.44	417.46	1,370.05	340.37	12,896.51
2010	23,044.45	7,882.43	9.54	469.35	3,914.43	737.89	10,030.81
2011	29,275.41	10,190.31	20.01	537.82	2,740.10	1,130.44	14,656.73
2012	38,858.54	14,100.41	16.4	688.17	4,893.04	2,260.86	16,899.66

TABLE 4.2: CALCULATION OF VALUE ADDITION OF WIPRO

Year	Sales	Wages	Interest	Depreciation	Dividends	Taxes	VA
2003	3,992.01	642.47	3	137.94	23.26	89.3	3,096.04
2004	5,134.89	864.44	3.41	151.6	675	141.27	3,299.17
2005	7,233.16	2,878.53	7.46	185.97	351.79	255.15	3,554.26
2006	10,227.12	4,279.03	2.13	292.26	712.88	286.1	4,654.72
2007	13,683.90	5,768.20	2.64	359.8	873.7	334.1	6,345.46
2008	17,492.60	7,409.10	32.6	456	876.5	406.4	8,312.00
2009	21,507.30	9,249.80	40.66	533.6	586	574.1	10,523.14
2010	22,922.00	9,062.80	12.02	579.6	880.9	790.8	11,595.88
2011	26,300.50	10,937.40	9.13	600.1	981.8	861.8	12,910.27
2012	31,682.90	13,223.70	6.65	739.5	1,475.20	1,233.50	15,004.35

TABLE 4.3: CALCULATION OF VALUE ADDITION OF INFOSYS

Year	Sales	Wages	Interest	Depreciation	Dividends	Taxes	VA
2003	3,622.69	1,677.12	518.21	188.95	178.81	199.5	860.10
2004	4,760.89	2,367.35	426.73	230.9	862.46	227.49	645.96
2005	6,859.66	3,183.25	384.02	268.22	309.8	325.3	2,389.07
2006	9,028.00	4,274.00	310.9	409	1,238.00	303	2,493.10
2007	13,149.00	6,316.00	235.84	469	649	352	5,127.16
2008	15,648.00	7,771.00	195.41	546	1,902.00	630	4,603.59
2009	20,264.00	9,975.00	250.29	694	1,345.00	895	7,104.71
2010	21,140.00	10,356.00	193.73	807	1,434.00	1,717.00	6,632.27
2011	25,385.00	12,464.00	488.2	740	3,445.00	2,378.00	5,869.80
2012	31,254.00	15,481.00	431.84	794	2,699.00	3,110.00	8,738.16

TABLE 4.4: CALCULATION OF VALUE ADDITION OF SATYAM COMPUTER SERVICES

Year	Sales	Wages	Interest	Depreciation	Dividends	Taxes	VA
2003	871.73	87.81	38.9	11.09	31.91	0.82	701.2
2004	1,127.98	79.76	47.3	10.19	68.41	7.59	914.73
2005	1,447.01	106.99	64.8	6.5	103.22	16.1	1149.4
2006	3,032.92	130.22	84.34	6.75	134.68	18.3	2658.63
2007	3,768.62	217.73	113.8	12.55	135.3	112.14	3177.1
2008	4,615.39	292.96	136.93	16.35	136.84	129.72	3902.59
2009	4,675.09	325.98	184.9	17.27	111.27	113.42	3922.25
2010	5,078.76	368.41	136.3	21.73	170.73	107.1	4274.49
2011	6,794.48	448.31	124.6	33.2	176.3	58.08	5953.99
2012	8,907.22	458.79	152.05	43.12	66.88	13.68	8172.7

TABLE 4.5: CALCULATION OF VALUE ADDITION OF HCL

Year	Sales	Wages	Interest	Depreciation	Dividends	Taxes	VA
2003	2,023.65	981.14	37.3	124.18	8.87	61.54	810.62
2004	2,541.55	1,338.84	26.3	111.62	16.24	106.15	942.40
2005	3,464.23	1,999.10	0.76	103.94	20.86	116.74	1,222.83
2006	4,634.31	2,702.24	0.72	122.81	32.02	206.14	1,570.38
2007	6,228.47	3,692.92	4.24	129.89	37.55	150	2,213.87
2008	8,137.28	4,964.84	16.2	137.94	74.89	226.12	2,717.29
2009	8,432.50	5,592.70	153.62	297.2	67.4	150.7	2,170.88
2010	5,107.60	3,731.00	9.96	190.8	63.81	16.2	1,095.83
2011	4,780.80	3,292.00	0.3	149.9	58.74	53.7	1,226.16
2012	5,964.30	3,635.40	0.31	149.4	49.75	53.9	2,075.54

