INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

IJRCM

CONTENTS

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   ii
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   iii
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT　iv

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

CALL FOR MANUSCRIPTS

We invite unpublished novel, original, empirical and high quality research work pertaining to recent developments & practices in the area of Computer, Business, Finance, Marketing, Human Resource Management, General Management, Banking, Insurance, Corporate Governance and emerging paradigms in allied subjects like Accounting Education; Accounting Information Systems; Accounting Theory & Practice; Auditing; Behavioral Accounting; Behavioral Economics; Corporate Finance; Cost Accounting; Econometrics; Economic Development; Economic History; Financial Institutions & Markets; Financial Services; Fiscal Policy; Government & Non Profit Accounting; Industrial Organization; International Economics & Trade; International Finance; Macro Economics; Micro Economics; Monetary Policy; Portfolio & Security Analysis; Public Policy Economics; Real Estate; Regional Economics; Tax Accounting; Advertising & Promotion Management; Business Education; Management Information Systems (MIS); Business Law, Public Responsibility & Ethics; Communication; Direct Marketing; E-Commerce; Global Business; Health Care Administration; Labor Relations & Human Resource Management; Marketing Research; Marketing Theory & Applications; Non-Profit Organizations; Office Administration/Management; Operations Research/Statistics; Organizational Behavior & Theory; Organizational Development; Production/Operations; Public Administration; Purchasing/Materials Management; Retailing; Sales/Selling; Services; Small Business Entrepreneurship; Strategic Management Policy; Technology/Innovation; Tourism, Hospitality & Leisure; Transportation/Physical Distribution; Algorithms; Artificial Intelligence; Compilers & Translation; Computer Aided Design (CAD); Computer Aided Manufacturing; Computer Graphics; Computer Organization & Architecture; Database Structures & Systems; Digital Logic; Discrete Structures; Internet; Management Information Systems; Modeling & Simulation; Multimedia; Neural Systems/Neural Networks; Numerical Analysis/Scientific Computing; Object Oriented Programming; Operating Systems; Programming Languages; Robotics; Symbolic & Formal Logic and Web Design. The above mentioned tracks are only indicative, and not exhaustive.

Anybody can submit the soft copy of his/her manuscript **anytime** in M.S. Word format after preparing the same as per our submission guidelines duly available on our website under the heading guidelines for submission, at the email address: **infoijrcm@gmail.com**.

GUIDELINES FOR SUBMISSION OF MANUSCRIPT

1. **COVERING LETTER FOR SUBMISSION**:

    DATED: _____

    THE EDITOR
    IJRCM

    Subject: **SUBMISSION OF MANUSCRIPT IN THE AREA OF**   .

    (e.g. Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/Engineering/Mathematics/other, please specify)

    DEAR SIR/MADAM

    Please find my submission of manuscript entitled '_____' for possible publication in your journals.

    I hereby affirm that the contents of this manuscript are original. Furthermore, it has neither been published elsewhere in any language fully or partly, nor is it under review for publication elsewhere.

    I affirm that all the author (s) have seen and agreed to the submitted version of the manuscript and their inclusion of name (s) as co-author (s).

    Also, if my/our manuscript is accepted, I/We agree to comply with the formalities as given on the website of the journal & you are free to publish our contribution in any of your journals.

    NAME OF CORRESPONDING AUTHOR:
    Designation:
    Affiliation with full address, contact numbers & Pin Code:
    Residential address with Pin Code:
    Mobile Number (s):
    Landline Number (s):
    E-mail Address:
    Alternate E-mail Address:

    NOTES:
    a)   The whole manuscript is required to be in *ONE MS WORD FILE* only (pdf. version is liable to be rejected without any consideration), which will start from the covering letter, inside the manuscript.
    b)   The sender is required to mention the following in the **SUBJECT COLUMN** of the mail:
         New Manuscript for Review in the area of (**Finance/Marketing/HRM/General Management/Economics/Psychology/Law/Computer/IT/ Engineering/Mathematics/other, please specify**)
    c)   There is no need to give any text in the body of mail, except the cases where the author wishes to give any specific message w.r.t. to the manuscript.
    d)   The total size of the file containing the manuscript is required to be below **500 KB**.
    e)   Abstract alone will not be considered for review, and the author is required to submit the complete manuscript in the first instance.
    f)   The journal gives acknowledgement w.r.t. the receipt of every email and in case of non-receipt of acknowledgment from the journal, w.r.t. the submission of manuscript, within two days of submission, the corresponding author is required to demand for the same by sending separate mail to the journal.

2. **MANUSCRIPT TITLE**: The title of the paper should be in a 12 point Calibri Font. It should be bold typed, centered and fully capitalised.

3. **AUTHOR NAME (S) & AFFILIATIONS**: The author (s) **full name**, **designation**, **affiliation** (s), **address**, **mobile/landline numbers**, and **email/alternate email address** should be in italic & 11-point Calibri Font. It must be centered underneath the title.

4. **ABSTRACT**: Abstract should be in fully italicized text, not exceeding 250 words. The abstract must be informative and explain the background, aims, methods, results & conclusion in a single para. Abbreviations must be mentioned in full.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

v

5.   **KEYWORDS:** Abstract must be followed by a list of keywords, subject to the maximum of five. These should be arranged in alphabetic order separated by commas and full stops at the end.

6.   **MANUSCRIPT:** Manuscript must be in **BRITISH ENGLISH** prepared on a standard A4 size **PORTRAIT SETTING PAPER**. It must be prepared on a single space and single column with 1" margin set for top, bottom, left and right. It should be typed in 8 point Calibri Font with page numbers at the bottom and centre of every page. It should be free from grammatical, spelling and punctuation errors and must be thoroughly edited.

7.   **HEADINGS:** All the headings should be in a 10 point Calibri Font. These must be bold-faced, aligned left and fully capitalised. Leave a blank line before each heading.

8.   **SUB-HEADINGS:** All the sub-headings should be in a 8 point Calibri Font. These must be bold-faced, aligned left and fully capitalised.

9.   **MAIN TEXT:** The main text should follow the following sequence:

INTRODUCTION

REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

ACKNOWLEDGMENTS

REFERENCES

APPENDIX/ANNEXURE

It should be in a 8 point Calibri Font, single spaced and justified. The manuscript should preferably not exceed **5000 WORDS**.

10.   **FIGURES & TABLES:** These should be simple, crystal clear, centered, separately numbered &self explained, and **titles must be above the table/figure**. **Sources of data should be mentioned below the table/figure**. It should be ensured that the tables/figures are referred to from the main text.

11.   **EQUATIONS:**These should be consecutively numbered in parentheses, horizontally centered with equation number placed at the right.

12.   **REFERENCES:** The list of all references should be alphabetically arranged. The author (s) should mention only the actually utilised references in the preparation of manuscript and they are supposed to follow **Harvard Style of Referencing**. The author (s) are supposed to follow the references as per the following:

- All works cited in the text (including sources for tables and figures) should be listed alphabetically.
- Use (**ed.**) for one editor, and (**ed.s**) for multiple editors.
- When listing two or more works by one author, use --- (20xx), such as after Kohl (1997), use --- (2001), etc, in chronologically ascending order.
- Indicate (opening and closing) page numbers for articles in journals and for chapters in books.
- The title of books and journals should be in italics. Double quotation marks are used for titles of journal articles, book chapters, dissertations, reports, working papers, unpublished material, etc.
- For titles in a language other than English, provide an English translation in parentheses.
- The location of endnotes within the text should be indicated by superscript numbers.

<p align="center">PLEASE USE THE FOLLOWING FOR STYLE AND PUNCTUATION IN REFERENCES:</p>

BOOKS
- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio" Ohio State University, Nigeria.

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.

UNPUBLISHED DISSERTATIONS AND THESES
- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, KurukshetraUniversity, Kurukshetra.

ONLINE RESOURCES
- Always indicate the date that the source was accessed, as online resources are frequently updated or removed.

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

<p align="center">**INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT**   vi</p>
<p align="center">A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories</p>
<p align="center">www.ijrcm.org.in</p>

EXPERT EVIDENCE: RULE OF ADMISSIBILITY IN INDIA WITH SPECIAL REFERENCE TO BALLISTICS

BHAGWAN R. GAWALI
RESEARCH SCHOLAR
RAJIV GANDHI SCHOOL OF IP LAW
INDIAN INSTITUTE OF TECHNOLOGY
KHARAGPUR

DR. DIPA DUBE
ASST. PROFESSOR
RAJIV GANDHI SCHOOL OF IP LAW
INDIAN INSTITUTE OF TECHNOLOGY
KHARAGPUR

ABSTRACT

The law of evidence is the edifice on which the system of dispensation of justice rests. In fact, the purpose and object of evidence is to guide the Courts to come to a conclusion regarding a case at hand. But, in certain cases, where the questions involved are beyond the range of common experience and knowledge, evidence in form of facts pose problems as the Court may not have sufficient competence to arrive at a conclusion based on those facts. Thus, the need arises for experts who have the required ability and knowledge to tender evidences. Section 45 of the Indian Evidence Act, 1872 deals with expert evidence. It allows an expert to tender evidence on a particular fact in question and to show to the court that his findings are unbiased and scientific. In contemporary times, the reliance on expert evidence has been overwhelming, especially in the area of ballistics. The present article tries to critically analyze the rules of admissibility with regard to expert evidence, in general and ballistics evidence, in particular.

KEYWORDS

Ballistics, Expert, Evidence, Admissibility, Evidence, Opinion.

INTRODUCTION

The law of evidence is the edifice on which the entire system of dispensation of justice is based. Infact, the purpose and object of evidence is to guide the Courts to come to a conclusion regarding a case at hand. But, in certain cases, where the questions involved are beyond the range of common experience and knowledge, evidence in form of facts pose problems as the Court may not have sufficient competence to arrive at a conclusion based on those facts. Thus, the need arises for experts who have the required ability and knowledge, through experience and education, to tender evidences on facts.

Expert Evidence is the desideratum of the present century where complex and intricate issues involving scientific knowledge and technological skills are slowly being enmeshed in legal domain. But how far that scientific testimony can make way in the traditional adjudication mechanism is a big question and the present article examines the extent and scope of admissibility of expert evidence and its appreciation by courts, especially in the area of Ballistics.

EXPERT-WHO IS

Section 45 of the Indian Evidence Act, 1872 deals with expert evidence and allows the production of an expert to aid the judge to form an opinion on points of foreign law or science or art or as to identity of handwriting.[1]

An expert is a person who has devoted time and study to a special branch of learning, and thus, is especially skilled on those points on which he is asked to state his opinion. Under Section 45 of the Indian Evidence Act, 1872 expert means one who is a "specially skilled person". Such persons may also be considered as experts who practice a business/profession, which requires them to possess certain knowledge of the matter in hand.

There are no tests as such laid down by law to determine how much experience or qualification a person must possess to be taken as an expert. A combination of elements may be considered for accepting a witness as an expert, like:

1. Expertise, including academic achievements, professional training, experience in the trade, means at the command and the application of those means for coming to a conclusion.

2. Clarity, include avoidance of jargons, use of simple language, evidence supported by photographs, charts, sketches etc. so as to make his opinion appreciated by layman.

3. Relevancy does not include mere presumption of facts, but drawing of conclusions either from his own experience or from published works of accredited authors.

EXPERT EVIDENCE: ADMISSIBILITY AND APPRECIATION

Expert evidence is an "opinion' evidence" and as a general rule, the opinion of a witness on a question of fact or of law is irrelevant.[2] A witness may testify only to facts, not to their effect or result, or to his conclusions based on those facts and he can give as evidence only of facts, which he has directly perceived through his senses.[3] It is the function of the judge to form his own opinion on the facts stated.[4] The opinion of witnesses possessing peculiar skills (as of experts) is an exception to this rule.[5] It is important to note here that the opinion of an expert is not accepted just because he says so. He has to satisfy the court about his expertise on the particular fact in question[6] and further, has to show to the court that his findings are unbiased and scientific. The duty of the expert witness is to furnish the judge with necessary scientific criteria for testing the accuracy of the conclusions so as to enable the judge-to form his "independent" judgment by application of these criteria.[7]

The report of an expert is not admissible unless he has been examined as a witness and the party affected by it has had the opportunity of cross-examining him. Further, a finding by an expert, not supported by reasons, has to be rejected.[8] Thus, the admissibility of an expert's evidence is subject to certain checks, which are in furtherance of the basic ideas of justice. It is argued that after all an expert is a human being and it must be borne in mind that an expert witness, however impartial he may wish to be, is likely to be unconsciously prejudiced in favour of the side which calls him. The mere fact of opposition on the part of the other side is apt to create a spirit of partisanship and rivalry, so that an expert witness is unconsciously impelled to support the view taken by his own side. Besides, it must be remembered that an expert is often called by one side simply because it has been ascertained that he holds the views favourable to its interest.[9] This is one reason why at times in certain cases two experts reach a different conclusion on the basis of the same material.[10]

Some scholars are antagonistic to the very concept of expert evidence and opine that "perhaps the testimony which least deserves the credit is that of skilled witness. These witnesses are usually required to speak, not to facts but to opinions: and when this is the case, it is often quite surprising to see with that facility, and to what an extent, their views can be made to correspond with the wishes of the interests of the parties who call them."[11]

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

1

The response to this view can be that the general motto for expert witnesses, viz. "An expert witness is there neither for the prosecution nor for the defense, but is there to assist the Court" should be sacredly espoused by the experts and an approach of caution should be taken up by the Court. This basically means that the rule that "it is unsafe to base a conviction solely on the expert opinion without substantial corroboration" should be applied in all cases[12] where an expert witness is giving evidence. Further, the testimony of an expert is to be received with great care and caution.[13] It has also been held by the Courts that the "expert evidence is a weak type of evidence that needs independent and reliable corroboration".[14] Although there is no clear bar to base a conviction solely on expert evidence,[15] it is advisable, in the opinion of the authors, not to base conviction solely on the opinion evidence of an expert, "especially if the evidence so adduced is not supported by logical and scientific reasons."[16]

One of the rules of caution that all courts follow as regards expert opinion is that they should never surrender their free will or independence or judgment to an expert. In all cases in which expert evidence is adduced before it, the Court must after giving it such weight as it deserves and the court thinks fit, make up its own mind upon the issue in respect of which the expert testimony has been given.[17]

FORENSIC BALLISTICS: MEANING AND SCOPE

The word "Ballistics" is etymologically derived from the Latin word 'ballista' and refers to a body in motion. Ballistics is that part of forensic science which deals with the study of motion of projectiles. Projectile is known as a body projected by force mostly from firearms, especially through air. The science of projectile thus involves the study of firearms.[18] Forensic ballistics is the study of firearms, ammunition and explosives with a view to reconstruct the crime scene accurately. It has now become an integral part of the crime investigation as the reconstruction can lead to many evidences which can be used in a given case with major effects. The general fact of ballistics is that no missiles discharged from the same or different firearms bear the same trace marks.[19] Thus, for example, each rifled firearm leaves its own striations (a sort of tell-tale finger-print) in terms of barrel and firing pin markings on the fired bullet and cartridge case respectively. This makes it possible to trace a bullet or cartridge to the particular weapon, which is in question. If an evidence bullet has the same class characteristics and matching individual characteristics to test bullets fired from a 'suspect firearm', the firearm examiner can conclude that the bullet was fired from the suspect firearm.[20] A successful demonstration of these facts by the use of comparison microscope along with photomicrography can be the most valuable and foolproof evidence.

Ballistic experts work closely with the police investigating officers, members of the legal profession and judiciary before whom they eventually appear as independent expert witnesses.[21] They, play an important 'complementary' role in ensuring justice in the modern society.[22] With the assistance and expertise of ballistics, it is now possible not only to tally the cartridge fired with the firearm used, but a number of other important factors also, though with varying degrees of probability. Among these factors are the range of fire, the approximate time when the firearm was discharged[23] and other questions of similar nature. A ballistics expert with the help of a chemical analyst can discover several facts in relation to the part played by the particular firearm in the commission of the offence, the nature of ammunition used, etc. The services of a ballistics expert is therefore necessary and valuable in cases where firearms are recovered either at the scene of the crime or from the accused.[24]

Sometimes firearms are left on the scene of an event. The place where the firearm is found is carefully surveyed to find foot-footwear prints, transport tracks, etc. Handprints may be detected too, specifically on the trigger guard, slide casing and other parts. In visually inspecting a firearm, all its structural features, damage and contamination is described in the report. The type, model, caliber, number and trademarks are established by the ballistics expert. The condition of the bore walls is also checked to detect the presence or absence of powder gas odour, which is very important for establishing when the shot was fired. Then, the flight detection of the projectile is determined by inspecting all the objects in the line of fire, especially all the dents and damages in walls, ceilings and floor. When inspecting the bullet, the ballistic expert establishes its form design, size, colour, number of traces left by the bore lands. When inspecting pellets, their number, form, maximal and minimal dimensions are also established by the ballistics expert. All of these are some of the procedures followed by the ballistics expert to help in reconstructing the offence committed with fire. In addition to the above investigations and methods, the ballistic expert also has to decide some other questions, namely; a) whether a given object is a firearm-this question could arise in examining a homemade weapon manufactured in simplified form to copy a known model. The question is resolved by studying the mechanism and the individual parts of that device to see whether it can actually ignite gunpowder, eject a projectile and develop striking power b) Whether a shot can be fired from a given type of weapon- this question is important in establishing its possible use as an instrument of crime c) Whether the weapon was the one used in the commission of the crime.

In the light of the above discussion, a ballistic expert has two basic functions: -[25]

1.   The scientific function — collecting, testing and evaluating evidence and thereby forming an opinion as to that evidence.
2.   The forensic function — communicating that opinion to the Court so as to help it reach a logical conclusion.

BALLISTIC EXPERT'S EVIDENCE: ADMISSIBILITY AND APPRECIATION

In India, in the case of *State (through Central Bureau of Investigation New Delhi)* v. *S. J. Choudhary,*[26] the Supreme Court has held that the expression "science or art" in Section 45 of the Evidence Act 1872 is of wide import. Each of the words 'science' and 'art' has to be construed widely to include within its ambit the opinion of an expert in each branch of these subjects: the meaning of the word 'science' as understood ordinarily with reference to its dictionary meaning must be attributed to the word. Therefore, the present section 45 of the Indian Evidence Act, 1872 can be better worded by amendment to clearly imply the above observations. It would be of further help if the words "or of science or art" in section 45 of the Indian Evidence Act, 1872 are substituted by the words" or of science, art, skill or trade or others of the like kind.[27]

Thus, by the above given understanding of Section 45 of the Indian Evidence Act, 1872 the word 'science' is not just confined to physical sciences, but any matter for the purpose of forming an opinion which requires some special skill, special training or special study is regarded as science. Thus, it can be easily concluded that in criminal cases where firearms are alleged to have been used, the Court is fully justified in 'admitting' the opinion of the ballistic experts as they are persons specially trained in this field of science. This is made clear by the Supreme Court of India in the case *Sukhwant Singh* v. *State of Punjab,*[28] where it was held that 'the failure to produce the expert evidence before the trial Court affects the credit-worthiness of the prosecution case to a great extent.'[29] It was also held that the cases in which the examination of a ballistic expert is essential will 'depend on the circumstances of each case'. The most common circumstance where the conditions are apt for the evidence of a ballistic expert is in a case 'where death is due to injuries or wounds caused by lethal weapons. It has been considered to be the duty of the prosecution to prove by expert evidence that it was likely or at least possible for the injuries to have been caused with the weapon with which and in the manner in which they are alleged to have been caused.[30] This understanding of the courts today is the result of a very appropriate judgment by the Supreme Court in the case of *Jaidev and Hari Singh* v. *State of Punjab,*[31] where the case of *Mohinder Singh* v. *State,*[32] was quoted by the learned counsel for the appellants to say that the Court was of the opinion that where a firearm is used in the perpetration of a crime, the prosecution 'must' bring expert evidence to connect the injuries with the weapon and its alleged manner of use. The facts of Jaidev's case were that the appellants had surrendered a revolver and the prosecution was contending that the injuries were caused by a rifle, which had not been recovered. This made the Court to give a reasonable remark that it may be a case that the appellants may have deliberately surrendered the revolver to introduce complications in the case. Thus, there was no purpose for which the prosecution could be expected to examine an expert in ballistics. Thus, Mohinder Singh case was held not applicable in the case at hand. In *Ghurey Lal* v.*State of U.P.,*[33] where question arose with regard to the complicity of the accused in the murder of the deceased, the Supreme Court relied on the Ballistics report to hold that the two shots allegedly fired causing the death of one and injuries to another were not from a single firearm, as alleged by the prosecution. The Court opined, "the medical evidence coupled with the Ballistic Expert report revealed the existence of two fires from two weapons and as such was inconsistent with the prosecution story…. The Ballistic Expert is a disinterested, independent witness who has technical knowledge and experience. It follows that the trial judge was fully justified in placing reliance on his report." The apex court accordingly acquitted the accused.[34] In *Mahesh Chand v. U.T. Chandigarh*[35], where a country made pistol alongwith three live cartridges and an empty cartridge were recovered from the accused and a bullet was recovered from the body of the victim and on examination, the Ballistic expert opined that 'they could not have been fired through any other fire-arm because every fire arm has its own individual characteristic marks.,' the Supreme Court proceeded to hold that the case against the accused is proved beyond reasonable doubt.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   2
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

It is important to note that ballistic experts' opinion has been consistently regarded as significant. In the case of *Ajay Singh* v. *State of Bihar*[36], the pistol used in the perpetration of the crime was never sent to the ballistic expert for examination. This was seen as a lacuna on the part of the prosecution but the case did not go in favour of the appellant as there were witnesses who testified to the satisfaction of the Court that accused had done that act of crime.[37] "It cannot be laid down as a general proposition that in every case where a firearm is allegedly used by an accused person, the prosecution must lead the evidence of a Ballistic Expert to prove the charge, irrespective of the quality of the direct evidence available on record. It needs little emphasis that where direct evidence is of such an unimpeachable character, and the nature of injuries, disclosed by post-mortem notes is consistent with the direct evidence, the examination of Ballistic Expert may not be regarded as essential. However, where direct evidence is not available or that there is some doubt as to whether the injuries could or could not have been caused by a particular weapon, examination of an expert would be desirable to cure an apparent inconsistency or for the purpose of corroboration of oral evidence."[38] In *Charan Singh* v. *State of Punjab*,[39] the medical and ballistic expert opinion was conflicting about the range of fire. The court, after appreciating the evidence before it, was satisfied with the scientific conclusions of the ballistic expert. This was one of the landmark cases in India where the ballistic expert's opinion prevailed over that of the medical expert.[40] Furthermore, in the case of *Kalua v. State of Uttar Pradesh*[41]*,* the court being satisfied with the evidence of Ballistic Expert held that the conclusion of Ballistic expert is sufficient to prove the guilt of the accused.

CONCLUSION

In the contemporary social context, the role and significance of ballistics can be overwhelming in administration of criminal justice. While of the one hand, the sophistication and complexities of modern weapons and arms and ammunition call for expert knowledge and skills in deciphering the nature, category and manner of use in specific cases, on the other, the effective interpretations of culpability and criminal liability require the blending of such knowledge in legal paradigm. In fact, the latter is important for bringing the guilty to the gallows and the innocent to freedom. However, what is important is the proper recognition and acceptance of expert evidence as a significant tool in the administration of justice. The old adage of "Witnesses are the eyes and ears of the Court," may sound good and in fact may be true to an extent; but in the present era of organized crimes, trans-boundary criminal activities and terrorism, reliance on testimonies of ordinary witnesses may be grossly insufficient and inadequate to excavate the extent and depth of illegalities involved. It may be possible only by means of distinct and specific knowledge of intricate aspects which only an expert may be qualified and experienced to testify. Thus, increased reliance on expert evidence and improved recognition of its value and credibility may help in efficient and effective dispensation of justice in future.

REFERENCES

1. Section 45 reads as: "When the Court has to form an opinion upon a point of foreign law, or of science, or art or as to identity of handwriting or finger impression, the opinions upon that point of persons specially skilled in such foreign law, science or art or in questions as to identity of handwriting or finger impressions are relevant facts. Such persons are called experts."
2. Khushboo Enterprises v. Forest Range Officer, AIR 1994 SC 120.
3. Babuli v. State, 1974 Cri LJ 510.
4. M.C. Sarkar, SC Sarkar and PC Sarkar, Sarkar's Law of Evidence (Wadhwa and Company Law Publishers: Nagpur, 1999) 863
5. Field, Commentary on Law of Evidence (Revised by Gopal S. Chaturvedi, Delhi Law House, 2001) p.2428.
6. State v. Madhukar, 1967 Cri LJ 167.
7. State of Himachal Pradesh v. Jai Lal, AIR 1999 SC 3318.
8. Haji Mohammed Ekramul Haq v. State of West Bengal, AIR 1959 SC 488.
9. Hari Singh v. Lacchmi Devi, AIR 1921 Lah.126.
10. Suresh Kumar v. Mewaram, AIR 1991 P&H 254.
11. Ejaz, Ahmed, Crimes-Expert Evidence (Medical and Non-medical) (Vinod Publications: Delhi, 1993) 32.
12. This basically means that the credit of an expert can be impeached like that of any other witness under Sections 146, 153 and 155 of the Indian Evidence Act, 1872.
13. Magan Bihari Lal v. State of Punjab, 1977 Cri LJ 711.
14. S. Gopal Reddy v. State of Andhra Pradesh, 1996 Cri LJ 3237.
15. Murarilal v. State of MP, AIR 1980 SC 531.
16. ibid.
17. State of UP v. Krishna Gopal, 1989 Cri LJ 288.
18. Rashika Gupta, Ballistics: the probative value of evidence,1992 Cri LJ 121.
19. MC Sarkar, SC Sarkar and PC Sarkar, Sarkar's Law of Evidence (Wadhwa and Company Law Publishers: Nagpur, 1999) 877.
20. Param Jeet Singh, Growing role of experts testimony in the Administration of justice, 1990 Cri LJ 109.
21. ibid.
22. ibid.
23. It is possible to form a rough estimate of the time of fire from gunpowder residue, carbon monoxide remains, mercury deposition etc. But it is difficult to fix the correct time. See, B.R.Sharma, Forensic Science in Criminal Investigation and Trials (Universal Law Pub., 4th Edn, 2005) p. 469.
24. Arava Nagreddi v. State, (1968) 12 MJHR (Cr).
25. Richard, Saferstein, Forensic science Handbook (Prentice Hall Regents: New Jersey, 1982) p.5.
26. 1996 Cri LJ 1713.
27. Supra n.4, p 868.
28. 1996 Cri LJ 1713.
29. State of Madhya Pradesh v. Surpa, AIR 2001 SC 2408
30. Gurcharan Singh v. State of Punjab, AIR 1963 SC 340.
31. 1963 Cri LJ 495.
32. AIR 1953 SC 415.
33. MANU/SC/3223/2008
34. See, Puran Singh v. State of Uttaranchal, 2008 CriLJ 1058; Budh Singh v. State of M.P., 2007(8)SCALE 252; Suresh Chandra v. State of Uttar Pradesh AIR 2005 SC 3120; Ramakant Rai v. Madan Rai and Ors., AIR 2004 SC 77.
35. AIR 1995 SC 1951
36. AIR 2000 SC 3538.
37. Vineet Kumar Chauhan v. State of U.P., AIR 2008 SC 780
38. Gurcharan Singh v. State of Punjab, MANU/SC/0136/1962.
39. 1974 Cri LJ 1253.
40. Kartar Singh v. State of Punjab, AIR 1977 SC 349; Kartik Harijan v. State of Orissa, 1995 Cri LJ 2019; Raza Pasha v. State of Madhya Pradesh, AIR 1983 SC 575.
41. AIR 1958 SC 180

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   3

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

USING ARTIFICIAL NEURAL NETWORKS TO EXAMINE SEMIOTIC THEORIES OF ACCOUNTING ACCRUALS IN TEHRAN STOCK EXCHANGE

AFSANEH MIRZAEI
MS DEGREE STUDENT
DEPARTMENT OF ACCOUNTING
NEYSHABUR BRANCH
ISLAMIC AZAD UNIVERSITY
NEYSHABUR

ALI REZA MEHRAZIN
ASSOCIATE PROFESSOR
DEPARTMENT OF ACCOUNTING
NEYSHABUR BRANCH
ISLAMIC AZAD UNIVERSITY
NEYSHABUR

ABULGHASEM MASYHAABADI
ASSOCIATE PROFESSOR
DEPARTMENT OF ACCOUNTING
NEYSHABUR BRANCH
ISLAMIC AZAD UNIVERSITY
NEYSHABUR

ABSTRACT

*The main objective of accounting is to report information. However, few studies have examined the nature of accounting information service. Thus, this study use semiotics, a theory of signs and signals to examine the informational content and efficiency of accruals through a method which based on prediction-artificial neural network. This research focus on two basic theories: **1**.The functions of accounting accruals and **2**. Theory of the Pragmatic of Information of accounting accruals examines informational content of accounting accruals by comparing the capability to predict future cash flow by considering cash-flow accounting data and accruals accounting data. The backpropagation artificial neural network has been furthermore considered in order to predict future cash flow. The results indicate that syntactic and semantic accruals have information value (informational content) to predict future cash flows. Thus, they will strengthen the information and reporting aspects of accounting, confirming the semiotic theories of accounting accruals.*

KEYWORDS

Semiotic theories of accounting accruals, Syntactic accounting accruals, Semantic accounting accruals, Theory of the pragmatic information of accounting accruals, Theory of the functions of accounting accruals.

INTRODUCTION

In today's world where logical thinking and reasoning is more common and applicable than any other periods, accounting can never remain as one of the worldwide sciences regardless of theoretical framework and foundations. The fact that fact that sciences like physics and chemistry have progressed and outran other sciences is due to the discursive and logical basis of these sciences and accounting has to organize its genesis basis theoretically and scientifically so that it can remain among the worldwide live sciences. Shamakhi et al (**2000**).

Accounting theory is a logical reasoning system that provides a framework so as to create inclusive principles. These principles are used both to evaluate accounting function and as a guideline to develop new accounting procedures. ghaemi (**1996**).

Since accounting may be considered as a kind of language, evolution of the financial reporting aspects should be a part of the accounting system evolution. The theories which describe the reporting process should improve the significance of accounting reporting, i.e. accounting reports and their components. Accruals are one of the components of accounting reports which can be reviewed through reporting theory .Etheridge et al (**2004**).

Accruals accounting has a decisire role to play in the process of evaluation, because they minimize the problems of timing and non-compliance hidden in cash figures. However, reliability and usefulness of accruals are dubitable, because considering the subjective and estimative nature of these accruals; managers are able to manipulate them to adjust the reported earnings consistent with the accepted accounting principles according to their own desire. Hence, despite the consensus on the usefulness of accruals in prediction and decision-making, it has some importance among the experts. Arabmazar et al (**2006**).

However, the efforts of Accounting Standards Board in reducing the accepted accounting procedures, the importance of auditors' reports and etc. are solutions that have been considered in recent decades.

THEORETICAL FOUNDATIONS AND REVIEW OF LITERATURE

Accruals accounting system accomplishes financial events in time and identifies them regardless of time of receipt or payment of the respective cash. If in a cash accounting system, the entering or exiting cash is the identification criterion, in the conditions that the time of occurrence of economic event is different from the time of entering or exiting the cash, the accrual system always provides more information for financial information users. This additional information that are accruals signs, are signs and signals of the events that will occur in the future. In other words, due to the treatment and disclosure of financial events, accrual accounting provides surprise value information which provides more accurate predictions on future conditions and especially prediction of future cash flows through sending signs and signals to information users.

The subject of semiotics is data exchange or in other words, "Communication". Semiotics reviews "implication". Thus, it can be considered as a central branch of the organized knowledge of communication. Knowledge of communication mainly discusses message. Message is a sign or a series of signs which are transferred from a signs' source to a specific sign receiver or a destination. Seboek (**1944**).

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   4
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

With a focus on linguistic aspects of financial information, Semiotic Theories of Accounting Accruals examine the signs and signals of accruals as a linguistic element in accounting with capability of data transference.

Given the stated facts and the definition that accounting is the language of business, we will first compare language generally and accounting as the language of business.

Every language must respond to the questions of what is the reason of words. What is the meaning of words? How they affect the audience? The answer to each of the mentioned questions presents one of the separate classes of theory.

1. Syntactic Theories: Theories which explain the rules and how to prepare words.

2. Semantic Theories: Theories which help us explain, interpret and analyze words.

3. Theory of the Pragmatic Information: The theory which helps the effectiveness of words on the audience. Khatami (1998).

Accounting as the language of business, must also respond to the questions of what are the rules of financial information preparation? What is the meaning of reported financial information? And how does financial information effect users? Hence:

1. Syntactic theories: Theories which explain the rules and how to prepare financial information.

2. Semantic theories: Theories which help us explain and interpret financial information.

3. Theory of the Pragmatic Information: through applying certain rules, we collect and report information or explain the meanings of information, for the purpose of influencing users of financial information and their decision-making. The theory which helps us in the influence of financial information on users is called the theory of pragmatic information. Shabahang (*1998*).

Since accruals are among the components of financial reports, these theories can be generalized for accruals as well, therefore:

Accruals syntactic theory: the theory which explains that how accruals should be prepared and tries to describe the current accounting procedures on accruals and is related to the structure of the process of collecting data and information.

Accruals semantic theory: the theory which helps us to explain, interpret and analyze accruals.

Theory of the Pragmatic of Information of accounting accruals: Applying certain rules, we collect and report some information or explain the meanings of information, for the purpose of influencing users of financial information and their decision-making. The theory which helps us in the influence of accruals on users is called theory of the pragmatic of Information of accounting accruals.

THEORY OF THE FUNCTIONS OF ACCOUNTING ACCRUALS

Accruals are mostly considered as the indicators of the difference between accounting and its cash component. Aliabadi (*2009*). In other words, it is the difference between timing of cash flows and timing of transactions identification.

But the definition describing the nature of accruals suggests that they are created premature items. In recognition of some accruals such as receivables and payables, it is enough to consider the rules and principles which are based on accrual assumption. However, it is not always the same. Sometimes, financial events mislead financial information if addressed syntactically. Therefore, the identification criterion in these cases is their economic content, such as depreciation. Hence, examining financial events, the theory of the functions of accounting accruals divides accruals into two categories of syntactic and semantic accruals, according to their functions.

A)   Syntactic accruals (rules and definitions) are the product of syntactic theories determining how information should be prepared and trying to describe the current accounting procedures and are related to the process of collecting data and information. These accruals report that part of financial events that although occurred, the cycle of receipt or payment of the cash from them is unfinished.

The Logic for this classification is that syntactics is pertained to the "surprise value" of information, and accruals that reverberates economic events not reported under cash-flow accounting should possess "surprise value" relative to the associated cash-flow data. Etheridge et al (*2004*).

B)   Semantic accruals (associated with the economic facts), is resulted from interpretation and analysis of economic events that mislead financial information if addressed syntactically. Accounting and financial reporting emphasize the economic content of functions and events, although the form of actions and events is inconsistent with their content and will require another way of action. For example, purchase of long life equipment to disclose this event can be addressed in two ways:

1. Syntactic → Belief in the influence of this event only on the occurrence period

2. Semantic → Belief in the influence of this event on the period of assets exploitation

Addressing syntactically means to accept that the assets have profit only in the purchase period and after that they will become unsuitable and remain unused. But the fact is that only in exceptional conditions (floods, earthquakes, fires, etc.); assets are likely to be unsuitable and have usually a long life. We use assets during their life cycles. However, the obtained benefits are decreasing due to their depreciation. Thus, it is very clear that allocation of costs to the purchase period and use of their interests to the asset exploitation period, are defective of the applied information system. On the other hand, when we consider assets purchase in the purchase period as costs, inconsistency between the obtained revenues and the imposed costs causes inflation of costs during the occurrence period and makes the profits low, so that we would not have a correct interpretation of the management function, status of the economic unit and etc. In addition, identification of benefits alone in future periods, will create a tentative income. This, on the one hand, provides wrong information on the financial information users and on the other hand, the main capital will be divided if the profit is supposed to be dividend.

Generally in structural approach, economic events that affect only the current period "discrete" and does not reflect that these economic events affect firm's future cash flows and future performance "are continuous". Etheridge et al (*2004*).

THEORY OF THE PRAGMATIC INFORMATION OF ACCOUNTING ACCRUALS

Identification of the effects of accruals on entry and exit of future cash flows through semiotics, which is possible by decoding financial information, will allow more accurate prediction of the expected cash flow. Each of the various accruals has a different effect on the future cash flows which is caused by the difference in their function.

The theory of the pragmatic information of accounting accruals expresses why accounting accruals Includes pragmatic information In other words, valuable. Three axioms are used to comprehend the theory of the pragmatic information of accounting accruals:

Axiom *1*: Adding up of syntactic accruals to cash-flow data can improve prediction of future cash flows*.*

Axiom *2*: Adding up of semantic accruals to cash-flow data can improve prediction of future cash flows*.*

Axiom *3*: Data that was added to cash-flow data and future cash flow forecasts are to improve contains pragmatic information*.*

Axiom *1* and Axiom *2* are insulate from the Financial Accounting Standards Board's (FASB's) position in the Statement of Financial Accounting Concepts (SFAC) No. *1*. The content of this statement is that accounting accruals cooperation financial statement users in forecasting future cash flows.

The FASB (*1978, 21*) states that investors' and creditors' . . . interest in an enterprise's future cash flows and its ability to generate favorable cash flows leads primarily to an interest in information about its earnings rather than information directly about its cash flows. . . accrual accounting generally provides a better indication of enterprise performance than information about current cash receipts and payments.

Axiom 3 is derived from the FASB's position in SFAC No. *1* that data which forecast future cash flows for financial statement users is useful (provides pragmatic information) to investors and creditors. The FASB (*1978, 17-19*) Insists that:

 . . . Financial reporting should provide information to help investors, creditors, and others assess the amounts, timing, and uncertainty of prospective cash inflows . . .

 . . . Investors, creditors, and others need information to help them form rational expectations about . . . prospective cash receipts and assess the risk that the amounts or timing of the receipts may differ from expectations. Etheridge et al (*2004*).

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 5
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

Sterling has presented "Usefulness" of information for accounting system planning and suggests that given the diversity of the groups using accounting information and the diversity of their information needs and lack of possibility to provide all their required information, application of the above criterion allows us to emphasize a variety of information in the accounting system, the effectiveness of which has been proven to fulfill the goals of decision makers. Tehrani et al (*2008*).

Proponents of prediction-based accounting theory also use "usefulness criterion in prediction" to develop accounting theory, based on which choosing among accounting procedures depends on the ability of specific methods, in terms of prediction of users' events of interest. It means that in an intended event, an event with the highest predictive power is known as the best method for that specific purpose. According to this point of view, those accounting figures and numbers which can help accounting products users to predict their desired events, have information content (Ibid).

On the other hand, given the relative freedom of managers to use different methods legally in the framework of the general ledger generally accepted accounting principles, it seems that the accruals are resulted from the manager's impetuous practices in identification, registration and reporting events as well as managers' capital in the distortion of financial statements .Hashemi et al (*2010*).

Hence, reliability and usefulness of accruals are very much in doubt.

However, through efforts to reduce the accounting procedures and information asymmetry among the accounting information users and employing well reputed practice offices, the investors can be protected against manipulation and management of earnings, which according to Schafer, is the targeted involvement of managers in the process of extra-organizational financial reporting in order to achieve personal interests. Accordingly, some of the most important studies related to this research will be discussed.

Ali Saghafi (*2004*), has analytically examined the operating cash flows and historical earnings as well as their components. The study results indicate that there is a significant relationship between the operating cash flows and accounting earnings and their components. Overall, the findings of this research are consistent with the theory of ability of accounting earnings and its components in prediction of operating cash flows as well as the theory of superiority of earnings ability to cash flows in prediction of cash flows.

Arab Mazar Yazdi et al (*2006*), have examined the information content of cash flows and accruals in capital market of Iran. The results suggest that earnings have greater information content than operating cash flows. On the other hand, other studies conducted in this research indicates the increasing information content of accruals compared to the operating cash flows, which is more represented through breakdown of total accruals into its discretionary and non-discretionary components, as well as the increasing information load of discretionary accruals compared to non-discretionary accruals.

In a study, Syed Abbas Hashemi et al (*2010*), assessed the ability of cash and accrual components of earnings in prediction of abnormal earnings and determination of the value of the companies listed in Stock Exchange. The study results represent the ability of cash flows and total accruals in determining the value of company and predicting abnormal earnings. Another result of this study indicates that the components of accruals have the ability to predict abnormal earnings. However, at the level of the selected sample, only some of the coefficients of accruals components are statistically significant.

Howe et al (*2001*), have examined the information content of accruals and cash flows and has indicated that earnings have more information content than the operating cash flows, because earnings include accruals. Another result of this study indicates more stability and predictability of earnings than that of operating cash flows.

Through an investigation, Barth et al (*2005*), realized that dividing earnings into two components of accruals and cash flows or into five components including cash flows, and four accruals components, reduces the average prediction error and thereby, helps to predict the value of the company.

Bracket et al (*2007*), realized that the average absolute prediction errors for future cash flows when accruals are added as a predictor of operating cash flows, is smaller than when the cash flows from operations are used alone as a predictor.

Hollister et al (*2008*), have conducted their studies in *9* countries and showed that the accrual components of accounting earnings provide increasing information in explaining the operating cash flows of the next year.

Through an investigation, El-Sayed Ebaid (*2011*), realized that aggregate earnings have superior predictive ability than cash flows for future cash flows. Also, the results reveal that disaggregating accruals into major components – changes in accounts receivable and payable, and in inventory, depreciation, amortization, and other accruals – significantly enhances predictive ability of earnings.

Arnedo et al (*2011*), in the research has been to analyze the role of accruals in a private dominated setting, namely the Spanish one And they found that that accruals do play a role in directly predicting future cash flows in Spain, a country that used the accounting reform that resulted from the implementation of EU directives (*1990*) to eliminate the traditional link between taxation and financial laws and, since then, has had a highly regulated accounting framework they have also found that the importance of accruals increases significantly for large and growing firms and for firms with persistent earnings and decreases with failure probability and accruals subjectivity. Finally, they also empirically defend that Barth et al. (*2001*)'s earnings decomposition in current cash flow plus five individual accruals categories produces lower prediction errors than both the use of aggregate earnings and of a more simple disaggregation into short and long term.

RESEARCH HYPOTHESES

Hypothesis *1*: Adding up of syntactic accruals to cash items can improve prediction of future operating cash flows.
Hypothesis *2*: Adding up of semantic accruals to cash items can improve prediction of future operating cash flows.
Hypothesis *3*: Adding up of syntactic and semantic accruals together to cash items can improve prediction of future operating cash flows.
Hypothesis *4*: Syntactic and semantic accruals equally improve prediction of future operating cash flows.

SAMPLE SELECTION AND DATA COLLECTION

Statistical population of this research includes the companies listed in Stock Exchange. Due to the high volume of statistical population, the following conditions were considered for selection of the statistical population:
1.The company should be listed in Stock Exchange from the beginning of 2007 financial year.
2. The financial year of the company should terminate at the end of March, every year.
3. The company should not change the financial year from 2007 to 2009.
4. The company should not be a financial trading company or an investment company.
5. Stabilization of procedure should be observed during the studied period during 2007 to 2009.
6. Operating cash flows, accrual components of earnings and balance sheet data should be available for all under test periods.
Among the companies that have the above conditions, a total of *60* companies were selected during 2007 to 2009. The following data were collected for each company:
Cash - flow accounting data*:* Cash and Operational flows
Syntactic accounting accruals: Receivables - total, Receivables - Increase (Decrease), Accounts payable and deferred expense - total, Accounts payable and deferred expense - Increase (Decrease), Advances from customers – total.
Semantic accounting accruals: Advances from customers - Increase (Decrease), Prepaid expense - total, Prepaid expense - Increase (Decrease), Orders, Inventories - total, Inventories - Increase (Decrease), Depreciation and amortization, Compensated absences.

RESEARCH METHOD

This study is inductive in terms of the logic used; it is also a field and library-based study in terms of the type of research and is applied in terms of its results. Theory of the Pragmatic of Information of accounting accruals relies on the theory of the functions of accounting accruals to classify accruals according to their functions and thus, direct test of the theory of the pragmatic of information of accounting accruals leads to indirect test of the theory of the functions of

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   6
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

accounting accruals. The pragmatic of information of accounting accruals cannot be directly tested. The information content representative in this study is the increase of accuracy of prediction of the future cash flow from operations. As Financial Accounting Standards Board argues in Statement No. **1**, the data that enhance accuracy of prediction of future operating cash flows for financial statements users have information content. Therefore, increase of the accuracy of prediction of the future cash flow from operations is selected as representative of accruals information content. Comparing the accuracy of prediction of future cash flows based on accruals and cash items accurately predict future cash flows based on accruals and cash items, the information content of accruals can be determined. The ability to predict future operating cash flow is measured through the following Error Metric:

Error Metric= (The predicted operating cash flow - The actual operating cash flow)
The actual operating cash flow

Back Propagation artificial neural network is used to organize the relationship between dependent and independent variables and to predict future operating cash flow. The network was examined and tested for each independent variable through the data in 2007 and operating cash flow in 2008 (dependent variable). The operating cash flow in 2009 was predicted for four independent variables using the trained network and financial data of 2008. The Error Metric of each prediction (the ability to predict future operating cash flow) was calculated and analyzed. To determine the appropriate test method in inferential statistics, the most basic assumption is to examine the normality of observations we have collected. It was performed through Kolmogorov–Smirnov test and considering the abnormality of observations, nonparametric statistical methods, specifically wilcoxon test were used. However, parametric methods such as correlation analysis and Student's t-test were also used to confirm the results of nonparametric methods.

DATA ANALYSIS

The results of the descriptive statistics are presented in Table **1**. However, for more appropriate review, remote observations relating to Iranian textile industry, Kosar Pharmaceutical and Damavand Mineral Companies were removed from the list of observations.

TABLE 1: DESCRIPTIVE STATISTICS FOR THE OBSERVATIONS

Descriptive criteria Group	Total	Average	Minimum	Maximum	Standard deviation	Skewness coefficient
Error Metric of prediction of future operating cash flow considering cash items	*57*	*0.5923*	*0.0116*	*3.3699*	*0.6515*	*2.204*
Error Metric of prediction of future operating cash flow considering cash items and syntactic accruals	*57*	*0.3005*	*0.0101*	*0.9798*	*0.2644*	*1.170*
Error Metric of prediction of future operating cash flow considering cash items and semantic accruals	*57*	*0.2507*	*0.0043*	*2.1434*	*0.3293*	*3.959*
Error Metric of prediction of future operating cash flow considering cash items and syntactic and semantic accruals	*57*	*0.1848*	*0.0023*	*0.9972*	*0.1983*	*2.628*

In order to determine the appropriate test method in inferential statistics, the most basic assumption is to examine the normality of observations we have collected. It was performed through Kolmogorov–Smirnov test, the results of which are presented in Table **2**.

TABLE 2: ONE-SAMPLE KOLMOGOROV-SMIRNOV TEST

Normality test [1]		Error Metric related to adding syntactic accruals to cash items	Error Metric related to adding semantic accruals to cash items	Error Metric related to adding syntactic and semantic accruals to cash items	Error Metric associated with considering only cash items
Normal parameters	Mean	*0.216*	*0.375*	*1.466*	*1.546*
	Standard deviation	*0.263*	*0.823*	*8.598*	*7.789*
Smallest upper bounds	Absolute value D_n	*0.222*	*0.342*	*0.473*	*0.400*
	D_n^+	*0.222*	*0.342*	*0.473*	*0.400*
	D_n^-	*-0.207*	*-0.326*	*-0.433*	*-0.395*
Z		*1.718*	*2.649*	*3.660*	*3.100*
p-value		*0.005*	*0.000*	*0.000*	*0.000*

In all four cases in the above Table, the significance level is lower than **0.05** (*P< 0.05*). Thus, the normality hypothesis will be rejected in all cases and in fact caution should be taken in using classic tests. Therefore, nonparametric methods should be used in inferential statistics. To evaluate the hypotheses using nonparametric methods, Wilcoxon test is used the results of which are presented as follows.

This study intends to explore the difference of Error Metric of operating cash flow considering cash items, and Error Metric of operating cash flow considering cash items along with syntactic and semantic accruals, which are respectively and separately evaluated in three hypotheses. In general, these hypotheses were formulated as follows:

$$\begin{cases} H_\circ: \mu_1 - \mu_j \leq \circ \\ H_1: \mu_1 - \mu_j > \circ \end{cases}$$

In The fourth hypothesis, the Error Metric of prediction of operating cash flow is compared when syntactic and semantic accruals are added to cash items.

$$\begin{cases} H_\circ: \mu_1 - \mu_j = \circ \\ H_1: \mu_1 - \mu_j \neq \circ \end{cases}$$

It is related to Error Metric of operating cash flow by only considering the cash items and Error Metric of operating cash flow by considering cash items along with syntactic, semantic accruals, and both (it is respectively for the first, second and third hypotheses).

1) FIRST HYPOTHESIS

The results of Table **1** indicate that the calculated test statistic of the differences of Error Metric of prediction of operating cash flow in two modes (considering only cash items - considering cash items added with syntactic accruals) is equal to **4.215**. Also, given that the significance level is **0.00** and less than **0.05** (*P< 0.05*), with the probability of **0.95**, we conclude that there is a significant difference between the Error Metric of the prediction of operating cash flow in both modes (considering only cash items - considering cash items added with syntactic accruals).

---

[1] One-Sample Kolmogorov-Smirnov Test

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   7
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE3: WILCOXON TEST FOR DIFFERENCES OF ERROR METRIC OF THE PREDICTION OF OPERATING CASH FLOW IN TWO MODES (CONSIDERING ONLY CASH ITEMS - CONSIDERING CASH ITEMS ADDED WITH SYNTACTIC ACCRUALS)

Test Statistics[b]	
	differences of Error Metric of the prediction of operating cash flow in two modes (considering only cash items - considering cash items added with syntactic accruals)
Test Statistics	^{a}-5.510
Asymp. Sig. (2-tailed)	0.000
a. Based on positive ranks.	
b. Wilcoxon Signed Ranks Test	

2) SECOND HYPOTHESIS

The results of Table **4** indicate that the calculated test statistic of the differences of Error Metric of the prediction of operating cash flow in two modes (considering only cash items - considering cash items added with semantic accruals) is equal to **-5.51**. Also, given that the significance level is **0.00** and less than **0.05** ($P < 0.05$), with the probability of **0.95**, we conclude that there is a significant difference between the Error Metric in both modes (difference of the Error Metric of prediction of operating cash flow in two modes of considering only cash items and considering cash items added with semantic accruals).

TABLE 4: WILCOXON TEST FOR DIFFERENCES OF ERROR METRIC OF THE PREDICTION OF OPERATING CASH FLOW IN TWO MODES (CONSIDERING ONLY CASH ITEMS - CONSIDERING CASH ITEMS ADDED WITH SEMANTIC ACCRUALS)

Test Statistics[b]	
	differences of Error Metric of the prediction of operating cash flow in two modes (considering only cash items - considering cash items added with semantic accruals)
Test Statistics	^{a}-4.215
Asymp. Sig. (2-tailed)	0.000
a. Based on positive ranks.	
b. Wilcoxon Signed Ranks Test	

3) THIRD HYPOTHESIS

The results of Table **5** indicate that the calculated test statistic of the differences of Error Metric of the prediction of operating cash flow in two modes (considering only cash items - considering cash items added with syntactic and semantic accruals) is equal to **-5.375**. Also, given that the significance level is **0.00** and less than **0.05** ($P < 0.05$), with the probability of **0.95**, we conclude that there is a significant difference between the Error Metric of the prediction of operating cash flow in both modes (considering only cash items - considering cash items added with syntactic and semantic accruals).

TABLE 5: WILCOXON TEST FOR DIFFERENCES OF ERROR METRIC OF THE PREDICTION OF OPERATING CASH FLOW IN TWO MODES (CONSIDERING ONLY CASH ITEMS - CONSIDERING CASH ITEMS ADDED WITH SYNTACTIC AND SEMANTIC ACCRUALS)

Test Statistics[b]	
	differences of Error Metric of the prediction of operating cash flow in two modes (considering only cash items - considering cash items added with syntactic and semantic accruals)
Test Statistics	^{a}-5.375
Asymp. Sig. (2-tailed)	0.000
a. Based on positive ranks.	
b. Wilcoxon Signed Ranks Test	

4) FOURTH HYPOTHESIS

In order to examine this hypothesis, the Error Metric for prediction of operating cash flow with adding up of syntactic accruals to cash items was compared with the Error Metric for prediction of operating cash flow with adding up of semantic accruals to cash items using Student's t-test, the results of which are presented in table **4** and **5**.

TABLE 6: EVALUATION OF THE CORRELATION OF ERROR METRIC FOR PREDICTION OF OPERATING CASH FLOW WITH ADDING UP OF SYNTACTIC ACCRUALS TO CASH ITEMS AND THE ERROR METRIC FOR PREDICTION OF OPERATING CASH FLOW WITH ADDING UP OF SEMANTIC ACCRUALS TO CASH ITEMS

Total	The correlation coefficient	Significance level
58	0.906	0.00

The results of Table **4** indicate that the calculated correlation between the Error Metric of the prediction of operating cash flow with adding up of syntactic accruals to cash items and the Error Metric for prediction of operating cash flow with adding up of semantic accruals to cash items is equal to **0.906**. Also, given that the significance level is **0.00** and less than **0.05** ($p < 0.05$), with the probability of **0.95**, we conclude that there is a significant linear relationship between the Error Metric in the two mentioned modes. To compare the effect of adding syntactic and semantic accruals, the paired t-test is used the results of which are presented in table **5**.

TABLE 7: EVALUATION OF THE CORRELATION OF ERROR METRIC FOR PREDICTION OF OPERATING CASH FLOW WITH ADDITION OF SYNTACTIC ACCRUALS TO CASH ITEMS AND THE ERROR METRIC FOR PREDICTION OF OPERATING CASH FLOW WITH ADDITION OF SEMANTIC ACCRUALS TO CASH ITEMS

	The mean difference	Standard deviation	The test statistic	Degrees of freedom	Significance level
Subtracting the Error Metric	0.0498	0.321	1.18	57	0.243

The results of Table **5** indicate that the amount of the statistics calculated is **1.118** and less than t-statistic criterion (**1.96**). Therefore, considering the collected data and significance of Zero hypothesis, we conclude that the researcher's claim suggesting that syntactic and semantic accruals are equally effective in improving the prediction of future operating cash flows, will be confirmed.

CONCLUSIONS

The average prediction error of operating cash flow which is predicted in four modes by considering only cash items, cash items added to syntactic accruals, and semantic accruals and both, will be respectively reduced. The best prediction is related to the operating cash flow in Rose Daru Company, with error of **0.23**%, which is almost close to zero. The minimal percentage of error reveals the strength of accruals in prediction of operating cash flows; because the average prediction error is reduced by adding accruals. According to the Statement of Financial Accounting Standards Board and Standards Committee of Iran, any information that will improve cash flow prediction has information content. Thus, it can be concluded that increase in accuracy of cash flows prediction indicates the information content of accruals. The comparison of standard deviation of four types of prediction also shows that accuracy of the fourth type of cash operating flows prediction has less standard deviation than others. Standard deviation in the second and third types of prediction is far more than the fourth

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 8
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

type, because only one type of accruals is considered in each prediction and standard deviation is also very high in the first prediction, due to elimination of accruals. Considering more accruals in predictions, the sample will be more homogeneous and more consistent, consequently density of errors will be increased around the mean, and thus, error fluctuation will be reduced. Finally, the selection of added information will move on the right direction.

The remarkable issue in this study about the other dispersion index, i.e. skewness coefficient is that unlike the other results, it does not follow a specific rule. Its high level also indicates abnormality of the distribution. The causes of abnormality of distribution cannot be exactly discussed the main reason of which is perhaps sample selection from various industries. However, due to the low number of companies in each industry, there is practically no other choice. Abundant economic fluctuations in *2008* and their different effects on industries can strengthen this possibility. The following chart shows stock index changes during 2007 -*201*0**.**
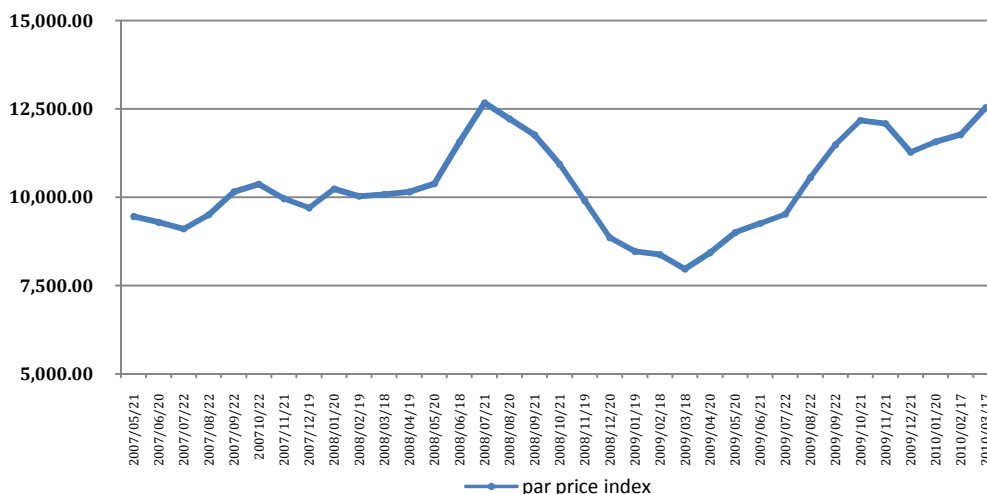
As mentioned in previous sections, the results of testing the first three hypotheses of research are as follows:
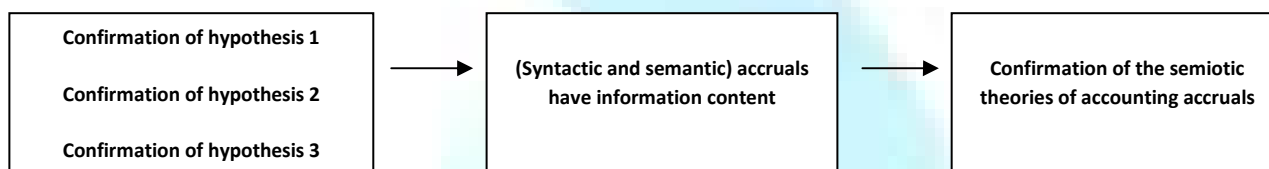
Hypothesis *4* of this research also suggests that syntactic and semantic accruals are equally effective in improving the prediction level of future operating cash flows. It means that the information contents of syntactic and semantic accruals are almost at the same level. Many studies have examined the information content of accruals. The result of such studies has confirmed the information content of accruals in prediction of operating cash flow, return on equity, abnormal earnings, company's value and company's valuation. However, the only study which has specifically tested semiotic theories of accounting accruals is a study conducted by Etheridge and Hsu in *2004*. However, presenting the information content of accruals in prediction of future operating cash flow in this study, the researchers confirmed the semiotic theories of accounting accruals. This study is inconsistent with the research of Etheridge and Hsu in terms of data types used in prediction of operating cash flow, which results from different divisions in the classification of cash flow statement (in Iran: five classifications and in Etheridge and Hsu research: three classifications) and the definition of cash (in Iran, cash equivalents are not considered cash).

SCOPE FOR FURTHER RESEARCH

According to the results of this study, the managers, investors, creditors and analysts are recommend to scrutinize accruals in making their decisions and predictions, because accruals have information content and surprise value due to the full disclosure of an economic events, thus, they make a clearer picture of the future. Meanwhile, the following recommendations are presented in order to be applied in further studies:

1) Testing of the semiotic theories of accounting accruals and Genetic Algorithms

2) Testing of the semiotic theories of accounting accruals and fuzzy logic

REFERENCES
1.   Accounting Standards Board. Accounting Standards**.** (2008). Iran: Publications of Audit Organization.
2.   Aliabadi, A. and Norifard, Y. (2009), "Accruals game", Accountant, No.*212*, pp. *78-81*.
3.   Arabmazaryazdi, M., Mashayekhi, B. and Rafiei, A. (2006), "Content information of cash flows and accruals in capital markets"**,** Accounting and Audit Review, No.*43*, pp. *99-118*.
4.   Arnedo, L., Lizarraga, F. and Sanchez, S. (2011)," The role of accounting accruals for the prediction of future cash flows: evidence from Spain", Journal of the Spanish Economic Association, pp. *1-22*.
5.   Barth, M., Beaver, w., Hand, J. and Landsman, w. (2005), "Accruals, Accounting– Based Valuation Models and The Prediction of Equity Values", Journal of Accounting, Auditing & Finance, Vol. *20*, No.*4*, pp. *311*-*345*.
6.   Brochet, F., Nam, S. and Ronen, J. (2007), "Accruals and the prediction of future cash flows", International Business & Economics Research Journal, Vol. *2*, No.*3* , pp.*55*-*82*.
7.   El-Sayed Ebaid, I. (2011), " Accruals and the prediction of future cash flows: Empirical evidence from an emerging market", Management Research Review, Vol.*34*, No.7, pp.838-853.
8.   Etheridge, H. L. , Hsu, K. H. Y. (2004), " Using Artificial Neural Networks to Examine Semiotic Theories of Accounting Accruals", Journal of Business & Economics Research, Vol.*2*, No.*12*, pp.*73*-*88*.
9.   Ghaemi, M.H. (1996), "Establishment of accounting theory based on conventional principles", Accounting and Audit Review, No.*16&17*,   pp.*110-145*.
10. Hashemi, S.A., Samadi, S. and Sorush Yar, A. (2010), "Assessment of capabilities of cash components and accrual components of earnings in prediction of abnormal earnings and valuation of the companies listed in Tehran Stock Exchange", Journal of Financial Accounting Research, No.*1*, pp.*93-112*.
11. Haw, I., Qi, D., Wu, W. (2001), "The Nature of Information in Accruals and Cash Flows in an Emerging Capitol Market: The Case of China", The International Journal of Accounting, No.*36*, pp.*391*- *406*.
12. Hollister, J., Shoaf, V. and Tully, G. (2008), "The Effect of Accounting Regime Characteristics on the Prediction of Future Cash Flows: An International Comparison", International Business & Economics Research Journal, Vol.*7*, No.*5*, pp.*15*-*30*.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   9

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

13. Khatami, M. (1998), " Accounting theory", Accountant, No.*123*, pp.14-18.
14. Modarres, A. and Deyanati Deylami, Z. (2004), "The examination of application of multivariate time series model in prediction of operating cash flows: comparison of theory with experimental evidence", Accounting and Audit Review, No.*34*, pp.*77-110*.
15. Saghafi, A. and Hashemi, S.A. (2004), "Analytical investigation of the relationship between operating cash flows and accruals, presenting a model to predict operating cash flows", Accounting Review, No.*38*, pp.*29-52*.
16. Sebeok, T. (1994), "Signs; an Introduction to Semiotics", Toronto, University of Toronto Press.
17. Shabahang, R. (2001), "Nature of accounting theory and its gradual evolution process", Auditor, No.*12*, pp.16-20.
18. Shamakhi, H. and Ghasemiyan, M. R., (2000), "The comparison of application of accounting standards in Iran and several selected countries around the world", Accountant, No.*134*, pp.20-32.
19. Sloan, R. G. (1996), "Do stock prices fully reflect information in accruals and cash flows about future earnings?", The Accounting Review, pp.333-305.
20. Tehrani, R. and Fani Asl, M. (2008), "The relationship of cash from operations and accruals earnings with stock returns of companies listed in Stock Exchange Financial Investigations", Financial Research, No.*24*, pp.*21 – 32*.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 10
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

JOB SATISFACTION AMONG EMPLOYEES IN INDUSTRIES IN TAMIL NADU, INDIA

DR. ANTHEA WASHINGTON
SR. LECTURER
CALEDONIAN COLLEGE OF ENGINEERING
MUSCAT

ABSTRACT

Job satisfaction is crucial for organization's performance and productivity. In spite of the countless studies on job satisfaction made from different perspectives, there are still gaps and several questions left unanswered, which paves way for more such research. This study makes an attempt to add to the existing knowledge by finding out the degree of satisfaction among employees in 12 different industries in India. This is an analytical - descriptive study based on primary data. The main objectives of the study are to find out the degree of Job Satisfaction of the employees in different sectors and to examine the factors that influence the Job Satisfaction of the employees. The study used a scale developed by Dubey et al (1969) on Job Satisfaction to understand the level of employee job satisfaction in the selected companies. The findings make it clear that factors like high salary, being in senior level positions, getting promotions and attending training programmes need not necessarily lead to job satisfaction. Employees look for other things at work such as blending of personal values with work values, organizational culture, fair treatment, open communication, career growth and healthy work environment for having a positive attitude towards work.

KEYWORDS

Employees Perception, HRM, Job Satisfaction, Salary, Promotion.

INTRODUCTION

Job satisfaction is one area of study which has drawn academicians, researchers and experts in the management field to come up with various inputs and knowledge facets. Studies made into assessing the job satisfaction of employees across different industries or sectors is something which forever is intriguing and has neverbecome outdated. There are thousands of studies on job satisfaction and the number is still growing stronger.This clearly shows the seriousness of the issue and the interest shown by organizations to analyze employee satisfaction. The reason is not too difficult to comprehend. Studies have revealed that job satisfaction is crucial for organization's performance and productivity. HR managers, psychologists and authorities would be only too happy if there is a single dose of solution for making employees satisfied at work. But, then a 'satisfied' employee is largely figurative and only too hard to define.

Employee satisfaction is essential to implementing high-performance or high-commitment work systems (Osterman P, 1987). Money alone in whatever terms – salary, bonus, benefits etc. cannot keep the employees satisfied. They look for much higher satisfiers such as safe and healthy working environment, sound culture, empathetic line managers, fair treatment at work, team spirit, fair policies, opportunities for career advancement and above all job security at work place.

"Job satisfaction is defined as "the extent to which people like (satisfaction) or dislike (dissatisfaction) their jobs" (Spector, 1997, p. 2). Source: Work & Family Researchers Network. "Hoppock defined job satisfaction as any combination of psychological, physiological and environmental circumstances that cause a person truthfully to say I am satisfied with my job" (Hoppock, 1935)."Job satisfaction is closely linked to that individual'sbehaviour in the work place "(Davis et al., 1985).Source - Aziri B (2011).Locke and Lathan (1976) give a comprehensive definition of job satisfaction as pleasurable or positive emotional state resulting from the appraisal of one's job or job experience. (Source – Tella A et al, 2007)

Job satisfaction is a result of employee's perception of how well their job provides those things that are viewed as important. (Source: Tella A et al, 2007). From the above definitions, it is clear that job satisfaction cannot be uniformly defined and it has several connotations to it. Generally, it refers to an employee's state of positive attitude or feelings towards the work that he is currently involved in.

LITERATURE REVIEW

The available research studies relating to job satisfaction are focused on such areas as these:Ali, N(2008)relating job satisfaction and employee turnover found that the highest correlation with turnover intention was of Pay, Promotion, Fringe benefits and contingent rewards. Edward SekKhin Wong &TeohNgeeHeng (2009) on studying the factors that affect satisfaction revealed that the major sources of job satisfaction for Malaysian faculty members are shown to be policy, administration, and salary. Chimanikire1 P. et al (2007) showed that a greater proportion of the academic staff was not satisfied with their jobs. Reasons for dissatisfaction include high volume of work, inadequate salaries, allowances, loans to facilitiespurchase of housing stands and cars.

Kaur S, et al, 2009 in their study of job satisfaction and work environment perception among doctors found that a significant proportion of doctors were found to be dissatisfied with the average number of their work-hours and salary. A study of the relationship between job satisfaction, organizational commitment and turnover intention among hospital employeesby Mosadeghrad AM, et al (2008) reported that Employees' job satisfaction and organizational commitment were closely inter-related and correlated with turnover intention.Muhammad MasroorAlamMohammad &Jamilha Fakir Mohammad, (2009) found that the nursing staffs were moderately satisfied with their job in all the six facets of job satisfaction i.e. satisfaction with supervisor, job variety, closure, compensation, co-workers and HRM/management policies and therefore exhibits a perceived lower level of their intention to leave the hospital and the job.

Bauer TK (2004) in his study on High Performance Workplace Practices and Job Satisfaction: Evidence from Europe, shows that a higher involvement of workers in HPWOs is associated withhigher job satisfaction. Ahsan N, et al (2009) associated Job Stress and Job satisfaction and found that there is significant negative relationship between job stress and job satisfaction; Mudor H &Tooksoon P (2011) in their study "Conceptual framework on the relationship between human resource management practices, job satisfaction, and turnover" found that HRM practice is positively and significantly correlated with job satisfaction. On the other hand HRM practice and job satisfaction are negatively and significantly correlated with turnover. Tella A et al (2007) in their study reported that a 'correlation exists between perceived motivation, job satisfaction, and commitment, although correlation between motivation and commitment was negative.Moreover, findings also show that differences exist in the job satisfaction of library personnel in academic and research libraries'.

The other areas of research include: Employee perceptions of job satisfaction: comparative study on Indian banks (Shrivastave A &Purang P, 2009); Linking Employee Satisfaction with Productivity, Performance, and Customer Satisfaction, (Corporate Leadership Council, 2003); Job Satisfaction of Professional and Paraprofessional Library Staff… (Murray RA, 1999);Job Satisfaction as Related to Organisational Climate and Occupational Stress: A Case Study of Indian Oil (K.K.Jain et al, 2007); Employee Attitudes and Job Satisfaction, (Saari LM & Judge TA, 2004);Factors influencing job satisfaction of banking sector employees in Chennai, India, (Sowmya1, K.R., &Panchanatham, N. 2011).

IMPORTANCEOF THE STUDY

In spite of the countless studies on job satisfaction made from different perspectives, there are still gaps and several questions left unanswered, which paves way for more such research. This study makes an attempt to add to the existing knowledge by finding out the degree of satisfaction among employees in 12 different industries in India. The focus is on how employee satisfaction varies in terms of HR vs. Line staff, different categories of industries such as IT &

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

11

Communication industry, Manufacturing industry and service industry and in terms of location, and other job related factors such as training, promotion, transfers, salary etc. These are important factors to be considered as they make an impact on job satisfaction.

OBJECTIVES OF THE STUDY
1) To find out the degree of Job Satisfaction of the employees in different sectors.
2) To examine the factors that influences the Job Satisfaction of the employees.
3) To study the level of satisfaction among employees based on HR vs. Line staff, location and type of organizational sector.

RESEARCH METHODOLOGY
This is an analytical - descriptive study based on primary data. It is descriptive in nature as it attempts to present the facts relating to different socio-economic characteristics and job satisfaction and analytical since important factors influencing the cause and effect relationship of job satisfaction are studied.

In this research, the target firms were first randomly selected from the NIPM listing. The companies were checked to see that they had more than 100 employees. Six companies from Madurai and six from Chennai were selected for data collection. Stratified random sampling method was adopted. The selected companies were categorized as companies with less than 300 employees, companies with 300 – 600 employees and those with more than 600 employees. The size of the sample varied depending on the total number of employees in each industry. A sample of employees from each organization was randomly selected, and the questionnaire was administered to them. In some organizations specific divisions/ departments were targeted. A total sample of 955 employees was selected.

The study used a scale developed by Dubey et al (1969) on Job Satisfaction to understand the level of employee job satisfaction in the selected companies. This scale was selected since it was simple and found to be relevant to the present study. The researcher had included appropriate questions for obtaining information on the socio-economic characteristics of the respondents such as age, experience, marital status, family and economic particulars. Information relating to certain organizational factors such as Number of promotions, Number of transfers in the last five years, Number of training programmes attended – internal, external and abroad etc was also included in the questionnaire.

Responses were obtained on a five point scale. The tool had 25 statements and hence the maximum score was 125 and the minimum score 25. The low, medium and high values were computed as Low – 25 – 65, Medium – 66 – 96 and High – 97 – 125.

Statistical presentation was made, using the Statistical Package for Social Sciences [SPSS] software. Quantitative techniques namely Chi-square, Mean, SD, ANOVA, 't' test and Multiple Regression were used to draw conclusions. Textual discussions were made and the results of the study have been presented.

ANALYSIS & INTERPRETATIONS
Cross-tabulation results of the Socio-economic characteristics of the respondents have been presented in relation to the nature of primary business carried out by the organizations. The primary business have been classified as IT and Communication (n=115), Manufacturing and Production (n=600) and Service industries (n=240). In Table 1, results have been given for gender, Managerial levels and HR vs. Line departments.

Table 1 - DISTRIBUTION OF RESPONDENTS BY GENDER, MANAGERIAL LEVELS, HR DEPARTMENT vs. LINE DEPARTMENT

S. No.	Gender	IT & Communication		Manufacturing & Production		Service		Total	
		n	%	n	%	n	%	n	%
1.	Male	99	86.1	496	82.7	179	74.6	774	81.0
2.	Female	16	13.9	104	17.3	61	25.4	181	19.0
	Total	115	100	600	100	240	100	955	100

Chi – Square = 9.454 df = 2 P < 0.05 Significant

S. No.	Managerial Levels	IT & Communication		Manufacturing & Production		Service		Total	
		n	%	n	%	n	%	n	%
1.	Bottom	69	60.0	472	78.7	114	47.5	655	68.6
2.	Middle	37	32.2	96	16.0	94	39.2	227	23.8
3.	Top	9	7.8	32	5.3	32	13.3	73	7.6
	Total	115	100	600	100	240	100	955	100

Chi-square = 82.634 df = 4 P < 0.05 Significant

S. No.	Department	IT & Communication		Manufacturing & Production		Service		Total	
		n	%	n	%	n	%	n	%
1.	HR	8	7.0	44	7.3	14	5.8	66	6.9
2.	Line	107	93.0	556	92.7	226	94.2	889	93.1
	Total	115	100	600	100	240	100	955	100

Chi-square = 0.599 df =2 P > 0.05 Not. Significant

Table 1 presents the distribution of respondents by gender, managerial levels and HR vs. Line departments drawn from three types of organizations namely IT and communications, manufacturing and production and service sectors. Of 774 male respondents selected for the purpose of the study, a high proportion of them (82.7%) were employed in manufacturing and production units. As it is evident, of 181 female respondents, 25.4% of them were employed in the service sectors. A high proportion of females were found in service sectors than in the other two groups, probably because females were preferred in service sectors to occupy positions such as front office executives, customer relationship executives, customer care officers etc. The chi-square test (9.454) shows a statistically significant difference between males and females.

The table also presents the distribution of respondents by their level of employment in the organizations. It is noted that 68.6% were at the bottom layer of the organizations, 23.8% were at the middle level and 7.6% were at the top layer of the organizations.

The table brings to light the distribution of respondents based on the categorization of employees namely HR personnel and Line personnel. It is noted that a majority of them (93.1%) were line personnel, whereas only 6.9% were from the Human Resources Departments in the organizations.

It is observed that 7%, 7.3% and 5.8% from IT and communication, manufacturing and production and service organizations respectively were HR personnel. The reminder 93%, 92.7% and 94.2% from IT and communication, manufacturing and production and service organizations respectively were line personnel. The result from chi-square (P>0.05) test shows that there existed no significant difference between the two groups, namely HR personnel and line personnel.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 12
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE 2 - ONE WAY ANOVA RESULTS OF TOTAL JOB SATISFACTION BY DIFFERENT ORGANIZATIONS

S No	Name of Organization	N	Mean	SD	F Ratio	Result	Scheffe Result
1	Firm 1	35	76.06	9.85			
2	Firm 2	270	83.26	11.41			GP7vs
3	Firm 3	100	83.26	11.34			4,9,8,10
4	Firm 4	100	66.78	13.46			1,5,6,3,2
5	Firm 5	80	76.49	15.38	43.22	P<0.05Sig	GP12vs8,10,5, 6, 3, 2
6	Firm 6	30	77.20	15.29			
7	Firm 7	80	56.19	16.44			GP4vs5,3,2
8	Firm 8	80	74.61	9.44			GP11vs3,2
9	Firm 9	50	72.72	9.21			GP8vs3,2
10	Firm 10	50	75.94	9.80			GP9vs3,2
11	Firm 11	25	67.60	6.68			
12	Firm 12	55	64.73	6.65			
	Total	**955**	**75.11**	**14.60**			

In Table 2, the One Way Anova results of Job Satisfaction based on different organizations have been portrayed. A careful analysis of the data reveals that the total mean value was 75.11 (SD=14.60) and that Firm 2 (Mean=83.26; SD=11.41) and Firm 3 (Mean= 83.26; SD=11.34) had the highest mean value indicating a high degree of satisfaction among the employees at work. It is very essential to note that in both these organizations, especially in Firm 2 quality circles have been established and successfully functioning in dealing with all employees and work related problems. The effective functioning of quality circles, where employees' suggestions were listened to could itself be a contributing factor for job satisfaction.

This was followed by Firm 6 with a mean value of 77.20 (SD=15.29), followed by Firm 5 with a mean value of 76.49 (SD=15.38). On the contrary, Firm 7 had secured the lowest mean value of 56.19 (SD=16.44).This clearly shows that the employees were not that satisfied with their work. This was followed by Firm 12 with a mean value of 64.73 (SD=6.65). Firm 4, Firm 11, Firm 9 and Firm 8 also had mean values, which were lower than the total mean value, which has revealed that they had low level of job satisfaction when compared to the firms with mean values higher than the total mean value. The observed f-ratio value was 43.22 which proved a statistically significant difference among the groups (P<0.05).

The Scheffe result further reveals that Firm 7 differed significantly with Firm 1, Firm 2, Firm 3, Firm 4, Firm 5, Firm 6, Firm 8, Firm 9 and Firm 10. Similar differences can be found from the table, which indicates that employees in the organizations covered in the study differed in their level of job satisfaction.

It is interesting to note that firms with employees who have had high level of job satisfaction were manufacturing and production industries, whereas firms with employees having low level of job satisfaction were IT and communication and service organizations. Presumably this might be due to the fact that more demands and pressure were put on employees in IT and communication and service sectors, to meet the growing competition which might have contributed to low level of job satisfaction. Moreover, in most of these organizations, the organizations structure is tall and it takes employees a long time to reach the top of the hierarchy. Because of the size of the organizations, knowing each employee individually becomes quite impossible, and hence recognition and word of praise and personal support by superiors come quite rarely. These reasons may have led to lower satisfaction of employees at work.

TABLE 3-'t' TEST RESULTS OF TOTAL JOB SATISFACTION BY SELECTED SOCIO-ECONOMIC VARIABLES

S.No	Factors	N	Mean	SD	't' Value	Result
1.	1.Male	774	74.92	14.79	0.86	P>0.05 Not.Sig
	2.Female	181	75.92	13.78		
2.	1.Married	619	76.96	14.09	5.30	P<0.05 Sig
	2.Single	336	71.70	14.93		
3.	HR vs. Line					P>0.05 Not.Sig
	1.HR	66	74.06	16.13	0.55	
	2.Line	889	75.19	14.49		
4.	Training abroad					
	1.Nil	910	75.01	14.62	0.92	P>0.05 Sig
	2.Yes	45	77.02	14.62		
5.	Spouse employed					
	1.Yes	275	78.65	13.94	4.92	P<0.05 Sig
	2.No	680	73.68	14.63		

Table 3 highlights the't' test results of job satisfaction based on selected socio-economic variables such as gender, marital status, HR & line personnel, training programmes attended abroad and employment status of spouse.

The study found that the mean value for male employees was 74.92 (SD = 14.79), whereas for female employees it was 75.92 (SD = 13.78). The observed mean difference did not differ statistically since the't' value (0.86) was not significant at 0.05 level. However, it is seen that both the groups had quite a high degree of job satisfaction, since the mean percentage value was high. The 't' test results of job satisfaction with regard to the marital status had revealed that the mean value for married employees was 76.96 (SD = 14.09) and the mean value for unmarried employees was 71.70 (SD = 14.93). This difference in mean values was found to be statistically significant, since the 't' value (5.30) was significant at 0.05 level (P < 0.05). Since the mean value for married employees was higher than the unmarried employees, it can be inferred that married people had high level of satisfaction in their jobs, than the unmarried. Overall, the job satisfaction of both the groups was high, since the mean percentage value was quite high.

The 't' test results of job satisfaction based on HR personnel vs. line personnel had revealed that the mean percentage value for HR staff was 74.06 (SD = 16.13), whereas the mean value for line personnel was 75.19 (SD = 14.49). This shows that the two groups had high level of job satisfaction. This observed difference in mean value did not differ statistically, since the 't' value (0.55) was not significant. Looking at the mean percentage value, it can be inferred that both the groups had relatively higher level of job satisfaction. Similar results have been found in the study conducted by Business Today through Gallup MBA India (1995) which reported that 78% of Human Resources Managers and other managers were satisfied in their organizations.

Considering the factor 'Training – Abroad', it is noted that the mean percentage value for those who had not attended any training programme overseas was 75.01 (SD = 14.62), whereas the mean value for those who had attended at least one overseas training programme was 77.02 (SD = 14.20). This difference in mean value did not differ statistically, since the 't' value (0.92) was not significant at 0.05 level (P> 0.05). However, the mean percentage value implies that whether or not employees had attended overseas training programme, they had quite a high level of job satisfaction.

Considering the factor 'Spouse – employed', it is noted that the mean value for those who had working spouse was 78.65 (SD = 13.94) and the mean value for those whose spouse were not working was 73.68 (SD = 14.63). This difference in mean value differed statistically, since the 't' value (4.92) was significant at 0.05 level. From this, it can be inferred that the employment status of the spouse had a bearing on the job satisfaction among employees at work, this is to say, employees with the working spouses had high level of job satisfaction than those with spouses who were unemployed. However, the level of job satisfaction among both the groups was quite high, as the observed mean percentage value was high.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   13
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE 4 - ONE WAY ANOVA RESULTS FOR TOTAL JOB SATISFACTION BASED ON SELECTED SOCIO-ECONOMIC VARIABLES

S. No	FACTORS	N	Mean	SD	F-Ratio	Results	Scheffe Results
1.	**Age**						
	1.Below 20yrs	26	71.15	13.69	2.84	P<0.05 Sig	--
	2.21-30yrs	469	73.99	14.64			
	3.31-40yrs	290	77.20	14.34			
	4.41-50yrs	123	75.79	14.62			
	5.51yrs& Above	47	73.77	15.14			
	Total	955	75.11	14.60			
2.	**Experience in org**						
	1.Below 5yrs	559	74.39	14.54	3.43	P<0.05 Sig	GP3vs1
	2.6-10yrs	163	75.70	14.80			
	3.11-15yrs	126	78.71	13.50			
	4.16yrs & above	107	73.74	15.36			
	Total	955	75.11	14.60			
3.	**Salary**						
	1.Below Rs25000	186	78.62	12.65	11.78	P<0.05 Sig	GP3vs2,5 GP4vs2
	2.Rs250001-Rs50000	289	78.19	12.98			
	3.Rs50001-Rs75000	266	70.23	15.85			
	4.Rs75001-Rs100000	99	70.46	14.22			
	5.Rs100001-Rs200000	48	78.50	16.71			
	6.Rs200001-300000	55	75.91	18.20			
	7.Rs300001 & Above	12	75.91	18.20			
	Total	955	75.11	14.60			
4.	**Primary Business**						
	1.IT &Comm	115	68.80	9.15	55.08	P<0.05 Sig	GP2vs1,3
	2.Manu &Prod	600	78.72	13.27			
	3.Service	240	69.10	16.77			
	Total	955	75.11	14.60			
5.	**Levels of Mgt**						
	1.Bottom	655	75.34	14.35	0.31	P>0.05 Not. Sig	
	2.Middle	227	74.46	15.96			
	3.Top	73	75.05	12.37			
	Total	955	75.11	14.60			
6.	**Type of Company**						
	1.MNC&FC	300	82.66	11.97	66.70	P<0.05 Sig	GP1vs2,3
	2.Public	180	71.09	15.10			
	3.Private	475	71.86	14.14			
	Total	955	75.11	14.60			
7.	**No.of. Promotions**						
	1.Nil	647	74.78	14.74	0.65	P>0.05 Not Sig	--
	2.1&2	272	75.65	14.74			
	3.3&Above	36	76.97	10.51			
	Total	955	75.11	14.60			
8.	**Training-External**				P<0.05 Sig		
	1.Nil	521	72.43	14.94	21.04		GP1vs2,3
	2.1-2	379	77.97	13.61			
	3.3&Above	55	80.78	12.73			
	Total	955	75.11	14.60			

Table 4 highlights the mean percentage value and SD values for job satisfaction taking into consideration selected socio-economic variables, such as 'Age', 'Total Experience', 'Salary', 'Primary Business', 'Level of Management', 'Number of Promotions', 'Number of Transfers' and 'Training programmes attended'. The data reveals that the total mean value was 75.11 (SD = 14.60).

For the factor 'Age', respondents who were between 31-40 years (Mean= 77.20; SD = 14.34) and those in the 41-50 years range (Mean= 75.79; SD = 14.62) had mean values which were higher than the total mean value. The f-ratio value being 2.84, it was found that significant differences existed among the groups. This result indicates that these respondents had higher level of job satisfaction than those in other age ranges.

This may be because as the individual matures and settles down in an organization, his expectations were moderated, he becomes more practical or objective towards his organization and he was more likely to make certain compromises with the prevailing situation, which means that he was indeed satisfied at work.

It is seen that for the factor 'Experience in present organization', the respondents with 11-15 years of experience (Mean= 78.71; SD = 13.50) and those with 6-10 years of experience (Mean= 75.70; SD = 14.80) had mean values which were higher than the total mean value. It is intriguing to note that respondents who had low level of job satisfaction have had 16 or more years of experience. The f-ratio value was 3.43 which proved that there was significant difference among the groups. The Scheffe result shows that respondents with 11-15 years of experience differed significantly with those having less than 5 years of experience.

As regards 'Salary', it is seen that except for those drawing Rs.50,001 – Rs.75,000 per annum (Mean= 70.23; SD =15.85) and those earning Rs. 75,001 – Rs.1,00,000 (Mean= 70.46; SD = 14.22) all others had mean values which were higher than the total mean value. It is noticed that respondents who earned less than Rs.25,000 per annum (Mean= 78.62; SD = 12.65) felt quite satisfied with their work than the other respondents. It is quite right to point out here the study by Indian Management (1998) which reported that salary and security were not important for satisfied workers but was important for the dissatisfied workers.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   14
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

The f-ratio value being 11.78, the groups differed significantly. The Scheffe result suggests that those earning Rs.50,001-Rs.75,000 were statistically significant from those drawing Rs.25,001 – Rs.50,000 and Rs.1,00,001 – Rs. 2,00,000. The results indicate that the employees were satisfied with their salary structure.

While discussing the factor 'Primary Business', it is seen that respondents employed in manufacturing and production industries had mean value (Mean=78.72; SD=13.27), which was higher than the total mean value. The f-ratio being 55.08, the groups differed significantly. It needs to be stressed that those respondents employed in manufacturing and production industries had greater satisfaction at work than respondents employed in the other sectors. It is further noticed that employees at IT and communication were the least satisfied at work.

As regards, 'Levels of Management' it is seen that only the respondents at the lower range of the job hierarchy had mean value (Mean=75.34; SD=14.35) which was higher than the total mean value. It is quite interesting that employees at the bottom level were more satisfied with their work than those in the middle management cadre, who were not very much satisfied with their work, as observed by their mean value.

This result is intriguing because most investigators seemed to have suggested that the position relationship between the job level or status and satisfaction was due to the fact that positions at high levels provided more rewards to their occupants than those at lower levels (Amarchand D &Jeyaraj DJ, 1992). The obtained result could be because there was no shoulder rubbing at this level or they felt their potentials were under-utilized or may be because the organization did not provide career growth opportunities.

Considering the factor 'Type of Company' it is noticed that those respondents employed in MNC & FC had mean value (Mean=82.66; SD=11.97) which was higher than the total mean value. The other two groups had mean values which was lesser than the total mean value. This indicates that respondents working in MNC & FC were more satisfied at work than their counterparts working in public limited and private companies.

Perhaps, good working conditions, attractive benefits, foreign trips, overseas training programmes, attractive pay package and facilities offered in MNC &FC, surpassing local companies, could be the reasons for higher job satisfaction among these employees. The f-ratio being 66.70, the groups differed significantly.

As regards, 'Number of Promotions' it is seen that those who had been offered 1-2 promotions (Mean =75.65; SD=14.74) and those who have had three or more number of promotions (Mean=76.97; SD=10.51) had mean values which were higher than the total mean value, which indicated that they were highly satisfied with their jobs than those who have had no promotion. The f-ratio value was 0.65 and the groups did not differ significantly.