TABLE 4.6: CALCULATION OF VALUE ADDITION OF IBM

Year	Sales	Wages	Interest	Depreciation	Dividends	Taxes	VA
2003	568.43	162.54	114	13.38	9.33	24.6	244.58
2004	684.46	260.07	124	3.6	26.16	49.51	221.12
2005	902.86	395.51	136	26.59	37.44	49.47	257.85
2006	1,153.82	518.56	97	38.78	38.26	44.76	416.46
2007	1,552.34	715.99	146	56.54	42.46	26.37	564.98
2008	1,792.97	870.07	92	60.31	49.06	20.67	700.86
2009	2,212.62	1,058.51	118	42.84	83.05	36.58	873.64
2010	2,243.47	1,048.56	126	37.41	78.81	86.52	866.17
2011	2,360.51	1,052.13	97	33.65	115.38	66.41	995.94
2012	2,605.85	1,253.27	124	40.12	129.71	476.66	582.09

TABLE 4.7: CALCULATION OF VALUE ADDITION OF TECH MAHINDRA

Year	Sales	Wages	Interest	Depreciation	Dividends	Taxes	VA
2003	602.62	123.17	54	22.53	117.22	33.79	251.91
2004	711.5	213.91	76	22.14	37.46	15.02	346.97
2005	922.34	353.73	110	31.53	22.32	14.28	390.48
2006	1,197.14	467.58	104	37.38	103.93	20.52	463.73
2007	2,753.22	840.41	56.56	46.28	26.62	61.51	1721.84
2008	3,604.70	1,222.40	11.48	73.6	66.8	68.9	2161.52
2009	4,357.80	1,419.70	20	107.4	48.8	103.9	2658
2010	4,483.80	1,598.70	261.72	129.9	42.8	131.4	2319.28
2011	4,965.50	1,943.80	91.93	138.3	51	109.3	2631.17
2012	5,243.00	2,209.80	149.9	150.5	51.4	118.4	2563

TABLE 4.8: CALCULATION OF VALUE ADDITION OF PATNI COMPUTER SERVICES

Year	Sales	Wages	Interest	Depreciation	Dividends	Taxes	VA
2003	448.21	166.7	4.42	29.73	3.91	26.83	216.62
2004	537.01	233.3	0.83	39.21	12.48	23.99	227.2
2005	702.07	286.08	0.9	47	25	25.71	317.38
2006	875.6	392.8	5.19	60.03	34.47	38.51	344.6
2007	997.83	446.15	1.96	72.56	41.48	100.13	335.55
2008	1,172.30	560.19	4.35	80.48	41.82	48.18	437.28
2009	1,541.02	742.55	6.29	87.82	38.45	24.14	641.77
2010	1,734.86	812.47	6.52	91.98	38.74	39.06	746.09
2011	1,891.27	946.22	2.3	91.9	84.67	60.49	705.69
2012	2,151.67	1,244.51	2.15	109.73	75.39	90.39	629.5

TABLE 4.9: CALCULATION OF VALUE ADDITION OF MPHASIS

Year	Sales	Wages	Interest	Depreciation	Dividends	Taxes	VA
2003	728.92	162.54	28.7	54	23.26	73.89	386.53
2004	927.82	260.07	27.3	76	75	86.21	403.24
2005	1,036.63	395.51	49.68	110	61.79	135.62	284.03
2006	1,356.81	518.56	61.18	104	71.88	38.17	563.02
2007	1,673.37	715.99	39.3	56.56	87.7	26.7	747.12
2008	1,451.55	870.07	3.7	11.48	86.5	14.15	465.65
2009	3,405.02	1,058.51	3.33	20	586	33.94	1,703.24
2010	3,770.08	1,048.56	10.3	261.72	880.9	95.22	1,473.38
2011	3,404.13	1,052.13	1.27	91.93	981.8	129.57	1,147.43
2012	3,420.84	1,253.27	1.17	149.9	1,475.20	142.2	399.10