As regards the factor 'Training – External', it is noticed that those who had attended 3 or more number of training programmes outside their organizations, (Mean= 80.78; SD = 12.73) and those who had attended 1-2 training programmes (Mean=77.97; SD=13.61) had mean values, which were higher than the total mean value, indicating their higher level of satisfaction at work than those who had not attended any training programme at all. It is quite natural that those who were not exposed to training programmes outside their organizations might not be fully satisfied at their work. The f-ratio value being 21.04, the groups differed significantly.

Studies have revealed that "'Co-operation between business units', 'leadership', and 'Salary' revealed strong significant correlation with employee satisfaction. It is also found that older employees are more satisfied than younger employees, females are more satisfied than males, and employees with children at home are more satisfied than employees without. It has also been shown that a satisfied employee has less intention to leave the organization and change employer." (Douglas Renwick; 2000)

TABLE 5 - 't' TEST RESULTS OF JOB SATISFACTION PERCEIVED BY RESPONDENTS BY LOCATION OF COMPANIES

S. No.	Factors	Madurai n = 665		Chennai n = 290		't' Value	Result
1.	Total Job Satisfaction	78.55	13.37	67.22	14.27	11.50	P<0.05 Sig

The 't' test analysis was used to find out the association between employees' job satisfaction in relation to the 'Location of the organizations'. The study was conducted in 12 industries in Tamilnadu, taking 6 industries in Madurai and 6 industries in Chennai. The study covered 655 respondents from Madurai and 290 respondents from Chennai.

Table 5 reveals that for 'Job Satisfaction', the mean value obtained by respondents of industries in Madurai was 78.55 (SD=13.37) whereas, it was only 67.22 (SD=14.27) for those respondents of industries in Chennai. The 't' value was 11.50, which proved that there was a significant difference between the two groups. The most surprising result in the study is that, respondents of industries / organizations in Madurai have had high level of job satisfaction compared with their counterparts in Chennai. This is surprising because Madurai is a much smaller town than Chennai, which is a metropolitan city, with many corporate headquarters, wider career options, better compensation and fringe benefits, different work styles etc. Madurai on the other hand is still trying to catch up with the fast trends of the cities and is limited in its scope.

TABLE 6 - MULTIPLE REGRESSION RESULTS OF JOB SATISFACTION IN COMPARISION WITH SOCIO – ECONOMIC VARIABLES

S. No.	Independent Variables	Corre-lation	RSQ	RSQ Change	B	Beta	't' value	Sig of 't'
1.	V17 – Training External	0.206	.2641	4.64	2.497	0.199	6.828	P <0.05
2.	V14 – No. of Promotions	- 0.015	.2721	0.80	-1.065	-0.079	-2.718	P <0.05
3.	V19 –No of Children	0.135	.2785	0.65	1.359	0.100	3.397	P <0.05
4.	V21 – Employed -Spouse	-0.037	.2877	0.91	-1.573	-0.105	-3.646	P <0.05
5.	V16 – Training -Internal	0.088	.2931	0.54	-0.298	-0.068	-2.234	P <0.05
6.	V22 – Type of Family	0.118	.2973	0.42	1.848	0.074	2.542	P <0.05
7.	V7 – Salary	-0.092	.3014	0.41	-1.018	-0.067	-2.345	P <0.05

Constant = 24.914 P<0.05 sig   F-ratio = 51.01 Df = 8,946   P <0.05

Multiple regression analysis was used to find out an association between independent variables namely socio-economic variables of the respondents and dependent variable - job satisfaction. Further, it was examined to identify the most important socio-economic variables which affected job satisfaction and the percentage of contribution of such selected socio-economic variables.

What is rather more significant is that among the different socio-economic variables, only 7 variables were identified as the important contributing factors affecting job satisfaction. All these variables could totally contribute 30.14 percent of the study population (Rsq=30.14%).

Among the seven socio-economic variables, 'V17 – Training – External' to the organization, contributed 4.64%, followed by 'V21- Employment of Spouse'- 0.91%, 'V14-No of Promotions' - 0.80%', 'V19 - No of Children' – 0.65%, 'V16- Training-Internal' - 0.54%, 'V22 - Type of Family' - 0.42%, and 'V9 – Salary' – 0.41%.

The study has revealed the fact that the socio-economic variables, namely 'V1-Age', 'V5-Total years of Experience', 'V6 - Experience in present organization', 'V13- No of Employees', 'V15- No of Transfers' and 'V20 – No of Dependents' did not affect job satisfaction significantly.

A Multiple regression equation for future prediction could be derived as follows;-

$$Y = a + b_1 x_1 + b_2 x_2 + b_3 x_3 + ... b_n x_n$$

Job Satisfaction = 24.914 + (2.497) Training- External +(-1.065) No. of Promotions + (1.359) No of Children +(-1.573) Employment of Spouse + (-0.068) Training-Internal +(2.542) Type of Family + (-2.345) Salary.

This is the best predictable equation since f-ratio=51.01, df=8,946 is significant at 0.05 level.

MAJOR FINDINGS

The study has brought forth interesting findings. Married employees were more satisfied with their work than the unmarried employees. Employees with working spouses had high level of job satisfaction than those with spouses who were unemployed. It is noticed that respondents who earned less than Rs.25,000 per annum felt quite satisfied with their work than the other respondents. Surprisingly, employees with16 or more years of experience had low level of job satisfaction than others. Employees working in organizations with more than 600 employees were more satisfied with their work

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   15
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

The respondents working in MNC & FC were more satisfied at work than employees working in public limited and private companies. Oddly enough, only the employees in Manufacturing and Production units were more satisfied with their work. Employees in Firm 2 and Firm 3 which were Manufacturing and Production industries were highly satisfied with their jobs whereas employees who have had low level of job satisfaction belonged to IT and Communication and Service industries. The employees who have had between 1 and 3 promotions in their career were more satisfied with their work than those who have not had any promotion.

Looking at the mean percentage value, it can be inferred that both the HR personnel and the line staff had relatively higher level of job satisfaction. Interestingly, only those in the lower rung of the management were more satisfied with their jobs than the other groups (Middle management & Top management). Those employees who have had transfers in their work were more satisfied at work than those who have not had any transfer. Employees who had attended different training programmes had higher level of job satisfaction than those who had not attended any training programme. Interestingly, employees working in industries located in Madurai were more satisfied with their work than those employed in industries located in Chennai.

The study reveals that certain socio-economic characteristics such as training programmes attended by respondents within and outside their organizations, salary, employment status of spouse, promotions that they had in their jobs and the type of family they lived in, all contributed to job satisfaction.

However, it is no longer acceptable by the workforce to merely make a wage. Salary is a significant element pertinent to job satisfaction, but it is not by itself enough to decrease or increase job satisfaction. This study has also found that it is not reliable to conclude that years of experience, transfers at work, age, or gender can be used as an accurate predictor of job satisfaction.

CONCLUSIONS

The findings make it clear that factors like high salary, being in senior level positions, getting promotions and attending training programmes need not necessarily lead to job satisfaction. For example, in the present study, employees from a smaller location are more satisfied with their jobs than those working in a metropolitan city. So is the case of promotions. Receiving a desired promotion might lead to higher job satisfaction, but at the same time failure to receive it might lead to job dissatisfaction and sometimes even frustration. Perhaps the absence of these factors, may lead to job dissatisfaction, but then their presence may not lead to job satisfaction (in line with Herzberg's theory). Employees look for other things at work such as blending of personal values with work values, organizational culture, fair treatment, open communication, career growth and healthy work environment for having a positive attitude towards work.

Job satisfaction is situational; it depends on many organisational and personal factors and is also attitudinal. How employees perceive the system in which they are working is a deciding factor for job satisfaction. Organisations, therefore need to make conscious efforts for enhancing the job satisfaction of employees. They need to understand that in the competitive job market, most employees are not too worried about finding new jobs. They are prepared to take new risks and challenges and are only motivated by factors that give them job and life satisfaction. Higher level of quality of work and job life might enhance employee job satisfaction.

REFERENCES

1. Ahsan N., et al (2009), "A Study of Job Stress on Job Satisfaction among University Staff in Malaysia: Empirical Study", European Journal of Social Sciences – Vol. 8, No. 1
2. Ali, N, (2008), "Factors Affecting Overall Job Satisfaction and Turnover Intention", Journal of Managerial Sciences Vol.2,No 2, pp. 239-252.
3. Amarchand, D., andJayaraj, BJ., (1992), "Corporate Culture and Organizational Effectiveness" Global Business Press, New Delhi.
4. Aziri, B., (2011), "Job Satisfaction: A Literature Review", Management Research and Practice Vol. 3 Issue 4 pp, 77-86.
5. Bauer, TK., (2004), "High Performance Workplace Practices and Job Satisfaction: Evidence from Europe", Discussion Paper No. 1265, Institute for the Study of Labor
6. Business Today through Gallup MBA India (1995)
7. Chimanikire, P., et al (2007)," Factors Affecting Job Satisfaction among Academic Professionals in Tertiary Institutions in Zimbabwe", African Journal of Business Management vol. 1(6) pp. 166-175.
8. Corporate Leadership Council, (2003), "Linking Employee Satisfaction with Productivity, Performance, and Customer Satisfaction"
9. Douglas Renwick., (2000) "HR-Line Work Relations: A Review, Pilot Case and Research Agenda", Employee Relations, Vol. 22, No. 2, pp. 179-205.
10. Edward SekKhin Wong., andTeohNgeeHeng., (2009), " Case Study of Factors Influencing Jobs Satisfaction in Two Malaysian Universities", International Business Research, Vol. 2, No 2, pp. 86 – 98.
11. Jain, KK., et al, (2007)," Job Satisfaction as Related to Organisational Climate and Occupational Stress: A Case Study of Indian Oil", International Review of Business Research Papers, Vol. 3, No.5, pp.193-208.
12. Kaur, S., et al., (2009), "A Study of Job Satisfaction and Work Environment Perception Among Doctors in a Tertiary Hospital in Delhi", Indian Journal of Medical Science, 63:139-44
13. Mosadeghrad, AM, et al., (2008), " A Study of the Relationship between Job Satisfaction, Organizational Commitment and Turnover Intention among Hospital Employees", Royal Society of Medicine Press, Vol. 21, No. 4,pp. 211-227.
14. Mudor, H., andTooksoon, P (2011), "Conceptual Framework on the Relationship between Human Resource Management Practices, Job Satisfaction, and Turnover", Journal of Economics and Behavioral Studies, Vol. 2, No. 2, pp.41-49.
15. Muhammad MasroorAlam., andJamilha Fakir Mohammad., (2009), "Level of Job Satisfaction and Intent to Leave Among Malaysian Nurses", Business Intelligence, Vol.3, No.1
16. Murray, RA., (1999) "Job Satisfaction of Professional and Paraprofessional Library Staff", University of North Carolina at Chapel Hill. A Master's paper for the M.S. in L.S.degree
17. Osterman, P., (1987),"Choice of Employment Systems in Internal Labor Markets", Industrial Relations, Vol. 26, pp. 46-67.
18. Saari,LM.,and Timothy, A., (2004), "Employee Attitudes and Job Satisfaction,. Judge Human Resource Management", Winter 2004, Vol. 43, No. 4, pp. 395–407.
19. Shrivastava, A., andPurang, P., (2009)"Employee Perceptions of Job Satisfaction: Comparative Study on Indian Banks",Asian Academy of Management Journal, Vol. 14, No. 2, pp. 65-78.
20. Sowmya, K.R., andPanchanatham, N. (2011), "Factors Influencing Job Satisfaction of Banking Sector Employees in Chennai, India", Journal of Law and Conflict Resolution, Vol. 3(5), pp. 76-79.
21. Tella, A., et al, (2007),"Work Motivation, Job Satisfaction, and Organisational Commitment ofLibrary Personnel in Academic and Research Libraries in Oyo State, Nigeria",Library Philosophy and Practice
22. Work & Family Researchers Network.http://workfamily.sas.upenn.edu/glossary/j/job-satisfaction-definitions

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 16

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

THE ICT ENABLED BUSINESS TRANSFORMATION IN THE BANKING INDUSTRY OF SRI LANKA (A CROSS CASES ANALYSIS)

POONGOTHAI SELVARAJAN
SR. LECTURER
FACULTY OF BUSINESS STUDIES
VAVUNIYA CAMPUS OF THE UNIVERSITY OF JAFFNA
VAVUNIYA

ABSTRACT

The paper reveals the impact of Information and Communication Technology (ICT) on the transformation of banking industry in Sri Lanka. In the competitive industry, banks play a vital role since they are under a very competitive pressure to provide a high quality service and sustain in the market. In this juncture, the ICT enabled business transformation is an inevitable and essential factor for the sustainability of banks. At present the public banks have been facing a lot of problems in providing an efficient service to its customers by various reasons. Similarly the people also face difficulties in getting their services in public banks. The private sector banks on the other hand thrive in the market to capture the market share The author selected two public sector banks- Bank of Ceylon and People's bank and two private sector banks- the Commercial Bank of Ceylon PLC and Hatton National Bank PLC for this research study by using a Case study design method. Furthermore the five levels of IT induced Business Reconfiguration identified by Venkatraman (1991) has been compared with the Sri Lankan Banking industry. The findings showed though the public sector banks have more customers and the early adopters of ICT architecture, their service quality and customization are lower than private sector banks and the author recommended that the public banks should acquire new hardware and other sophisticated information systems to achieve the revolutionary levels very soon. Similarly, the private banks should follow a proper strategic plan for ICT to maintain and sustain in the revolutionary levels continuously.

KEYWORDS

Business Transformation, Evolutionary levels, Information and Communication Technology, Revolutionary levels.

INTRODUCTION

ICT is an increasingly important field in the development and growth of every organization. The availability and usage of adequate ICT components in the operation of organizations are inevitable in the current competitive business environment, since organizations want to capture the market share and sustain in the market. In Sri Lankan context, banks and financial sector has undergone rapid changes due to ICT and is one of the fast growing industries. (Central Bank of Sri Lanka, 2003) Further Ranasinghe (2000) argued that banking sector in Sri Lanka uses IT 90% on average which is the highest when compared to the other sectors. According to Mutsaers, et al (1998) financial institutions were the early adopters of IT. Kumara (2006) argued that technology will take over banking in near future. In Sri Lanka, since the banking industry is considered a very competitive and profit motive one than the other sectors, the adoption of ICT in banks also at a higher level. Moreover, the public sector banks have to compete with the private sector banks and other financial institutions in a competitive business environment. Therefore it is inevitable for the banks to adopt ICT enabled Business transformation in both the evolutionary and revolutionary levels for their survival and thrive in the market.. In order to achieve these objectives, banks continuously transform themselves to attract more customers and thrive in the market. This research study intended to identify the ICT enabled business transformation in the public and private sector banks. Since the ICT plays a major role in the operations of the banking sector, it is significant to investigate the ICT enabled business transformation in the banking industry. The main objective of this study was to compare the public and private sector banks and how the ICT enabled business transformation elevated the quality of their services to sustain in the market. In the previous studies of the researcher, findings showed that there is a need for ICT induced Organizational Transformation among the public sector banks in Sri Lanka (Selvarajan, 2010) and the recent revolutionary approaches adopted by the public sector banks. (Selvarajan, 2011) based on the Venkatraman's (1991) Framework for IT- induced business reconfiguration. As such the researcher liked to investigate the business transformation in the private sector banks and conduct a comparative study.

LITERATURE REVIEW

There are various studies conducted related with the ICT and organizational changes. The organization that can move quickly to respond to this change can gain a bigger market share and reduce customer churn purely by enhancing the experience of customers who now expect anytime, anywhere access to services (Lucent,2007)The Sri Lanka banking and financial sector is observing a significant increase in the utilization of IT. Specifically in private sector, most organizations are now heavily depending on IT related solutions to deal with the growing competition and productivity requirements by their customers (Tennakoon and Syed, 2008). The study conducted by Maldeni and Jayasena (2009), showed that there is a strong relationship between ICT usage and Bank branch performance. Robinson and Mahony (2003), further argues high technology and ISDN networks resulting in high speed data transmission. Some recent researches have studied the relationship between IT, organizational performance and productivity, has reported a positive and significant effects. (Brynjolfsson & Hitt, 2000; Oliner & Sichel, 2000; Ko & Bryson, 2004 as in Asai, 2004) From the above literature, the researcher understood that there is a need for organizations to use the ICT for various purposes. In this context, the ICT – enabled Business Transformation plays a vital role in many organizations. In order to identify various stages of Business Transformation, the researcher has selected the five stages of IT – induced Business Reconfiguration identified by Venkatraman (1991) as a baseline for this research study. According to his finding **the stage one** was characterized by localized exploitation and at this stage IT is exploited within existing, isolated business activities normally within one function. **The stage two** can be thought of as building the internal electronic infrastructure or platform that permits the integration of tasks, processes and functions. Stage two is a necessary condition if the investments in stage one is ever to be fully exploited.

He further argued that the remaining three stages are the combination of stage one and two. Without this base there is no evidence that an organization has the necessary foundation for the future. Stages three, four and five are not sequential. Given that stages one and two have been accomplished, organizations have the option of deciding among the remaining three options. **Stage three** was the business process redesign – resulting from a fundamental rethinking of the most effective way to conduct business. **Stage four** was the business network redesign. This is the use of IT by the organization to include suppliers, customers or anyone else who can contribute to the firm's effectiveness. **In stage five**, business process redefinition - an organization decides to breakout and exploit the new technology in the market place or in products. He argued that in this level, the role of IT is very crucial and the potentiality for business scope enlargement and business scope shifts were highlighted. He further pointed out that a major challenge for organizations in the 1990s clearly lies in implementing these stages in a way that supports the degree of Organizational Transformation required to maintain effectiveness in the turbulent 90s and beyond.

There are various supportive literatures for Organizational Transformation. According to Heredero and Barahona (2004) several approaches of ICT offer us a quite common vision from different perspectives. Out of a traditional competitive advantage consideration, governments can benefit from a proper implementation of IT when the organizational change is induced according to the specific circumstances. There is a complementary focus to the "enabling one" named the "transforming effect" (Stoeltjed, 1996) he recognizes ICT as promoters in the firm's transformation process. The Spanish Tax Agency when introducing ICT, has accomplished a group of stages that coincide with the one describe by Zuboff (1988), Davenport (2000) and Quinn (2000); automation computerization and transformation.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   17
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

Venkatraman's (1994) model of IT – enabled business transformation examines the range of potential benefits from employing IT and the degree of Organizational Transformation. The model suggests, that organizations adopt a "bottom - up" approach and progress through a five stage sequential process. This model recognized organizational differences, with the view that business will engage in this linear process at different stages and in relation to internal structural changes and external competitive issues. However it did not encompass other key factors of adoption, in terms of organizational size, sector or geographic location.

Conversely the model promulgated by Poon and Swatman (1997) concurs with Venkatraman's model to the extent that a stage based transformation process occurs when SMEs use ICTs to improve their strategic position. However Poon and Swatman (*ibid*.) propose a "top - down" approach.

Hidaya and Perera (2008) also emphasized that the Business Process Reengineering (BPR) has become an inevitable item in the agenda for many public sector organizations in Sri Lanka. Although there are many cases internationally and locally highlighting the factors for failure, Sri Lankan public sector still seems to be hesitant and delayed in BPR efforts.

From the previous researches, the researcher intended to compare the public and private banks in relation with ICT enabled business transformation. It was much significant to understand the issues related with size, sector and geographic location which had not been considered by Venkatraman (1994) in his research.

METHODOLOGY

This research study followed a qualitative research methodology of Case Study Exploratory analysis by interviewing, by accessing the relevant organization's web sites and from other secondary data of banks. Since this research was a lengthy study, the judgment sampling method has been chosen in selecting the banks because it was not appropriate to study the ICT enabled business transformation of the newly established banks. Therefore the two old banks in the public sector and the private sector has been taken for this research.

FINDINGS

THE CASE STUDY OF BANK OF CEYLON

The Bank of Ceylon is the pioneer bank in Sri Lanka and it was established in 1939 and successfully completed its 71 years of age. It has approximately 8800 staff and an island wide vast network covering 307 main branches with the widest customer base of covering approximately 7.5 million customers. In the asset base, it is the largest one in the banking system. It has three overseas branches and over 700 online connected service points to its customers through the application of various information systems and ICT products.

In this way, banks face a challenge and it would be into two folds. Firstly, optimizing the productivity of employees while retaining superior expertise to drive strategic efforts and secondly, effectively managing the human capital aspect of external partnering which will require greater focus on managing vendor relationships than on actually running the operations themselves. Therefore it is inevitable that the Bank of Ceylon has to concentrate on the revolutionary approaches of business reconfiguration in order to thrive in the business.

If we take the five levels of business reconfiguration introduced by Venkatraman (1991) the first level "Localized Exploitation" was introduced by the Bank of Ceylon in late 1980s. The decentralization of banking activities was extended. The first installation of ATM (Automated Teller Machine) was held in 1988 and the "Micro banker" system was implemented within branches. Especially the 'Transaction Processing' System was in practice and it was the only information system used by the bank. The managerial implication of this level is identifying the high leverage activities and exploiting the ICT capabilities than others.

In the second level of" Internal integration" the ICBS system (International Core Banking System) was introduced as a trial version in this bank and it was practiced in the Head Office at Colombo and the Colombo based branches. Through this system, several branches were interlinked. Now this system has been extended to 300 branches. Further the Bank of Ceylon was offered an award for the fastest deployment of an on line core banking system in Asia Pacific Region from IBM/FISERV (Kodithuvakku,2010).

The above two levels have been considered as evolutionary levels since there are incremental changes occurred in the then organizational processes.

The third level "Business Process Redesign" emphasize on fundamental rethinking of most effective way to conduct the business. The ICBS was expanded in 2004 in order to eliminate the drawbacks in the previous systems. Through this online system, more than 700 service points connected throughout the island. Further at present there are more than 100,000 Internally Displaced People (IDPs) in North having their account at Bank of Ceylon and the bank is willing to provide an efficient service to these public. The bank has been providing 'safety locker' facilities to IDPs without charging any payment – Due to the inadequate space they have introduced the "safety sealed packets" system. Moreover the bank's plan to relocate its branches in their own places which were shifted to other places due to the war in the northern part of Sri Lank has been successfully in practice during the year 2010. The disaster recovery system is another new opening in this level.

The fourth level "Business network redesign" explains the use of ICT for redesigning the nature of exchange among multiple participants in a business network. The Interbank network system between Bank of Ceylon and Sampath Bank is one of the best examples for this level. Through this system, the Bank of Ceylon gain collaborative advantage and reduce the competition. Sampath bank is a private sophisticated bank with limited number of customers. Further the Bank of Ceylon has the "extranets" to link their suppliers and customers through the network and enables them for "Internet banking".

There are 337 ATM machines of Bank of Ceylon and 1600 ATM outlets, in collaboration with other banks. These have the connectivity to international networks such as SWIFT, Visa and MasterCard. To facilitate customers, a web based electronic fund transfer system named "E-cash" was introduced. The Bank also introduced "X Press Money" a network of speedier, low cost money transfer facility in Middle East. There are three overseas branches located in London, Chennai and Male. The salient feature in this level is that the London branch has been turned into a full- fledged bank on the name of **Bank of Ceylon- U.K** recently and linked with European countries for money transferring. Further, there are two additional ATM points installed at the District Secretariat, Vavuniya and at the Army Headquarters in Vanni region to cater different customers.

The last level "Business scope redefinition" is assessing the potential role of ICT in redefining the business scope in two different ways –Business scope enlargement and Business scope shifts. In this case, in future, customers will also redefine the rules of the game. Distinct shifts in demographics, attitudes and behaviors, in addition to omnipresent information, will give customers the power to demand greater responsiveness and transparency from their banks. Customer diversity and individualism will pervade buying behavior. How customers perceived value will change as a result of shifts in demographics and value systems. Therefore altering the business scope both proactively and reactively is essential to this bank.

Therefore, there is a potentiality for this bank to improve the technology to identify the new ways and potential threats. Advanced technologies will allow banks to infuse their legally operating models and infrastructures with exceptional functionality. Emerging technologies such as grid computing, service oriented architectures, virtualization of data and storage and predictive intelligence will root new dimensions of Management (Dheerasinghe, 2009).

Introduction of Automated inward Remittance Products system has the capacity to automatically process inward remittance received through multiple channels. Further a fully automated centralized treasury Bills system was developed in house and implemented with many added features and enhanced security. It has the capability of processing investments in treasury bills from prospective clients at any branch in its network. This system now caters to the script – less system introduced by Commercial Bank of Sri Lanka.

Moreover the bank has introduced **Paymate**-the SMS banking system in October 2010 (targeting 6 million customers) to enable the customers for fund transferring, bills payment and for the balance inquiry. This is an example for business scope enlargement. Further, the bank issued computers in August 2010 to its 200 corporate customers- who are the big companies involving in export and import businesses to promote the **Net banking**. This is a short term plan for three years and this task is expected to be widened to others who could be considered as corporate customers. This is considered as business scope shifts. Now the bank has taken steps to move into the Model Banking concept i.e., any time anywhere banking. The cloud computing technology will enable the bank to fulfill this task.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   18
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

THE CASE STUDY OF PEOPLE'S BANK

The People's Bank was established in 1961 with the motto of "Pulse of the people" of this country. It has been given the winning People's award in the banking and financial services sector for the fourth consecutive year. This bank has a high reputation on a strong foundation of being a bank by the people. It has been forwarding "thriving on the vision of being the bank of the aspiring people of Sri Lanka and as a partner in empowering them to become value creating, competitive and self reliant". It has over 12 million account holders serviced by an unmatched dedicated team of approximately 8900 through an expansive outreach of 329 branches. 341 service centers and 300 ATMs.

To get closer to the customers, it has unreservedly made the bank accessible not only through physical infrastructure but also using innovative ICT facets to take banking to the doorstep.

According to Venkatraman (1991), if we take up the business reconfiguration at people's Bank, as like Bank of Ceylon similar kind of system exists in this bank in the first two stages.

In the level one, the bank introduced the PABS system (People Automated Branch System) and a Centralized General Ledger was maintained by the regional offices and the summary of the branches were sent to the Head Office. This system had not been linked with branches since there was no network facility. Therefore it was practiced within an office. This could be considered as "Localized Exploitation"

In the second level of "internal integration" the bank started the 'Inter Banking Transaction' (IBT) system. Through this system the majority of branches were able to do their operations electronically. Electronic Fund Transfer and Electronic Data Interchange (certain extent) were possible in this stage. However the online updating of files were not possible in this system and time was needed for this updating.

In order to eliminate the drawbacks in the Inter Banking system, the third level in the reconfiguration– the 'SIBS' (Silver lake Inter – Banking System) system was introduced by the People's Bank. 180 branches and 300 service centers have been in operation under the 'SIBS'.

Through this 'SIBS' Bank is able to function in the 'branchless' banking status. This core banking is also now well on track, having linked 38 branches and service centers in year 2009, increasing the total number of interlinked branches to 461.Further through the application of 'SIBS' each branch can check their variance, non performing accounts and over dues. This aids their customer – service tenets considerably as response times are faster, productivity higher and information gathering is more efficient. Therefore it is the process of 'Business Process Redesign' as per the Venkatraman's (1991) classification.

The fourth level Business Network redesign shows a new platform in networking. In case of People's bank, the Chairman's statement explains thus "We have not lost sight of the fact, however, that while physical infrastructure is a vital core to our existence. Innovations like Palm Top banking and SMS banking must become a feature of everyday banking and our bank has been at the forefront of introducing these technological, innovations to our customers "(Karunajeewa, 2009). The system of "Customer Identification File" (CIF) was introduced in this level. According to this, each customer is given a "Personal Identification Number" (PIN) and through this 'PIN' number customer can do the transactions in any of the bank branches. Further Intranet facilities were used for internal communication in this level.

Moreover the bank expects to bring all the branches under the core banking system (SIBS) before first quarter of 2011 and it has been in progress. This is a kind of "Business Network Redesign". In the middle of 1990s the People's bank had the Common Interbank Network with the Hatton National Bank - a private bank, which is very successful in the banking industry. Through this 'COIN' system both People's bank customers and Hatton National Bank's customers got benefited. But now this system is not in practice.

The fifth level 'Business scope Redefinition' routes the bank to do the business by breakout and exploit new technology. In this case the People's bank is trying to adopt the 'internet banking' to avoid customer traffic and enable the customers to access the banks freely and independently. But so far this has not been practiced. Further the SMS banking is extended to the other telecommunication network- Dialog GSM and through this network, customers will get quick accessibility.

As per their corporate plan 2009-2014 it is emphasized that getting closer to customers, coupled with a state of the art ICT platform and a need to be better and bigger. Further in addition to the existing ICT – driven products, new innovations are being done for brand building and thriving. Now the country is marching towards development after the war and this bank's business scope enlargement and business scope shifts are also towards the development of northern and eastern regions of Sri Lanka.

THE CASE STUDY OF HATTON NATIONAL BANK PLC

The Hatton National Bank PLC (HNB) was established in 1970 and it is the largest private bank with 207 customer centers, 153 Students' banking centers, two mobile bank centers, one micro banking unit, 110 Gami Pubuduwa Banking centers and two overseas representative offices. It has redefined the very foundations of the banking industry through streamlining the process reengineering. At this bank over the past decade technology has been a change agent.

In case of the Venkatraman's model, the bank was in the level one- localized exploitation in 1980s and the computerization was commenced in 1994 through an in house developed system of 'COBAS'. The advantage of this system was that every branch had been functioned independently and if the system failed in one branch never affected the other branches' operations. This was the second level identified as internal integration.

In the third level- Business Process redesign, the bank acquired the Emirates bank International in 1989, Colombo branch of Banque of Indosuez in 1996 and merged the Habib AG Zurich Colombo south bank with the wellawatte branch. In 1997 the Business today Magazine ranked as the first among the top ten companies. These were the evidences for the third level of transformation.

Simultaneously, the bank had a common interbank network with People's bank in the middle of the 1990s and both the banks got benefitted. This was considered as the Business network redesign. This system is not in practice.

In September 2009, the HNB introduced its new system called 'FINACLE' and through this system the bank was able to carry out its operations efficiently and provide the e-banking services such as Tele line, Internet banking, Mobile banking and SMS banking. It has the exchange houses in Oman and Abu Dhabi and around over 300 correspondent banks all over the world. These are the evidences for the business network redesign. Further, the bank has taken initiative for strategic IT plan that supports the bank's overall 'go to market' strategy with the focus on taking the bank beyond the realm of transaction processing to utilize IT for analytics, business intelligence and optimization.(Annual Report, 2010) These are the transformations towards revolutionary level of business scope redefinition.

THE CASE STUDY OF COMMERCIAL BANK OF CEYLON PLC

Commercial bank of Ceylon PLC (CBC) is one of the leading commercial bank in Sri Lanka with over 195 branches and more than 340 ATMs. It was established in 1969. From the establishment to 1983, the bank was in the evolutionary level of localized exploitation since it had been opening the new branches. However in 1984 the computerization program was launched ad it covered the entire branch network. In 1985, the foreign department of the bank was elevated as a fully fledged branch and in 1987; Commercial Insurance Services (pvt) Ltd was formed in which the bank enjoyed 40% of equity participation. These were the transformational level of internal integration.

In 1993, the International Comprehensive Banking System (ICBS) was introduced by linking nine metropolitan branches and it was extended to other branches up to 1997. This was the Business Process Redesign. In 1998, through the sophisticated on line banking system, customers were allowed to do their transactions by using their personal telephone, personal computer or lap top. Further there are inter- organizational systems with many companies. It is the Business network redesign. Finally, The introduction of internet banking in 2000 was the example for the Business Scope redefinition and the CBC has been rated as the Best bank in Sri Lanka by 'Global Finance' for the 12th consecutive year. In 2006, the bank introduced the Island's first mobile ATM and in 2007 linked up with 'MoneyGram' for fund transfers around the world. These were the features of Business scope enlargement and business scope shifts.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   19

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

DISCUSSION CONCLUSION AND RECOMMENDATION

This research study has been conducted among the two public sector banks and two private sector banks in Sri Lanka to identify the revolutionary trend of ICT – enabled business transformation. A case study methodology was adopted in order to understand the ICT strength in these banks in a qualitative way. In Sri Lanka, researches conducted in ICT/ Information Systems are very few and the findings drawn from this study would be very much useful to these banks to gain competitive advantage and capture the market share.

The researcher has selected the five levels of IT induced business reconfiguration introduced by Venkatraman (1991) and compared with the public sector and private sector banks in Sri Lanka. According to Venkatraman (1991) if the level one and two have been accomplished, organizations have the option of deciding among the remaining three levels. But this research findings show that the levels found by Venkatraman (1991) have been in sequential order in these two public sector banks and some deviation in the private sector banks. And both the banks in the public sector have strived and entered into the fifth levels. However the accessibility of emerging technology by them was in different period. But in case of the private banks, they have already achieved the fifth level as well. Moreover, when we compared the evolutionary levels and revolutionary levels, revolutionary approaches have been adopted by these banks within a short period of time. The researcher further found that the five levels of business reconfiguration identified by Venkatraman (1991) showed that the sophistication and innovation has been increasing when these banks go into the next level from the beginning. Further Core System Report Generation, Central Clearing system and micro finance lending and also in converting branches into the core system are in progress. Public banks need computer hardware and other sophisticated information systems for better customer care and efficiency. Since a remarkable number of customers are in the resettled areas and their income level also low. Therefore it was found that rather than evolutionary levels revolutionary levels play major role in these banks to gain competitive advantage and sustain in the market. The author recommended that the public banks should acquire new hardware and other sophisticated information systems to achieve the revolutionary levels very soon. Similarly, the private banks should also follow a proper strategic plan for ICT to maintain and sustain in the revolutionary levels continuously. Since this research findings show the situation of Banks in 2010, it has opened up several avenues to the author to extend this research further by adopting recent models in quantitative way as well in future.

REFERENCES

1. ADB (2005) Sri Lanka: Financial Sector Assessment, Strategy and Program Assessment, Asian Development Bank.
2. Annual Report- Commercial Bank of Ceylon PLC, 2009.
3. Annual Report- Hatton National Bank PLC, 2010
4. Annual Report-Bank of Ceylon, 2010.
5. Annual Reports-People's Bank 2007, 2009.
6. Asai, S. (2004). Factor Analysis for Demand Growth for Information Technology input in Japan. Economics Innovation New Technology 13 (8): 687-694.
7. Central Bank Annual Report (2003) Available from http://www.cbsl.lk/cbsl/AR003index.html (Accessed 16 June 2007)
8. Davenport, T.H. (2000) Mission Critical: Realizing the Promise of Enterprise systems. Harvard Business School Press: Boston.
9. Dheerasinghe,C.M.K.(2009) 'Ceybank News' Bank of Ceylon, 12(4)
10. Heredero, C.P., and Barahona, E.P. (2004) Approaches to justify the use of web technologies in the Public Administration: Some applications to the Spanish National Tax Agency, the IAIDS International Conference e – Society, pp. 44 – 51.
11. Hidaya, K.Z., and Perera, H.S.C.(2008) Critical Success Factors for BPR in the Sri Lankan Public Sector: A case study. The 5th International Conference on Business Management. University of Sri Jayewardenepura, Colombo 27 March, Faculty of Management Studies & Commerce. pp. 334 – 346.
12. Karunajiwa.W,(2009) AnnualReport, People's Bank
13. Kodithuvakku,K.D.M.(2010). Ceybank News Bank of Ceylon, 13(3)
14. Kumara, S. (2006) Can Development in technology replace people? Can Development in communication dominate branch banking? Association of professional Banks – Sri Lanka [online] [Accessed 13 December 2008] Available at : http://www.apbsrilanka.org/articles/15an/article-saliya%20 kumara.html
15. Lucent, A. (2007) Improving customer satisfaction through more effective ICT Strategies [online] (Accessed 20 March.2009] Available at : www.bitpipe.com
16. Maldeni, H.M.C.M., and Jayasena, S.(2009) The impact of ICT usage on Bank branch performance, the 6th International Conference on Business Management. University of Sri Jayewardenepura, Colombo, 25 March: Faculty of Management Studies & Commerce. pp. 367 – 375
17. Mutsaers, E.J., Zee, H., and Giertz, H. (1998). The evolution of Information Technology. Information Management and Computer security, 6 (3) pp. 115-126.
18. Poon, S., and Swatman, P.M.C.(1997) Small business use the internet: findings from the Australian case studies. International Marketing Review, 14(5): pp.385-402.
19. Prospectus (2010) Deberture Issues BOC. Colombo
20. Quinn, J.B. (2000) Services and Technology: Revolution Economics, Business and Education in the Internet and the University 2000 Forum (Eds) Delvin, M Larson, R and Mexerson.J) Forum for the Future of Higher Education and Educes Boulder CO.
21. Ranasinghe,B,(2000) Innovation, Diffusion and IT: Critical factors in adoption and use of IT / Internet Technology in Sri Lanka, Ph.D Thesis, Postgraduate Institute of Management, Sri Lanka.
22. Robinson, C and Mahony, M. O. (2003) The growth of ICT and Industry Performance, National Institute Economic Review. 184 (60)
23. Selvarajan, P. (2011) The ICT induced Business Reconfiguration from Evolution to Revolution (A Case study of Public sector Banks in Sri Lanka). GSTF International Journal on Computing, 1(2): 134-139
24. Selvarajan,P.(2010) The need for ICT induced Organizational Transformation among the Public sector Banks in Sri Lanka. The Annual International Conference on Data Analysis, Data Quality and Meta Data Management, GSTF, Singapore, 12-13 July : . Hotel Mandarin Orchard. 94-100
25. Stoeltjed, M. (1996) Human cost in the Computer Age. Journal of systems Management, January/February: 57-66
26. Tennakoon, H., and Syed, R(2008) Impact of the use of Information Technology on Employee stress level and Job satisfaction in the banking and financial sector of Sri Lanka. The 5th International conference on Business Management, University of Sri Jayewardenepura, Colombo. 27 March: Faculty of Management Studies & Commerce. pp. 191-203.
27. Venkatraman, N. (1991) IT induced Business Reconfiguration Scott Morton M.S.(Ed.) The Corporation of 1990s, Oxford University press.
28. Venkatraman, N. (1994) IT – enabled business transformation from automation to business scope re definition, Sloan Management Review, winter pp.73-87
29. Weeratunga, L. (2005) Sri Lanka's e – government program: Challenges ahead [online] [Accessed on 18February2008]. Available at: www.icta.lk/ insidepages/downlosaDOCS/presentions/e-Gov%20by%lalith.ppt
30. Yin, R. (2003). Case Study Research Design and methods: Sage Publications.
31. Zuboff, S (1988) In the age of the smart machine the future of work and power: Heimann Oxford UK.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 20

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

THE NEED FOR ENERGY DEMAND SIDE MANAGEMENT IN COMMERCIAL AND RESIDENTIAL SECTORS IN NIGERIA

AHMED ADAMU
ASST. LECTURER
UMARU MUSA YAR'ADUA UNIVERSITY
KATSINA

ABSTRACT

As fossil fuels become less attractive due to its high prices and environmental impact, the need to look at the demand side management became imperative for sustainable energy and environment. However, in Nigeria, inadequate supply of energy and low production capacity couple with the need to fuel the most promising economy has necessitated the need for energy efficiency and conservation. Residential and commercial sectors consume up to 80% of the total energy consumption in the country. As such, there is need for a considerable reduction in these high energy consuming sectors for sufficient energy in other sectors especially industrial sector. Subsequently, Energy demand in the country were analysed using indicators of trends, demand elasticities, energy intensities, and future energy trends for the demand side analysis. Consequently, Energy Reduction Programme was considered the most appropriate DSM measure in the country, but massive awareness campaign, new capacity building and electric metres for all consumers have to be provided.

KEYWORDS

Demand side management, Energy reduction programme, Commercial and residential sector, Gig watt Hour (GWh), Million Tons of Oil Equivalents (MTOE).

INTRODUCTION

Persistent domination of fossil fuels in energy mix, its regional concentration and negative effect on the environment, its capital intensive requirement as well as its depleting propensity has necessitated the need for a reasonable reduction and technical efficiency in its consumption. However, electricity sector is one of the most consuming areas of fossil fuels; hence the need to consider reduction in electricity consumption became imperative. Electricity sector involves both the supply side and demand side activities. To ensure efficiency and reduction in electricity consumption, demand side activities has to be considered, which called for the demand side management programmes.

Demand side management (DSM) "is the systematic utility and government activities designed to change the amount and/or timing of customer's use" (Charles River Associates, 2005). In other words, DSM "is the implementation of policies and measures which serve to control, influence and generally reduce electricity demand" (Eric, B., Anne, A., 2006). In some developing countries, DSM became viable option due to the difficulty in capacity expansion and high expensive investment need in the power sector; DSM has been practiced for many decades in different systematic ways. The idea was first put into practice by electric utilities in the USA around 1970s which later spread to other sectors and subsequently beyond the country. It involves both utilizing very efficient appliances and efficient electric consumption behaviour from the end-users.

Commercial and residential users are economically more convenient and appropriate to engage in DSM programmes due to the nature of their consumption and relative low contribution to the economy compare to the industrial sector. Subsequently, the paper concentrated on the Nigerian commercial and residential sectors to consider the urgent need for the application of DSM programmes in these sectors. Nigeria has been experiencing power shortages for long due to the challenges bedevilling the infrastructural development of the power sector alongside increasing demand for electricity. Subsequently, the need to efficiently develop DSM programmes in order to utilize the available distribution capacities to provide accessible electricity to the teaming Nigerian populace became essential. Presently, residential and commercial sectors consume more than half of the total electricity distributed in the country (see table one in appendix). Residential sector which includes activities like cooling, use of appliances, heating and lighting while commercial sectors include activities in transacting trade, schools, offices, hotels, university etc.

The Nigerian electricity sector dated back in 1896 and since then experienced different reforms, all the reforms were targeted at ensuring effective operation of the power sector to sufficiently meet the increasing energy demand for economic growth. The recent one was the 2005 electricity sector reform act that was enacted to liberalize the electricity market especially the generation and distribution segments. Subsequently, the power sector was unbundled into six generating companies, one transmission company and eleven distribution companies with only two Hydro plants and four Gas turbine stations supplying the whole country. However, power issues and challenges have persistently becoming a dominant economic obstacle. The aim may not be achieved unless the government or utilities deploy the use DSM programmes at a short-term period.

There are other benefits to enjoy from implementing DSM programmes; this could be to the end-users for reduction in energy cost and the utility for efficient utilization of its available capacity. DSM programmes help the utility to have extra capacity while supplying the same level of demand, which provides the opportunity to promote its sales by selling the extra capacity to new customers thereby enhancing revenue. Therefore, revenues acquired by utility will be more profitable to invest on DSM and energy saving programmes than expanding its production capacity. This is further justified by the fact that capacity expansion result in more consumption, which will be detrimental to environmental condition, and which will also be more expensive to cure. Governments and utilities can therefore implement different DSM programmes on electricity consumption to achieve efficiency and more revenues.

Nigeria has a relative large production capacity compare to the total electricity distributed annually due to inadequate supply of Gas to the power plants. However, Increase in population, urbanization and use of appliances has continue to push the demand for electricity higher, with no or little effort to enhance the generating or distribution capacities to offset the demand. Therefore, it will be more economical and politically wise to consider DSM programmes in Nigeria to meet the energy demand.

Residential sector is one of the large energies consuming sectors in Nigeria due to the nature and pattern of appliances usage, like refrigerators which used to be in force almost 24 hours, standby electronics (despite the small unit of the standby power), high voltage electric lamp which used to be turned on even on the daytime and placed in unnecessary locations, couple with timely use of appliances like water heater, microwaves, Irons etc. All these have added to the power consumed by the residential sector which if the consumption pattern is managed efficiently, large capacity would be spared for the industrial sector utilization. Similarly, commercial sector need to improve efficiency in its energy consumption to save more energy. It constitute the use of air conditioning, computer equipment, photocopy machines, printers, fax machines, lifts, lighting etc.