TABLE 4.10: CALCULATION OF VALUE ADDITION OF L&T INFO TECH LTD

Year	Sales	Wages	Interest	Depreciation	Dividends	Taxes	VA
2003	12,899.56	1,677.12	164.98	29.73	283.02	582.72	10,161.99
2004	14,871.91	2,367.35	378	39.21	438.42	736.18	10,912.75
2005	16,892.56	3,183.25	142.7	47	552.13	782.29	12,185.19
2006	18,788.72	4,274.00	237.7	60.03	660.56	845.42	12,711.01
2007	20,671.88	6,316.00	252.17	72.56	1,125.39	915.04	11,990.72
2008	24,946.11	7,771.00	42.52	80.48	1,370.05	982.05	14,700.01
2009	33,856.54	9,975.00	57.82	87.82	1,370.05	1,176.19	21,189.66
2010	36,870.19	10,356.00	9.47	91.98	3,914.43	1,577.02	20,921.29
2011	43,656.71	12,464.00	9.59	91.9	2,740.10	1,858.47	26,492.65
2012	53,265.95	15,481.00	58.95	109.73	4,893.04	1,853.83	30,869.40

The ANOVA test is conducted between the groups which were formed on the basis of positivity of MVA. It is found that eight of ten companies in the selected samples have positive MVA.

TABLE 4.11: ANOVA TEST RESULTS (GROUPING ON BASIS OF MVA)

		Sum of Squares	df	Mean Square	F	Sig.
Accounting profit	Between Groups	7.619E7	1	5.619E7	7.865**	0.046
	Within Groups	9.736E8	99	10575051.2		
	Total	**9.747E8**	**100**			
Value added	Between Groups	2.603E10	1	2.603E10	3.583*	0.062
	Within Groups	6.467E11	99	7.267E9		
	Total	**6.728E11**	**100**			
EVA	Between Groups	3.421E8	1	3.421E8	0.434	0.512
	Within Groups	7.013E10	99	7.880E8		
	Total	**7.048E10**	**100**			
MVA	Between Groups	1.362E8	1	1.362E8	51.787**	0.001
	Within Groups	2.953E7	99	3329637.8		
	Total	**4.758E7**	**100**			

Table 4.11 shows that the positive MVA affect the EVA, accounting profit and value added to the organization cannot be differentiated on the basis of MVA.

TABLE 4.12: DESCRIPTIVE ANALYSIS OF ANOVA TEST RESULTS (GROUPING ON BASIS OF MVA)

		N	Mean	Std. Deviation	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Accounting profit	0	5	2743.38	3782.729	1372.82	4271.65	70	18920.63
	1	95	3783.73	2876.581	1976.61	2668.87	95.17	20921
	Total	**100**	**3299.97**	**4587.706**	**2389.67**	**4210.27**	**70**	**20921**
Value added	0	5	3648.7289	4827.80903	2749.8379	4948.4543	389.84	83940.41
	1	95	2748.8737	5378.76388	1738.6538	1426.7289	216.62	30869.40
	Total	**100**	**4665.6427**	**5987.30063**	**3477.6324**	**5853.6530**	**216.62**	**30869.40**
EVA	0	5	1269.4355	19825.5224	-2972.7255	3984.9878	-71861.62	69867.02
	1	95	2852.5910	15918.8172	681.7728	2062.6385	-101166.00	52761.719
	Total	**100**	**1119.6753**	**17312.16416**	**-2315.4337**	**4554.7843**	**-101166.00**	**69867.02**
MVA	0	5	27739.738	42893.849	17498.25	35282.628	-11744	211962
	1	95	22638.526	39628.425	12636.46	31526.756	-9168	17928
	Total	**100**	**28390.96**	**44918.522**	**19432.12**	**37349.80**	**-11744**	**211962**

Table 4.12 confirms that the mean value of MVA and Accounting profits vary across the groups. That is, negative MVA generating organizations have also resulted in lower market addition to the value of organization. At the same time, they also generate lower Accounting profits. However, they are considerably providing same values to the different stakeholders of the organization, irrespective of the MVA.

CONCLUSION

The software industry is going through a rapid and significant transition. India's domination in the IT and software sector and its growing reputation as one of the world's best outsourcing destinations have created good basis for future prospects. The key to creating wealth is adding value. Adding value is the way that all fortunes are made. In many studies relating to EVA and MVA, the twin wealth creation measures were established. Even though in the present study, most of the companies have observed negative and low positive EVA, their MVA performance is good. This implies that the wealth creation has the direct influence on market forces.