LITERATURE REVIEW

CSPM (California Standard Practice Manual), (2001), studied load management program, they stated that the program is targeted toward manipulating the distribution of the demand as well as the time of power utilization; usually it is implemented by utilities by changing the pattern of loading and encouraging low demand during the peak hours, they argued that this is the most effective technique of energy conservation. This opinion is supported by Swisher, J. N., G.M. Jannuzi, and R.Y. Redlinger, (1997), but they categorised it into two: clipping and filling technique. Clipping by reducing or shifting the load during the peak hours to the off peak period and filling by providing additional capacities (thermal storage) to meet the increasing loads during the off peak period, this is done devoid of affecting the pattern of electronic usages. They cited example of thermal heat storage, which can be used to store heat during the off peak period for utilization in the peak period.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

21

Charles River Associates (CRA, 2005), emphasized on load levelling technique, which they categorised under Load Management program and is aim at making an efficient use of the available capacities devoid of the need for additional reserve capacities to offset the hours of high demand. They categorised it into two: Peak Clipping and Valley Filling**.** According to them, Peak Clipping is where the utility tries to reduce consumption during the peak hours thereby clipping the overall load during the peak periods as shown in figure one. This can be achieved by limiting the use of equipment and appliances during the peak hours. While, Valley Filling this is another option in which the off peak period is provided with a special energy capacities without affecting the load of the peak period. This is usually provided through thermal energy storage to substitute fossil fuel. According to Sustainable energy regulation and policy for Africa (2005), two possible options are considered appropriate for African, which are: Load Growth and Conservation. It involves increasing the consumption level tactically in order to develop customer productivity and increasing the revenues for utilities. This is done by enhancing the energy access to new customers or areas, Thereby enhancing the utilities' market share which enables it to provide enough supply of power in the off peak and on-peak period. Load conservation on the other hand involves low supply of electricity and efficient utilizations of energy by changing the pattern in the usage of appliances. It is directed by utilities to influence the loading system. Applying the two techniques will not necessitate the need for additional capacities despite the new consuming areas because the energy saved from the energy conservation will be used to supply the new consuming areas.

Several researches were equally conducted on the possible techniques to apply in Nigeria, According to Prof. B. Garba (2009), Nigeria shall explore the vast potential of renewable energy sources as a measure against energy supply security concern, he also stressed on other government policies and establishments that are targeted toward enhancing energy conservations. Prof. S.T. Wara (2011) he stressed on the necessary steps before implementing any DSM program, where he mentioned Demand Forecasting, Load and Market Research, as well as Financing as the major prerequisite for effective implementation of DSM in Nigeria. Lugano Wilson (2006), emphasized on African most effective techniques of Energy conservation, which he called Energy Reduction Programs (ERP), whichhe described as the option that is aims at reducing energy demand by employing more efficient practices, equipment and buildings. However, some of these measures may involve capital investment; they involve high and low energy saving tips, like observing combustion condition of boilers in the process of producing steam or hot water to ensure optimum efficiency. Lighting is another area where these programs can be applied, where the usage of efficient fluorescent and other energy saving lighting devices are recommended. Similarly, removal of high consuming lamps out of the system and installation of automatic light switch system are one of the recommendations of ERP.

SUBJECT IMPORTANCE

The research is important and timely considering the continuous decline in the average supply of energy which hinders the country's industrial growth and social wellbeing of the citizens, hence the need for immediate enhancement of energy access. Similarly, the country's inadequate supply of energy is largely attributed to the low supply of Natural Gas (to power the Gas turbines) as well as the low generating capacity, which require long term plan and huge monetary requirement to expand, consequently, Nigeria can only improve the energy access by applying some Energy Conservation techniques, which this paper explores in order to serve as a policy guide to the government and behavioural recommendation to citizens on how to conserve energy as immediate measure to increasing energy access and as a short term measure to addressing energy supply problem in the country.

STATEMENT OF PROBLEM

Low energy supply is principally instrumental toward increasing the average cost of production in the manufacturing sector, which make the economy unattractive to foreign investors and contribute to inflation. Subsequently, the research studies the need for the energy demand side management with a view to identifying the most appropriate conservation technique and the possible recommendation for effective implementation of the suitable technique.

However, as fossil fuels (source of energy) become less attractive due to its high prices and environmental impact, the need to look at the demand side management became imperative for sustainable energy and environment. However, in Nigeria, inadequate supply of energy and low production capacity couple with the need to fuel the most promising economy has necessitated the need for energy efficiency and conservation. Residential and commercial sectors consume up to 80% of the total energy consumption in the country. As such, there is need for a considerable reduction in these high energy consuming sectors for sufficient energy in other sectors especially industrial sector.

OBJECTIVES

The objective of the research is to identify the most appropriate Demand Side Management program/technique that can immediately enhance the energy access in the country. The paper is also aim at identifying the benefits from energy conservation in the residential and commercial sector of the economy. It is also aim at discovering how DSM program can bring about immediate solution to the energy problem in the country.

HYPOTHESES

1. There is huge energy save from energy conservation program in Nigeria.
2. There will not be increase in energy access upon implementing energy preservation techniques in the country
3. Applying DSM will bring about immediate solution to energy problem in the country.
4. Reduction in energy consumption from residential and commercial sector will enhance industrial growth in the country.

METHODOLOGY

To identify the necessity of and appropriate DSM programme in Nigeria, it is germane to look at some facts on the country's electricity sector especially the consumption pattern of the electricity, its trend, and the rate at which it grows as well as the residential and commercial sectors' shares in the total consumption. To achieve this some economic tools were applied in determining the past and future energy demand trend, growth rates as well as the percentage share of the two sectors in the overall energy demand in the country. Energy production, Intensity and per-capita consumption were calculated to determine the potential areas and measures for energy efficiency.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   22
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE 1: TREND OF SECTORAL ENERGY CONSUMPTION

TIME	Total final consumption(Ktoe)	Residential	Commerce and public services
1990	676.906	339.614	163.916
1991	713.112	346.064	191.436
1992	748.114	373.24	187.652
1993	859.828	448.662	233.404
1994	825.17	433.182	216.204
1995	811.496	425.7	210.614
1996	778.472	390.268	210.958
1997	760.498	382.872	199.262
1998	732.806	376.766	191.092
1999	737.536	379.862	197.628
2000	747.168	381.066	201.756
2001	776.924	396.288	209.754
2002	1104.498	663.49	283.628
2003	1106.562	659.534	304.268
2004	1379.096	821.902	379.26
2005	1486.596	885.972	408.844
2006	1313.048	673.552	350.622
2007	1691.706	867.826	451.672
2008	1592.462	880.64	393.364
TOTAL	**18841.998**	**10126.5**	**4985.334**

Source of Data: IEA (2010)

FIG 1: CHART DEDUCED FROM ABOVE TABLE

$y = 50.45x + 487.1$
$R^2 = 0.716$

$y = 30.7x + 225.9$
$R^2 = 0.713$

$y = 13.64x + 125.9$
$R^2 = 0.725$
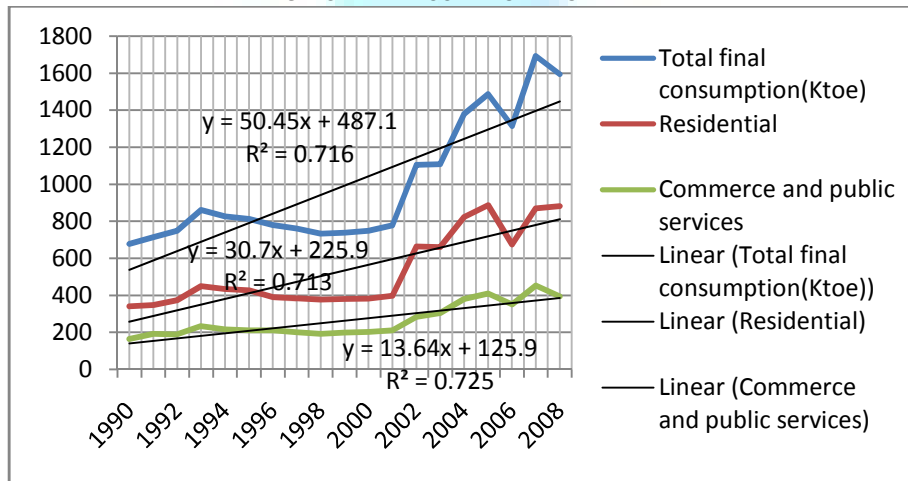
GROWTH RATE FOR FIN. CONSUMPTION	4.87%
GROWTH RATE FOR RES. CONSUMPTION	5.44%
GROWTH RATE FOR COMM. ONSUMPTION	4.98%
Percentage share of residential	53.74
Percentage share of commercial	26.45863
Percentage share of Others	19.80

TABLE 2: FORECAST OF SECTORAL ENERGY CONSUMPTION

TIME	Total final consumption(Ktoe)	Residential	Commerce and public services
2009	1445.785	809.27	385.231
2010	1496.24	839.97	398.88
2011	1546.695	870.67	412.529
2012	1597.15	901.37	426.178
2013	1647.605	932.07	439.827
2014	1698.06	962.77	453.476
2015	1748.515	993.47	467.125
2016	1798.97	1024.17	480.774
2017	1849.425	1054.87	494.423
2018	1899.88	1085.57	508.072
2019	1950.335	1116.27	521.721
2020	2000.79	1146.97	535.37

Source of Data: IEA (2010)

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   23
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

FIG 2: CHART DEDUCED FROM ABOVE TABLE
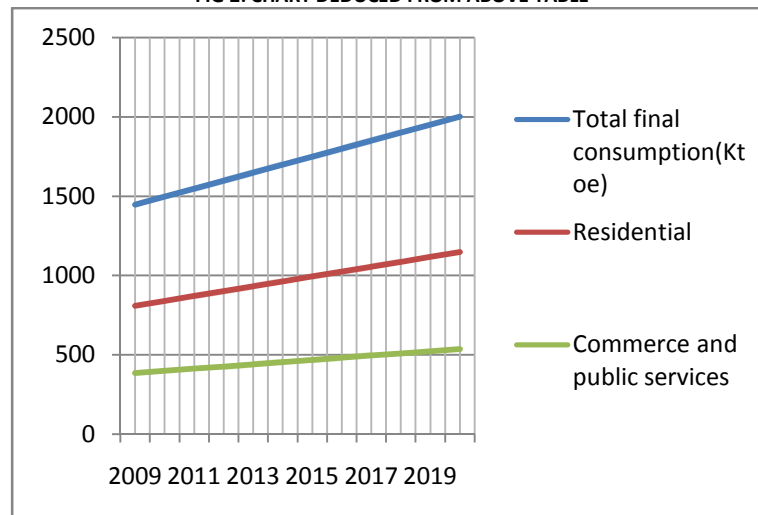
RESULTS & DISCUSSION

Table one and two illustrated the fast and future energy demand for the residential and commercial sectors, using a simple trend and growth rate analysis in the forecast. Period used in the past analysis were 1990 to 2008, and 2009 to 2020 for the future forecast. Table one is showing the trend of the Nigerian total final consumption (domestic supply less losses and energy consumed by energy industry) in Ktoe unit from 1990 to 2008. From the past trend, the rate at which Nigerian electricity demand expanded could be difficult to be met immediately due to the low growth in energy production, the immediate solution is to employ an efficient utilization of the available capacities and reduction in the electricity consumption.

The growth rate for final electricity consumption was averagely 4.87% annually (see table one), which is higher than the energy production growth rate of 2.31% (table three in appendix). Similarly, energy intensity has reduced very insignificantly with 1.84% reduction (table three in apendix), the intensity which was calculated on toe/thousand US$ was 4.30 in 1990 and reduced to 3.08 in 2008. This indicates lack of enough efficiency in energy usage and greater increase in consumption than production. At the sectoral levels, the residential and commercial sectors consumed up to 80% of the final energy consumption, 53.74% for residential and 26.46% for commercial sectors (see table one). Therefore, DSM programs are more appropriate to be applied in the residential and commercial sectors considering the huge consumptions recorded in the two sectors so that more energy can be saved to meet the escalating demand. Therefore, among the DSM programmes, Energy Reduction Programmes (ERP) would be more appropriate for Nigeria in order to substantially reduce the demand for electricity, maintain environmental sanity, escape fossil fuel price shocks and meet the increasing demand before the capital intensive capacity expansion is achieved. This is explained more in the following chapter.

FINDINGS, RECOMMENDATIONS/SUGGESTIONS

Based on the above analysis, the energy reduction option is found to be more appropriate as it concentrate more on the end-users of electricity; it controls directly the consuming habits of households and commercial users, which constitute about 80% of the total electricity consumption (table one). Lighting, cooling, ironing, water heating, cooking, electronic appliances and computer equipment are the elements causing high electricity consumption in both residential and commercial sectors in which no efficiency is applied in terms of its usage and operation in Nigeria. Some of the appliances like irons and microwaves which are used timely contribute less compare to other consuming activities that are used frequently. Even standby appliances when accumulated the total power they consume, add a lot to overall consumption.

For commercial and service sector, air conditioning and use of computer equipment consume more energy in offices and stores, while hotels and restaurants consume more from water heating. The unit consumption of computers, photocopy machines and printers might be low, but their number has continue to increase leading to huge consumption in total. Standby consumptions are estimated to be two-thirds of the total appliances electricity demand, which means only one third of the demand is used in operating the appliances. Use of lift in offices and hotels add significantly to electricity consumption.

Energy reduction programme (ERP) is directly connected toward ensuring efficient use and energy saving attitude in terms of the above electricity consumption activities. Some of the measures by ERP do not attract any cost in its implementations. In order to achieve energy efficiency and reduction using ERP the following measures has to be employed.

ENERGY SAVING AREAS

LIGHTING & BUILDINGS

Lighting is a very good opportunity of saving energy in Nigeria, but to achieve this, first there must be an updated record of energy users and metres, which in Nigeria is seriously lacking because, many households live in areas that are not even motor-able, and tend to connect to the electric poles directly without registration or metre. The second step is to wipe away the existing electric lamps, as an average electric lamp now in Nigeria is 60 watt, some use 100 watts, under ERP the government shall prevent the production and importation of these kinds of electric bulbs and provide incentives for the use of more efficient ones that consume around 10 to 15 watts. Thirdly, the electricity regulatory body shall initiate a penalty or punishment to any household or offices that turned on their lights in the daytime or in areas where lighting is not required. If consumers pay exactly what they consume, they tend to be more efficient to save their income. Natural light should be effectively utilized. Ageing bulbs consume more electricity therefore cleaning, replacement and maintenance should be carried out frequently.

For buildings, this may require cost and medium term to adjust, large windows should be provided to allow sufficient breath into rooms and people should avoid building in congestion areas. This is important in Nigeria due to the hot temperature which may not be the same thing in other countries. Similarly, white or light painting should be applied in buildings.

EQUIPTMENTS AND APPLIANCES

Standby appliances should be turned off when not in used, office computers, photocopiers and printers should be turned off as well except when in use. Washing machines should be used only when there are full loads of clothes. Fridges should be left closed as much a possible because, opening it allows cold air to escape, and warm foods should be left to be cold before putting it into the fridge, so as to easy the cooling system and save more electricity. However, when not necessary, it should be turned off, and freezers should be frequently defrosted. The number of air conditioners in offices and houses should be reduced. Wide and open buildings should be constructed where breath could penetrate easily. All outdated appliances should be replaced with modern and efficient ones. Similarly, energy consumption capacity levels of equipment should be labelled.

HEATING, COOKING AND OTHERS

Water heating is more demanded by hotels and restaurants, it is rarely required for houses except for winter, and hot water cylinders should be set at low degrees (50^{0}C). Alternatively, due to the abundance of solar energy in the country, solar water heating system should be installed. Frequently and un-necessary cooking should be reduced, and cooking materials should be made easier and soft before cooking e.g., beans should be placed in a water for a while to get soft

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 24
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

before cooking, or any other techniques to reduce the length of the cooking period because the longer the cooking the higher the energy needed. Pressing irons should be set at low level and avoid frequent use.

AWARENESS

All of the above techniques cannot be achieved unless the households and commercial users are sensitized and made aware of the need to save more energy, as well as the attitudinal and structural requirement to achieve that. "Energy savings and energy efficiency improvements depend on the combined efforts of many individuals, well motivated personnel are best able to develop and implement energy efficiency policies that are crucial for continued energy efficiency improvement in their organizations. It is therefore, necessary to raise awareness by campaigns informing the staff of energy-consuming organizations and households about energy efficiency options and specific DSM techniques" (Lugano Wilson, 2006).

This kind of campaign should be made individually and through the use of media, drama, video films, posters. But individual campaigns is preferable in Nigerian case due to low access to social amenities especially in local communities e.g. Television, Radio.

BENEFITS

Some of the benefits to be derived upon implementing ERP in Nigeria include the following:

COST REDUCTION: total cost of energy production (in terms of building capacities) and the cost of providing energy to new customers are relieved because the energy saved from DSM program will be transferred to new demand. Similarly, this will help provide sufficient energy and reduction in tariff for all when new capacities are established.

ENVIRONMENTAL IMPROVEMENT: reduction and efficient use of electricity consumption will reduce the need for generating more energy, and impliedly reduction in burning fossil fuels that release emission thereby saving the environment.

RELIABILITY OF NETWORKS: too many loads on electricity network may cause damages, sparks or blast of electrical infrastructures. DSM programmes are geared toward reducing such loads, thereby enhancing the reliability of electric networks. Other benefits as highlighted by Satish Saini, (2004) include the following:

- Reduction in the need for new power plant, transmission and distribution networks
- Stimulation of economic development since wasteful use of energy is reduce
- Creation of long-term jobs to new innovations and technologies
- Reduction in air pollutions
- Reduce dependency on foreign energy sources
- Reduction in peak power prices for electricity

CHALLENGES

Some of the challenges that could be faced while implementing any DSM program in Nigeria include the following:

- Lack of awareness on the importance of energy efficiency which was attributed to lack of education and access to social amenities like televisions and radio.
- Lack of commitment from government.
- Illegal connections to electric poles i.e. lack of proper record of electricity consumers and metres.
- Lack of skilled personnel to undertake energy audits.
- Low distribution capacities and short supply of Natural Gas to the Gas turbine plants.
- Gas pipeline vandalism and Bunkering.
- Expensiveness of the more efficient appliances and electric bulbs.

CONCLUSIONS

Power outage has continued to be the major cause for economic backwardness in Nigeria, several efforts were made to ensure adequate supply of energy in the country, but all prove abortive. However, Nigeria has a relatively sufficient capacity to provide a sufficient supply of power (table three shows 226.79Mtoe of energy production against 19120GWh of electricity consumption in 2008) but the outage is becoming more frequent. Subsequently, there is an urgent need to find alternative and immediate solution to the problem, and from the discussion in this paper, it was found that Demand Side management is the most effective solution to the Nigerian power problem. However, Energy Reduction Program (ERP) is found to be the most convenient DSM program for energy reduction in both the residential and commercial sectors, which were found to consume up to 80% of the total electricity consumption in the country.

Therefore, for the ERP to be implemented effectively and to achieve adequate electricity supply in the country, the National Electricity regulators, Energy Commission and other Institutions in the electricity sector should make energy efficiency a priority and engage on massive individual campaign especially in the rural areas. The marketing should be undertaken by personnel that has knowledge and understanding of DSM systems and opportunities. Similarly, electric metres should be enforced generally and incentivised to low income earners in order to verify the amount of energy consumption accurately and allow easy and effective electricity billing and payment. Finally efforts should be made to develop new capacities using different energy sources especially renewable energies and natural Gas, because the existing capacities are relatively inefficient to implement effective DSM programmes.

SCOPE FOR FURTHER RESEARCH

There is need for a further research on the economic evaluation of implementing the ERP in Nigeria, so as to serve as a financial guideline to the government, utilities and consumers.

ACKNOWLEDGMENTS

REFERENCES

BOOKS
1. Clark, W., G. & John, H., C., (1993), Demand-Side Management: Concepts and Methods. Fairmont Press, Business and economics.
2. Stoll, H., G., (1989), Least Cost Electric Utility Planning, John Wiley & Sons, New York

ARTICLES AND OTHERS
3. Adekola Oyenuga (2009), Getting Nigerian Electricity Sector Liberalization Right: four important issues. International Association for Energy Economics. An analyst with Electeric Power and Natural Gas Practice of McKinsey & Company in Oslo, Norway.
4. CRA,(2005),Primer on Demand-side management, with an emphasis on price-responsive programs, Charles River Associates, Carlifornia.
5. CSPM, (2001), Economic Anaysis of Demand-Side Management Programs and Projects, California Standard Practice Manual, California, USA.
6. Eric, B., Anne, A., (2006), Demand side management for residential and commercial users. www.leonardo-energy.org efficiency and co-design.
7. Lugano Wilson (2006), Energy Conservation And Efficiency, Case Study, Power Factor Correction, Tanzania Industrial Research and Development Organization (TIRDO), March.
8. Ofosu Ahenkorah, (2006) Capacity Building in Energy Efficiency and Renewable Energy Regulation and Policy-Makingin Africa, Ghana - Energy Efficiency Country Profile, Alfred K. Accra, January.SancoGlobals, Jan.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   25
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

9.   Prof. B. Garba (2009), Demand side management and efficient lighting in Nigeria, paper presented at the WEC Africa Workshop on Energy Efficiency. Director, Energy Management, Training and Manpower Development, Energy Commission of Nigeria, Abuja.
10. Prof. S.T. Wara (2011), Demand-side management - An energy management, efficiency, conservation, security technique Dean, General Abduslam A. Abubakar College of Engineering,Director, Product Development/Energy Centre, Igbinedion University, Okada.
11. Satish Saini (2004), The Growing Need of Demand-Side Management , Energy Programmes,
12. Source of Data from IEA (2010): Country Statistics: Nigeria
13. Sustainable energy regulation and policy for Africa (2005). Energy Efficiency and Demand Side Management, Module 14, University of Warwick, April
14. Swisher, J. N., G.M. Jannuzi, and R.Y. Redlinger, 1997, Tools and method for integrated resources planning; improving energy efficiency and protecting the environment, UCCEE, Riso.
15. The Measurement and Verification Guideline for Demand-Side Management Projects, Eskom Corporate Division, Corporate Technical Audit Department, Contracted North- West University, 23 February 2006
16. www.cogeneration.net/Demand_Side_Management.htm, 2010

ANNEXURE

TABLE 3: TREND OF ENERGY INTENSITY, ENERGY PER CAPITA, AND EXCHANGE RATE

TIME	Energy production (Mtoe)	Electricity consumption (GWh)	GDP (billion 2000 USD using exchange rates)	Population (millions)	Electricity consumption per capita(GWh)	Energy Intensity(toe/thousand $)
1990	150.45	8290	34.98	94.45	0.0878	4.30
1991	156.71	8750	36.64	97.25	0.0900	4.28
1992	161.99	9020	37.71	100.1	0.0901	4.30
1993	164.88	10360	38.54	103.02	0.1006	4.28
1994	166.16	10060	38.58	105.99	0.0949	4.31
1995	169.19	9880	39.54	109.01	0.0906	4.28
1996	181.96	9510	41.24	112.08	0.0849	4.41
1997	193.86	9300	42.36	115.19	0.0807	4.58
1998	188.58	8950	43.15	118.35	0.0756	4.37
1999	187.91	9040	43.63	121.54	0.0744	4.31
2000	202.02	9110	45.98	124.77	0.0730	4.39
2001	211.62	9480	47.41	128.04	0.0740	4.46
2002	196.63	13460	48.14	131.34	0.1025	4.08
2003	216.17	13440	53.1	134.66	0.0998	4.07
2004	229.12	16730	58.73	138	0.1212	3.90
2005	232.22	17960	61.9	141.36	0.1271	3.75
2006	234.04	15930	65.74	144.72	0.1101	3.56
2007	230.24	20330	69.98	147.98	0.1374	3.29
2008	226.79	19120	73.68	151.32	0.1264	3.08
Growth rate	2.31%					-1.84%
Forecast		y = 603.58x + 6002.1	y = 2x + 28.475	y = 3.18x + 90.262		y = -0.0548x + 4.6535
YEAR	Energy production (Mtoe)	Electricity consumption (GWh)	GDP (billion 2000 USD using exchange rates)	Population (millions)	Electricity consumption per capita(GWh)	Energy Intensity(toe/thousand $)
2009	240.13	17470	66.475	150.68	0.1159	3.61
2010	243.60	18074	68.475	153.86	0.1175	3.56
2011	246.85	18677	70.475	157.04	0.1189	3.50
2012	249.89	19281	72.475	160.22	0.1203	3.45
2013	252.70	19884	74.475	163.40	0.1217	3.39
2014	255.30	20488	76.475	166.58	0.1230	3.34
2015	257.67	21092	78.475	169.76	0.1242	3.28
2016	259.83	21695	80.475	172.94	0.1254	3.23
2017	261.77	22299	82.475	176.12	0.1266	3.17
2018	263.49	22902	84.475	179.30	0.1277	3.12
2019	264.99	23506	86.475	182.48	0.1288	3.06
2020	266.27	24110	88.475	185.66	0.1299	3.01

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 26
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

EMOTIONAL INTELLIGENCE, CUSTOMER ORIENTATION, ADAPTIVE SELLING AND MANIFEST INFLUENCE: A COMPLETE TOOL KIT IN MARKETING EXCHANGES FOR SALESPERSONS

ARSLAN RAFI
SCHOLAR
IQRA UNIVERSITY
ISLAMABAD

ZEESHAN ASHRAF
SCHOLAR
IQRA UNIVERSITY
ISLAMABAD

DILJAN KHAN
SCHOLAR
IQRA UNIVERSITY
ISLAMABAD

YASIR SALEEM
SCHOLAR
IMPERIAL COLLEGE OF BUSINESS STUDIES
LAHORE

TAJAMAL ALI
SCHOLAR
IQRA UNIVERSITY
ISLAMABAD

ABSTRACT

This research aims to find out factors that play their role in the individual's purchase decisions. This paper also attempts to identify the impact of emotional intelligence (EI), customer orientation, adaptive selling and manifest influence on business performance. Moderation effect of Emotional Intelligence of sales team on customer orientation, manifest influence, and adaptive was employed to check how these variables enhance business performance. The research concludes that customer orientation, manifest influence, adaptive selling with high levels of Emotional Intelligence is more likely to enhance the sales performance. Managers should organize such training programs, which would prove helpful for sales professionals to enhance their emotional intelligence abilities, customer orientation and adaptive selling. Literature significantly supports hypothesis of this study, but it also raises additional research issues, for instance emotional confidence that how much a salesperson is confident while using emotions.

KEYWORDS
Emotional Intelligence, Customer Orientation, Adaptive Selling, Manifest Influence, Sales Performance.

INTRODUCTION

Personal selling happens when a sales representative sells a service, product, or solution to a customer. Sales representatives match the benefits through their product, service or a solution to fulfill a customer's needs, wants, and desires. Sales are undoubtedly the chief goal of an organization for generating equitable revenue. They do so by fulfilling customer needs; which should be transformed into wants by harmonizing the Cultural, Social, Behavioral and Psychological aspects. Sales force may prove competitive edge over competitors, and can create real differences in company's success. Sales force is the chief contributor to a company's endurance in terms of a central hub between the company and its customers. The sales process becomes more complex, and the determination of the required measures of performance is correspondingly more difficult to identify (Jaramillo *et al.*, 2005). Salespersons' primary job is not just to make a sale, but to satisfy customers and create loyalty for the firm.

In such situations, it is quite difficult to assess salespersons' performance (Marshall & Johnston, 2009). As performance assessments become more complex, additional measures are required to cope up with these circumstances. Clear identification of the skill-sets, essentially required for successful job performance measures, has become more complex. Traditionally, firms have successfully designed criteria for salesperson who are enthusiastic, aggressive, self-motivated, extrovert and competitive (Spiro *et al.*, 2008).

Emotions comprise of powerful psychological influences that can strongly persuade sales professionals' behavior and performance (Slocum *et al.,* 1997), however understanding that how to effectively use emotions in marketing exchange is not yet explored (Nyer, Gopinath, & Bagozzi, 1999). In Emotional Intelligence (EI) specific emotions such fear, anxiety, cheerfulness, gratitude (Palmatier 2009; Rudolph & Wagner, 2009) and guilt and shame (Duhachek & Agrawal, 2010) have been examined but no research has been conducted that how salespersons' emotional intelligence can influence salespersons' own abilities and customers' emotions, and how these abilities and skills can influence or affect key marketing exchange variables. Research still lacks in this area that how salespersons interpret and react to their own and customers' emotions and how these emotions can influence marketing exchanges between buyers and sellers. Study proposes that salesperson' ability to understand emotions proves helpful in dealing with the customers, as emotional intelligence in marketing transactions.

In past few years, competition among salesperson is getting very high, salesperson need more mental and physical skills to cope up with competitor's strategies, and above all to influence purchase decisions tool knowledgeable customers. To cope up with customers' awareness and knowledge about several brands and competitive products, salesperson needs to be customer oriented. Customer orientation is very important construct in marketing literature. The most concerned areas in which customer orientation of employees, individuals, chiefly salespeople (Park & Franke, 2006) are examined these days.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   27
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

The salespersons' objectives are very different from traditional concepts. The salesperson's new motives are to build up relationships and value additions in selling concepts (Perreault & Hunter, 2007). In this new competitive era customer oriented behaviors such as identifying customers needs and wants, fulfilling their needs with value added product and service are the chief goals (Steenkamp & Scheer, 2007).

Study recommends salespersons to use emotions to better facilitate transactions with customers by using emotional intelligence in marketing exchanges. Emotional intelligence is the capacity to obtain and use knowledge from individual's emotions and those of others to fabricate valuable results. In the light of emerging challenges in businesses, more skills such as adaptive selling and manifest influence are required to better perform in this era of competitiveness. "Adaptive selling" framework, salespeople have ability to identify customer needs, gather information and then use this information to better satisfy each customer. Literature is also supportive that adaptive selling lead to beneficial business performance (Park & Franke, 2006) and Manifest influence is the change into the purchase decision of a customer due to the participation of salesperson (Zaltman & Kohli, 1988). Salespeople with better manifest influence capabilities are expected to be higher performers (Shervani, Challangalla, & McFarland, 2006). Study anticipates that manifest influence to be more directly related to sales performance at superior Emotional Intelligence levels.

The purpose of this research is to find out factors, which enhance sales-individual's ability to influence purchase decisions of customers. Furthermore, it also identifies the impact of Emotional Intelligence (EI), customer orientation, adaptive selling and manifest influence on business performance. In particularly, the research investigates the following research question: What attributes play vital role in influencing to customers' purchase decisions? It also provides the guidelines how to overcome these shortcomings, by incorporating Emotional Intelligence in marketing exchanges. Secondly, this study concludes that how moderation effect of Emotional Intelligence affects variables like, customer orientation, manifest influence and adaptive selling enhances business performance.

REVIEW OF LITERATURE

Emotional Intelligence (EI) initially introduced by Mayer and Salovey (1990), which reveals that it is kind of social sciences, which permits individuals to know about the body language, emotional capacity of other persons. Mayer and Salovey (1990) presented ability model called as MSCEIT (Mayer-Salovey-Caruso Emotional Intelligence test), which was based on four dimensions 1) Perceiving 2) Facilitating 3) Understanding 4) Managing.

The concept of Emotional Intellience (EI) has been emerging since Goleman (1995) introduced Emotional Intelligence (EI) as Individual's ability to cope with several types of emotional states. For instance, how a person would able to motivate in the state of frustration how would he or she will compete with frustration state. Goleman (1990, 1995) competency model identified twenty-one Emotional capabilities to be more effective in each state of emotion. Furthermore, these twenty-one dimensions further divided into four major clusters including 1) self-awareness, 2) self-management, 3) social awareness and 4) relationship management.

The mental-ability framework of Emotional Intelligence is a combination of reasoning abilities, which allows people to better understand emotions related information (Caruso, *et al.,* 2000). Furthermore, we discuss dimensions of Emotional Intelligence. There are four dimensions of Emotional Intelligence, which are: 1) Perceiving Emotions, 2) Facilitating Emotions, 3) Understanding Emotions, and 4) Managing Emotions.

Perceiving emotions is the ability to recognize and interpret emotions accurately (Caruso & Mayer, 1999). Perceiving emotions is the ability to differentiate different types of emotions (Matthews *et al.,* 2001). Specifically it is very important for sales professionals to better perceive customers' emotions that is or she is bored or excited, confused or interested, such differentiation provide sales professionals to select strategies accordingly.

Once customer's state of emotions is successfully identified, sales persons can use their own emotions to facilitate customers' intentions (Salovey & Mayer, 1997). Facilitating emotions is the most important dimension because in first dimension salespeople are analyzing customers' emotions, then salespersons have to select his own emotion accurately (Matthews, Zeidner, & Roberts, 2001). Specifically in marketing exchanges it is foremost to differentiate emotions and identify that which emotion is suitable in that particular situation. Sales professionals with higher levels of emotional intelligence perceive emotions, and then understand how appropriate emotion can affect customers' purchase intentions.

Understanding emotions is to identify complex emotions and develop emotional knowledge (Salovey & Mayer, 1997). It involves understanding complex emotions, that how different emotions lead to anxiety or anger, and how these emotions change interactions with customers. In conclusion, managing emotion is the aptitude to control emotions of others and yourself to achieve profitable outcomes (Salovey & Mayer, 1997). In marketing exchange, salesperson with higher level of emotional intelligence better differentiate among positive and negative emotions. It depends on customers' state of mind and effective sales professionals have this ability to understand customers' complex emotions and then use their own emotions to make attached them towards their products and services.

The logic why ability based domain specific assessment of Emotional Intelligence is important. Study forecast the direct influences of Emotional Intelligence on performance in terms of customer retention and sales revenue, accentuate salesperson's skills to consider and use emotions sensibly. Study hypothesized to check Emotional Intelligence's moderation effect to sales performance between three key exchange variables: Customer Orientation, Adaptive Selling, and Manifest Influence. Furthermore, Study chooses an ability-based over a self-report measure of Emotional Intelligence in selling behaviors. Self-report measures most of the time insufficient because people are more likely to report their skills, abilities imprecisely (Lysy, Paulhus, & Yik, 1998).

In addition, they try to manipulate their reporting through impression motives and self-concepts (Mayer, Caruso, & Solvey 2002), which tend to encourage desirable outcomes. Expectedly, the links are low between self-report and ability-based model's scales (Brackett *et al.*, 2006), analyzing that both of these two scales quantify different results for same person (Mayer and Brackett, 2003). In conclusion, literature have identified people are biased in self-reporting (Dunning & Ehlinger, 2003). Furthermore, self-reporting scale is inadequate to measure Emotional Intelligence abilities (Brackett *et al*., 2006). Thus, prior research used ability-based scale to quantify Emotional Intelligence skills that accurately relate in sales performance.

This study includes four variables to better assess emotional intelligence moderation role on business performance. Study anticipates significant impact of Emotional Intelligence on business performance. Sales professional with higher levels of emotional intelligence are more likely to satisfy customers and generate higher sales revenues. We also develop hypothesis to check the moderation effect of Emotional Intelligence between customer orientation, Manifest Influence, and Adaptive Selling.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   28
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

CONCEPTUAL MODEL
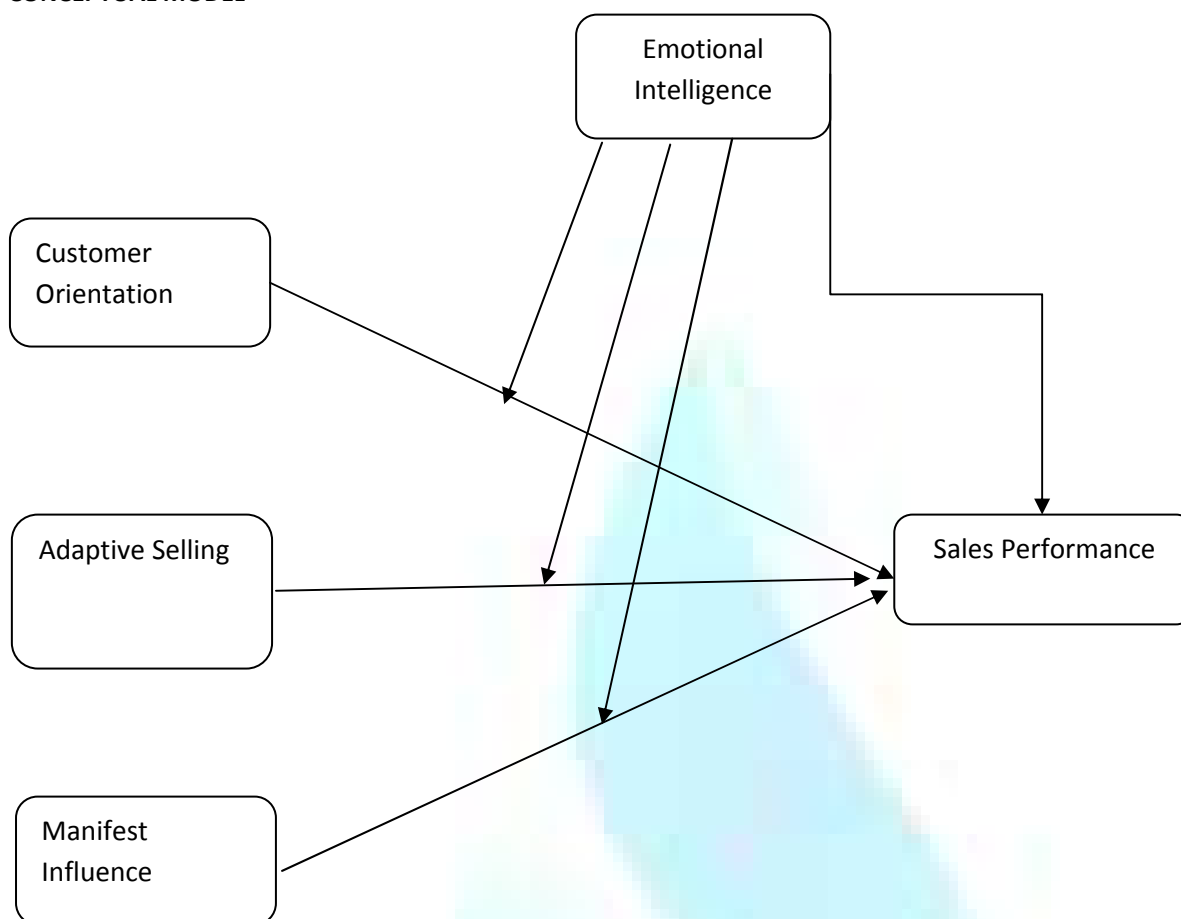
CUSTOMER ORIENTATION

Customer orientation involves sales professionals to "appoint those behaviors that lead to customer satisfaction and keep away from behaviors cause customer dissatisfaction" (Dotson, Chambers, & Dunlap, 1988). Initially, there were two approaches for customer orientation (Weitz & Saxe, 1982), which derived from SOCO, SO is called selling-oriented. In this particular situation, salesperson's ultimate goal is to make a purchase. The second approach is CO, which is called customer-oriented. In this particular situation, here the motive of salesperson is very different he has not just to make a sale here but to build up long-term profitable relationship with the targeted customer.

Weitz and Saxe (1982) identified seven dimensions of customer orientation 1) help customer to make reasonable purchase 2) assessing customers' needs 3) suggesting alternatives 4) explaining features of each alternative 5) suggesting those choices which shows customer's interest 6) beware of manipulating customer 7) give open hand to select product

Salespeople having high Emotional Intelligence are more likely to show behaviors reliable with customer orientation for the reason that they efficiently understand, utilize, distinguish, and manage emotions in marketing activities. High Emotional Intelligence sales professionals are more expected to appraise consumers' requirements better, propose products that would please them, explain products and their services more efficiently related to the customer's existing emotional situation, and keep away from persuasive selling, which might result from low social abilities (Ryan, Soutar, & Thomas, 2001). Kumar and Ramani (2008) propose that a customer orientation depicts the aptitude to utilize information gathered through successive exchanges to attain profitable customer relationships.

ADAPTIVE SELLING

Adaptive selling is a one to one selling technique in which "selling activities and methods are utilized during a sales exchange, dependent on information about the environment of the selling situation" (Sharma, & Levy, 1994). Adaptive sales professionals will adapt their sales techniques, interpersonal skills and presentation, with relevant to the consumer type or selling situation.

For instance, an adaptive salesperson might use cost driven presentation when interacting to a hasty, economic buyer (e.g. purchasing agent). The same sales professional may choose a socially driven method that highlights the benefits and advantages of the product or service when communicating on a product operator who take pleasure in conversation. This apply of adaptive selling can have a significant effect on sales performance (Zolner, Howard, & Gengler, 1995). This result, though, does not happen through practicing alone. Adaptive selling should be engaged for it to give in constructive results successfully (Weitz & Spiro, 1990). In a precise manner, adaptive selling can be employ in an efficient, as well as an unproductive manner.

Efficient use of adaptive selling concerns on choosing the suitable level of adaptation and decide on to utilize the sales behaviors that match to this adaptation. This most favorable level of adaptation happens when the discrepancy in the sales circumstances equals the discrepancy in sales behaviors" (Weitz 1984). From this position, such attributes as sensing different cues from potential buyers and properly interpreting them are significant to adaptive selling and are a considerable link between sales professionals' behaviors and selling efficiency (Keck, Grove, & Knowles, 1994).

MANIFEST INFLUENCE

Manifest influence refers to adjust customers' purchase decisions and behaviors because of salespeople's' active contribution (Zaltman & Kohli, 1988). Sales professionals' with higher manifest influence are more likely to be better performers (Shervani *et al.,* 2006). High Emotional Intelligence sales professionals persuade consumers more successfully because they distinguish and comprehend their needs and can give best solutions according to their needs, resulting in constructive outcomes for the firm, consumer, and sales professionals (Kidwell 2011). With no Emotional Intelligence, interpersonal skills undergo, and endeavor to manipulate may result disruptive. Kidwell (2011) proposed that manifest influence to be more significantly linked to sales performance at higher Emotional Intelligence stages. Furthermore, the two way relationships, predict that manifest influence would considerably have an effect on sales performance when sales

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   29
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

professionals are more likely to utilize customer orientation, but it will only happened if they got higher levels of Emotional Intelligence. Sales professionals who might have low Emotional Intelligence would try to employ customer orientation to persuade customers' purchase decisions, but their interpersonal skills will be less effective because they would unable to incorporate emotional information.

For instance, customers may understand an inability to notice anxiety or annoyance as pointing a lack of concerned when the sales professional is only able to interpret emotions. Otherwise, greater levels of Emotional Intelligence are likely to employ customer orientation look more convincing and honest because the salespeople also integrates consumers' emotions. Consequently, we anticipate customer orientation to temperate the relationship between manifest influence and sales performance.

EMOTIONAL INTELLIGENCE

Emotional intelligence is the capability to attain and use knowledge from individuals' emotions to produce better results. Modern research has proposed that salespeople's' greater emotion identification during discussions with customers can be beneficial for both the seller and buyers (Elfenbein *et al.*, 2007). By higher joint value, salespeople generate higher outcomes and brighten the chances of future marketing exchanges (Martin *et al.,* 2008). Research in a service industry recommended that professionals' display of emotion could influence customers' emotional states and pleasure (Hennig-Thurau *et al.*, 2006). Therefore, Emotional Intelligence has the ability to get better sales performance and improve long-term customer relationships. An individuals' ability to process and practice emotions can significantly affect marketing exchanges Bornemann, Wieseke, and Homburg (2009) proposed that empathetic knowhow increases the ability of sales professionals to meet customers' needs and wants. Research has identified a particular emotional capability that gives an understanding how to interpret and utilize emotions in marketing exchanges to increase business performance (Palmatier *et al.,* 2009).

IMPORTANCE OF THE STUDY

This research provides insight that high level of Emotional Intelligence salesperson compares tomedium and low level of Emotional Intelligence salesperson enhances sales revenue and maintain customer relationship. High level Emotional Intelligence salesperson, are more likely to understand how and what customer feels in different situations. Know how to use appropriate emotions in certain selling situations, recognize how main emotions might change given a customer's emotional state, and utilize emotions, which might result in ease of frustration and anxiety. Therefore, Emotional Intelligence can be beneficial to efficient customer relationship management (CRM).

Salesperson with high level of Emotional Intelligence not only facilitates the firm but also its customers. Salesperson with high level of Emotional Intelligence is more likely to better interpret customer's emotions, detailed information about alternatives, suggesting best option, which can best meet the required need of the customer. Consequently, this will create customer loyalty, which ultimately enhances repeat sales.

Effective Sales force would lower the cost of sales processes and procedures by providing the best solutions to the target customers through meeting their needs and demands. As sales force grow to satisfy more customers, customer loyalty is more likely to achieve. Furthermore, loyal customers would refer to other potential customers by sharing their experience with the company and its products.

This research study provides a framework to Sales Managers for selecting an emotionally sound candidate to be part of sales team, keep in mind that sales force turnovers influence recruitment and selection costs. Furthermore,choosing people with high level of Emotional Intelligence would be beneficial in other aspects. For instance, it would result as less communication gap among colleagues and coworkers. People can polish their emotional abilities and skills, therefore emotionally sound candidates might share and trained coworkers.

PROBLEM STATEMENT

Emotional Intelligence enhances the sales performance, and improve customer relationships beyond self-report Emotional Intelligence and domain-general Emotional Intelligence, Moderating role of Emotional Intelligence in buyer-seller relationships improve the positive relationships among customer orientation, adaptive selling and manifest influence on sales performance.

OBJECTIVES

The purpose of this research is to find out factors, which enhance sales-individual's ability to influence purchase decisions of customers. Furthermore, it also identifies the impact of Emotional Intelligence (EI), customer orientation, adaptive selling and manifest influence on business performance. In particularly, the research investigates the following research question: What attributes play vital role in influencing to customers' purchase decisions? It also provides the guidelines how to overcome these shortcomings, by incorporating Emotional Intelligence in marketing exchanges. Secondly, this study concludes that how moderation effect of Emotional Intelligence affects variables like, customer orientation, manifest influence and adaptive selling enhances business performance.

HYPOTHESIS

Study propose that high Emotional Intelligence salespeople recognize customers' emotions more efficiently; understand which emotion are influential to customers' needs and wants; know how anxiety, fear, or annoyance might compose customers sense; and handle emotions related to joint solutions. Consequently, study anticipates customer orientation with high level Emotional Intelligence is more likely to be positively related to sales performance. Manifest influence with high levels of emotional intelligence are more significantly enhance customers relationships and would able to create positive feelings in the minds of customers. Adaptive salesperson might use cost driven presentation when interacting to a hasty, economic buyer. The same sales professional may choose a socially driven method that highlights the benefits and advantages of the product or service when communicating on a product operator who take pleasure in such conversation. Therefore, study anticipates in a more precise manner, effectual adaptive selling depends on individual's ability to properly interrupt the buyer and situations, and react suitably.

H-1: *Emotional Intelligence in marketing exchanges moderates the relationships between (a) customer orientation (b) manifest influence (c) adaptive selling, sales performance get higher if these relationships are more positive at higher levels of Emotional Intelligence.*

RESEARCH METHODOLOGY

A research methodology consisting of quantitative research techniques has been adopted. Several industries like tobacco, telecommunication, home appliances, FMCG can be included, due to time constraints, only telecom companies, which are currently working in Pakistan, are being targeted. The selection of Telecom Industry is based on convenient basis out of ten industries (tobacco, telecommunication, home appliances, FMCG, sports goods, surgical instruments, fan industry, banks, textile, and confectionary industry).

Telecom Sector of Pakistanis the fastest growing sector. The companies included in this sector are (PTCL, V Wireless, Wateen, Telcom, Mobilink, Mobilink PCO, Ufone, Zong, Telenor, Warid Telecom (Pakistan), Warid PCO, WorldCall Wireless, WorldCall PCO, ARY Cards, Hello Cards, PTCL calling cards, and Vision Telecom (Pvt) Ltd. A sample includes PTCL, Mobilink, Ufone, Telenor, Warid, and Zong, from Telecom Sector, since these Telecom companies have the largest sales revenue in all Telecom Companies. The sample size is 300 (6*50=300). Literature suggested that the ratio of parameters with respondents should be 10:1 or 15:1 in extreme case. According to this criteria and our model sample size should be around 100 is appropriate but we take 300 for the sake of more accuracy.

Sample consisted of Sales Managers of all six above-mentioned Telecom Companies. Fifty respondents will be each company. Male and female Area Sales Manager, both are included in this sample on convenient basis. The population frame was the users of all telecommunication company's brands. Convenient sampling is used for this survey. The unit of analysis was company and in each brand unit of analysis was Sales Managers of that particular Company.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   30
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

RESULTS & DISCUSSION

There were 300 questionnaires distributed among salesperson of six telecom companies based on convenient sampling. Among 300 questionnaires, 217 were usable for analysis purpose. Which show usable response rate of 72.6%.

The majority of respondents fall in the age group of 20-25 covering 86.2% of the data. The age group of 25-30 covered 13.1% of the data. 30-35 age groups cover the remaining 0.7%. These figures show that all telecom companies mostly have young salesperson as their employees. The majority of respondents were Male covering 91.1% of the data. The remaining 8.7% fall in the Female category. These figures show that all Telecom companies mostly have Male employees. The majority of respondents having the sales experience of below than 5 years, which covers 56.4% of the data. The second major respondents having 5-10 years experience, which covers 27.3%. The remaining respondents having the sales experience of 10-15 years, which covers 16.3% of the respondent's data.

Regression analysis was run through SPSS 17.0 version for windows to evaluate the model. The results reveal that all independent variables have positive impact on dependent variable The **Model Summary** gives you the Adjusted R Square (R^2). Adjusted R Square (R^2) value is 0.873. This explains is that 87% of the variation in the dependent variable can be explained by variation(s) in the independent variable(s).

The main reason behind this research study is to investigate several salespersons' abilities and to find out how these abilities can play an influential part during sales encounters. First, Customer orientated sales professionals are key for creating long-term buyer-seller relationships. Customer orientation needs time and diverse complexity for the selling companies. By incorporating high level of customer orientation, the chances would be higher on salesperson performance (Park & Franke, 2006). By putting together the theoretical viewpoints that evaluate customer orientation at individual's levels of measurement, a comprehensive approach of the effects of customer orientation can be highlighted (Mark & Thomas, 2007). Assessments of market orientation have largely ignored the potential role of salesperson, have come up with a key predictor.

As organizations growing larger important factors regarding how to best communicate with the customers to aware them about organizational value creation, giving assurance, evaluating and offering best solutions to customer needs and wants, these ambitions cannot be done without including the vital frontier spanners, the salesperson (Mark & Thomas, 2007). Queries are still there that whether an optimal level of customer orientation is present and what factors are essential to get that optimal level of customer orientation. Second, sales professionals apparently consider adaptive selling as more important. Salesperson also feels that through adaptive selling training they would be highly successful to increase productivity.

Fullager *et al.*, (1995) proposed that individuals would learn more when they are encouraged with such training programs. Employees would perform better if they are provided with specialized training on a particular topic. Third, Manifest influence with high levels of emotional intelligence more significantly enhance customers relationships and enable the salesperson to create positive feelings in the minds of customers.

Fourth, Emotional intelligence gives an important factor for interpreting that how salesperson deals with customers in such ways that not only make easy the deals but also cause better outcomes for the firm (Goleman 1995). Therefore, being successful to understand customers' needs (customer orientation) and persuades them (manifest influence), is more significantly related to sales performance. Furthermore, we conclude that Emotional Intelligence moderates the relationship among customer orientation and sales performance, proposing that salesperson' emotional capabilities are crucial if they are to efficiently use strategies and procedures to deal with customers.

Consequently, Study anticipates that top managers only select highly talented applicants who have ability to control and express emotions while interacting with their target customers. Secondly, these selected candidates should be provided with specialized training programs that they might better polish these skills. Individuals can learn emotional intelligence. It is also suggested by Salovey & Mayer, (1997). Consequently, such training programs should be considered and given due priority in designing the training and development programs.

MANAGERIAL IMPLICATIONS

The findings of this paper imply certain thoughtful considerations for managers. This research provides several guidelines that those salespersons that have high emotional intelligence would influence higher sales and retain more clients than those who have low level of emotional intelligence. Customer orientated salespeople better estimate, understand, and interpret that what customers' feels in different circumstances, know which emotions and emotional states influence their purchase decisions. With greater manifest influence, salespeople would be able to ensure customers' purchase decisions with their active participation. Resultantly, more customers would be more attracted towards the products and services such salespeople offer. For meeting the objective of generating higher sales revenues, managers should focus on several areas. Those candidates who are good at interpreting and understanding customers' state of mind should be hired and their abilities be further polished through training and development. Managers should also organize such training programs which would prove helpful for sales professionals to enhance their emotional intelligence abilities, customer orientation and adaptive selling.

CONCLUSION

This study revealed that salespeople having higher Emotional Intelligence are more likely to perform behaviors reliable with customer orientation for the reason that they efficiently understand, utilize, distinguish, and manage emotions in marketing activities. With high Emotional Intelligence, sales professionals persuade consumers more successfully. They distinguish and comprehend their needs and can give best solutions according to their needs resulting in constructive outcomes for all the stake holders, i.e. the firm, consumer, and sales professionals. Adaptive sales professionals will adapt their sales techniques, interpersonal skills and presentation, with relevance to the consumer type or selling situation. Consequently, Study concludes that customer orientation, manifest influence, adaptive selling with high levels of Emotional Intelligence are more likely to play an important and considerable role in enhancing the sales performance of an organization's sales team.

SCOPE FOR FURTHUR RESEARCH

However, literature significantly supports hypothesis of this study, but it also raises additional research issues which are yet to be explored, i.e. role of emotional confidence; how much a salesperson is confident while using emotions (Alba & Hutchinson, 2000). Future studies should include emotional confidence and calibration to more strengthen the relationships between salesperson and sales revenue.

Empirical Research is needed on these variables so we can better understand the extent of the effect of each variable on sales performance. Authors assume that this study will provide researchers with a guideline to better interpret the influence of emotions and feelings in marketing transactions. Understanding the impact of Emotional Intelligence might lead to a range of results, including knowledge of salespeople that how to deal with customers, and how to feel and use different emotions while marketing exchanges.

REFERENCES

1. Agrawal, Nidhi and Adam Duhachek (2010) Emotional Compatibility and the Effectiveness of Antidrinking Messages: A Defensive Processing Perspective on Shame and Guilt, *Journal of Marketing Research*, 47(April), 263–73.
2. Bagozzi, Richard P., Mahesh Gopinath, and Prashanth U. Nyer (1999). The Role of Emotions in Marketing, *Journal of the Academy of Marketing Science*, 27 (2), 184–206.
3. Brackett, M.A. & Mayer, J.D., (2003). Convergent, discriminate, and incremental validity of competing measure of emotional intelligence. *Personality and Social Psychology Bulletin*, 1-12.
4. Brackett, Susan E. Rivers, Sara Shiffman, Nicole Lerner, & Peter Salovey, (2006). Relating Emotional Abilities to Social Functioning: A Comparison of Self-Report and Performance Measures of Emotional Intelligence. *Journal of Personality and Social Psychology*, 91 (4), 780–95.
5. Brown, Steven P., William L. Cron, and John W. Slocum Jr. (1997). Effects of Goal-Directed Emotions on Salesperson Volitions, Behavior, and Performance: A Longitudinal Study, *Journal of Marketing,* 61 (January), 39–50.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 31
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

6.   Chitturi, Ravindra, Rajagopal Raghunathan, and Vijay Mahajan (2007). Form Versus Function: How the Intensities of Specific Emotions Evoked in Functional Versus Hedonic Trade-Offs Mediate Product Preferences, *Journal of Marketing Research,* 44 (November), 702–714.

7.   David Caruso (2000). *Models of Emotional Intelligence*, in The Handbook of Intelligence, Robert J. Sternberg,ed. New York: Cambridge University Press, 396–420.———, ———, and ——— (2002), Mayer-Salovey-CarusoEmotional Intelligence Test (MSCEIT) Item Booklet. Toronto: MHS Publishers.

8.   Dunlap, B.J., Michael J. Dotson, and Terry M. Chambers (1988). Perceptions of Real Estate Brokers and Buyers: A Sales-Orientation, Customer-Orientation Approach, *Journal of Business Research,* 17 (2), 175–87.

9.   Ehrlinger, Joyce & David Dunning, (2003). How Chronic Self- Views Influence (and Mislead) Estimates of Performance. *Journal of Personality and Social Psychology*, 84 (1), 5–17.

10. Elfenbein, Hillary Anger, Maw Der Foo, Judith White, HweeHoon Tan, and Yoon ChuanAik (2007) Reading Your Counterpart: The Benefit of Emotion Recognition Accuracy for Effectiveness in Negotiation, *Journal of Nonverbal Behavior,* 31 (September), 205–223.

11. Franke, George R. and Jeong-Eun Park (2006). Salesperson Adaptive Selling Behavior and Customer Orientation: A Meta-Analysis, *Journal of Marketing Research*, 43 (November), 693–702.

12. Fullagar, Clive.A., Daniel G. Gallagher, Michael E. Gordon and Paul F. Clark (1995). Impact of Early Socialization on Union Commitment and Participation: A Longitudinal Study, *Journal of Applied Psychology*, 80 (1), 147-157.

13. Gengler, Charles E., Daniel J. Howard, and Kyle Zolner (1995). A Personal Construct Analysis of Adaptive Selling and Sales Experience, *Psychology and Marketing*, 12 (July), 287-304.

14. Goleman, Daniel (1995). *Emotional Intelligence.* New York: Bantam Books.

15. Hunter, John E. and Frank L. Schmidt (1998). The Validity and Utility of Selection Methods in Personnel Psychology: Practical and Theoretical Implications of 85 Years of Research Findings, *Psychological Bulletin*, 124 (2), 262–74.

16. Knowles, Patricia A., Stephen J. Grove and Kay Keck (1994) Signal Detection Theory and Sales Effectiveness, *Journal of Personal Selling and Sales Management*, 14 (Spring), 1-14.

17. Kohli, Ajay K. and Gerald Zaltman (1988). Measuring Multiple Buying Influences, *Industrial Marketing Management*, 17 (3), 197–204.

18. Levy, Michael and Arun Sharma (1994) Adaptive Selling: The Role of Gender, Age, Sales Experience, and Education, *Journal of Business Research,* 31, 39-47.

19. Mark E. Cross, Thomas G. Brashear, Edward E. Rigdon and Danny N. Bellenger (2007). Customer orientation and salesperson performance, *European journal of Marketing.* Vol. 41 No. 7/8, 2007. Pp. 821-835.

20. Martin, David, Martin O' Neill, Susan Hubbard, and Adrian Palmer (2008). The Role of Emotion in Explaining Consumer Satisfaction and Future Behavioural Intention, *Journal of Services Marketing*, 22 (3), 224–36.

21. Mayer, John D., David R. Caruso, and Peter Salovey (1999),"Emotional Intelligence Meets Traditional Standards for anIntelligence," Intelligence, 27 (1), 267–98.

22. Mayer, Salovey, & Caruso, (2002). *Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) Item Booklet*. Toronto: MHS Publishers.

23. McFarland, Richard G., Goutam N. Challagalla, and Tasadduq A. Shervani (2006). Influence Tactics for Effective Adaptive Selling, *Journal of Marketing,* 70 (October), 103–117.

24. Mueller, Jennifer S. and Jared R. Curhan (2006). Emotional Intelligence and Counterpart Mood Induction in a Negotiation, *International Journal of Conflict Management*, 17 (2), 110–28.

25. Palmatier, Robert W., Cheryl Burke Jarvis, Jennifer R. Bechkoff, and Frank R. Kardes (2009). The Role of Customer Gratitude in Relationship Marketing, *Journal of Marketing,* 73 (September), 1–18.

26. Palmatier, Robert W., Lisa K. Scheer, and Jan-Benedict E.M. Steenkamp (2007). Customer Loyalty to Whom? Managing the Benefits and Risks of Salesperson-Owned Loyalty, *Journal of Marketing Research*, 44 (May), 185–99.

27. Paulhus, Delroy L., Daria C. Lysy, & Michelle S.M. Yik, (1998). Self-Report Measures of Intelligence: Are They Useful as Proxy IQ Tests? *Journal of Personality*, 66 (4), 525–54.

28. Peter Salovey (1997). *What Is Emotional Intelligence?* in Emotional Development and Emotional Intelligence: Implications for Educators, Peter Salovey and David Slusher, eds. New York: Basic Books, 3–31.

29. Richard P. Bagozzi (2000). Sales Call Anxiety: Exploring What It Means When Fear Rules a Sales Encounter, *Journal of Marketing*, 64 (July), 88–101.

30. Spiro, RosAnn L. and Barton A. Weitz (1990). Adaptive Selling: Conceptualization, Measurement, and Nomological Validity, *Journal of Marketing Research*, 27 (February), 61-69.

31. Thomas, Raymond W., Geoffrey Soutar, and Maria M. Ryan (2001). The Selling Orientation–Customer Orientation (S.O.C.O) Scale: A Proposed Short Form, *Journal of Personal Selling & Sales Management*, 21 (Winter), 63–69.

32. Verbeke, Willem (1997). Individual Differences in Emotional Contagion of Salespersons: Its Effect on Performance and Burnout, *Psychology and Marketing*, 14 (6), 617–36.

33. Wagner, Tillmann, Thorsten Hennig-Thurau, and Thomas Rudolph (2009). Does Customer Demotion Jeopardize Loyalty? *Journal of Marketing*, 73 (May), 69–85.

34. Weitz, Barton (1984). *Sales Effectiveness through Adaptation to Situational Demands*, in Personal Selling, J. Jacoby and C. S. Craig, eds. Toronto: Lexington Books.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   32

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

PARADIGMS OF MODERN DAY MARKETING - A LOOK AT CURRENT SCENARIO

SUPREET AHLUWALIA

EXECUTIVE DIRECTOR - CREATIVE HEAD CONSULTANTS

VISITING FACULTY

THE INDIAN INSTITUTE OF PLANNING & MANAGEMENT

JAIPUR

VIVEK JOSHI

ASSOCIATE PROFESSOR

PEARL ACADEMY OF FASHION MANAGEMENT

JAIPUR

ABSTRACT

The world of business is changing every day and it is exerting pressure on marketers to sell more and to do it effectively as well as to contest in an overly crowded, exceedingly competitive segments. Forces of market and technological advances will continue to change how marketing is being practiced. This study looks at how promising innovations and latest developments may impact marketing in the future, especially in current scenario. Specifically, this study discusses how modern day advertising practices i.e. advergaming and product placement along with new emerging trends- will increase in importance due to socioeconomic and technological changes or advancements. Impact of developing consumer tribes and their effectiveness in modern marketing effort has been considered. The article also focuses upon how a more complete understanding of consumer roles with in consumer tribes can be leveraged to create sustainable loyalty. Other emerging elements of modern day marketing such as eye tracking, three dark horses, net promoter score, co-creation and other crucial trends are also being discussed.

KEYWORDS

Advertising Strategy, Competition, Consumer Behaviour, Marketing, Marketing Strategy.

INTRODUCTION

Modern day markets are competitive and that makes it mandatory for today's marketer to become more techno savvy and innovative as well as novel in his approach towards customer's needs. A marketing wrap-up of year 2011, the cat is out and all the new gimmicks adopted by marketers and latest trends developed and generated by marketing experts and gurus have been bought out. This has without a doubt been the year of Twitter. Last couple of years saw exponential rise of twitter and other social networking domains as emergent marketing grounds. In last few years big crowd of young people believed and followed the principal of brevity. Brevity as defined uncharacteristically by a 140-character Tweet. In keeping with the change and swiftness of new technological advancements, let me get to the point right away and discuss the modernity of marketing as it is surfacing in new decade of 21st Century. Year 2011 was a turning point that revolutionised the markets and marketing practices as the world was coming out of global recession and the year started with new hopes and large part of the world believed that new strategies will be bought out and path breaking efforts will be made and the corporate will record historic performance and economies will see a complete turnaround. 2011 was the year of hope and desperation.

The year 2011 was also the year of challenges and rebuilding what was once a grand monument but shattered to pieces by brutal forces of recession. What was this marketing year 2011 all about? In order to make a better picture of the year 2011 and to analyze its impact on future marketing practices we need to understand the conventional marketing and the modernistic approach that marketing as a practice has developed over the decades and centuries.

A conventional perspective of marketing places individual consumers into market segments, to enable efficient and effective use of marketing resources. Common segmentation processes, however, have little appreciation of the presence of social connections and their potential influence upon consumption. Fortunately, post-modern research approaches offer a means to broaden our perspective of consumers (Gronroos, 2006) and examine their consumption within a social context. The dimensions of social context were aptly used by information technology and IT enabled entertainment companies for the launch of social networking websites along with loads of web based entertainment. The social networking grew leaps and bounds making inroads in everybody's life. The internet got accessed by 62 million people in India. 70% (percent) of them got on with devices that were not broadband led. Nevertheless, the killer application in use was the social networking site. Face book, Twitter and Orkut and many more, it seems the cyberspace one day may explode with the phenomenal rate of growth with which these sites are mushrooming.

Emergence of social networking sites have helped us in understanding segmentation, to be precise marketing segmentation, better along with customizing products only in accordance to catering to the users and non users of social networks. The biggest example was including application on single touch to get connected with your social network by all sorts of mobile phones be it a reasonable phone or a smart phone. A very important marketing funnel got created. Most top-end consumers of products and services alike got talking to one another socially first. This virtual interaction is creating a marketing concentration of significance. No marketer could dare to ignore, even making an effort to modify is to be established only at your peril. Remember, a very important thing is happening here, consumers are chatting with one another not only on the subject of their social engagement needs, but they swap over valuable information about products and services and most important of all, brands and the perceived value that each brand holds and the reaction of others within the network about these brands in addition to the values these brands bring about. Consumers are chatting with one another about brands before getting to the market, particularly for more expensive and more long-lasting products.

Marketers have always used technology to advance their art. The promising use of technology is evident by the growth achieved in advergaming, product placement and other electronic marketing mediums which were tested first in the year 2008 but got consolidated in the year 2010 due to desperation for revenue a crunch or pain felt by businesses at the peak of global economic crisis and these technology driven methods became a big marketing force in the year 2011.

The author believes that advergaming and product placement, both depending on technology, are the response to a growing difference in entertainment consumption between the affluent and the poor in industrialised nations. Online advertising supported entertainment, such as advergaming, is growing rapidly among those who are willing to expose themselves to more advertising in exchange for free or subsidised entertainment. This bargain is more attractive to those with less disposable income as they have fewer entertainment options.

Product placement is becoming more and more important, especially for reaching wealthier consumers, as the affluent have many more options for ad free media consumption. Therefore, market investigation and study department needs to do their job like training the qualified personnel for conducting research, evolving consumers on continuous basis and then to continuously research and study the features and trend of consumers. Thus, the whole process for modern day organization becomes "**N**eeds ➡ **P**roducing ➡ **M**arketing ➡ **C**onsuming". This change indicates that the consumers' needs are in the important position. Pay attention to the long-term profit. With the development of marketing concept, the goal isn't changed, but enterprise needs to focus on the long-term profit.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   33
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

The best way to keep gaining benefit is to make use of consumers' needs. The more satisfied consumers mean that the more benefits could be earned and vice versa.

Developments like eye tracking, use of Net Promoter Scores (NPS), co-creation as well as increase in teleshopping etc have revolutionised the marketing scene in India. The recent developments and the tone they set for future could be well understood only when we try to unearth the reasons for collapse of traditional marketing and advertising and also make an effort to analyze plus understand why marketing practices changed and how did old advertising underwent the change and how the new paradigms have emerged. The latter portion of this study will discuss all modern changes or some not so flush modernistic changes in brief furthermore make an effort to outline and define the marketing initiatives for the future.

WHY TO CHANGE - A REVIEW OF ADVERTISING

Advertising forms are important tools that relate directly to advertising issues such as intrusiveness, irritation and ad avoidance and questions about effectiveness or more about their lack of effectiveness.

Fritz (1979) found that irritating advertising is better remembered than non-irritating advertising, while Aaker and Bruzzone argued that high irritation levels are associated with a decrease in advertising effectiveness. General attitude of the consumer toward advertising is negative. This poses a serious problem for marketers because advertising effectiveness is believed to be rooted in the view that advertising messages are potential communication exchanges between advertisers and consumers. The exchange assumes that both parties give and receive something of value in order for both parties to be satisfied. The main objective of the advertiser is to sell or create a positive perception toward the product or service. To the consumer, the value of advertising is achieved when advertising matches or exceeds their expectation. Traditional advertising faces numerous serious challenges that are difficult to overcome. These challenges are as follows:

1. Consumers are exposed to a tremendous number of advertisements on a daily basis which makes it impossible to give significant attention to most of them and this number is expected to continue to increase in the future.
2. Majority of advertising is presented when consumers are not shopping. This makes it even more difficult for consumers to pay attention, retain and respond to these advertising. These advertising messages are viewed to be less relevant to the consumer during the time the consumer is exposed to them.
3. The cost of advertising and particularly T.V advertising is fairly high, and the time the consumer is exposed to these commercials is very short.

Consumers do not consider the nature of most advertising to be worth their attention or time. The negative perception of consumers toward advertising has been significantly impacted by irritation felt toward the bombardment of daily advertising. This irritation is believed to lead to a general reduction in advertising effectiveness. Irritation is often caused by techniques that are perceived to annoy, insult, offend or overly manipulate the consumers and as a result consumers develop a negative attitude toward it.

Pleasant or likeable advertising is thought to have a positive impact on brand attitudes. Research has demonstrated that the value of entertainment lies in its ability to fulfil audience needs for escapism, diversion, aesthetic enjoyment, or emotional release. The ability of advertising to entertain can enhance the experience of advertising exchanges for consumers.

The visible use and evident increase in values and advantages of advergaming and product placement may also be seen as pointing out the shortcomings of traditional methods of advertising such as T.V, newspaper, and radio advertising rather it could be taken as a call to change the way advertising is done and considered by the corporations. Advergaming and product placement provide alternative venues for advertisers where consumers may not be as negative toward advertising. This can be achieved when the product's name image become part of the game the consumer is playing or when a hero utilizes the product during a movie. The consumer is likely to be more positive toward these forms of advertising compared to the traditional forms.

ADVERGAMING

With traditional media spaces like television and print getting increasingly cluttered, brand owners are facing a constant struggle to find ways to get their brand message noticed, understood and then acted upon by consumers. Their search for a clutter-free environment is making them turn to the Internet, and 'advergaming' is the latest online property that enables brands to wrap core brand messages in a gaming format. Brand managers are increasingly exploring advergaming (or in-game advertising) as a medium to attract young gamers while adding a new stream of revenue. To bring out the growing strength of this form we can consider the great inroads made by Anil Ambani-owned Reliance Entertainment's gaming subsidiary "Zapak". Zapak alone has executed advergaming campaigns for over 300 brands across online casual game and mobile gaming genres.

An advergame is a custom-made game built around the attributes of a brand. The game is built around an objective which the brand manager wants to convey to the audience. The brand is the hero of the game and the consumer plays it to have fun. By the end of the activity, the gamer ends up learning a lot about the brand. Though the business of Internet advergaming is still small in India, pegged at Rs 2 crore per annum, the concept is fast emerging with more and more brands opting for it. But the potential of this medium is obvious when one considers that worldwide, net advergaming is already a Rs 1,000-crore business. The market for advergaming is projected to touch $68 billion by 2012 in the US alone.

Advergaming's main objective is to develop lasting exchange relationships with customers, through immersive and entertaining experience. Because the entertaining experience of electronic games is believed to enrich the relationship between user and the advertised brand, advergaming is gaining recognition among advertisers.

Advergaming is the growing method for reaching many younger consumers, especially those whose limited resources encourage them to pursue relatively inexpensive or free entertainment options. Traditional media deliver a maximum of a 30-second exposure using a TVC, and 10-15 seconds using print and hoardings. "There is no involvement. At the same time, media is getting cluttered and therefore there is no surety that even the few seconds of expensive media bought will be noticed.

Considering online usage is on an average quite young in India, with 70 per cent below 30 years, it will be a generalization if we say it's the young India that advergames, online ad community and gaming are targeted at. Kids (5-12 years) and women (up to 45 years) are as eager and as involved in advergaming as the younger male target group is. The increasing popularity of this medium and the unique capability to maintain players' full attention during the time the game is being played is increasing corporate interest in advergaming.

You are not going to meet your entire audience with an online computer game, but you're meeting a much targeted portion and one that, on a product-by-product basis, could be the exact people you're most interested in meeting. Great potential for advergaming and how companies are using technology to reach consumers via an entertaining experience. Besides the FMCG sector, food and beverage brands, entertainment and media, retail, travel and tourism, telecom, education and lifestyle are the other segments, are increasingly adopting advergaming. Insurance companies like ICICI Prudential Life and IDBI Fortis too are using this interactive medium to explain complex products to consumers in a fun-interactive manner.

Advergaming has not received an adequate attention in research due to its newness. Brands do not primarily look at advergames for revenues. Typically, a consumer spends 3 minutes on an advergame and an advergame generates 25,000 responses ie 75,000 interactive minutes spent on a brand. Brand owners cannot buy that in traditional media. Advergaming can especially be seen on new and popular platforms such as iPhone where there are a lot of free advertisement-driven games. The world's power brands never repeatedly invest in a service which does not provide ROI and which is not measurable."

According to research estimates 'Net advergame' typically involves the consumer for at least 4-5 minutes. If additional media was bought, the responses could go up to 50,000. Internationally, mobile games accrue 20 per cent of their revenues from advertising as many companies are providing games for free. At present, less than 3 per cent of mobile telephony revenues come through games advertising. However, over the next two years it is expected to grow to at least 25 per cent with the key growth drivers being the mass market distribution of mobile games and more awareness among advertisers of this interactive medium.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   34

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

PRODUCT PLACEMENT

The practice of product placement is well established, more research is needed to determine both the impact of product placement and to determine what factors increase the effectiveness of product placement. Though previous research suggests that product placement may be effective in some situations and not so much in certain others. Still the need for product placement will continue to dramatically increase as changes in society provides wealthy consumers with more and more ways to consume content while avoiding traditional advertising. Affluent consumers now regularly bypass commercials in three distinct methods for their home video consumption. First, consumers watch movies and unique television shows on subscription channels such as HBO.

Second, consumers will continue to purchase advertising free video content in ever increasing numbers. Erstwhile a few previews at the beginning of the movies which are easily bypassed on most disc players. Purchased video games for consoles are another growing method for consumers to participate in ad-free entertainment. According to a survey the average gamer spends at least 90 hours a year purchasing advertising free video entertainment. This is a very conservative estimate as it does not include time spent on older games, game rentals, downloaded titles, nor other ad-free entertainment options.

Finally, the growing adoption of viewing steaming medium like youtube.com and use of digital video recorders DVRs will continue to enable those willing and able to pay for the service to fast forward through commercials. However, there was one positive finding for advertisers- the researchers found that the diminished impact of fast forwarded was almost neutralised if the viewer had previously viewed the advertisement at least once. They theorised that the zipped fast forwarded ad helped the viewer recall the previously viewed commercial. Thus, the case for increased product placement rests upon multiple trends among those with large disposable incomes to purchase advertising-free entertainment. In terms of passive video consumption, well over thirty million households subscribe to premium ad free television content. It is clear that there is a large and growing market for advertising free television service for those with the discretionary income to enjoy it. Product placement is a viable mechanism for marketers to reach this affluent population as they enjoy these ad-free entertainments.

EYE-TRACKING

Though not a very modernistic phenomenon and used outside India from last decade or so recently gained popularity in India and regained significance through-out the world in last couple of years as the recession started taking its toll and marketing as well as research campaigns looked more cumbersome and expensive mode for generating market-based or consumption preference related information. Eye-tracking research is based upon the assumption that if one may observe where a respondent places his visual attention; one may better understand where the respondent places his mental attention. This is not a new assumption, researchers have been tracking eye movements and publicising their theories on the subject for almost three centuries. What is relatively new is the use of video-based machines to track eye movements for researchers. These machines were very expensive when first developed as they required extensive computing power to calculate the point of regard visual attention in real-time from viewing respondent eye features such as corneal reflections and the pupil center. However, as Moore's law progressed, the cost of these devices has now reached the point that it is very feasible for marketers and market researchers to utilise them.

In Duchowski (2003), an eye tracker can only track the overt movement of the eyes; however, it cannot track the covert movement of visual attention. Thus, in all eye-tracking work, a tacit but very important assumption is usually accepted: we assume that attention is limited to foveal gaze direction, but we acknowledge that this may not always be so. In theory, respondent's mental attention may be elsewhere instead of where his visual focus is. He may be lost in thought and not paying attention to his vision. Or he may be deliberately using his peripheral vision. However, neither of these can be currently measured, so researchers have to assume that visual attention is a good proxy for mental attention. In practice, this has worked well.

CONSUMER TRIBES

Consumers have gathered from the beginning of consumption in one or the other form of group or collective entity such as Auto enthusiasts or Tupperware parties, both are unsophisticated examples of the inclination. Many consumer groups share an affiliation that is based upon enthusiasm and knowledge of a specific consumption activity. In fact, academics and consultants have recognized these groups and dubbed them as "consumer tribes" – a term borrowed from anthropology, describing groups of people who are brought together not around something rational, such as a job, but around deeper, more profound needs, such as kinship, passion, and identity. To put in simple words, Consumer tribes are groups of people who intensely share a common passion. This common passion could be for a brand, or may be for a good cause. While some brands are lucky enough to have consumers who bond around their brand (Harley Davidson and Apple strongly come to mind), others have realized the potential of tapping into tribes of enthusiasts (rock climbers, skateboarders, cigar lovers, etc). The opportunity to learn from, and market to, these passionate consumers warrants attention.

Consumer tribes, a group of people emotionally connected by similar consumption values and usage, use the social "linking value" (Cova, 1997, p. 297) of products and services to create a community and express identity. Theoretical developments in tribal marketing utilize Bagozzi's (2000) concept of intentional social action, to link social context with consumption to understand "real" consumers. This approach proposes that social associations are the most important influence on an individual's consumption decisions. Cova and Cova (2002) build upon this theoretical work to present tribes as an expression of both self and social identity. Earlier work by Maffesoli (1996) establishes, however, that consumer social identities and consumption choices shift according to situational and lifestyle factors. In this view, the consumer tribe can be understood and accessed through their shared beliefs, ideas and consumption patterns or preferences. These findings would seem to indicate that an individual may belong to multiple tribes at the same time to express different aspects of his or her identity.

A tribal approach to consumer behaviour answers marketers' calls to look beyond conventional marketing theory and avoid pigeonholing consumers (Addis and Podesta, 2005) through providing a means to segment groups of consumers based on meaningful shared characteristics. The affective attachment that tribal members possess for their tribe (Cova, 1997) provides an opportunity for marketers to foster meaningful and "symbiotic" relationships with groups of consumers. These relationships extend beyond a focus upon the level of repeat purchasing behaviour, to those based on affective bonds of loyalty, with the potential of "collective action" and advocacy from the tribe (Cova and Salle, 2008, p. 7). Firms supporting consumer-consumer relationships, such as consumer tribes, are proposed to create long-term loyalty through establishing both an emotional connection as well as a rational reason for commitment (Cova and Cova, 2002). A priori research indicates that the key to understanding and reaching the tribe as a collective is through their consumption. Consumption is seen to act as a tool for individuals to create and communicate self-identity (Belk, 1988; Grubb and Grathwohl, 1967; McIntosh and Schmeichel, 2004; Sirgy, 1982; Solomon, 1983).

Involvement with a tribe is an expression of self-identity, so the consumer tribe shares not only moral values or opinions, but consumption values and preferences. This provides opportunity for marketers to access a group of consumers, like a market segment, that actually connect with each other and share consumption preferences. The post-modern consumption practices and values assigned to consumption of certain products and brands by a tribe provide unique characteristics for marketers to explore and leverage. Customer co-creation and co-production has been recognized as an area of consumer behaviour theory that cannot be ignored in the process of gathering marketing intelligence (Rowley et al., 2007). Researched areas such as product development, experience environments, loyalty schemes and virtual communities have all been identified as key points for customer involvement (Rowley et al., 2007). Tribal marketing scrutinizes how tribes consume and "co-create" products for their own uses. This gives marketer's another avenue for creating social interaction around their good, service or brand. To further understand how a tribe works, the role of tribal members is to be understood and analyzed. The roles of tribal members within a tribe are as follows –

- Sympathizers - Individuals with an interest in the product or the brand or the product category, however, actual consumption of the product and knowledge of the product associated practice is relatively small.
- Members - This role includes people who actively buy, consume and collect product or the brand moreover socialize with the tribe, in physical and virtual spaces.
- Devotees - These members have a long-standing passion, knowledge and involvement with the tribe. They may not be as frequently active as members, but consider buying or consuming or collecting the product or the brand a central part of their self-identity.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 35
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

- Practitioners - This role includes members who are professionals and use the product or brand or consume product category, either professionally or informally with friends.

The value of a firm understanding the dynamics of tribal roles lies in supporting the individuals' involvement within the tribe, facilitating group activity and aligning marketing efforts with the tribe's values.

TWEETER

Micro-blogging site Twitter is now endeavoring hard to catch up with other social networks like Facebook, Orkut, and NetLog to step-up or enhance its marketable value by consenting to advertising on its platform. Sponsored Trends and Promoted Accounts have already been around for quite some time. Twitter recently came up with an additional platform for brands to advertise, called Promoted Tweets.

As Twitter's website divulges, "Promoted Tweets are an innovative form of advertising inimitable to Twitter that facilitate you to articulate to users that don't at this time, follow your account. Promoted Tweets are customary Tweets that are augmented to a broader audience."They start as regular tweets to followers and can be 'promoted' after the tweets is sent out. This will create the tweet to be featured on the top of all searches on the site for the associated keywords in the tweet.

Offered on a Cost-per-Engagement (CPE) basis, the Promoted Tweets feature for companies is a less subtle way of advertising on the platform. Unlike Promoted Trends and Accounts, the Promoted Tweets, will be supplementary moreover likely to be noticed as they would rest at the top of the timeline as Twitter says, "They appear as content in search results, not alongside them."

Numerous media, entertainment, food and beverages brands have before now established a sturdy existence on Twitter and used it as a valuable engagement medium with their followers. How would this novel feature be useful for a brand in the social media marketing plans is something that will be interesting to be seen? On the other hand, promoted tweets should be used wisely by brands as endorsing a brand by retweeting is a much more personal interface as contrasting to simply 'Liking' a page. The consumers won't pass around the tweet if they are not persuaded enough about the intentions of the brand. It is also imperative for brands to effectively use the tweets to their advantage. What is important to take into account is that how these tweets would be relevant to the brand category and how relevantly brands optimize their use. They can be advantageously used by restaurants to promote their new menu, or by companies to promote their new products. They can also prove to be a good way to get feedback. However it all depends on how effectively they are used.

THE THREE DARK HORSES

1. **Cash&Carry Wholesale retail**: Bharti Wal-Mart has made rapid strides in Punjab and following the suit aggressively in other states. Expect this to cascade into a ramp-up. It can be supposed that this is the best solution to open up the largely under-served markets of Tier 3 and rural India at large. There is a big untapped demand from the hospitality sector, intermediary traders, villagers and farmers alike. The next new success will emerge from there. Metro cities are eagerly waiting as well.
2. **Tele-shopping and Home-Shopping**: This again is the next big opportunity ahead as more than 148 million household's wait in anticipation. Direct selling offers the ability of under-served markets being able to tap into products and services that more-served markets in metros take for granted. The intermediary is cut out and prices are competitive as well.
3. **Private labels**: As organized retail booms, every super-market chain will want its piece of the action. More and more private label opportunities will emerge across the low-end, mid-market and premium tags. The apparel players are doing well on this count already. Expect more categories to open up. The private label will be private no more.

MORE CONSUMER GENERATED ADVERTISING AND CO-CREATION

The lazy Marketers have their dream coming true: Consumer Generated Advertising is an in-thing. Let your customers not only be your Promoters, but actually makes or create or at least provide you with a story so as to help you with your advertising. As this advertising will always be based on what they REALLY love about your market offering or may be an experience that they cherished or the association created with the usage of the product, it's sure to strike home with other consumers.

Not only marketers dream lazy-developers dream too – Let your customers come up with your products for you. The power of harnessing your customers' insights is amazing. Once again you are connecting directly to the insights, wishes and beliefs of your customers, ensuring that you will hit a home-run with the rest of the world too.

NET PROMOTER SCORES (NPS)

Net Promoter Score or NPS as it is popularly called is a net figure stating success of a company's policy performance. Net Promoter Score is based on the fundamental perspective that every company's customers can be divided into three categories. First Category is "Promoters", they are loyal enthusiasts who keep buying from a company and urge their friends to do the same. Second category is "Passives". These are satisfied but unenthusiastic customers who can be easily wooed by the competition. Last Category is "detractors" they are unhappy customers trapped in a bad relationship. Customers can be categorized based on their answer to the ultimate question. The best way to gauge the efficiency of a company's growth engine is to take the percentage of customers who are promoters (P) and subtract the percentage who are detractors (D). This equation is how we calculate a Net Promoter Score for a company:

P — D = NPS

While easy to grasp, NPS metric represents a radical change in the way companies manage customer relationships and organize for growth. Rather than relying on notoriously ineffective customer satisfaction surveys, companies can use NPS to measure customer relationships as rigorously as they now measure profits.

Many companies over a period of time recognized the power of loyalty and its impact on financial performance. Not only is the notion of loyalty intuitively appealing, but a growing body of empirical evidence suggests that companies that choose to ignore loyalty may find themselves on precarious footing as they attempt to ascend the ladder of financial success. Given the link between loyalty and financial benefits, such as increased market share, higher revenue, and lower costs, companies are wisely investing time and resources into developing loyalty programs that seek to measure, manage and improve loyalty performance. Despite the growing popularity of loyalty programs, the true value of such programs is not often realized due to ambiguous or ill-defined measurement systems. An informal meta-analysis, performed in 2003, showed that a standardized metric that accurately measures loyalty was difficult to find. Moreover, it became quite obvious that measuring customer satisfaction was simply not enough (Reichheld, 2003).

This comprehensive undertaking revealed unequivocal results: an individual's propensity to recommend a company to friends and colleagues may be the most direct gauge of customer loyalty and, ultimately, financial success. Although this finding was borne out by statistical tests, it also makes intuitive sense. When customers are truly loyal, their relationship with a particular company surpasses the basic model of economic exchange, where money is simply spent for products acquired or services rendered. Not only do these customers remain committed to the company, despite price increases and occasional errors, they also actively recruit new customers through positive word-of-mouth. These recommendations indicate true loyalty, since they reveal customers who are willing to risk their character, trustworthiness and reputation with virtually no reward beyond the positive regard and thanks of others. Furthermore, it also makes sense that the Net Promoter metric demonstrates the strongest link to long-term corporate growth. Net Promoter Score accurately measures the net effect of word-of-mouth. In other words, the reason why Net Promoter is such a powerful metric for gauging long-term growth is because it takes into account both the increased growth achieved through positive referrals, as well as the lost potential for growth caused by the effects of negative word-of-mouth.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 36
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

CRUCIAL TRENDS

The latest and very observant trends being forecasted for next few years are –

1. **Growing respect for Chinese population and businesses around the world** – Businesses world over are showering Chinese customers and visitors with even more tailored services and perks, and in general, lavish attention and respect. Global consumption arena we see a similar picture: department stores, airlines, hotels, theme parks and museums, if not entire cities, around the world are going out of their way to shower Chinese customers with tailored services and perks, and in general, lavish them with attention and respect.

2. **Counter-attack on China** - Chinese residents made over 30 million overseas trips in the first half of 2011 alone, up 20% since 2010. For comparison, US citizens made only 37 million outbound air travel trips during the whole of 2010 (Source: China Ministry of Public Security, July 2011; Office of Travel and Tourism Industries, September 2011) and that's just the beginning: The World Tourism Organization has estimated that the total number of outbound tourists from China will reach 100 million by 2020. In July 2011, Hilton Hotels Worldwide created a service targeting Chinese travelers. Called **"Hilton Huanying"** (Mandarin for "welcome"), the program is available at 30 Hilton hotels across the world, and offers tailored assistance for Chinese guests, including check-in in their native language and in-room facilities such as Chinese tea and television channels, as well as slippers and a Welcome letter in Mandarin. There's also a breakfast buffet available, with congee, dim sum and fried noodles on the menu.

3. **Augmented Applications on Devices** - More smart applications being developed by marketers to lure consumers these applications extend from mobile phones to brick and mortar retail outlets and includes health care, golden age privilege and checking for infections. The Do It Yourself trend is not going to slow down in 2012. Now, there are two kinds of DIY: the kind (most!) consumers hate and the kind they love. For 2012, the latter category will show endless innovation driven by, what else, technology, which in turn feeds off a never-ending desire among consumers to be in control. And while innovative DIY spottings keep pouring in (check out true DIY luggage check-in at **Amsterdam Schiphol Airport**), for this 2012 overview we're focusing on DIY and health, as countless new apps and devices are actively targeting consumers keen on preventing, examining, improving, monitoring and managing their health.

4. **Arrival of Deals (Deal Hunting)** - Continuous look out for heavy distribution & Securing the best deal (i.e. Yebhi.com, times shopping, TV18 shopping network, snapdeal.com) Deal hunting has become an integral part of daily life for millions of consumers. Yes, there are many new and innovative ways in which brands are using promotions and offers, but consumer attitudes to discounts and deals are what are really changing. Obviously, consumers have always loved getting good deals or exclusive rewards, but rather than having to hide one's haggling, securing the best deal is now accepted, if not admired by one's fellow consumers. In fact, it's now about more than just saving money: it's the thrill, the pursuit, the control, and the perceived smartness, and thus a source of status too.