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THE STUDIES ON UNDERSTANDING THE DEMOGRAPHICS OF CUSTOMERS' AND THEIR ATTITUDES TOWARDS (CRM) PRACTICES: AN EXPLORATORY STUDY OF THE FIVE SELECT PUBLIC SECTOR BANKS IN ODISHA

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ABSTRACT

The major objective of this research study is to analyze the nature and impact of customer demographics (gender, occupation and tenure of banking) on the CRM awareness and efficiency from five select public sector commercial banks that are located in major cities of Odisha state. A sample size of 2502 respondents was chosen and a survey instrument was designed to measure the relationship between the demographics and CRM awareness and efficiency. CRM efficiency was measured on a Likert scale of 1 to 5, where 1=Very Low, 2=Low, 3=Moderate, 4= High and 5= Very High. Chi-Square test was performed to asses the relationship between the respondents' occupation and their perception of CRM awareness. This test was also used for testing the association between the tenure of banking and CRM effectiveness. The relationship between the gender type and customers' bank preference was also tested by using Chi-Square test. In line with the research findings suggestions were offered to strengthen the service delivery in the Indian banks.

KEYWORDS
Banking, CRM.

INTRODUCTION

The phenomenon of globalization has paved the way for the entry of new generation multinational (foreign) banks in general and private sector banks in particular into the Indian banking market. Several banking experts argue that the world class services that are offered by these new generation banks have a tremendous bearing on the mindset and expectations of Indian banking customers. The services that are offered by these banks are characterized on a 24 hour X 7 day a week basis with a focus on delivering higher quality of service across the multiple channels. In this context, phone banking and internet technologies have emerged as a major option before the Indian banks. In addition to these modern services such as Tele-banking, Internet banking, Mobile banking, and Automated Teller Machine (ATM) banking are also offered by Indian banks to serve customers better. It is against this backdrop, the studies on understanding the demographics of customers' and their attitudes towards customer relationship management (CRM) practices are gaining importance.

Several researches studies that were conducted on the customer service aspects of Indian banking scenario, highlighted the need for designing effective customer relationship management (CRM) systems for enhancing the customer satisfaction and loyalty. It is against this background, Reserve Bank of India (RBI) instructed all public sector banks to focus on implementing innovative customer relationship management (CRM) systems through multiple touch points of CRM systems such as call centers (to disseminate information to customers), websites (to enable flow of information from anywhere in the world), email systems and interactive kiosks (to cater to the ever changing customer needs) across various service units and support processes. Research studies further revealed that customer relationship management (CRM) is emerging as an offshoot of the modern technological landscape by incorporating customer demographics, business intelligence, and Internet proximity and therefore takes its place at the heart of the modern banks. These technological advancements and global competitive pressures have reoriented the public sector commercial banks in India to pay more attention to the changing customer needs and effective CRM interventions in the light of the changes in the consumer demographics.

LITERATURE REVIEW

There is an increasing body of research evidence which highlighted the importance of understanding the nature of customer demographics and its impact on the service delivery in Indian banks (Sureshchander et al, (2003); Gudep& Elango,(2006); Rajanish& Snageetha,(2005); Navdeep& Mohit,(2005)). Research studies also revealed that retaining current customers is a major challenge before the Indian banks. It was also observed that this is a far more difficult task than attracting new customers. In this context, several research studies that were conducted on the Indian banking scenario have revealed that customer satisfaction may in turn result in loyalty towards the brand, continuous sales and repeat purchase intentions (Pratibha et al, 2000). In this context, Niraj et al (2001) made an effort to explain why customer relationship management (CRM) philosophy fails in the Indian banking context by addressing the issue of organizational culture of the bank and its impact on the spirit of CRM implementation programs. Rajnish et al (2007) also conducted a research on CRM implementation in the Indian Public Sector Banks, with a focus on profit generation, increase of market share, cost of baking transactions and expected profit margins under the risk conditions. Several global research studies also revealed that understanding the customer demographics is critically important for the success of the banking organizations (Huber & Morgan,(2001); Caruana, (2002);.Research studies that were conducted in the Indian context also revealed that analysis of consumer demographics played a vital role in supporting innovative service concepts and providing novel ways of service delivery. It is against this background that research studies on the nature of consumer demographics and its impact on service delivery mechanisms are gaining validity.

OBJECTIVES OF THE STUDY

The major objectives of this research study are as following.
1. To understand the customers' awareness of the CRM practices in the select public sector commercial banks in India.
2. To assess the influence of occupation of the respondents on the awareness of CRM.
3. To focus on the relationship between the tenure of banking of the customers' and CRM efficiency.
4. To find the association between the gender and the customers' preference of the bank.
5. To offer suggestions to improve the quality of service delivery in the Indian public sector banks.

SCOPE OF THE STUDY

The scope of the study is limited to the survey of customers of five select public sector commercial banks namely State Bank of India (SBI),Canara Bank, Andhra Bank, Punjab National Bank and Indian Overseas Bank in Major cities of Odisha state.

RESEARCH HYPOTHESES

Three research hypotheses were formulated for this research study. They are as following.
Hypothesis 1: There is an association between the occupations of the respondents and their awareness of CRM.
Hypothesis 2: There is a relationship between the tenure of banking and CRM efficiency.

Hypothesis 3: Gender has an influence on the bank chosen by respondents.

RESEARCH METHODOLOGY

A Questionnaire with 49 statements (variables) was developed to measure the attitudes of the respondents' from five select banks towards CRM practices by using Principal Components Analysis (PCA) method. Customers' awareness of CRM was tested in terms of Yes or No. CRM efficiency was measured on a Likert scale of 1 to 5, where 1=Very Low, 2=Low, 3=Moderate, 4= High and 5= Very High. Frequency distributions of the consumer demographics in terms of gender, type of occupation and tenure of banking were designed. Chi-Square test was performed to asses the association between the respondents' occupation and their awareness of CRM. The same test was used to check whether the nature of gender (male and female) has any impact on the consumers' preference for a bank. The five banks that were considered for this research study are State Bank of India (SBI), Canara Bank, Andhra Bank, Punjab National Bank (PNB) and Indian Overseas Bank (IOB). Suggestions were offered to improve the quality of service delivery in the five select Indian banks.

SAMPLE SIZE AND NATURE OF RESPONDENTS

For this research study, five select public sector commercial banks were chosen which include State Bank of India (SBI), Canara Bank, Andhra Bank, Punjab National Bank (PNB) and Indian Overseas Bank (IOB). Cluster sampling method was used for this research study. The sample size is 2502. The respondents are drawn from five select banks, who were holding a banking account in Major cities of Odisha state in India.

The respondents were drawn from the five select banks located in major select cities. Three demographic profiles were considered for further analysis and they include occupation, gender and tenure of banking. Respondents differed in terms of four types of occupations (Government service, Private sector, retired employees who are living on pension and small scale entrepreneurs). Both male and females were considered for this research study. Respondents also differed by the number of years of the bank account (tenure). They varied in terms of 1 year account holding, 2 years account holding, 3-5 years account holding and above 6 years.

SOURCES OF DATA COLLECTION

Research data was collected from both primary and secondary sources. The primary data was collected by administering questionnaire to the respondents. Questionnaires were administered to them by meeting them in their respective offices with prior appointment. In addition to this, personal interviews were also conducted to understand the respondents' attitudes towards CRM aspects in the five select banks. Secondary data sources were also used to collect the data for this research study. Bulletins from banking staff colleges which include RBI publications and manuals were major sources of secondary data. Various other sources like journals and magazines, which focus on the contemporary issues in the banking areas, were also referred.

FREQUENCY DISTRIBUTIONS

The frequency distributions of the respondents' awareness towards five select banks are displayed below. The frequency distributions are related to four types of tenure of banking, occupation, gender basis and awareness of CRM are displayed. The frequency distribution of response rate of respondents among the five select public sector commercial banks is also displayed below. The frequency distribution of the response rate among the respondents of four types of tenure of banking considered for this study is displayed in Table.