5. **Brands adopting recycling and green-initiatives for their products** – Most prominent to start with were mobile handset companies and other followed. While in times of recession, economic interests tend to overrule. Eco-causes, the quest for a more sustainable lifestyle will remain a most pressing issue for years to come. The 'green' trend is the phenomenon of brands helping consumers recycles by taking back all old items from customers, and then actually doing something constructive with them since, modern day consumers are increasingly aware not only of the financial value in their past purchases, but the material and ecological value of 'stuff' as well.

6. **Cashless Transactions** - The cashless society has been popping-up in every trend list, now consumers en masse will forego coins and notes and just swipe their Smartphone, it is going to be the year that major players like Google and MasterCard will actively roll out their cashless initiatives around the world. For consumers, the initial lure will be convenience, but eventually mobile payments will create an entirely new data-driven eco-system of rewards, purchase history, deals and so on. Google Wallet, MasterCard's PayPass technology, shoppers simply tap their mobile device on special terminals at points-of sale to pay instantly. Square is another innovation, an electronic payments service which enables users to accept credit card payments by using a card reading portable device connected to their iPhone, iPad or Android device. Both the Square card-reader and app are free, although there is a 2.75% charge for each payment made.

7. **Bottom of the Urban Pyramid** - In 2012, the opportunities to cater to hundreds of millions of low income urban consumers will be unprecedented. Driven by extreme urbanization on a global scale that will not slow down in 2012, expect more BOTTOM OF THE URBAN PYRAMID (BOUP) consumers than ever to demand innovation tailored to their unique circumstances, from health issues to lack of space to the need for durability. Furthermore remember, BOUP consumers have materialistic and aesthetic desires too. Aakash is an Android-based, wifi-enabled tablet computer, manufactured in Hyderabad, India as a low-cost but full functioning device. It is expected to be sold for USD 60 in retail stores, and (subsidized by the Government of India) to students for around USD 35. PepsiCo India is test-marketing two products: Lehar Gluco Plus, a beverage with electrolytes and glucose, and Lehar Iron Chusti, a fortified iron snack. Both are aimed at consumers at the bottom of the pyramid — in urban (and rural) areas (Source: Economic Times, June 2011).

8. **Flawsome** – The brands that behave more humanly, including showing their flaws, will be awesome. While many trends are all about the new, it's always worth remembering that success in business in the end is more about being aligned with consumer culture than just being aware of 'new' techniques and technologies. While 2011 saw new levels of consumer disgust at too many business' self-serving and often downright immoral (if not criminal) actions, stories of businesses doing good remind consumers that personality and profit can be compatible. In fact, in 2012 consumers won't expect brands to be flawless; they will even embrace brands that are FLAWSOME, and at large (or at least somewhat) human. Brands that are honest about their flaws, which show some empathy, generosity, humility, flexibility, maturity, humor and dare to show some character and humanity are going to be a rage.

ADVENT OF SCREENS – BIG ONES AND SMALLER

Screen culture and its emergence is more like offshoot of stringent marketing communication mode or availability of more interactive medium through which so many benefits as well as communication or informational advantages will manifest themselves. Year 2012 and onwards will see three mega-tech currents converge continuing. Screens will be (even more) ubiquitous / mobile / cheap / always on; interactive and intuitive (via touch-screens, tablets and so on); an interface to everything and anything that lies beyond the screen (via the mobile web and, increasingly and finally mainstream in 2012, 'the cloud'). In fact, the future for most devices will be a world where consumers will care less about them and just about the screen, or rather what's being accessed through it.

Following the influence even the country like Indian urbanized into a screen-potato. Five of them dominated our lives. Television remained the big one for all of us, rural or urban. 148 million television sets decorated our homes with an average viewing time of 4.5 hours per day in rural and 23 minutes a day in Urban. The second screen in urban lives was the desktop at office and in some cases in homes as well. The third screen was the laptop computer, fast losing its appeal among the wannabes who want a tablet in their hands. The fourth screen that edged its way into Indian hands this year was the tablet. In came Samsung Galaxy, the I-Pad or I- Pad 2 (brought in from the markets where it has been launched) and more. The Fifth screen, though small in size, remained the biggest and most omnipresent of them all: the Mobile phone. More and more applications went mobile and the death of the laptop became a hot topic to discuss.

RECOMMERCE

With the changing economic classes and emerging dynamics of market has given rise to a new phrase, "Trade in to Trade up" For smart consumers, 'trading in' is the new buying in 2012. It's never been easier for consumers to unlock the value in past purchases. Consumers have always resold large, durable goods like cars and houses; but in 2012, almost anything is ripe for resale, from electronics to clothes, and even experiences. Novel brand buy-backs, exchange schemes, online platforms and mobile marketplaces offer smart and convenient options for consumers keen to 'trade in to trade up', alleviate financial strains (double dips, anyone?), and/or quell environmental and ethical concerns. Three drivers behind the RECOMMERCE phenomenon are:

- **NEXTISM**: Consumers will forever crave new and exciting experiences promised by the 'next'.
- **STATUSPHERE**: The growing status boost that comes from being savvy and shopping (environmentally) responsibly.
- **EXCUSUMPTION**: Cash-strapped, recession-stricken consumers embracing creative solutions to spend less and still enjoy as many experiences and purchases as possible.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 37
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

CONCLUSION

India emerges as a most-ruthless and enigmatic young market looking ahead into the future based upon changes taking place as on this day we find the economic pressure is severe on the biggest class, "Middle Class", loyalty lines are receding into the memory of past advertising. The new story in town is the range story. The story of variety on hand along with the value purchase accompanied by a complete offer, that could not be missed as it will fit present consumption patter and meet modernistic needs. Companies are trying to create an offer with the most number of options an offer that will assure that you might as well stay with me. Flit like a butterfly from this variant to the other. But stay with me. Companies are vying with one another to build promiscuity-palate offers within their own mother brand to keep customers back.

Sell your shares in market research agencies – their extensive research methods will go the way of the dinosaurs. Turns out, it all comes down to one question: "On a scale of 0 to 10, how likely are you to recommend brand/product X to someone else?" As the results of this research can be directly tied to revenue growth, instead of intangible fuzzes like brand recognition, watch the corporate world being taken by storm by NPS, following the likes of GE and Philips.

Integrated marketing is now the main means in marketing. In the field of marketing concept, the marketing activity is whole and complete which includes research and forecast, development and design, organization of producing and analysis of finance, electronic products, distribution, stock and shipment, marketing and public relations, brand and package and advertising. Organizing the whole process well to develop more benefits and meet consumers' needs. Internet advergaming is rapidly becoming popular since it delivers intense involvement of brands with consumers. Furthermore, the consumers being targeted have rapidly changed their media consumption habits to smaller screens like the PC/laptop monitor screens and mobile screens, thus paving way for Net advergaming in becoming a strong marketing tool.

As the consumers' aversion to traditional '30 seconds' spots is starting to hurt, TV channels and advertisers alike have to look for different models. Product placement and branded entertainment are starting to take up a serious position in their portfolios. A major advantage is that the convergence of TV and online is almost built into this model, as there are far less objections to the re-distribution of branded content throughout the internet then with traditional advertising-funded models.

Things seem evolving in this new millennium as we have just entered in 12 years but 88 more are left to go. By the end of this century the marketing will evolve and change so fast that the paradigms of today will be no longer visible and the literature written about modern methods of marketing will soon get outdated and the great experts of modern day marketing as it exist today may not be able to realize how things have changed.

REFERENCES

1. Aaker, D. and Bruzzone, D. (1985), "Causes of irritation in advertising", Journal of Marketing, Vol. 49, pp.47-57.
2. Aaker, D.A., Batra, R. and Myers, J.G. (1992), "Advertising Management", 4th Edition, Prentice Hall, New Jersey.
3. Addis, M. and Podesta, S. (2005), "Long life to marketing research: a postmodern view", European Journal of Marketing, Vol. 39 Nos 3/4, pp. 386-413.
4. Alvesson, M. (2000), "Social identity and the problem of loyalty in knowledge-intensive companies", Journal of Management Studies, Vol. 37, pp. 1101-24.
5. Anderson, E.W., C. Fornell, and D.R. Lehmann. "Customer satisfaction, market share, and profitability: Findings from Sweden." Journal of Marketing 58: 53-66 (July, 1994).
6. Arnould, E. and Thompson, C. (2005), "Consumer culture theory (CCT): twenty years of research", Journal of Consumer Research, Vol. 31 No. 4, pp. 868-82.
7. Avery Rosemary J and Rosellina Ferraro, Verisimilitude or Advertising? Brand Appearances on Prime Time Television, Journal of Consumer Affairs, 34(2),217-2444, 2000
8. Bagozzi, R. P. (1975), "Marketing as exchange", Journal of Marketing, Vol. 39, pp. 32-39.
9. Bagozzi, R.P. (2000), "On the concept of intentional social action in consumer behavior", Journal of Consumer Research, Vol. 27 No. 3, pp. 388-96.
10. Belk, R.W. (1995), Collecting in a Consumer Society, Routledge, London.
11. Carson, D., Gilmore, A., Perry, C. and Gronhaug, K. (2005), Qualitative Marketing Research, Sage, London.
12. Cova, B. (1996), "The postmodern explained to managers: implications for marketing", Business Horizons, November-December, pp. 15-23.
13. Cova, B. (1997), "Community and consumption: towards a definition of the 'linking value' of product or services", European Journal of Marketing, Vol. 31 Nos 3/4, pp. 297-316.
14. Dahl, Micael N. (2005), "The Medium as a Contextual Cue: Effects of Creative Media Choice," Journal of Advertising, 34 (3), 89-98.
15. Delabarre, E. (1998), "A method of recording eye movements", American Journal of Psychology, Vol. 9, pp. 572-572.
16. Duchowski, A. (2003), "Eye Tracking Methodology: Theory and Practice", Springer-Verlay Ltd., London.
17. Friestad, Marian and Peter Wright, (1995) The Persuasion Knowledge Model: How people cope with Persuasion Attempts, Journal of Consumer Research, , June, 22, 62-74.
18. Fritz, N. (1979), Claim recall and irritation in television commercials: An advertising effectiveness study, Journal of the Academy of Marketing Science, Vol. 7, pp. 1-13.
19. Gentry, L., Calantone, R. (2007), "Forecasting consumer adoption of technological innovation:Choosing the appropriate diffusion model for new products and services before launch", Journal of Global Business Management, Vol. 3, pp. 136-146.
20. Gomez, B., Gutierrez, A. and Cillan, J. (2005), "The role of loyalty programs in behavioural and affective loyalty", Journal of Consumer Marketing, Vol. 23 No. 7, pp. 387-96.
21. Greenwald, A.G. (2001-2003, 2005), Dr. Anthony Greenwald/IAT Materials. Available at http://faculty.washington.edu/agg/iat_materials.htm (accessed 9/28/11).
22. Gronroos, C. (2006), "On defining marketing: finding a new roadmap for marketing", Marketing Theory, Vol. 6 No. 4, pp. 395-417.
23. Gunther, Marc, Now Starting Party of Five- Dr Pepper: Is This Spin City or the Home Shopping Network? Fortune, 141, April, 2000
24. Heskett, J.L., Sasser, W. E., and Schlesinger, L.A. The Service Profit Chain. New York: The Free Press (1997).
25. Kalliny, M.(2009), "Attitude towards advergaming: A physiological and attitudinal testing of game players towards online advertising using eye tracking technology"' proceedings of the International Academy of Business and Economic Conference.
26. Kim, Ryan (2006), "Video Game Ads No Longer Child's Play: Product Placement Expected to be Crucial as Online Competition Has More Timeliness," San Francisco Chronicle, (June 12), C1. Available at http://www.sfgate.com (accessed 10/29/11).
27. Kumar, V. and Shah, D. (2004), "Building and sustaining profitable customer loyalty for the 21st century", Journal of Retailing, Vol. 80 No. 4, pp. 317-29.
28. Maffesoli, M. (2007), "Tribal aesthetic", in Cova, B., Kozinets, R.V. and Shankar, A. (Eds), Consumer Tribes, Elsevier, Oxford, pp. 27-34.
29. McIntosh, W. and Schmeichel, B. (2004), "Collectors and collecting: a social psychological perspective", Leisure Sciences, Vol. 26, pp. 85-97.
30. Nelson, Michelle. Recall of brand placements in computer games, Journal of Advertising Research, Vol. 28 No. 2, pp. 80-92,1999
31. Reichheld, F.F. "The only number you need to grow." Harvard Business Review. (2003)
32. Saunders, C. (2001), "Offline brands turning to advergaming". Available at http://www.clickz.com/clickz/news/1718236/offline-brands-turning-advergaming (accessed 10/29/11).
33. Schiffman, L., Bednall, D., O'Cass, A., Paladino, A., Ward, S. and Kanuk, L. (2008), Consumer Behaviour, 4th ed., Pearson Education
34. Sirgy, J. (1982), "Self-concept in consumer behaviour: a critical review", Journal of Consumer Research, Vol. 9, pp. 287-300.
35. Solomon, Michel R and Basil G. English, The Big Picture: Product Complementarity and Integrated Communication, Journal of Advertising Research, 34(1),57-64,1994
36. Van Kuran, Patricia (2003), "Product Placement as the New Advertising? The Effectiveness of Implicit Processing of Advertisements," working paper, Pomona College.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 38
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

MIS VS. DSS IN DECISION MAKING

DR. K.V.S.N. JAWAHAR BABU
PROFESSOR
KMM INSTITUTE OF POSTGRADUATE STUDIES
TIRUPATI

B. MUNIRAJA SEKHAR
ASST. PROFESSOR
KMM INSTITUTE OF POSTGRADUATE STUDIES
TIRUPATI

ABSTRACT

MIS means MANAGEMENT INFORAMTION SYSTEM. The Primary purpose of MIS is to help an organization achieve its goals by providing managers with insight into the regular operations of the organization so that they can control, organize, and plan more effectively. One important role of MIS is to provide the right information to the right person in the right format at the right time. In short, an MIS provides managers with information, typically in reports, that supports effective decision making and provides and provides feedback on daily operations.

KEYWORDS

Raw data, Quality information, Decision making, Intelligence phase, Design phase, Choice phase, Effectiveness, Efficiency, Profitability.

INTRODUCTION

The Management Information System is a collection of men, tools, procedures and software to perform various business tasks at various levels in the organization. Many organizations have separate MIS departments which are involved in maintaining records, performing transactions, report generations and consolidation of the important information which will be supplied to the various levels of the management. MIS has three basic levels: operational, middle management and top management where the information is passed from bottom to top. This paper is an attempt to design and develop the model of MIS for Birla Corporation Limited, which involves Attendance Capturing & Recording System which will be used in monitoring the staff, control over the irregularities and reporting to the top management and show how it is useful in decision making at top level.

FEATURES OF MIS

1. In any organization managers will have varieties of task to manage. MIS is mainly designed to take care of the needs of the managers in the organization.
2. Organizations will have different departments like marketing, production, sales, inventory, maintenance etc. Each of these departments function individually and also in relationship with other departments. Information is available in abundance. MIS aids in integrating the information generated by various departments of the organizations.
3. MIS also helps in establishing mechanism to eliminate redundancies in data.
4. MIS as a system can be broken down into sub system; each sub system may be programmed. This results in easy access of data, accuracy of data and information. It helps in maintaining the consistency of data.

NECESSITY OF MIS

Managers play a key role in any organization. They are responsible for taking decisions appropriate to the need of the market. Information systems have become the main tool used by managers in decision making. Mangers perceive information as the driving force to achieve success in any business. Hence there is a need of MIS. The impact of MIS on the functions is in its management. With a good support, the management of **marketing, finance, production and personnel become more efficient**. A well designed system with a focus on the manager makes an impact on the managerial efficiency. The impact is on the managerial ability to perform. It improves the decision making ability considerably.

CLASSIFICATION OF MIS

There are various types of management information systems. Mason and Swanson (1981) describe four categories of management information systems: (1) Databank information system, (2) Predictive information system, (3) Decision-making information system, and (4) Decision-taking information system. The classification is based on the level of support that the information system provides in the process of decision making. Sachdeva (1990) comprehensively presents these four types of systems:

Databank Information System: The responsibility of this information system is to observe, classify, and store any item of data which might be potentially useful to the decision maker. Each of these databases can be summarized and converted to single tabular presentations of information of interest to management. When information from two or more time periods is compared, trends can be observed.

Predictive Information System: This system moves beyond pure data collection and the determination of trends over time. Predictive information systems provide for the itself keeps the plane on course and at the proper speed and altitude (according to parameters determined by the pilot). Another example of decision-taking information systems is found in modem factory production. In automobile production, continuous inventories of parts are maintained by computer as cars move down an assembly line. Orders are placed automatically by the computer when additional parts are needed. This is done without the intervention of a manager.

DECISION MAKING PROCESS

In the 1950s, Herbert Simon and James March for the first time introduced a different decision making framework for understanding organizational behavior. Although they labored on the bureaucratic model by emphasizing on individual work in rational organizations and thus behaving rationally, their model added a new dimension: The idea that a human being's rationality is limited. By offering a more realistic alternative to classical assumption of rational in decision-making, this model supported the behavioral view of individual and organizational functioning. The model suggested that when an individual makes decision, he examines a limited set of possible alternatives rather than all available options. "He accepts satisfactory or good enough" choices, rather than insist on optimal choices. He makes choices that are good enough because he does not search until he finds perfect solution to a problem (Gordon, 1993). Simon divided kinds of decisions into two basic types: programmed and non programmed decisions.

a) Programmed decisions are routine and repetitive decisions, and the organization typically develops specific ways to handle them. For this kind of routine repetitive decisions, standard arrangement decisions are typically made according to established management guidelines.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   39
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

FIGURE 1: STEPS IN SIMON'S MODEL
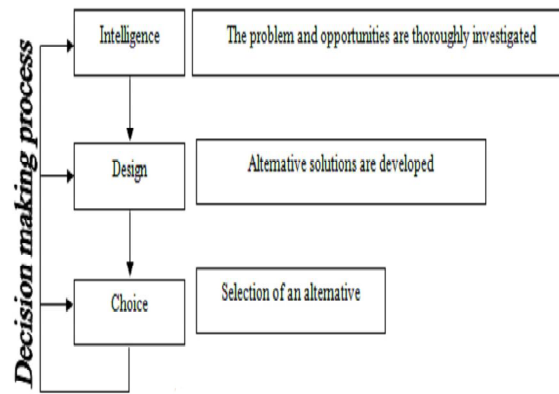
Source: Simon, 1997

b) Non-programmed decisions, in contrast, are typically one-shot decisions that are usually less structured than programmed decisions (Certo, 1997). Simon's model of decision-making has three steps (Figure 1). www.ccsenet.org/ijbm International Journal of Business and Management

After Simon, Huber (1980) expanded the model for decision making process and added two steps into Simon's model.

FIGURE 2: STEPS IN HUBER'S MODEL
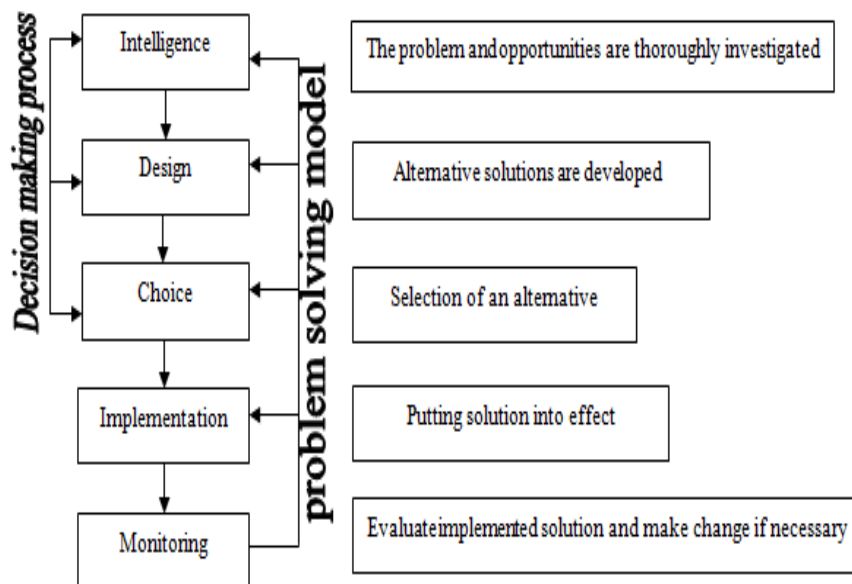
Source: Huber, 1980

After them, Gorry and Morton (1971) classified decisions by its structure into three levels; **structured decision,** in which the ingredients, or variables, that comprise a decision are known and they can be measured quantitatively.

Unstructured decision is one that the ingredients, or variables, that comprise a decision cannot be measured quantitatively.

Semi structured decision is in between structured and unstructured decisions. Usually most business decisions are semi structured. Then Gory and Morton continued on computer applications in terms of the degree of structure in the decision they are intended to make and the management level that they support (Gorry, Michael, 1971). Figure 3 shows the Gory and Morton grid.

FIGURE 3: THE GORY AND MORTON GRID

Source: Gorry & Michael, 1971

A review of decision making literature reveals that the core process of decision making process consists of mainly six steps which are shown in Figure 4 and Figure 5.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   40

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

FIGURE 4: THE SIX-STEP DECISION MAKING PROCESS
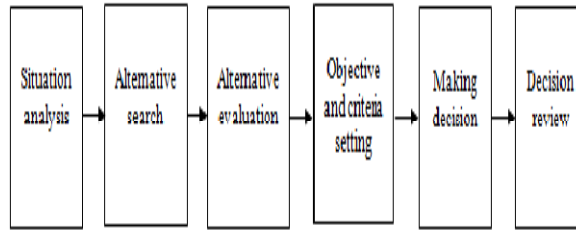
Source: Simon, 1997

Figure 5: The six-step decision making process in details
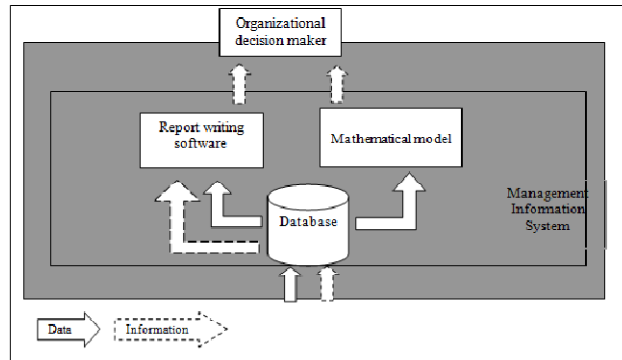
Source: Simon, 1997

The six-step decision making process increases the likelihood that a high quality, accepted decision will result.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   41

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

FIGURE 6: AN MIS MODEL

(Raymond, 1990)

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   42
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

MANAGEMENT INFORMATION SYSTEM (MIS)

Management information system (MIS) is one of the major computer based information systems. Its purpose is to meet the general information need of all the managers in the firm or in some organizational subunit of the firm. Subunit can be based on functional areas on management levels. There are many definitions for MIS, but one of the most appropriate definitions describes management information system (MIS) as "an organizational method of providing past, present and projected information related to internal operations and external intelligence. It supports the planning, control and operation functions of an organization by furnishing uniform information in the proper time frame to assist the decision makers" (Waston,1987). The information in MIS describes the firm or one of its major systems in terms of what has happened in the past, what is happening now and what is likely to happen in the future. The information is made is available in form of periodic reports, special reports and output of mathematical simulations. All managers use the information output as they make decisions to solve the firm's problems (Raymond, 1990).

AN MIS MODEL

An MIS model is illustrated in Figure 6. The database contains the data provided by accounting information system. In addition, both data and information are entered from the environment. The data based content is used by software that produces periodic and special report, as well as mathematical model that simulate various aspects of the firm operations. The software output is used by people who are responsible for solving the firm's problems. Note that some of the decision maker might exist in the firm's environment. The environment will involve once the firm bonds together with other organizations such as suppliers to form an Inter Organizational Information System (IOS). In such case, the MIS supplies information to the other member of the IOS (Raymond, 1990).

MIS CHARACTERISTICS

In general, management information systems have a number of characteristic, which include the following:

➢ **Report with fixed and standard formation.** For example scheduled reports for inventory control may contain the same type of information placed in the same location on the reports.
➢ **Have report developed and implemented using information system personnel, including systems analysts and computer programmer.** Typically analysts and programmers are involved in developing and implementing MIS reports. User is normally involved in the design of the reports, but they are not typically involved in writing the computer programs to produce them.
➢ **Require formal request from user.** Because information systems personnel typically develop and implement MIS reports, a formal request to the information systems department for report is usually required.
➢ **Produce scheduled and demand reports.** The major type of reports produced by an MIS is scheduled; demand reports (Stair, 1992).
➢ **External data is not captured by the organization but is used by the MIS.** (i.e., customer, supplier and competitor information).www.ccsenet.org/ijbm International Journal of Business and Management.

THE ROLE OF MIS IN DECISION MAKING PROCESS

The MIS and its organizational subsystems contribute to decision making process in many basic ways. Nowadays, some of the organizations use MIS to assist managers for decision making. For example, to assist decision-makers in extracting synthesized information from a massive database such as the Current Public Transport Record (CPTR) of Durban (CPTR), the Durban Unicity Council decided to make use of a Public Transport Management Information System (PTMIS) developed by Stewart Scott. This system is for use by transport planners and managers (Louw et al, 2001). Power (2002) has stated that making decisions is an important part of working in business environment. Companies often make decisions regarding operational improvements or selecting new business opportunities for maximizing the company's profit. Companies develop a decision-making process based on individuals responsible for making decisions and the scope of the company's business operations. A useful tool for making business decisions is a management information system (MIS). Historically, the MIS was a manual process used to gather information and funnel it to individuals responsible for making decisions.

1 Organization–wide information resource: The MIS is an organization – wide effort to provide decision making process information. The system is a formal commitment by executive to make the computer available to all managers. The MIS sets the stage for accomplishments in the other area, which is DSS, the virtual office and knowledge based systems.

2 Situation analysis, problem identification and understanding: The main idea behind the MIS is to keep a continuous supply of information flowing to the management. Afterward by data and information gathered from MIS system, make decisions.

DECISION SUPPORT SYSTEM (DSS)

A decision support system or DSS is a computer based system intended for use by a particular manager or usually a group of managers at any organizational level in making a decision in the process of solving a semi structured decision (Figure 7). The DSS produces output in the form of periodic or special report or the results of mathematical simulations (Raymond, 1990). It is difficult to pinpoint that are completely structured or unstructured. The vast majorities are semi structured. This means that the DSS is aimed at the area where most semi structured decision is needed to be made.

FIGURE 7: THE DSS FOCUSES ON SEMI STRUCTURED PROBLEMS

Source: Raymond, 1990

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   43
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in
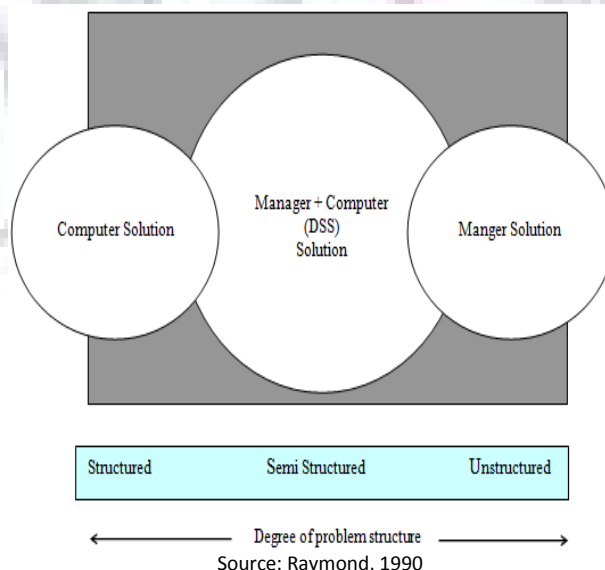
A DSS MODEL

A DSS model includes four parts as follows (Figure 8) (Raymond, 1998).

FIGURE 8: A DSS MODEL
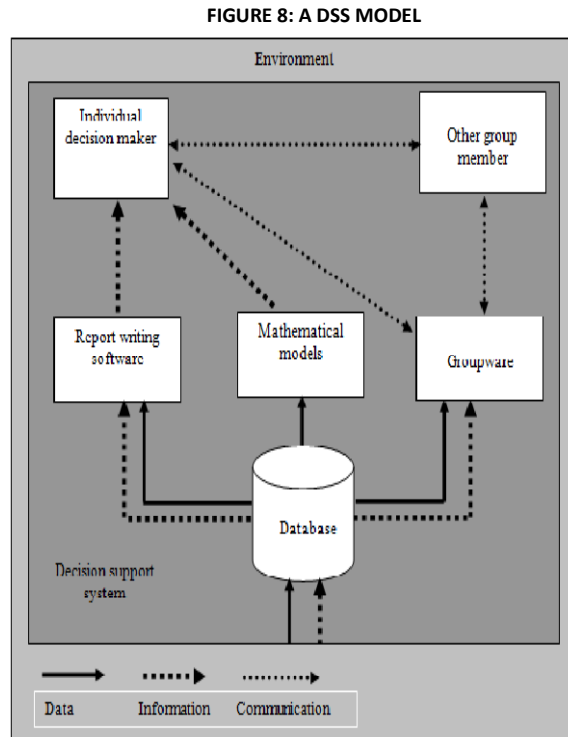
(Raymond, 1998)

- ➢ **Data base** produces both internal and environmental data, which are stored in the database.
- ➢ **Report writing software** produces both periodic and special reports. Periodical reports are prepared according to a schedule and typically they are produced by software, which is coded in a procedural language such as COBOL or PL/I. The special report is prepared in response to unanticipated information need and takes form of database by users who use the query language of a DBMS or fourth generation language.
- ➢ **Mathematical model** produces information as a result of either simulation that involves one or more components of the physical system of the firm or facts of its operations. Mathematical models can be written in any procedural programming language. However, special model languages make this task easier and have the potential of doing a better job.
- ➢ **Groupware** enables multiple decision makers, working together as a group, to reach solutions. In this particular situation, the term GDSS, or a group decision support system is used. Perhaps the decision makers represent a committee or a project team. The group members communicate with one another both, directly and by means of the group ware. The reports writing software and mathematical model have always been regarded as necessary DSS ingredients. As the DSS concept was broadened to provide support to two or more decision maker working together as a team or committee, the idea of special group oriented software or groupware, became a reality.

DSS CHARACTERISTICS

Decision support system has a number of characteristics, which include following:
- ➢ **DSS provide support for decision maker mainly in semi structured and unstructured situations** by bringing together human judgment and computerized information. Such problem can not be solved (can not be solved conveniently) by other computerized systems, such as MIS.
- ➢ **DSS attempts to improve the effectiveness of decision-making** (accuracy, timeliness, quality) rather than its efficiency (cost of making the decision, including the charges for computer time) (Davis & Olson, 1985). www.ccsenet.org/ijbm International Journal of Business and Management.
- **DSS provides support to individuals as well as to groups.** Many organizational problems involve group decision-making. The less structured problem frequently requires the involvement of several individuals from different departments and organizational levels.
- ➢ **Advanced DSS are equipped by a knowledge component**, which enables the efficient and effective solution of very difficult problems (Turban & Aronson, 1998).
- ➢ **A DSS can handle large amount of data** for instance advanced database management package have allowed decision makers, to search database for information. A DSS can also solve problems where a small amount of data is required.
- ➢ **A DSS can be developed using a modular approach.** With this approach, separate functions of the DSS are placed in separate modules - program or subroutines-allowing efficient testing and implement of systems. It also allows various modules to be used for multiple purposes in different systems.
- ➢ **A DSS has a graphical orientation**. It has often been said that a picture is worth a thousand words. Today's decision support systems can help managers make attractive, informative graphical presentations on computer screens and on printed documents. Many of today's software packages can produce line drawing, pie chart, trend line and more. This graphical orientation can help decision makers a better understanding of the true situation in a given market place.
- ➢ **A DSS support optimization and heuristic approach**. For smaller problems, DSS has the ability to find the best (optimal) situation. For more complex problems, heuristics are used. With heuristic, the computer system can determine a very good-but not necessarily the best- solution. This approach gives the decision maker a great deal of flexibility in getting computer support for decision making activities.
- ➢ **A DSS can perform "what – if" and goal – seeking analysis.** "What – if "analysis is the process of making hypothetical change to problem data and observing impact of the results. In with" what – if "analysis, a manager can make changes to problem data (the number of automobiles for next month) and immediately see the impact on the requirement for subassemblies (engines, windows, etc.) (Stair, 1992).

THE ROLE OF THE DSS IN THE PROCESS OF DECISION MAKING

Previously it was mentioned that the MIS is best suited in identifying problems and helping managers understanding them to make suitable and correct decisions, but the main weakness of MIS is that it is not aimed at the specific need of the individual and group decision makers. Very often the MIS does not

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 44
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

provide exactly the information that is needed to solve problems for individual and group decision making. DSS is tailored to the specific need of the individual and group managers. Therefore, the DSS can extend this support through the remaining steps (in objective and criteria setting, alternative search, alternative evaluation, making the decision and decision review) of the decision making. Finally DSS has more roles in decision-making and problem solving than MIS (Raymond, 1998). The other researches such as the following confirm this idea: Uma (2009) has stated that a Decision Support System is an integrated set of computer tools allowing a decision maker to interact directly with computer to retrieve information useful in making semi structured and unstructured decisions. Example of this decisions include such things as merger and acquisition decisions, plant expansion, new product decisions portfolio management and marketing decisions. Nokhbatolfoghahaayee et al (2010) have introduced a fuzzy decision support system (FDSS) with a new decision making structure, which can be applied to manage the crisis conditions in any large scale systems with many parameters. After receiving both functional variables of the system and fault signals, the FDSS makes proper decisions to make up and repair the distorted situation and the affected elements of the network according to its data base established through experience gathered from expert managers and decision models properly developed. These decisions are expressed in the form of some scenarios with different desirability degrees, which are determined by some properly developed fuzzy multi-criteria decision making methods, helping the manager choose the best one according to his discretion. Alonso et al (2010) have presented an implemented web based consensus support system that is able to help, or even replace, the moderator in a consensus process where experts are allowed to provide their preferences using one of many types (fuzzy, linguistic and multi-granular linguistic) of incomplete preference relations. These studies show the important and role of MIS during managers' decision making process.

DISCUSSION

Managers in all levels of organization hierarchy need precise and suitable data and information to make decisions that increase organizational performance. Such concept suggests an informational need of supervisory level is different from top level. At the same time the type of information also at each level is different. At lower level, supervisors need defined, clear, precise, quantifiable and internal organizational information but at the top level a manager needs undefined, future oriented, infrequent, summarized, relatively, non quantifiable and mostly external information. Such concept is illustrated in Figure 9. Quantifiable information could be gathered from external environment if suitable. Management Information Systems are placed in organizational information system such as CSCWS, GDSS and ESS. And some of organization environment elements such as www.ccsenet.org/ijbm International Journal of Business and Management socio-cultural factors like birth rate, population rate, competitor's share of market and so on could be quantifiable data and be considered and used it the process of top level management decision making process.

FIGURE 9: INFORMATION AND DECISION-MAKING
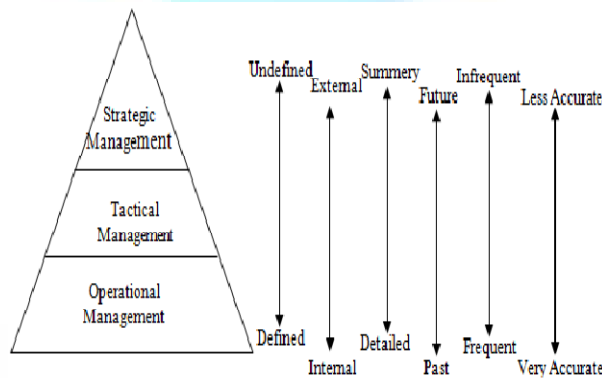
Source: Certo, 1997

In general, different kinds of data and information are suitable for decision-making in different levels of organizational hierarchy and require different information system to be placed. Such system could have explicit effect on each step of decision process in solving problems. At the same time each information system can not fulfill complete information needs of each level, but rather different information systems if integrated in different levels could satisfy information needs of a level and at the same time fulfill part of information needs of other levels. For example TPS fulfills the lower level needs of an organization but MIS furnishes data and information for lower and middle level management needs. On the other hand, DSS furnishes information for middle level and higher level of organizational hierarchy and ES fulfills only higher level managerial needs. Clearly by segregating each IS, its particular function could be recognized and it's overlapping distinguished. The role of different information systems is depicted in Figure 10.

FIGURE 10: ORGANIZATION AND INFORMATION SYSTEM
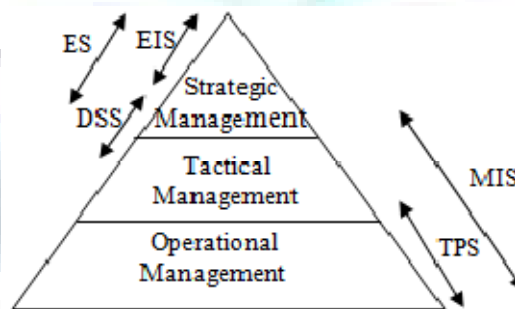
Source: Davis & Olson, 1985

The perceived concepts, which are based on the role of MIS and DSS in the decision making process, especially with emphasize on MIS and DSS which provide information services for middle and higher level managers in the process of decision making are integrated in Figure 11.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   45

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

FIGURE 11: TRANSFERRING DATA FROM EDP SYSTEM TO DBMS AND MANAGERS' DECISION MAKING PROCESS
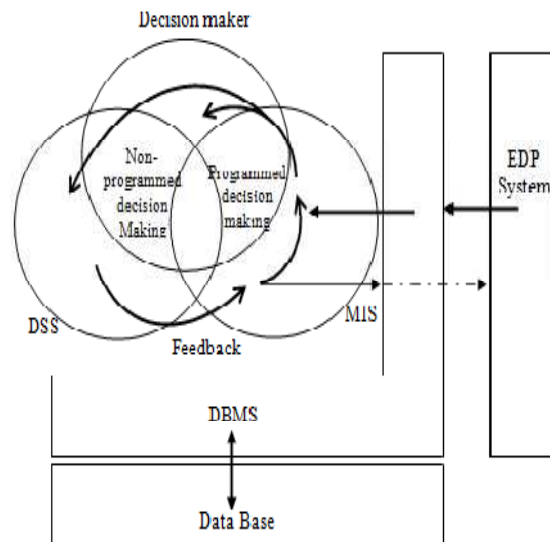
In Figure 11 it could be noted that data from EDP system transfers to DBMS and helps managers to make programmed and non-programmed decisions (Note 2). The flow of data after moving from EDP system to DBMS will move from MIS level to DSS and at the same time part of processed data will be restored in EDP system.

CONCLUSION

The paper entitled 'MIS is an Effective Tool to Decision Making' gives an impact on the important function of top management. It is also used to generate the reports with the help of advanced technology having maximum characteristics of good information by which the decisions are to be taken related with the functionality of management decisions. The MIS model developed specifically helps HR managers to keep the control on working of the staff at various levels. The system has been tested for above module in Birla Corporation Ltd. The Reports generated are as per the format by which it will help top management to take decision concerned with human resource in attendance recording and capturing which is one of the basic needs of any organization.

REFERENCES

1.   Annual Report of Birla Corporation Limited.
2.   Arora A., Management Information Systems, Himalaya Publishing House, Mumbai.
3.   Banerjee, U. K., & Sachdeva, R. K. (1995). Management Information System: A new frame work. New Delhi: Vikas Publishing House.
4.   Davis, G.B., & Olson, M. H. (1985). Management information systems: Conceptual foundations, structure, and development. New York: McGraw-Hill.
5.   Dr. Milind Oka (2009), Management Information Systems Text and Cases (16th ed.), Everest Publishing House, Pune.
6.   Gupta R. C., Management Information Systems, CBS Publishers & Distributers, New Delhi.
7.   Jawadekar, W. S. 1998, Management Information System, Tata McGraw Hill Publishing Company Ltd. New Delhi.
8.   Lordon K. L., Management Information System, Prentice Hall of India, New Delhi.
9.   Lucas, H. C., Jr. (1990), Information systems concepts for management. New York: McGraw-Hill.
10. McLeod, R., Jr. (1995). Management information systems: A study of computer-based information systems (6th ed.). New Delhi: Prentice Hall of India.
11. Murthy C. S. V., Management Information Systems, Himalaya Publishing House, Mumbai.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   46
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

PRE-PROCESSING AND ENHANCEMENT OF BRAIN MAGNETIC RESONANCE IMAGE (MRI)

K.SELVANAYAKI
RESEARCH SCHOLAR
ANNA UNIVERSITY OF TECHNOLOGY
COIMBATORE

DR. P. KALUGASALAM
PROFESSOR & HEAD
DEPARTMENT OF SCIENCE & HUMANITIES
TAMILNADU COLLEGE OF ENGINEERING
COIMBATORE

ABSTRACT

This proposed system for pre-processing and enhancement through Magnetic Resonance Image (MRI) is a gradient based image enhancement method and is based on the first derivative, local statistics. The Proposed enhancement method consists of four processing stages. In the first stage, the MRI brain image is acquired from MRI brain data set to MATLAB 7.1. After acquisition the MRI is given to the preprocessing stage, here the film artifacts (labels) are removed. In the third stage, the high frequency components and noise are removed from MRI using the following filters. Such as Median filter, Weighted Median filter, Adaptive filter and Spatial filter. The performance of above filters are measured and evaluated. Finally the best filter is identified and used for MR brain image enhancement.

KEYWORDS

Magnetic Resonance Image (MRI), Image Acquisition, Pre-processing, Enhancement, Median filter, weighted Median filter, Spatial filter, Adaptive filter, performance Analysis.

1. INTRODUCTION

Brain tumor is one of the major causes for the increase in Mortality among children and adults. A tumor is a mass of tissue that grows out of control of the normal forces that regulate growth. The complex brain tumors can be separated into two general categories depending on the tumors origin, their growth pattern and malignancy.Primary brain tumors are tumors that arise from cells in the brain or from the covering of the brain. A secondary or metastatic brain tumor occurs when cancer cells spread to the brain from a primary cancer in another part of the body. Most Research in developed countries show that the number of people who having brain tumors and die from them has increased perhaps as much as 300 over past three decades. The National Brain Tumor Foundation (NBTF) for research in United States estimates that 29,000 people in the U.S are diagnosed with primary brain tumors each year, and nearly 13,000 people die. In children, brain tumors are the cause of one quarter of all cancer deaths. The overall annual incidence of primary brain tumors in the U.S is 11 to 12 per 100,000 people for primary malignant brain tumors, that rate is 6 to 7 per 1,00,000. In the UK, over 4,200 people are diagnosed with a brain tumor every year (2007 estimates). There are about 200 other types of tumors diagnosed in UK each year. About 16 out of every 1,000 cancers diagnosed in the UK are in the brain (or 1.6%). In India, totally 80,271 people are affected by various types of tumor (2007 estimates). NBTF reported highest rate of primary malignant brain tumor occurred in Northern Europe, United States and Israel. Lowest rate arised in India and Philippines. At present in medical world lot of brain tumor detection systems are available. This paper describes overall information about preprocessing and enhancement of automatic system with high efficiency and accuracy than existing systems.

FIGURE 1: THE OVERVIEW OF AUTOMATIC SYSTEM
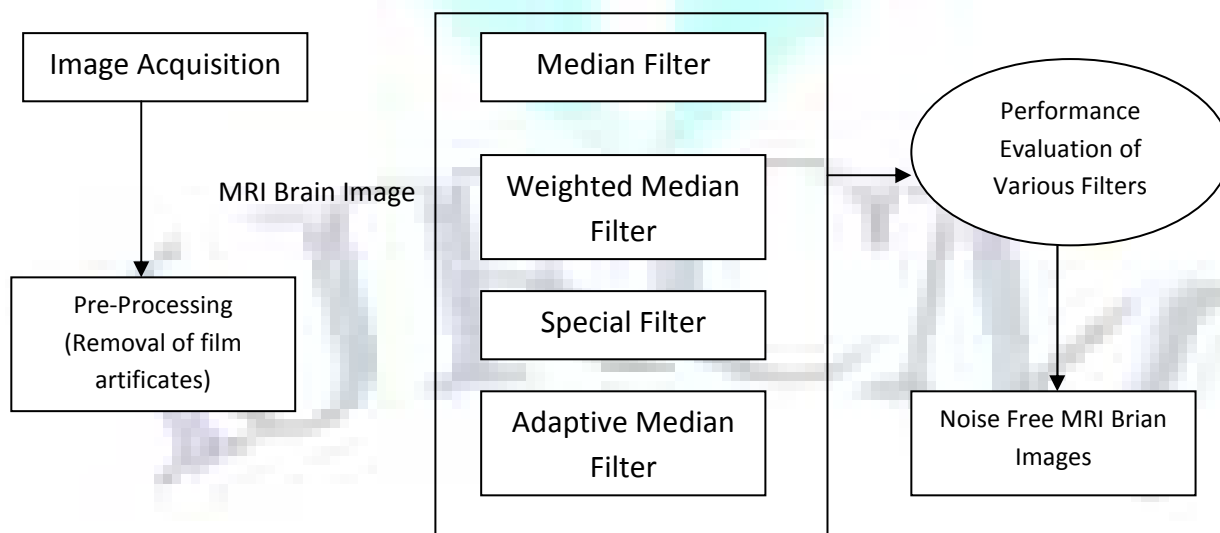
2. OVERVIEW OF AUTOMATIC SYSTEM

This Automatic system proposes a gradient-based image enhancement method in order to improve the image quality and visibility of low-contrast features while suppressing the noises. Image enhancement is the improvement of image quality without knowledge about the source of degradation. The enhancement methods can be dividing into indirect and direct method. In direct method is to find the contrast of the image and then enhance the contract. But the indirect method is not defining the contrast. The algorithm of contrast is based on global information or local information or both of local and global information [29]. The major problem with the contrast enhancement algorithms is that for an image, some regions may be under-enhanced while some regions may be over-

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   47

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

enhanced. Mainly image enhancement includes intensity and contrast manipulation, noise reduction, background removal, edges Sharpening, filtering etc. The above Figure 1 shows the overview of the automatic system.

The advantage of this automatic system is it explains the gradient-based image enhancement method with high range of efficiency and accuracy. It performs four steps namely Image Acquisition, Preprocessing, Enhancement and Performance Analysis. In image acquisition step, MRI brain image is acquired from brain dataset to MATLAB 7.0. Secondly, the film artifacts on the MRI are removed in preprocessing. Artifacts like name, age, date of birth of the patient. third step of automatic system is enhancement use to remove noise, high frequency components, and unwanted region of brain MRI through enhancement filters. We are using an efficient tracking algorithm to remove film artifacts. Finally the performance of median, weighted median, Adaptive and spatial filters are measured and evaluated.

3. EXISTING METHODS FOR ENHANCEMENT

Image enhancement is the improvement of digital image quality without knowledge about the source of degradation. The enhancement methods can be dividing into indirect and direct method. In direct method is to find the contrast of the image and then enhance the contract. But the indirect method is not defining the contrast. The algorithm of contrast is based on global information or local information or both of local and global information [29]. The major problem with the contrast enhancement algorithms is that for an image, some regions may be under-enhanced while some regions may be over-enhanced. Mainly image enhancement includes intensity and contrast manipulation, noise reduction, background removal, edges Sharpening, filtering etc. Now lot of methods and techniques are available for enhancement.Table1 shows the existing enhancement techniques in the recent years of research.

TABLE 1: ENHANCEMENT TECHNIQUES

Authors	Methods
Ladan et al..[18]	Prewitt edge-finding filter.
M.Karnan et. al.[29]	Median Filter, Gradient Based Method.
Gray [12]	Genetic Algorithm
Chunyan et al.,[6]	Triple Quantum Filtered Sodium MRI (TQF) Technique.
Tsai et al.,[30]	Low pass Filter.
Boada et al.,[4]	Triple Quantum Filtered (TQF) Sodium NMR, Novel image Approach.
Marcel Prastawa et al.,[20]	Anisotropic Diffusion.
Ladan et al.,[18]	Edge Finding filter, Morphological operation.
Aria et al.,[2]	Gadolinium-Diethylenetriaminepentaacetic acid (Gd-TPA) Enhancement.
Amini et al.,[1]	Prewitt edge-finding filter.
Zhe chen et al.,[34]	Morphological Filter.
Xiao et al.,[32]	Gabor Filter.
Corina et al.,[7]	Gaussian Filter.
Dimitris et al.,[9]	Gabor Filter Bank technique.
Hideki et al.,[14]	V-filter.
Gordon et al.,[13]	Anisotropic sample.
ShiShir et al.,[27]	Nonlinear Filter.
Salman et al.,[25]	Region Growing Filter.
Sean et al.,[26]	K-nearest neighbour Algorithm.

4. IMAGE ACQUISITION

To Access the real medical images like MRI, PET (Positron Emission Tomography) or CT (Computer Tomography) scan and to take up a research is a very complex because of privacy issues and heavy technical hurdles. . MRI Images were transformed to a Linux Network through LAN (Local Area Network) Kovai Medical Center Hospital (KMCH) India. All images had 1 mm slice thickness with 1×1 mm in plane resolution. Among this automatic systems, the 0.5T intra-operative Magnetic Resonance Scanner of the Kovai Medical Center and Hospital (KMCH, Signa SP, GE Medical Systems) offers the possibility to acquire 256×256×58(0.86mm, 0.86mm, 2.5 mm) T1 weighted images with the fast spin echo protocol (TR=400, TE=16 ms, FOV=220*220 mm) in 3 minutes and 40 seconds. The quality of every 256 ×256 slice acquired intra-operatively is fairly similar to images acquired with a 1.5T Conventional Scanner, but the major drawback of intra-operative image is that slice remains thick (2.5 mm).The following figure2 shows the example of image acquisition through MATLAB.The images we got from MRI are of four type of views such as Top view of brain MRI, Bottom view, Side view and Front view. But here we are using front view of brain image with the age from 20 to 50.

FIGURE 2: THE ORIGINAL MR IMAGE FROM MAT LAB7.0
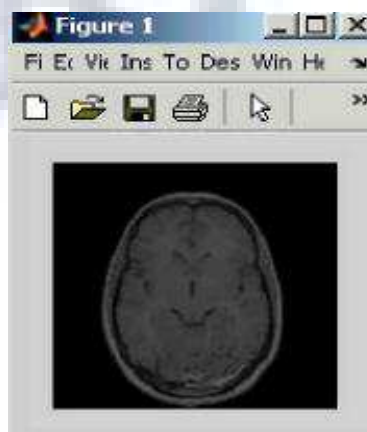
MRI provides detailed pictures of brain and nerve tissues in multiple planes without obstruction by overlying bones. Brain MRI is the procedure of choice for most brain disorders. It provides clear images of the brainstem and posterior brain, which are difficult to view on a CT scan.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   48

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

5. PRE-PROCESSING

Preprocessing functions involve those operations that are normally required prior to the main data analysis and extraction of information, and are generally grouped as radiometric or geometric corrections. Radiometric corrections include correcting the data for sensor irregularities and unwanted sensor or atmospheric noise, removal of non-brain voxels and converting the data so they accurately represent the reflected or emitted radiation measured by the sensor. The Preprocessing aspects are surveyed and analyzed in this section. The Preprocessing Techniques such as Content Based model, Fiber tracking Method, Wavelets & Wavelet Packets, and Fourier transform technique [15; 23; 3; 17]. Olivier et al. designed a new Standard Imaging Protocol for brain tumor radiotherapy. MRI has been acquired in the standard follow up after surgical resection [22]. Dana et al presented statistical parametric mapping implementation and pipeline approach for registration and resampling stages. The pipeline consists of noise reduction and inter-slice intensity variation correction [8]. Elizabeth et al explained Pixel Histograms and Morphological process for acquiring brain image from MRI. It was more robust to noise [10]. Leung et al described Boundary Detection Algorithm, Generalized Fuzzy Operator (GFO), Contour Deformable Model, and Region base technique for image processing applied in radiology for 3D reconstruction [19]. Patrick et al developed a new Boundary Model and Nonlinear matching scheme to estimate the location of the boundary points using intensity data with standardized data. Azadeh et al designed a method on Wavelets & Wavelet Packets for Noise reduction and correcting baseline [3]. Paulo proposed a method of Fiber tracking to process MR-DT1 datasets [23]. Karen et al represented a Fourier transform technique for MRI preprocessing [17]. Lorenzen et al designed a Geometric prior image registration [24]. Xin et al. presented Unseeded Region Growing (URG) Algorithm use to convert the MRI image into standard Format [33]. Zu et al, analyzed a new method on Sub-second imaging technique and histogram based technique Separate brain image from head image removal of residual fragments [35]. Brian et al, designed Principal Component for to minimize the artifacts present in the PET data set [5]. Mark et al, described a new method on Statistical Parametric Mapping for spatial registration and resampling stages used the T1 single subject template and used existing implementation for the intensity normalization stages [21]. Toshiharu et al, said a Independent Component Analysis (ICA) method for separate the components in MR images into independent components (IC's).

5.1 REMOVAL OF FILM ARTIFACTS

The film artifacts are removed using tracking algorithm. Below the table2 describes the steps for tracking algorithm. This algorithm is used for efficient removal of film artifacts without disturbance of pixels on the MRI. Poor power quality is a major contributor to MRI image artifacts. Power anomalies such as spikes, surges, sags and unwanted electrical noise all contribute to the inaccurate detection, processing and display of images in MRI systems. Here, starting from the first row and first column, the intensity value of the pixels are analysed and here the threshold value of the film artifacts are found. The threshold value, greater than of threshold value is removed from MRI. The high intensity value of film artifacts are removed from MRI brain image and it's consists of salt and pepper noise occurred during the removal of film artifacts. Figure 3 shows the MRI without film artifacts

FIGURE 3 (A) THE ORIGINAL MRI IMAGE (B) MRI WITHOUT FILM-ARTIFACTS.
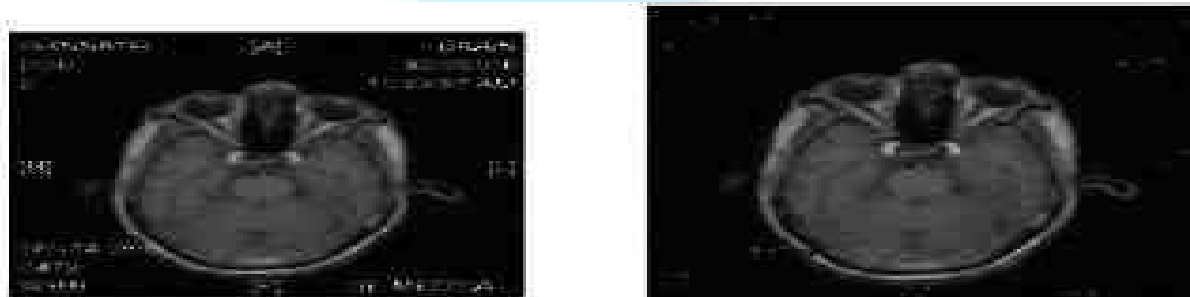
TABLE 2: THE STEPS FOR TRACKING ALGORITHM

Step 1: Read the MRI image and store it in a two dimensional matrix.
Step 2: Select the peak threshold value for removing white labels
Step 3: Set flag value to 255.
Step 4: Select pixels whose intensity Value is equal to 255.
Step 5: If the intensity value is 255 then, The flag value is set to zero and thus the Labels are removed from MRI.
Step 6: Otherwise skip to the next pixel.

6. ENHANCEMENT

Image enhancement methods inquire about how to improve the visual appearance of images from Magnetic Resonance Image (MRI), Computed Tomography (CT) Scan, Positron Emission Tomography (PET) and the contrast enhancing brain volumes were linearly aligned. The enhancement activies are removal of film artifacts and labels, filtering the images. This part is use to enhances the smoothness towards piecewise-homogeneous region and reduces the edge-blurring effect. Conventional Enhancement techniques such as low pass filter, Median filter, Gabor Filter, Gaussian Filter, Prewitt edge-finding filter, Normalization Method are employable for this work.

The proposed system describes the information of enhancement using four types of filters such as 1.median filter 2. Weighted Median filter 3. Adaptive filter and 4. Spatial filter for removing high frequency components such as impulsive noise, salt and peper noise and high frequency components.In the Enhancement stage the filters are designed to enhance the appearance of images, primarily by sharpening Edges, corners, and line detail. Several of the new enhancement filters also incorporate a noise-reduction component.Noise is like interferences which present as a irregular granular pattern. This random variation in signal intensity degrades image information. The main source of noise in the image is the patient's body (RF emission due to thermal motion). The whole measurement chain of the MR scanner (coils, electronics...) also contributes to the noise. This noise corrupts the signal coming from the transverse magnetization variations of the intentionally excited spins (on the selected slice plane). four filters in the Enhancement phase are designed to enhance the appearance of images, primarily by sharpening edges, corners, and line detail. Several of the new enhancement filters also incorporate a noise-reduction component.

6.1 MEDIAN FILTER

In medical image processing, necessary to perform a high degree of noise reduction in an image before performing high-level processing steps. So we performed Median Filter can remove the noise, high frequency components from MRI without disturbing the edges and it is used to reduce' salt and pepper' noise. This technique calculates the median of the surrounding pixels to determine the new (denoised) value of the pixel. A median is calculated by sorting all pixel values by their size, then selecting the median value as the new value for the pixel. The amount of pixels which should be used to calculate the median.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   49
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

FIGURE 4: (A) THE FILTERED MRI BRAIN IMAGE USING MEDIAN FILTER WITH 3X 3 WINDOW (B) 5X 5 WINDOW (C) 7X 7 WINDOW (D) 11X 11 WINDOW.
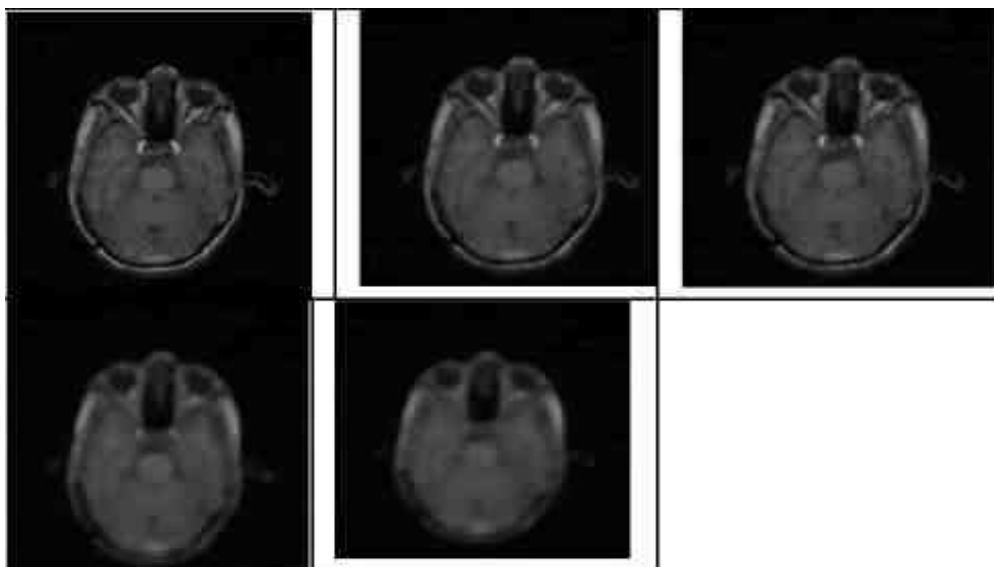
each pixel, an 3 x 3, 5 x 5, 7 x 7, 9 x 9, 11 x 11 window of neighbourhood pixels are extracted, and The pixel intensity values are arranged in Assending orderand the median value is calculated for that window. The intensity value of the center pixel is replaced with the median value. This procedure is done for all the pixels in the image to smoothen the edges of MRI. High Resolution Image was obtained when using 3 x 3 than 5 x 5 and so on. The below table3 shows the model of median filter.

TABLE 3: THE EXAMPLE OF MEDIAN FILTER WITH 3 X 3 WINDOWS

(a) Before filtering

42	47	52
55	64	41
47	55	66

41, 42,47 ,47 , **52,** 55,55,64,66 ----→Assending Order of pixel intensity
Median value 52

(b) After Filtering

42	47	52
55	**52**	41
47	55	66

TABLE 4: PERFORMANCE ANALYSIS OF MEDIAN FILTER WITH DIFFERENT SET OF WINDOW

Pixel size	Mean gray level of foreground	Mean gray level of Background	Contrast value
3×3	**93.154**	**4.049**	**0.9167**
5× 5	95.414	4.267	0.9144
7×7	95.475	4.305	0.9137
9 ×9	94.835	4.284	0.9136
11 ×11	93.869	4.243	0.9135

The above 3×3, 5×5, 7×7, 9×9, 11×11 windows are analysed in that 3×3 window is choose based on the high contrast than 5×5, 7×7, 9×9,and 11×11.

6.2 WEIGHTED MEDIAN FILTER

A weighted median filter controlled by evidence fusion is proposed for removing noise from MRI brain images with contrast. It has a great potential for being used in rank order filtering and image processing. The weights of the filter are set based on intensity value of the pixels in the MRI image. Here we used four weights such as 0, 0.1, 0.2 and 0.3. if the intensity value of the pixel is 0 then consider the weight of the pixel is 0. Else if the range of pixel intensity between 1-100 then the weight is 0.1, else if the range of pixel intensity between 101-200 then the weight is 0.2, otherwise the weight of the pixel is 0.3. the above weights are multiplied with pixel intensity .after that the median filter is applied for calculate weighted median filter. The following figure 5 shows the filtered original MR brain image using 3×3, 5×5, 7×7, 9×9, 11×11 windows.

TABLE 5: PERFORMANCE ANALYSIS OF WEIGHTED MEDIAN FILTER WITH DIFFERENT SET OF WINDOW

Pixel size	Mean gray level of foreground	Mean gray level of Background	Contrast value
3×3	88.2121	3.3551	0.9267
5× 5	**96.4823**	**3.6145**	**0.9278**
7×7	95.9038	3.6561	0.9266
9 ×9	96.1042	3.7143	0.9256
11 ×11	96.1785	3.7485	0.9250

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   50
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

FIGURE 5: THE FILTERED MRI BRAIN IMAGE USING WEIGHTED MEDIAN FILTER WITH 3X 3, 5X 5 , 7X 7, 9 X9 , 11X 11 WINDOW
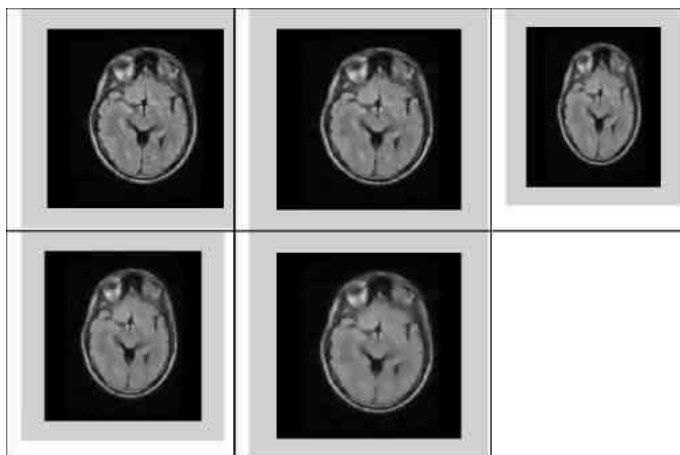
In above table5 3×3, 5×5, 7×7, 9×9, 11×11 windows are analysed in that 5×5 window is choosed based on the high contrast than 3×3, 7×7, 9×9, and 11×11.

6.3 ADAPTIVE FILTER

A new type of adaptive center filter is developed for impulsive noise reduction of an image without the degradation of an original image. The image is processed using an adaptive filter. The shape of the filter basis is adapted to follow the high contrasted edges of the image. In this way, the artifacts introduced by a circularly symmetric filter at the border of high contrasted areas are reduced. The following figure 6 shows the filtered original MR brain image using 3×3, 5×5, 7×7, 9×9, 11×11 windows.

TABLE 6: PERFORMANCE ANALYSIS OF ADAPTIVE FILTER WITH DIFFERENT SET OF WINDOW

Pixel size	Mean gray level of foreground	Mean gray level of Background	Contrast value
3×3	92.5059	4.2789	0.9116
5× 5	95.1252	4.5236	0.9092
7×7	95.2662	4.5717	0.9084
9 ×9	94.1861	4.5462	0.9079
11 ×11	92.5125	4.4779	0.9077

FIGURE 6: FILTERED MRI BRAIN IMAGE USING ADAPTIVE FILTER WITH 3X 3, 5X 5, 7X 7, 11X 11
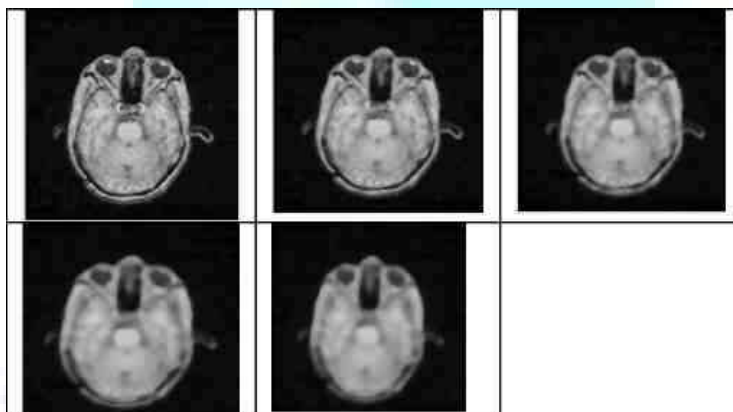
6.4 SPATIAL FILTER

A spatial filter design method is used to reduce the magnetic noise in the magnetic resonance. This filter is used to extract the external magnetic noise appearing on MRI scan image and to improve the signal-to-noise ratio of the MRI brain image. In spatial domain filtering, the filter is specified as 3D array. The kernel is then applied to the image via convolution or correlation using imfilter or filter2.Here, the filter for the picture elements includes a first filter that applies one filter function to the pixels in each column of the image. The partially filtered pixels are stored in matrix and then read row by row in a field interlaced order. The rows of picture elements are sent to a second filter that applies another filter function to each row. The fully filtered picture elements from the second filter are stored or converted to a matrix to display an image.For each pixel, an 3×3, 5×5, 7×7, 9×9, 11×11 window of neighbourhood pixels are extracted A new type of adaptive center filter is developed for impulsive noise reduction of an image without the degradation of an original image. The image is processed using an adaptive filter. The shape of the filter basis is adapted to follow the high contrasted edges of the image. In this way, the artifacts introduced by a circularly symmetric filter at the border of high contrasted areas are reduced.and the median value is calculated for that window.finally 3×3 window is selected for noise reduction based on high contrast.The following figure 7 shows the filtered original MR brain image using 3×3, 5×5, 7×7, 9×9, 11×11 windows.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 51
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE 7: PERFORMANCE ANALYSIS OF SPATIAL FILTER WITH DIFFERENT SET OF WINDOW

Pixel size	Mean gray level of foreground	Mean gray level of Background	Contrast value
3×3	**92.5049**	**4.2689**	**0.9106**
5× 5	95.1232	4.5136	0.9072
7×7	95.2552	4.5617	0.9024
9 ×9	94.1851	4.5452	0.9019
11 ×11	92.5225	4.4679	0.9017

FIGURE 7: FILTERED MRI BRAIN IMAGE USING SPATIAL FILTER WITH 3X 3 , 5X 5 ,7X 7 ,11X 11
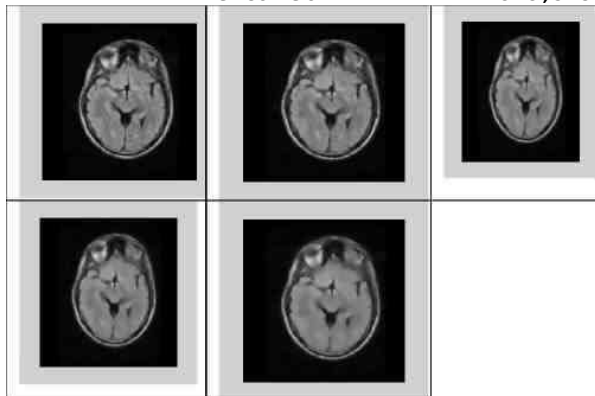
In the above table 3×3, 5×5, 7×7, 9×9, 11×11 windows are analysed in that 3×3 window is choosed based on the high contrast than 5×5, 7×7, 9×9, and 11×11. The filters in the Noise Reduction class are designed to remove extreme or outlier values from image areas that should have relatively uniform values.

7. PERFORMANCE EVALUATION

It is very difficult to measure the improvement of the enhancement objectively. If the enhanced image can make observer perceive the region of interest better, then we can say that the original image has been improved. In order to compare different enhancement algorithms, it is better to design some methods for the evaluation of enhancement objectively. The statistical measurements such as variance or entropy can always measure the local contrast enhancement; however that show no consistency for the MRI. Performance of the Median filter, Weighted Median filter, Adaptive filter and spatial filters are analysed and evaluated using the following equations.Table8 shows the performance of listed filters.

1) Contrast
2) Contrast Improvement Index(CII)

C processed and C original = Contrasts of MRI   _____ (1)

$C = (f-b) / (f + b)$_____(2)

f = mean gray -level value of the foreground, b= mean gray-level value of thebackground

Noise level= standard derivation (σ) of the background

$\sigma = \sqrt{(1/N) \sum (b_i-b)^2}$_____(3)

bi = Gray level of a background region

N= total number of pixels in the surrounding background region (NB)

PSNR = (p-b) / σ ___(4)

ASNR = (f-b)/ σ___(5)

Where p is the maximum gray-level value and if is the average gray level of a foreground. The value of two indexes are larger, the enhancement method performance better. Our proposed method we choose weighted median filter is highly contras than other three filterst based on the below statistical analysis from PANR and ASNR values. Figure8 shows the value of   Peak Signal-to-Noise Ratio (PSNR) for filters. Figure 9 shows the value of Average Signal-to-Noise Ratio (ASNR) for filters.

TABLE 8: PERFORMANCE ANALYSIS FILTERS

Sno	Filters	PSNR	ASNR
1	Median	0.91543	0.9267
2	Weighted Median	0.92667	0.9278
3	Adaptive	0.9126	0.9261
4	Spatial	0.89120	0.8991

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   52

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

FIGURE 8: PEAK SIGANAL-TO-NOISE RATIO (PSNR)

FIGURE 9: AVERAGE SIGANAL-TO-NOISE RATIO (ASNR)

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   53
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

CONCLUSION

This paper proposed a gradient based image enhancement method using first derivative and local statistics and showed the validity of detection of MRI. Initially the MRI brain image is acquired from MRI brain data set to MATLAB 7.1. After acquisition the MRI is given to the preprocessing stage, here the film artifacts (labels) are removed. Next, the high frequency components and noise are removed from MRI using the following filters. Such as Median filter, Weighted Median filter, Adaptive filter and spatial filter. The performance of above filters are measured and evaluated. Finally the best filter of weighted median filter is identified and used for MR brain image enhancement. It is used for removing noise from MRI brain images with high contrast.

REFERENCES

1. Amini L, Soltanian-Zadeh H, Lucas.C,:"Automated Segmentation of Brain Structure from MRI", Proc. Intl.Soc.Mag.Reson.Med.11(2003).
2. Aria Tzika.A, Maria K. Zarifi, Liliana Goumnerova, Loukas G.Astrakas,David Zurakowski,TinaYoung-Poussaint, Douglas.Anthony, R.MichaelScott, PeterMcL.Black. "Neuroimaging in Pediatric BrainTumors: Gd-DTPA-Enhanced, emodynamic, and Diffusion MR Imaging Compared with MRSpectroscopic Imaging", Neuroradiol 23, February 2002.
3. Azadeh yazdan-shahmorad, Hamid soltanian-zadeh, reza A.Zoroofi,:"MRSI– Braintumor characterization using Wavelet and Wavelet packets Feature spaces and Artificial Neural Networks",IEEE Transactions on EMBS,sep 1-5, 2004.
4. Boada F.E, Davis.D, Walter.K, Torres- Trejo.A, Kondziolka.D, Bartynski.W, Lieberman.F. "Triple Quantum Filtered Sodium MRI of Primary Brain Tumors, "IEEE, USA, 2004.
5. Brian Parker and David Dagan Feng,:" Variational Segmentation and PCA Applied to Dynamic PET Analysis", Australian Computer Society, Pan-Sydney Area Workshop on Visual Information Processing (VIP 2002).
6. Chunyan Jiang,Xinhua Zhang,Wanjun Huang,Christoph Meinel.:"Segmentation and Quantification of Brain Tumor,"IEEE International conference on Virtual Environment,Human-Computer interfaces and Measurement Systems, USA, 12-14, July 2004.
7. Corina S.Drapaca, Valerie Cardenas,Colin Studholme,:"Segmentation of tissueboundary evolution from brain MR Image sequences usingmulti-phaselevel sets",Elsevier,Computer vision and image understanding,2005.
8. Dana Cobzas, Neil Birkbeck, Mark Schmidt, Martin Jagersand.:"3DVariational Brain Tumour Segmentation Using a High Dimensional Feature Set,".
9. Dimitris N Metaxas,Zhen Qian, Xiaolei Huang and Rui Huang,Ting Chen,Leon Axal.:"Hybrid Deformable Models for Medical Segmentation and Registration, "IEEE Transactions on Medical Image processing, ICARCV ,2006.
10. Elizabeth Bullitt,Donglin Zeng,Guido Gerig,Stephen Aylward,Sarang Joshi,J.Keithsmith,Weili Lin,Matthew G.Ewend,:"Vessel Tortuosity and Brain Tumor Malingnancy:A Blinded Study",Academic Radiology,2005.
11. Farahat A.S., El-Dewany E.M., El- Hefnawi F.M.,Y.M.Kadah, A.A.Youssef,:"Calculations of Heatinc g Patterns of Interstitial Antenna for Brain Tumors Hyperthermia Treatment Planning",The 23thNational Radio Science Conference, March 14-16, 2006.
12. Gordon Kindlmann,Carl-Fredrik Westin:"Diffusion Tensor Visualization with Glyph Packing",IEEE transactions and computer graphics,vol.12,no.5.Sep 2006.
13. Gray H F,:"Genetic Programming for the Analysis of Nuclear Magnetic Resonance Spectroscopy Data", The Institution of Electrical Engineers, 1997.
14. Hideki yamamoto and Katsuhiko Sugita, Noriki Kanzaki, Ikuo Johja and Yoshio Hiraki,Michiyoshi Kuwahara , : "Magnetic Resonance Image Enhancement Using V-Filter", IEEE AES Magazine, June 1990.
15. Jayaram K.Udupa, Vicki R.Lablane, Hilary Schmidt,Celina Lmielinska, Punam K.Saha,George J.Grevera,Ying Zhuge,Pat Molholt,Yinpengjin,Leanne M.Currie,:"A Methodology for Evaluating Image Algorithm",IEEE on Medical Image Processing.
16. Karen Chia-Ren Lin,Miin-Shen Yang,Hsiu-Chih Liu,Jiing-Feng Lirng,Pei-Ning Wang,:"Gentralized Kohonen's Competitive Learning Algorithms for Ophthalmological MR image Segmentation",Elsevier,Magnetic Resonance Imaging 21,2003.
17. Karnan.M, Sivakumar.R,:"Detection of Microcalcifications in Mammograms-A Survey",Proceedings of national Conferenceand workshop on Soft and Intelligent Computing,23-25,jan 2008.
18. Ladan Amini Hamid Soltanian-Zadeh Caro Lucas,:"Computer Vision Segmentation of Brain Structures from MRI Based on Deformable Contour Models".
19. Leung C.C, Chen W.F, Kwok P.C.K, Chan F.H.Y,:"Brain Tumor Boundary Detection in MR Image with Generalized Fuzzy Operator",IEEE, 2003.
20. Marcel Prastawa, John Gilmore, Weili Lin, Guido Gerig,:"Automatic Segmentation of Neonatal Brain MRI",USA.
21. Mark Schmidt, Ilya Levner, Ressell Greiner, Albert Murtha, Aalo Bistritz,:"Segmentation Brain Tumors using Alignment-Based Features",IEEE on Proceesings of the fourth International Conference on Machine Learning an Applications(ICMLA'05)",2005.
22. Olivier Clatz,Maxime Sermesant,Pierre-Yves Bondiau,Herve Delingette,Simon K.Warfield,Gregoire Malandain,Nicholas Ayache,:"Realistic Simulation of the 3-D Growth of Brain Tumors in MR Images Coupling Diffusion With Biomechanical Deformation",IEEE on Medical Imaging,Vol.24,Oct 2005.
23. Paulo Roberto Dellani, Martin Glaser, Aldo Von Wangenheim,:"Tracking Cerebral White Pathways from Diffusion Tensor Imaging Data: Application in Patients With Brain Tumors", Proceedings of the 17th IEEE Symposium on Computer-Based Medical Systems (CBMS'04), 2004.
24. Peter Lorenzen, Marcel Prastawa, Brad Davis, Guido Gerig, Elizabeth Bullitt, Sarang Joshi.:"Multi- modal image set registration and atlas formation",Elsevier on Medical Image Analysis,Vol 10,2006.
25. Salman.Y.M.Assal.M.A Badawi.A.M, El-Bavome.M: Validation Techniques for Quantitative Brain Tumors Measurements, Proceedings of the 2005 IEEE Engineering in Medicine and Biology 27th annual Conference shanghai, China, September 1-4, 2005.
26. Sean M.Haney,Paul M.Thompson,Timothy F.Cloughesy, Jeffry R.Alger,Arthur W.Toga,:"Tracking tumor Growth Rates in Patients with Malignant Gliomas:"A Test of two Algorithms:,American Society of Neuroradiology,AJNR Am J Neuroradiol,22:73-82, January 2001.
27. Shishir Dube, Suzie El-saden, Timothy F.Cloughesy, Usha Sinha,:"Content Based Image Retrieval for MR image Studies of Brain Tumors",Proceedings of the 28th EEE EMBS Annual International Conference,NewYork City,USA,Auguest 30-September 3,2006.
28. Thangavel.K, Karnan.M,:"CAD System for Preprocessing and Enhancement of Digital Mammograms",GVIP Journal, Volume 5,Issue9, Dec 2005.
29. Toshiharu Nakai, Shigeru Muraki, Epifanio Bagarinao, Yukio Miki, Yasuo Takehara, Kayako Matsuo, Chikako kato, Harumi Sakahara, Haruo Isoda,:"Application of independent component analysis to magnetic resonance Imaging for enhancing the contrast of gray and white matter",Elsevier on Neuroimage 21,251-260,August 2003.
30. Tsai .C, Manjunath B.S, Jagadeesan.R,:"Automated Segmentation of brain MR Images",Pergamon,Pattern Recognition, Vol 28, No 12, March 1995.
31. Wilburn Xiao Xuan, Qingmin Liao, "Statistical Structure Analysis in MRI Brain Tumor Segmentation", FourthInternational Conference on Image and Graphics, IEEE, 2007.
32. Xiao Xuan, Qingmin Liao:"Statistical Structure Analysis in MRI Brain Tumor Segmentation ", Fourth International Conference on Image and Graphics, IEEE, 2007.
33. Xin Bai, Jesse S.Jin, Dagan Feng,:" Segmentation Based Multilayer Diagnosis Lossless Medical Image Compression", Australian Computer Society,Pan Sydney Area Workshop on Visual Information Processing (VIP 2003).
34. Zhe chen, David Dagan Feng, Weidong Cai:" Automatic Detection of PET Lesions", Pang-Sydney Area Workshop on Visual Information Processing(VIP 2002), Conference in Research and Practice in IT, Vol.22, Sydney, 2003.
35. ZuY.Shan, Jing Z.Liu, Guang H.Yue,:" Automated Human Frontal lobe Identification in MR images based on Fuzzy-Logic Encoded Expert Anatomic Knowledge", Elsevier, Magnetic Resonce Imaging, 22,2004.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   54

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

IMPACT OF SERVICE QUALITY DIMENSIONS ON CUSTOMER SATISFACTION OF SBI ATM

NAMA MADHAVI
RESEARCH SCHOLAR
DEPARTMENT OF MANAGEMENT SCIENCES
SRI VENKATESWARA UNIVERSITY
TIRUPATI

DR. MAMILLA RAJASEKHAR
PROFESSOR
DEPARTMENT OF COMMERCE
SRI VENKATESWARA UNIVERSITY
TIRUPATI

ABSTRACT

Core banking solutions is a new jargon frequently used in banking circles. The internet and information technology has introduced new delivery channels through which the customers can transact their business with the bank. ATM is one of the important and popular delivery channels of core banking. Customers do not perceive quality in one dimension but rather judge quality based on multiple dimensions, relevant to the context. The present paper adopts an explorative research design to focus the customers' perception on the service quality dimensions of SBI ATM and its impact on customer satisfaction, that drive the customers to go for it. The information provided by this paper can be used by SBI in designing marketing strategies and to improve customer satisfaction on ATM. Convenience sampling technique was used to collect data using survey questionnaire with five point Likert scale from a sample of 50 customers who use the ATM services of SBI. Factor analysis, correlation and regression were used to re categorize the service factors and ANNOVA was used to determine whether demographic characters influence the customer satisfaction. It was found that the assumed factors are not equally significant in influencing the customers' satisfaction. There is significant relationship between individual service quality dimensions and customer satisfaction. There is no impact of demographic characters on the customer satisfaction.

KEYWORDS

ATM, customer perception, customer satisfaction, factor analysis, service quality dimensions.

INTRODUCTION

C ore banking is the buzzing word in the baking scenario. CORE stands for centralized online real time electronic banking. Technically it is a platform where communication technology and information technology are merged to suit core needs of banking. Delivery channels are the means through which the customers can transact their business with the bank. ATM, internet banking, mobile banking are the core banking delivery channels. ATM card is a document that enables the customer to withdraw and transfer cash using automated teller machines. ATM machine was invented by Scot John Shepherd Barron and it was introduced in the year 1967 by Barclays bank in Enfield town in north London. It has used paper vouchers that had to be purchased from tellers in advance. In 1971 Docutel introduced its first fully functioning bank ATM with magnetic strip card at New York's Chemical bank. ATM card can be used for making purchases, recharging of pre paid mobile phones, e-bill payments of MTNL / electricity bills of selected areas, donating to selected temples / trusts and relief funds, transfer of cash from card to card. (including third party transfers). ATM is a switched, connection-oriented networking technology that provides dedicated, high-speed connections to virtually an unlimited number of users. It operates on fast-packet communication method that supports transfer rates from 1.544 Mbps to 10 Gbps. HSBC in 1987 was the first bank to introduce ATM in India (Mumbai). In 2003 SBI using BaNCS system of TCS has introduced core banking system and ATMs in India.

As per RBI report by the end of March 2011 (table-1) there are 74,505 ATMs for scheduled commercial banks in India. SBI group hold a lion's share of 33% with 24,651 ATMs.

TABLE - 1: ATMS OF SCHEDULE COMMERCIAL BANKS OF INDIAN (TOP 5) AS AT THE END OF MAR 2011

Sno.	Name of the bank	No. of ATMs (March 2011)
1	SBI Group	24,651
2	Punjab National Bank	5,050
3	Union Bank of India	2,634
4	Canara Bank	2,173
5	Bank of Baroda	1,561

(Source: Trend and progress of Banking in India – Appendix table IV.9 from www. report.rbi.org.in)

CUSTOMER PERCEPTION OF SERVICES: Perception is an approximation of reality. It is about recognizing how consumers view a company's service. The value, quality and satisfaction levels influence the customer perception. IT based distribution channels reduce personal contact between service provider and the customer, which inevitably leads to a complete transformation of traditional bank customer relationship (Barnes & Howlett, 1988).

SERVQUAL: SERVQUAL is a multi-item scale developed to assess customer perceptions of service quality in service and retail businesses (Parasuraman et. al., 1988). This scale decomposes the notion of service quality into five dimensions as follows:

- Tangibles - physical facilities, equipment, staff appearance, etc.
- Reliability - ability of staff to perform service dependably and accurately.
- Responsiveness - willingness of staff to help and respond to customer's need.
- Assurance - ability of staff to inspire confidence and trust.
- Empathy - the extent to which caring, and individualized service is given.

REVIEW OF LITERATURE

Satisfied customers are key to long term business success. This was well established by Kristen (1992), Zeithaml (1996), McColl-Kennedy and Schneider (2000). It is also well accepted fact (Ho, C., Wu, W 1999) that customer satisfaction is a crucial topic for success in any business either traditional or online. Services are intangible because unlike a product, a service can't be experience before it is used. Measuring customer satisfaction has gained importance in service marketing. Service quality is an important tool to measure customer satisfaction (Pitt, L.F, Watson R.T., and Cavan C.B.1995). Satisfaction is customers' fulfillment response.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 55
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

The traditional customer has become online customer with the advent of information technology; hence there is no personal contact with the service provider. In this regard Santos L. (2003) observed that online customers' expectation is higher than traditional customers. Parasuraman, A. and Grewal, D.(2000) proved that the traditional five dimensions of service quality changes when customers deal with technology instead of service personnel. As customers become more sophisticated, it will become imperative for banks to use technology to respond to the continuous changing requirements. Coming to the core banking services Neha Dixit (2010) found that adult customers are more reluctant to new technology and Ganesan R (2009) also confirmed that those who are interested in new technology were worried of security and privacy constraints (Reliability). Other assurance factors like usefulness, ease of use (Rahmath Safeena, Abdullah, Hema 2010) are the main perusing factors of business value. While measuring the various factors of service quality dimensions Thamarai Selvan Natarajan (2010) suggested that some factors like purpose, perceived risk, benefits and requirements (Empathy) of self service technologies cannot be quantitatively & precisely measured. With reference to Joseph, M., & Stone, G. (2003) the factors like easy access, user friendliness and security are important for analyzing the online banking customer's perception. Studies on ATM made by Leonard and Spencer (1991) it is argued that customers perceive ATM as indicative of achievement and contribute towards a positive organizational image. The cost of customer acquisition is higher than the cost of retention of customers. In the technology driven marketing scenario to induce positive attitude in the mind set of a dynamic customers is an added flavor for retaining organizational image. The perceptional outcomes in turn will affect the customers' level of satisfaction, retention and switching rates. Probing into the customers' perception on ATM, Howcroft (1991) stated that customers develop positive attitude towards ATM based on factors like convenience, accessibility, easy to use. The banks are concentrating on improving the service delivery channels for retaining the customers. Failure to meet the needs and expectations is assumed to result in dissatisfaction. It is well proved by Leeds (1992) that 40% of customers switched banks due to poor service, adds weight on the importance of customer retention strategy for marketing. Dove and Robinson's (2002) study indicated that when the customers believe that their troubles with the banks, has been resolved, then their satisfaction levels are at the top gear. Inquisitive study by Muhammad Asif Khan (2010) concluded that banks should focus on important aspects of security and privacy as well as efficient operations of ATMs. Extracting the customer attributes on level of satisfaction Hernan E. Riquelme (2010) in his study found that less satisfied customers are less technologically ready.

NEED FOR THE STUDY AND STATEMENT OF THE PROBLEM

It is known from the table-1 that SBI does not have nearby competitor with reference to market share based on number of ATMs among the scheduled commercial banks of India. But it is an alarming fact that out of 17,116 complaints received during 2010 - 2011 at banking Ombudsman offices on ATM cards, the complaints from SBI group are 5,874 accounting for 34.3% of total complaints (table-2). Here also SBI group is at pinnacle. This clearly illustrates that SBI group's ATMs are sharing proportionate complaints with reference to the no of ATMs. It's an indication that the performance of SBI ATM is not noticeably better than other banks. This scenario points to the fact that there is an element of dissatisfaction among the ATM customers of SBI group. If left unnoticed it will decline the organizational image. Hence there is a pinching need to study the customer's perception. The customers have become dynamic and their perceptions too are dynamic. Due to financial inclusion, technological advancement in the market, there is an aggravated need to re categorize the various factors of service quality dimensions and to study the impact of new categories on the customer satisfaction.

TABLE - 2: COMPLAINTS RECEIVED AT BANKING OMBUDSMAN OFFICES DURING 2010-11

Nature of Complaint	Public sector banks	Nationalized banks	SBI group	Private sector banks	Old private sector banks	New private sector banks	Foreign banks	All SCBs	UCBs/ RRBs/ others	Total
1	2	3	4	5	6	7	8	9	10	9+10)
ATM cards	9,217	3,343	5,874	4,458	149	4,309	3,196	16,871	245	17,116
% of complaints	53.9	19.5	34.3	26	0.9	25.2	18.7	98.6	1.4	

(Source: Trend and progress of banking in India – Appendix table IV.9 from www. report.rbi.org.in)

OBJECTIVES OF THE STUDY

Following are the objectives for the study:
1. To examine the essential service quality dimensions of SBI ATM.
2. To analyze the effect of service quality dimensions on customer satisfaction of SBI ATM.
3. To analyze the impact of demographic characters like education and area on the levels of customer satisfaction on the services of SBI ATM
4. To suggest measures for the policy makers in improving customer satisfaction.