TABLE 1 - DISTRIBUTION OF FREQUENCIES OF RESPONSE RATE AMONG THE FOUR TYPES OF TENURE OF BANK ACCOUNT OF THE RESPONDENTS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Year	672	26.9	26.9	26.9
	2Years	694	27.7	27.7	54.6
	3-5 Years	627	25.1	25.1	*79.7*
	Above6 Years	509	20.3	20.3	100.0
	Total	2502	100.0	100.0	

TABLE 2 - DISTRIBUTION OF FREQUENCIES OF RESPONSE RATE AMONG THE 4 TYPES OF RESPONDENTS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Government Service	670	26.8	26.8	26.8
	Private Sector	672	26.9	26.9	53.6
	Savings Oriented	633	25.3	25.3	*78.9*
	Small Scale and Self Employed	527	21.1	21.1	100.0
	Total	2502	100.0	100.0	

TABLE 3 - DISTRIBUTION OF FREQUENCIES OF MALE AND FEMALE RESPONDENTS AMONG THE FIVE TYPES OF BANKS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	1267	50.6	50.6	50.6
	Female	1235	49.4	49.4	
	Total	2502	100.0	100.0	

TABLE 4 - DISTRIBUTION OF FREQUENCIES OF AWARENESS OF CRM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1833	73.3	73.3	73.3
	No	669	26.7	26.7	100.0
	Total	2502	100.0	100.0	

TABLE 5 - DISTRIBUTION OF FREQUENCIES OF RESPONSE RATE AMONG THE FIVE SELECT BANKS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Andhra Bank	446	17.8	17.8	17.8
	State Bank of India	533	21.3	21.3	39.1
	Canara Bank	781	31.2	31.2	70.3
	Punjab National Bank	379	15.1	15.1	85.5
	Indian Overseas Bank	363	14.5	14.5	100.0
	Total	2502	100.0	100.0	

CHI-SQUARE TESTS

Three Chi-Square tests were conducted separately to assess the influence of customer demographics (tenure of banking, occupation and gender) on the CRM awareness and efficiency.

Initially a Chi-Square test was performed to test the association between the types of respondents based on occupation and their awareness of CRM. Both Null hypothesis (HO) and Alternate hypothesis (H1) are formulated and they are as following.

HO: Types of respondents based on occupation has an influence on their awareness of CRM.

H1: Types of respondents based on occupation has no influence on their awareness of CRM.

TABLE 6 - CHI SQUARE TABLE OF TYPE OF RESPONDENTS BASED ON OCCUPATION AND CRM AWARENESS

			CRM Awareness		
Respondents Type Based on Occupation			**Yes**	**No**	**Total**
	Government Service	Count	**445**	**225**	**670**
		Expected Count	**490.9**	**179.1**	**670**
	Private Sector	Count	**505**	**167**	**672**
		Expected Count	**492.3**	**179.7**	**672**
	Savings Oriented	Count	**502**	**131**	**633**
		Expected Count	**463.7**	**169.3**	**633**
	Small Scale and Self Employed	Count	**381**	**146**	**527**
		Expected Count	**386.1**	**140.9**	**527**
	Total	Count	**1833**	**669**	**2502**
		Expected Count	**1833**	**669**	**2502**
Pearson's Chi-Square Value			0.000 at Degree Of Freedom = 3 (α = 0.05)		

INTERPRETATION

A lower value of Pearson's Chi Square Test (0.000) demonstrates that there is a significant interrelationship between the type of respondents based on occupation and their awareness of CRM. Since this value 0.000 is less than 0.05 it can be concluded that the test is significant at α= 5%. It can also be inferred that the type of respondents based on occupation has an influence on the consumers' awareness of CRM. Therefore, the Null Hypothesis (HO) is accepted.

Again, Chi-Square test was performed to test the association between the tenure of banking and CRM efficiency. Both Null hypothesis (HO) and Alternate hypothesis (H1) are formulated and they are as following.

HO: There is an association between the tenure of banking and CRM efficiency.

H1: There is no association between the tenure of banking and CRM efficiency.

TABLE 7 - CHI SQUARE TABLE OF TENURE OF BANKING AND CRM EFFICIENCY

			CRM Efficiency					
			Very Low	**Low**	**Moderate**	**High**	**Very High**	**Total**
Banking Tenure	1 Year	Count	84	84	179	164	161	672
		Expected Count	98.3	131.1	147.5	147.5	147.7	672
	2 Years	Count	125	161	191	146	71	694
		Expected Count	101.5	135.4	152.3	152.3	152.6	694
	3-5 Years	Count	80	124	80	199	144	627
		Expected Count	91.7	122.3	137.6	137.6	137.8	627
	Above 6 Years	Count	77	119	99	40	174	509
		Expected Count	74.5	99.3	111.7	111.7	111.9	509
	Total	Count	366	488	549	549	550	2502
		Expected Count	366	488	549	549	550	2502
Pearson's Chi-Square Value			**0.000 at Degree Of Freedom = 12 (α = 0.05)**					

INTERPRETATION

A lower value of Pearson's Chi Square Test (0.000) demonstrates that there is a significant interrelationship between the banking tenure of the respondents and CRM efficiency. Since this value 0.000 is less than 0.05 it can be concluded that the test is significant at α= 5%. It can also be inferred that the banking tenure of the respondents has an influence on the CRM efficiency. Therefore, the Null Hypothesis (HO) is accepted.

Further, Chi-Square test was used test the association between the nature of the gender and customers' bank preference. Both Null hypothesis (HO) and alternate hypothesis (H1) are formulated and they are as following.

HO: There is an association between the gender (male and female) and the bank chosen by the respondents.

H1: There is no association between the gender (male and female) and the bank chosen by the respondents.

TABLE 8 - CHI SQUARE TABLE OF GENDER AND PREFERENCE FOR A BANK

			Preference for a Bank					
			Andhra Bank	**State Bank of India**	**Canara Bank**	**Punjab National Bank**	**Indian Overseas Bank**	**Total**
Gender	**Male**	Count	268	396	229	195	179	1267
		Expected Count	269.9	395.5	225.9	191.9	183.8	1267
	Female	Count	265	385	217	184	184	1235
		Expected Count	263.1	385.5	220.1	187.1	179.2	1235
	Total	Count	533	781	446	379	363	2502
		Expected Count	533	781	446	379	363	2502
Pearson's Chi-Square Value			**0.976 at Degree Of Freedom = 4(α = 0.05)**					

INTERPRETATION

A higher value of Pearson's Chi Square Test (0.976) demonstrates that there is no significant interrelationship between the gender of the respondents and preference for the bank. Since this value 0.976 is greater than 0.05 it can be concluded that the test is not significant at α= 5%. It can also be inferred that the gender of the respondents has no influence on the CRM efficiency. Therefore, the Null Hypothesis (HO) is rejected.

SUMMARY OF THE RESEARCH FINDINGS

A summary of the research findings is presented below.

1. The respondents' awareness of the CRM revealed that a large proportion of respondents (73.3%) are aware of CRM aspects of the five select public sector commercial banks that are chosen for this research study.

2. Analysis of the Chi-Square test results on the association between the respondents' occupation and their awareness of CRM revealed that occupation has an influence on the CRM awareness across the five select banks.
3. Chi-Square test results on the association between the tenure of banking and CRM efficiency revealed that tenure of banking has an influence on the CRM efficiency.
4. Chi-Square test results further revealed that there is no association between the nature of the gender and customers' bank preference.

SUGGESTIONS FOR IMPROVING SERVICE DELIVERY

The following suggestions are offered to improve the service delivery in the Indian public sector commercial banks.

1. Indian public sector banks may focus on understanding the demographics of the customers in order to serve better.
2. Public sector banks may pay attention to design interactive and user-friendly web sites for accessing 24X7 basis online banking transactions.
3. In view of the dynamic nature of the consumer demographics, Indian public sector banks may consider using biometrics by replacing the traditional methods of Personal Index Number (PIN) while using ATM transactions. The biometrics may include modern finger print identifications details through retina or face.
4. Indian public sector banks may consider using the technology to increase the speed of the service delivery. Emphasis may be laid on phone banking, e-banking and mobile banking.
5. Indian banks may consider designing E-customer service interventions on par with foreign and private banks by using the auto responder feature.

CONCLUSION

This research study made an attempt to analyze the nature of the demographics of the customers' and their impact on the CRM awareness and efficiency. The findings of this research study revealed that the tenure of banking of the respondents has an influence on the CRM efficiency. It was also observed that the occupation of the respondents has an influence on the consumers' awareness of CRM. Further analysis of the data revealed that the gender of the respondents has no influence on the CRM efficiency. In line with the research findings, an effort was made to offer suggestions to strengthen the service delivery in the five select public sector commercial banks in the major cities. These suggestions are based on the findings of the current research study and the suggestions that are offered by the respondents. The suggestions mainly focused on the issues like understanding demographics, usage of technology and E-customer service. Focusing on these suggestions may help the Indian banks in improving the quality of service delivery.

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