HYPOTHESES

Against the background of the research objectives and review of literature following hypotheses were set for the study:

H_o1: All the assumed factors are not equally significant in influencing the customers' satisfaction on the services of SBI ATM.
H_o2: There is no significant relationship between individual service quality dimensions and customer satisfaction on the services of SBI ATM.
H_o3: There is no influence of area on the levels of customer satisfaction on the services of SBI ATM.
H_o4: There is no influence of education on the levels of customer satisfaction on the services of SBI ATM.

RESEARCH METHODOLOGY

SAMPLING AND DATA COLLECTION: Convenience sampling technique was used to collect data from a sample of 50 customers who use the ATM services of SBI. Customers were sampled from rural, urban and semi urban areas with different educational levels.
RESEARCH INSTRUMENT: The survey questionnaire gathers response with respect to 25 factors of service quality of SBI ATM. Five point Likert scale ranging from five (very good) to one (very bad) was used to measure the perception and satisfaction.

LIMITATIONS OF THE STUDY

The study has the following limitations
1) The sample taken for the study is confined to 50 customers of Tirupati town and rural areas around Tirupati town. With the small sample size and restricted area it is difficult to interpret and generalize the response of the entire population.
2) Only 25 factors which seemed to be dominant were selected for the study. There may be other significant factors dominating the customer perception in other localities / cultures in the subcontinent of India.
3) Non inclusion of bankers (the service providers) perspective to identify the problem domain.

RESULTS AND DISCUSSION

The data was collected from 50 respondents using SBI ATM with the aim of analyzing the relationship between service quality dimensions and customer satisfaction. 62% of the sample respondents were male where as 38% were female. Among the respondents 54% are from rural area, 26% are from Semi urban area, 10% are from urban area. The level of education was also felt as an important constraint. The category of illiterates was not included, as SBI is not issuing

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   56

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

ATM cards to them. 22% of the sample respondents were having primary education, 30% of them were having secondary education remaining 48% were graduates and above.

TABLE - 3: DEMOGRAPHIC PROFILE OF THE RESPONDENTS

Demographic character	Categories	No of respondents	Percentage
Gender	Male	31	62 %
	Female	19	38 %
Area	Rural	27	54 %
	Semi Urban	18	36 %
	Urban	5	10 %
Education	Primary	11	22 %
	Secondary	15	30 %
	Graduate and above	24	48 %

(Source: Primary data)

FACTOR ANALYSIS

Factor analysis was used to reduce the 25 factors by encapsulating them into 4 components using SPSS 13.0. The factor analysis is done using principle component extraction method with Varimax rotation and Kaiser Normalization. Factor loading represents the quantum of the component explained by the factor. It is observed that one factor 'written guarantee' had no factor loading hence it was not encapsulated. The remaining 24 factors were then encapsulated into 4 components based on factor loading score. The rotated values for factor loading with minimum value of 0.5 are considered for encapsulation. If a given factor is encapsulated in more than one component then the factor is retained in the component where it has exhibited maximum factor loading. 72% of variance is explained by the components is a satisfactory symptom (table-5). Eigen values are the variances of the factors, in the current study the Eigen values greater than 1.0 are considered significant. Communalities is the proportion of each factors variance that can be explained by the retained factors. Factors with high values are well represented in the common factor space, while variables with low values are not well represented.

TEST OF SAMPLE ADEQUACY

Kaiser-Meyer-Oklin measure of sampling adequacy and Bartlett's test of sphericity together, provide a minimum standard which should be passed before a factor analysis (or a principal components analysis) is administered. In general KMO measure of sample adequacy varies between 0 and 1, and values closer to 1 are considered better. The KMO value as in the table-4 illustrates sampling adequacy of 0.864 is a good indication. The sampling data is 86.4% adequate for factor analysis and falls in the meritorious range of 0.8 and above (Hair et al., 1998). The sample further got approved in the Bartlett's test of sphericity with approximate Chi-Square value of 1225.826 for 300 dof at 0.000% level of significance. This tests the null hypothesis and also notifies that the correlation matrix is an identity matrix. An identity matrix is a matrix in which all of the diagonal elements are 1 and all off diagonal elements are 0 (An identity matrix indicates the rejection of null hypothesis). Thus the method is suitable for identifying the important factors in the individual components.

TABLE - 4: KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.864
Bartlett's Test of Sphericity	Approx. Chi-Square	1225.826
	df	300
	Sig.	0.000

(Source: Primary data)

In the screen plot for Eigen value against the component number as shown in chart-1 indicates that from the fifth factor on the line is almost flat, meaning that each successive factor is accounting for smaller and smaller amounts of the total variance. Justifying the same, principle component extraction method with Varimax rotation and Kaiser Normalisation also encapsulated the 25 factors into 4 components.

CHART-1: SCREEN PLOT

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   57
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in
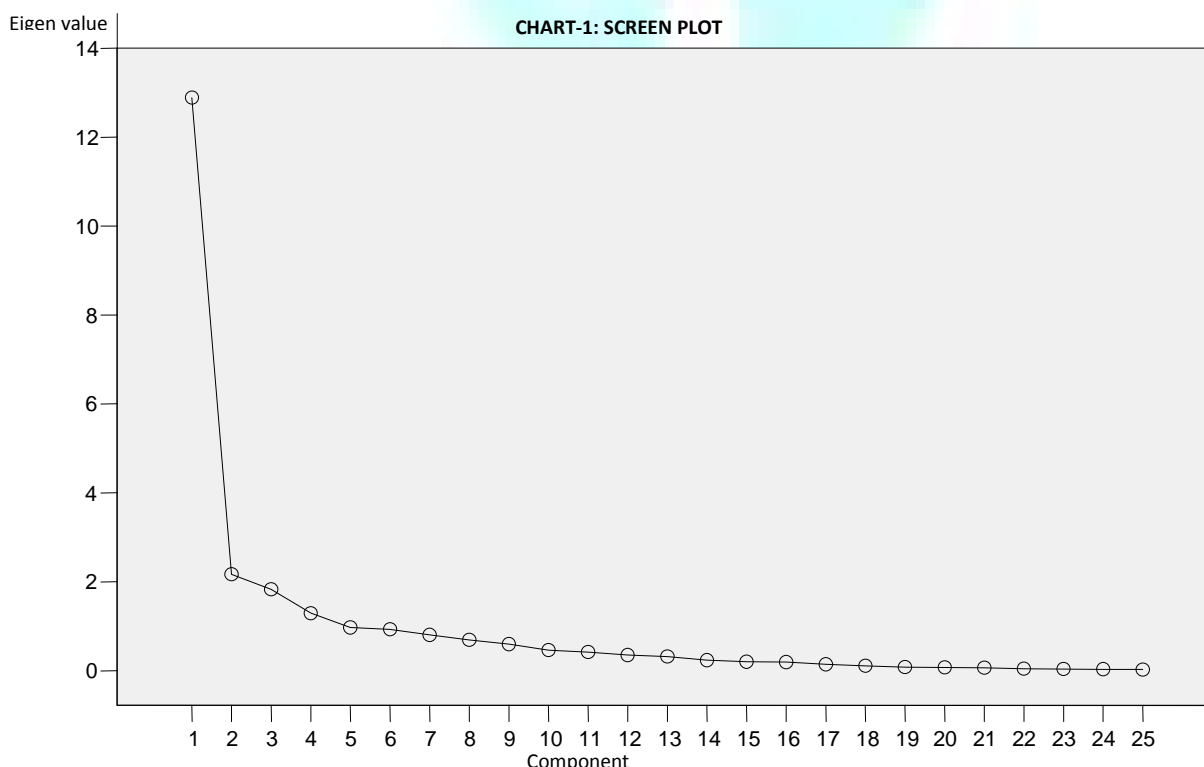
FINDINGS OF FACTOR ANALYSIS

In the current study the encapsulated 4 components were different from the traditional service quality dimensions. It is proved that the traditional five dimensions of service quality changes when customers deal with technology instead of service personnel as stated by Parasuraman, A. and Grewal, D.(2000). This is due to the fact that, there is a difference in customer's perception on variables from service to service. The null hypothesis H_o1 is accepted that all the assumed factors are not equally significant in influencing the customers' satisfaction on the services of SBI ATM. Based on the factor loading values from table-5 it can be concluded that some variables with less than 0.8 factor loadings need attention for quality improvement in the present context. The 4 components depicting the same are discussed below:

COMPONENT – 1

This component comprising of 13 factors accounts for 33.18% of variance explained. From table-5 it can be accessed that customers perceive 'round the clock' (0.882) with highest factor loading followed by 'user friendliness' (0.869), 'confidentiality' (0.845),' instant & accurate' (0.82), 'trust worthy' (0.819), 'identifying & greeting customer' (0.811), 'personal attention' (0.765), 'thanking customer' (0.748), 'emergency handling equipment' (0.72), 'advising customer' (0.693), 'handling service interrupts' (0.595) , 'special attention' (0.586), 'promised time' (0.582). This indicates that the factors 'round the clock' and 'promised time' play a leading and least roles in gaining customer satisfaction. Communalities of the factors are ranging high (except for 'handling service interrupts') gives an indication that there is a stronger and closer association among variables encapsulated in the component.

COMPONENT – 2

This component comprising of 4 factors accounts for 16.59% of variance explained. From table-5 it can be accessed that customers perceive 'not misusing information' (0.797) with highest factor loading followed by 'PIN security' (0.756), 'feedback system' (0.648), 'lighting and ventilation' (0.5). This gives a signal to the management that the ATM customers perceived tangibles especially air and light as poor.

COMPONENT – 3

This component comprising of 3 factors accounts for 12.14% of variance explained. From table-5 it can be accessed that customers perceive 'accessibility' (0.771) with highest factor loading followed by 'educating the customer' (0.726), 'visually appealing ATM' (0.667). SBI should observe that though only 3 factors were put into the nutshell of this component these are very important factors as they explain 12.14 % of variance. The lower factor loading for 'visually appealing ATM' gives a hint for the management, that the customers prefer a trendy ATM.

COMPONENT – 4

This component comprising of 4 factors accounts for 10.81% of variance explained. From table-5 it can be assessed that customers perceive 'cleanliness of ATM' (0.851) with highest factor loading followed by 'consistency in level of service' (0.759), 'consideration on property and value' (0.708), 'guaranteed service' (0.625). As this component explains only 10.81% of variance it does mean that customers have not perceived these factors to a favorable extent and should not be neglected, if so there may imbibe dissatisfaction.

TABLE - 5: ROTATED COMPONENT LOADING – WITH VARIMAX ROTATION AND KAISER NORMALIZATION

Component	Brief description of the factor	Factor loading	Communalities (sum of squared factor loadings)	Eigen values	Rotation sum of squared loading of component
1	Round the clock	0.882	0.882	12.89	No of variables :13
	User friendly	0.869	0.912	0.974	Eigen value :8.295
	confidentiality	0.845	0.856	1.293	Variance explained :33.180
	Instant & accurate	0.82	0.806	1.831	Cumulative variance :33.180
	Trust worthy	0.819	0.843	2.169	
	Identifying & Greeting customer	0.811	0.847	0.805	
	Personal attention	0.765	0.93	0.933	
	Thanking customer	0.748	0.842	0.597	
	Emergency handling equipment	0.72	0.701	0.034	
	Advising Customer	0.693	0.803	0.695	
	Handling service interrupts	0.595	0.528	0.321	
	Special attention	0.586	0.83	0.464	
	Promised time	0.582	0.853	0.42	
2	Not Misusing information	0.797	0.762	0.202	No of variables:4
	PIN security	0.756	0.872	0.236	Eigen value:4.147
	Feedback system	0.648	0.56	0.194	Variance explained:16.590
	Lighting and ventilation	0.5	0.383	0.044	Cumulative variance:49.770
3	Accessibility	0.771	0.657	0.04	No of variables:3
	Educating the customer	0.726	0.538	0.143	Eigen value:3.037
	Visually appealing ATM	0.667	0.579	0.026	Variance explained:12.147 Cumulative variance:61.917
4	Cleanliness of ATM	0.851	0.81	0.067	No of variables:4
	Consistency in level of service	0.759	0.658	0.082	Eigen value:2.703
	Consideration on property and value	0.708	0.533	0.075	Variance explained:10.81
	Guaranteed service	0.625	0.618	0.112	Cumulative variance:72.727

Source: Primary data

Extraction Method: Principal Component Analysis

CORRELATION ANALYSIS

To determine the relationship between encapsulated service quality dimensions and level of satisfaction on the ATM services of SBI correlation analysis is administered. Analysis shows that there exists a positive correlation.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 58
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE - 6: CORRELATION MATRIX

		Component 1	Component 2	Component 3	Component 4	Level of Satisfaction
Component 1	Pearson Correlation	1	.000	.000	.000	**.388(**)**
	Sig. (2-tailed)		1.000	1.000	1.000	.005
	N	50	50	50	50	50
Component 2	Pearson Correlation	.000	1	.000	.000	.138
	Sig. (2-tailed)	1.000		1.000	1.000	.341
	N	50	50	50	50	50
Component 3	Pearson Correlation	.000	.000	1	.000	.064
	Sig. (2-tailed)	1.000	1.000		1.000	.658
	N	50	50	50	50	50
Component 4	Pearson Correlation	.000	.000	.000	1	**.424(**)**
	Sig. (2-tailed)	1.000	1.000	1.000		.002
	N	50	50	50	50	50
Level of Satisfaction	Pearson Correlation	**.388 (**)**	.138	.064	**.424(**)**	1
	Sig. (2-tailed)	.005	.341	.658	.002	
	N	50	50	50	50	50

Source: Primary data

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

REGRESSION ANALYSIS

R square (0.353) tells how well regression approximates the real data. The value of R square suggests that various factors considered for service quality dimensions explain only 35 % of satisfaction. Hence other factors of the dimensions are to be considered. The validity of regression can be accessed by the *significant F* value, smaller F value (0.000491) confirms that regression output is not obtained by chance. P value of 5.72E-31 of regression co-efficient indicate that there is less than 0% scope that the result occurred as a result of chance.

REGRESSION EQUATION

For a deeper understanding of relationship regression analysis is used. The result of regression (table-7) clarifies that there is a positive and statistically significant relationship (F 6.149 and p <0.001) between independent variables (component 1,2,3,4) and the dependent variable (level of satisfaction). Mathematical representation of regression equation can be written as:

$Y = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4$

where value of dependent variable b_0 is constant and is also called as intercept. b_1, b_2, b_3, b_4 are the co-efficients that represents the estimated change in mean value of dependent variable for each unit change in independent variable value, X_1, X_2, X_3, X_4 are the components 1,2,3,4 respectively . Considering the values from table-7 the regression equation will be as follows

$Y = 3.94 + 0.439 X1 + 0.155 X_2 + 0.072 X_3 + 0.479 X_4$.

Indicating that component 4 is contributing more for the customer satisfaction level and component 3 needs an improvement. Further the adjusted R^2 value (0.295) shows an indication that the relationship is not statistically significant between overall dimensions and satisfaction levels.

TABLE - 7: SUMMARY OUTPUT OF REGRESSION ANALYSIS

Regression Statistics					
Multiple R	0.594489				
R Square	0.353418				
Adjusted R Square	0.295944				
Standard Error	0.950068				
Observations	50				
ANOVA					
	df	SS	MS	F	F- signi
Regression	4	22.2017	5.550426	6.149178	0.000491
Residual	45	40.6183	0.902629		
Total	49	62.82			
	Coefficients	Standard Error	t - Stat	P-value	
Intercept	3.94	0.13436	29.32423	5.72E-31	
Component-1	0.439564	0.135724	3.238661	0.002259	
Component-2	0.15575	0.135724	1.14758	0.257209	
Component-3	0.072677	0.135724	0.535474	0.594959	
Component-4	0.479936	0.135724	3.53612	0.000954	

Source: Primary data

FINDINGS OF CORRELATION AND REGRESSION ANALYSIS

Results from table-6 it can be predicted that the value of Pearson correlation co-efficient shows positive relation between component-1 (.388), component-2 (.138) component-3 (.064), component-4 (.424) and level of satisfaction. Hence the null hypothesis H_o2 is rejected at 0.01 level of significance; this proves that there is a significant relationship between service quality dimensions and customer satisfaction. Probing further into the relationship of independent components and level of satisfaction, it can be observed from table-7 that Component 1 and 4 where p < 0.05 shows that the relationship is statistically significant, where as the relationship is statistically insignificant for component 2 and 3**.** There is a demanding need in improving the factors relating to component 2 and 3 consisting of security, feedback system, educating the customer etc. On the other hand it is evident that the factors relating to component 1 and 4 consisting of user friendliness, special attention, guaranteed service etc., should not be neglected as they have greater influence on the level of customer satisfaction.

ANALYSIS ON DEMOGRAPHIC CHARACTERS

ANNOVA tests were conducted for analyzing the influence of demographic characters on service quality dimensions. The results of the tests are shown in table-8 (area and level of satisfaction) and table-9 (education levels and level of satisfaction).

FINDINGS OF ANNOVA

Based on the results of one way ANOVA (table-8) P value is 0.2 > 0.05 hence it is concluded that there is no influence of area of the customers' levels of satisfaction i.e., customers from various areas have same level of satisfaction on ATM services of SBI. Hence the null hypothesis H_o3 is accepted**.**

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 59
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE - 8: SINGLE FACTOR ANOVA ON AREA AND LEVEL OF SATISFACTION

Area	Count	Sum	Average	Variance		
Rural	27	113	4.185185	0.695157		
Urban	18	65	3.611111	2.133987		
Semi urban	5	19	3.8	1.2		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	3.668148	2	1.834074	1.457291	0.243195	3.195056
Within Groups	59.15185	47	1.25855			
Total	62.82	49				

Source: Primary data

Based on the results of one way ANOVA (table-9) where P value is 0.09 > 0.05 it is concluded that there is no influence of education on levels of satisfaction i.e., customers from various education levels have same level of satisfaction on ATM services of SBI. Hence the null hypothesis H_o4 is accepted.

TABLE - 9: SINGLE FACTOR ANOVA ON EDUCATION LEVELS AND LEVEL OF SATISFACTION

Groups	Count	Sum	Average	Variance		
Primary	11	37	3.363636	2.254545		
Secondary	15	58	3.866667	1.409524		
Graduate & above	24	102	4.25	0.630435		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F- crit
Between Groups	6.041212	2	3.020606	2.500379	0.092912	3.195056
Within Groups	56.77879	47	1.208059			
Total	62.82	49				

Source: Primary data

SUGGESTIONS ON 7PS OF MARKETING

SUGGESTIONS ON PRODUCT: It is observed from table-5 that almost all the factors relating to the product (confidentiality, instant and accurate, trust worthy) have been encapsulated into component 1 and are having a maximum factor loading. This indicates that the customers have perceived that ATM service by and large as a good product. But the factor guaranteed service a factor of 4th component has less factor loading (0.625). Hence it is suggested that management should modernize the ATM switching router to meet band width guarantee, giving guarantees on behalf of customers to other banks in respect of discrepancies, Powerful MAC (Message authentication code) may be used to guarantee the customer that no information is tampered while in transaction between ATM and the banks network. Introducing biometrics for usage of ATMs such that the customers are guaranteed to full extent from hackers of ATM PIN/Card.

SUGGESTIONS ON PLACE: Round the clock, accessibility are the two factors under consideration relating to place. These were encapsulated in component 1 and 3 respectively. The factor round the clock has got maximum factor loading of 0.882 than all the factors and accessibility with 0.771 factor loading. Hence it is suggested that the availability of ATM round the clock is the most fascinating feature that has attracted the customers and hence the factors of component one has statistically strong positive relationship with the customer satisfaction. It is suggested that convenience in accessibility of the ATM needs a little attention and the management should concentrate on the locating more ATMs. Introduction of mobile ATMs, Door step ATMs would be a better option.

SUGGESTIONS ON PROMOTION: From table-5 it is observed that feed back system of 2nd component and educating the customer of 3rd component are placed at the middle of the component when arranged in the order of factor loadings. Hence these are considered as key anchoring factors of the respective components in influencing the customer satisfaction. It is suggested that the SBI should have a powerful audio video feedback systems such that the customers reactions either positive or negative can be captured if customer wishes to give their feedback. The feed back in turn should be attended to the notice of the customers. Then the customer feels himself as a privileged customer of the bank. The customers should also be educated through clippings on the latest changes or developments in the services.

SUGGESTIONS ON PRICE: Consideration on property and value is the factor of 4th component relating to price, this has a factor loading of 0.708. Customers' property is to be considered and valued then only the price paid for the service will not be felt by the customers and they feel only the value of the service. Time is also an most important property in the busy life style, the queing times should be reduced by introducing ultramodern ATMs and nano optical networks.

SUGGESTIONS ON PEOPLE: From table-5 it is observed all that the factors relating to people namely identifying and greeting customers, personal attention, thanking customer, special attention are encapsulated in 1st component. Except special attention factor others have got good factor loadings. Hence it is suggested that SBI should implement a strategy where all the customers feel that they are special to the bank. SBI should concentrate to create innovative services for special and specific needs of the customers. From table-8 observations it is suggested that the SBI should modernize even the rural ATMs and treat the rural customers also in the same lines as that of the urban and semi urban customers. Observations from table-9 suggests that the customers with lower education levels are perceiving the service factors in the same trend as that of the highly qualified customers and hence the demarcation of customers based on education levels should not exist for the long run benefit of the organization.

SUGGESTIONS ON PHYSICAL EVIDENCE: From table-5 it is observed that various tangible items relating to physical evidence are scattered in all the components. This shows that customers perceive different tangibles in multidimensional view and load these factors differently. The factors like emergency handling equipment, lighting and ventilation, visually appealing ATM, cleanliness are under consideration. The lowest factor loading is given for lighting and ventilation because of power shortage which is causing inconvenience while operating ATM. Management should use solar power or any other non tradition power systems to compensate power failures. Further a trendy ATM is preferred by the customers.

SUGGESTIONS ON PROCESS: User friendliness, promised time, consistency in level of service are the factors relating to process. It is observed that all these factors except promised time have reasonably good factor loadings. Hence it is suggested that SBI should frame a cut off time for all the processes and an online monitoring system is to be developed to set right those processes which have crossed the promised time.

CONCLUSION

Based on the findings of the above study it is evident that the management has to concentrate on factors like security, confidentiality, feedback system, accessibility, visually appealing, light and ventilation. Failure to meet these needs is assumed to result in dissatisfaction. On the other hand management should not neglect the factors of component one and four as these factors are influencing the customers' satisfaction level and the customers develop positive attitude towards ATM based on these factors. Due to the advent of technology into nook and corner villages and due to the steps taken by the govt. for financial inclusion even the rural customers have shown same level of satisfaction as that of urban and semi urban customers. The technology has simplified the processes and the services are user friendly that there is no difference in the perception of customers with various educational levels on the various service quality factors of SBI ATM.

SCOPE FOR FURTHER RESEARCH

Researchers should also focus on diversifying the sample across different ethnic groups. Study can also be done on dissatisfaction levels of ATM services. Price can also be considered as an important factor which influences the customer satisfaction. A study is to be carried out to establish the challenges encountered by

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 60

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

the customers in the process of using ATM service. Researchers have to probe for other factors of service quality dimensions which have a strong positive correlation for the level of satisfaction. A comparative study between the public sector banks and private banks or a comparative study between different public sector banks will be a better option.

REFERENCES

1. Barnes J.G., Howlett, D.M. (1998)" Predictors of equity in relationship between financial services providers and retail customer" International journal of Bank marketing Vol. 16 pp.15-23.
2. Dove D.W, Robinson D. (2002) "Moments of dissatisfaction are opportunities in disguise" American banker, Vol. 167, no 191, pp. 6-7
3. Ganesan R (2009) "A Secured Hybrid Architecture Model for Internet Banking (e-Banking) "Journal of Internet Banking and Commerce, April 2009, vol. 14, no.1.
4. Hernan E. Riquelme (2010) "Internet Banking Customer Satisfaction and Online Service Attributes"Journal of Internet Banking and Commerce, August 2009, vol. 14, no.2.
5. Ho, C., Wu, W (1999) "Antecedents of customer satisfaction on the internet: an empirical study of online shopping" proceedings of the 32nd Hawaii international conference on system sciences.
6. Howcroft B (1991) "Customer services in selected branches of UK clearing bank: A pilot study "The services manufacturing divide: synergies and dilemmas, proceedings of service industries management unit conference.
7. Joseph, M., & Stone, G.(2003) "An empirical evaluation of US bank customer perception of the technology on service delivery in the banking sector" International journal of Retail and Distribution Management, 31(4), 190-202.
8. Leeds, B. (1992) "Mystery shopping, offers clues to quality service" Bank marketing 24(11), November, pp 24-27.
9. Leonard and Spencer A(1991) "The importance of image as a competitive strategy : an exploratory study in commercial banks" International journal of bank marketing Vol 9 No 4PP 36-40
10. Muhammad Asif Khan (2010) "An empirical study of Automated teller machine service quality and customer satisfaction in Pakistani Banks" Europian journal of social sciences—Vo.l 13, Number 3(2010)
11. Neha Dixit (2010) "Acceptance of E-banking among Adult Customers: An Empirical Investigation in India" Journal of Internet Banking and Commerce, August 2010, vol. 15, no.2.
12. Parasurama,A., & Grewal D.(2000) " The impact of technology on the quality-value loyality chain : a research agenda" Journal of the academy of marketing science", Vol 22, issue-1, pp 168-174.
13. Parasuraman,A.; Berry,Leonard L.; Zeithaml,Valarie A.(1988) "SERVQUAL: A Multiple-item scale for measuring consumer perceptions of service quality" Journal of Retailing, 1988, 64, 1, 12-40.
14. Pitt, L.F, Watson R.T., & cavan C.B. (1995) "Service quality a measure of information systems effectiveness" MIS quality.
15. Rahmath Safeena, Abdullah, Hema (2010) "Case study of customer perspectives on E-business value " Journal of Internet Banking and Commerce, April 2010, vol. 15, no.1
16. Santos J(2003) "e-service quality a model of virtual service quality dimensions " Managing service quality Vol 13(3) pp.233-246.
17. Shamsuddoha M., Chowdhury, M.T., Ahsan, A.B.M.J (2005) "Automated teller machine: A new dimension n the banking services of Bangladesh" http://papers.ssrn.com/ sol3/papers.cfm?abstract_id =1302301.
18. Thamaraiselvan Natarajan (2010) "Customer's Choice amongst Self Service Technology Channels in Retail Banking: A Study Using Analytical Hierarchy Process" Journal of Internet Banking and Commerce, August 2010, vol. 15, no.2.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 61
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

DEVELOPMENT OF LOW COST SOUND LEVEL ANALYZER USING SCILAB FOR SIMPLE NOISE MEASUREMENT APPLICATIONS

OJAS M. SUROO
RESEARCH SCHOLAR
DEPARTMENT OF ELECTRONICS
SAURASHTRA UNIVERSITY
RAJKOT

MAHESH N. JIVANI
ASSOCIATE PROFESSOR
DEPARTMENT OF ELECTRONICS
SAURASHTRA UNIVERSITY
RAJKOT

ABSTRACT
Sound is an impression of acoustic waves (disturbance/pressure fluctuations setup in a medium) and unpleasant, unwanted, disturbing sound is generally treated as Noise and is a highly subjective feeling. Noise is omni present, in other words Noise is becoming a progressively more ubiquitous. Regularly we hear from the people who return from the market about lot of noise pollution in the city. According to them vehicles and commercial units are responsible for escalating ambient noise pollution. During the functions like carnivals, wedding, birthday celebrations, social gathering etc., we can hear loud-speakers' Noise piercing the ordinary man's ear which gives rise to noise pollution. A great level of noise may cause strict strain on the auditory and nervous system. So, it is very much important to measure noise. For this purpose present study was carried out at various locations with Sound Level Meter to asses the day and night sound level in Rajkot City (Gujarat, India). Also, development of low cost Sound Level Analyser (SLM) was carried out, utilizing the sound card and microphone of PC and GUI programming features of the open source scientific computing language Scilab. Observation are compared with commercial sound level meter and found good matching. This paper aims at several essential concepts pertaining to noise measurement using hardware and software approach.

KEYWORDS
Measurement, Noise, Open Source, Scilab, Sound.

1. INTRODUCTION
Sound Pressure Level (SPL) is carried out when analyzing the acoustic properties of a building, environmental noise pollution, monitoring noise exposure of workers in industries, quality of audio equipment etc. It is insufficient to measure SPL as a function of RMS voltage, using a simple level meter or voltmeter, as the results obtained are not faithful. This is because noise contains energy spread over a wide range of frequencies and levels, and different sources of noise have different spectral content [3]. As a result, a filter which responds to the sound in a manner similar to the human auditory system should be developed. The filter should be capable of filtering out the frequencies below 22 Hz and above 22 kHz.

2. OBJECTIVE
The objective of present work is to design a low cost Sound Level Analyzer (SLM), utilizing the sound card and microphone of PC and GUI programming features of the open source scientific computing language Scilab. This leads to the development of an off-line A-weighted SLM, which estimates the Sound Pressure Level (SPL) of any mono wav sound file, recorded at any sampling rate or bit depth for the duration 1 min. at 'Slow' response rate.

The FFT algorithm is used to compute the N-point DFT for a time window, which depends on the sampling rate of a recorded file [1][2]. The resultant frequency spectrum is weighed using expression for A-Weighing Filter. The average energy of the signal in the frequency domain is estimated using Parseval's relation [1][2]. A simple front end graphical interface is designed for loading the wav file and display the plots of wav file, A-weighing filter response and dBA with time, in addition the SPL at distance of 0 through 60 sec, with intervals at 5 sec are also displayed.

3. SOUND LEVEL METER DESIGN
The primary consideration for designing the SLM is the utilization of Discrete Fourier Transform (DFT) to determine frequency spectrum[1] of a time windowed segment of a wav file and A-weighing Filter. To implement DFT we have used fft() function of scilab and created a dedicated function AweighingFilt() to emulate A-weighing filter.

4. IMPLEMENTATION OF DFT AND DETERMINING DFT LENGTH
It is a proven fact that the DFT can be used to approximate the DTFT, the N- point DFT equation is given by

$$X[k] = \sum_{n=0}^{N-1} x[n] e^{\frac{j2\pi kn}{N}}$$

(1)

To find out the respective frequency of each DFT sample $X[k]$, we use the equation

$$\Delta f = \frac{f_s}{N} = \frac{1}{NT}$$

(2)

Where, f_s is the sampling frequency, *N* is the length of sequence and Δf is the frequency resolution.

To estimate DFT we have used Decimation-In-Time (DIT) Radix-2 FFT [1]. For Radix-2 FFT the input sequence must be a power of two i.e. $N = 2^m$, where *m* is a positive integer [2]. For a given sampling frequency f_s and period t [1 sec. for slow and 0.125 for fast rate], the minimum number of samples is given by

$$N_{min} = [f_s \Delta t]$$

(3)

Which may not be a power of two, so we find out next power of two greater than or equal to N_{min}, using the **nextpow2()** function

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   62
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

5. IMPLEMENTATION OF A-WEIGHING FILTER

As mentioned earlier, the A-weighing filter responds in a manner similar to the human ear. Although there are other weighing systems as well, but most widely used weighing scheme in most of the commercial SLMs is A-weighing. We can apply A-weighing directly to each FFT frequency bins without necessarily using 1/3-octave filters [1].

The implementation of A-weighing Filter can be done using the expression

$$\alpha_A(f) = \frac{(3.5041384 \times 10^{16})f^8}{(20.598997^2 + f^2)^2 \times (107.65265^2 + f^2) \times (737.86223^2 + f^2) \times (12194.217^2 + f^2)^2} \tag{4}$$

The filter response is shown in fig. 1 It can be observed that the peak is obtained around 3000 Hz, there after it starts decreasing gradually till 22.05 kHz, which is imitation of human auditory system.

We then use frequencies $[f_k]$ obtained by equation (2) for each FFT sample $X[k]$ to evaluate A-weighing filter coefficients in the above equation[1].

The A-weighted FFT samples are then described as

$$X_A[k] = \alpha_A(f_k)X[k], \text{for } f_k = k\Delta f \tag{5}$$

6. COMPUTATION OF THE SOUND PRESSURE LEVEL IN DBA

The Sound Pressure Level is at any given point is given by the expression given below

$$SPL\ (dBA) = 20\ log10\left(\frac{P}{Pref}\right) \tag{6}$$

Where, P is the instantaneous sound pressure and $Pref$ is the reference pressure corresponding to the quietest perceivable sound or threshold of hearing i.e. 2×10^{-5} N/m2 (20 μ Pa).[4]

If we express in terms of energy then the above equation can be modified as

$$SPL\ (dBA) = 10\ log10\left(\frac{E}{Eref}\right) \tag{7}$$

Where E instantaneous energy and $Eref$ is energy corresponding to the reference pressure.

The energy of audio signal can be calculated by finding out the sum of squared magnitudes of its samples. This condition holds true in the time domain, but as we have chosen the frequency domain for the processing either we have to find out inverse FFT and analyze the filtered signal in the time domain. Carrying out these steps would significantly increase the complexity of the software and also demand more computational resources. Hence, we find out energy of the signal in frequency domain using Parseval's relation [1] which is given by.

$$\varepsilon = \sum_{n=0}^{N-1} |x[n]|^2 = \frac{1}{N}\sum_{k=0}^{N-1} |X[k]|^2 \tag{8}$$

It is known that the DFT samples have complex-conjugate symmetry for real valued samples, and the same being the case with samples of wav file, we estimate the energy of the signal using the first $\frac{N}{2}+1$ samples of the A-weighted FFT spectrum as depicted by the equation.

$$\varepsilon_x \approx \frac{2}{N}\sum_{k=0}^{\frac{N}{2}} |X_A[k]|^2, for\ x[n]\epsilon\ R \tag{9}$$

Using the symmetry property reduces the CPU consumption during process and also makes the algorithm less complex. As the Sound Level Analyzer supports various sample rates and response types, namely slow and fast, the average signal power should be used as expressed by the equation below:

$$\tilde{\varepsilon}_x \approx \frac{2}{N\Delta t}\sum_{k=0}^{N/2} |X_A[k]|^2, for\ x[n]\epsilon\ R \tag{10}$$

refer to the equation (7) to compute the dBA, we now have value of $\tilde{\varepsilon}_x$ with us, now we need to have value for $\tilde{\varepsilon}_{ref}$, since the input voltage for the reference pressure level is unknown and varies with different system. Now, substituting the values $\tilde{\varepsilon}_x$ and $\tilde{\varepsilon}_{ref}$ in the equation (7) we get

$$SPL\ (dBA) = 10log_{10}\left(\frac{\tilde{\varepsilon}_x}{\tilde{\varepsilon}_{ref}}\right) = 10log_{10}(\tilde{\varepsilon}_x) - 10log_{10}(\tilde{\varepsilon}_{ref}) \tag{11}$$

As we know, that $Pref$ is a constant quantity, hence the corresponding energy $\tilde{\varepsilon}_{ref}$ will also be a constant, which states that $10log_{10}(\varepsilon_{ref})$ is also a constant. As a result we can express above equation as

$$SPL\ (dBA) = 10log_{10}(\varepsilon_x) + C \tag{12}$$

Where, C is a calibration constant, which can be found out experimentally.

7. SOFTWARE IMPLEMENTATION

For the software implementation of Sound Level Analyzer, we have used Scilab an open source scientific computation language, which can be downloaded free of cost from http://www.scilab.org. The front end of the software has been designed using "guibuilder" feature of Scilab to provide simple and Interactive Graphical User Interface.

The software consists of five major divisions namely (1) Front End User Interface (2) Loading, Plotting and acquiring information of wav file, (3) Determination of FFT window length and display of estimated data (4) Estimation of FFT spectrum, applying A-weighing to the FFT spectrum and computation of dBA and (5) A-weighing filter realisation.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   63
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

FIG. 1: FLOW CHART OF FOR THE LOW COST SOUND LEVEL ANALYZER
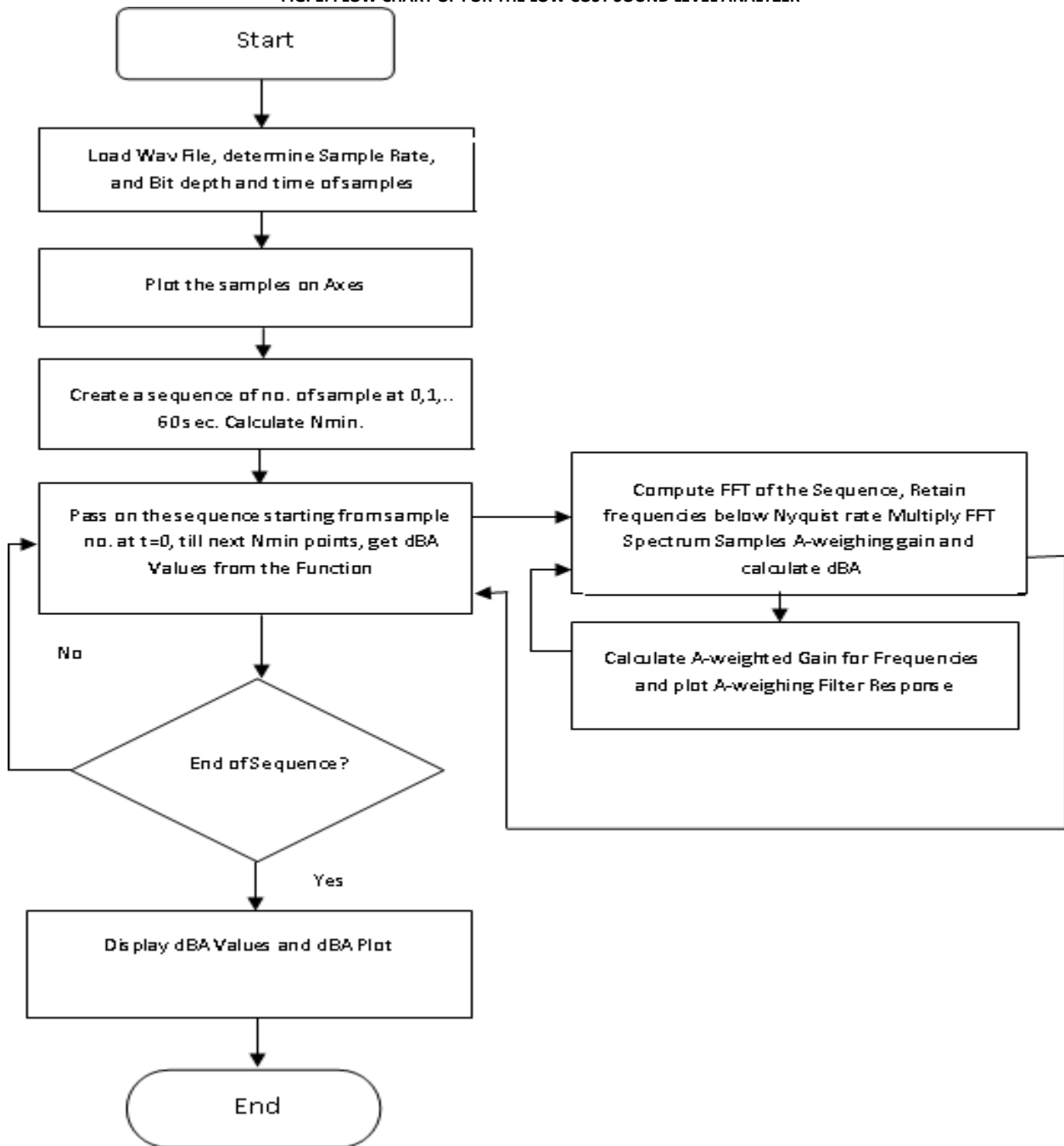
7.1 FRONT END USER INTERFACE

The front end of software has been designed using 'guibuilder' feature of Scilab. The interface provides controls to load wav file, initiate processing and display of data on the window, set the Calibration constant C if required and also has the menu 'Info' to view the information about the loaded wav file.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 64
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

FIG. 2: SCREEN SHOT OF SLA FRONT END INTERFACE
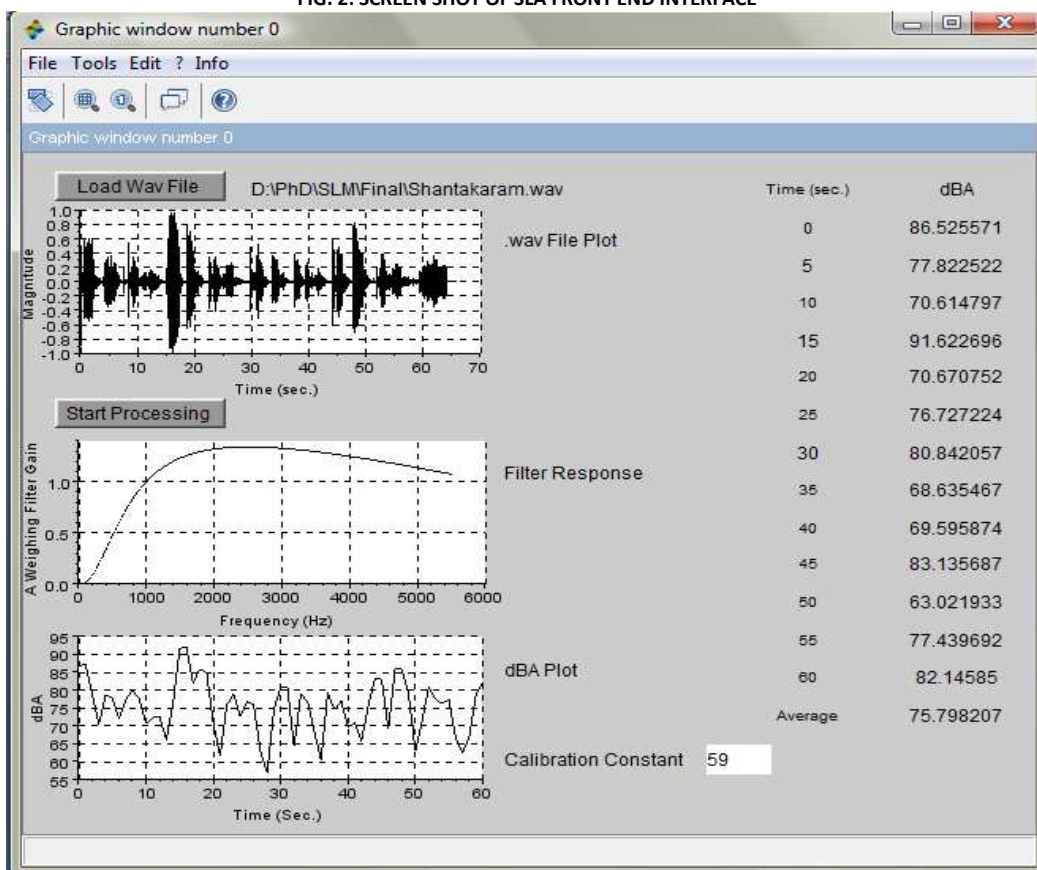
FIG. 3: SCREEN SHOT OF FILE INFORMATION WINDOW
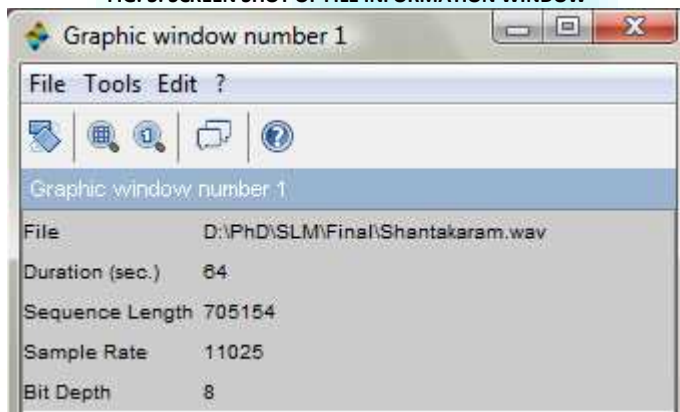
7.2 LOADING, PLOTTING AND ACQUIRING INFORMATION OF WAV FILE

Once the user issues the command from the user interface the function written to load the file loads the specified wav file using the inbuilt function **wavread()** of Scilab. Various parameters like sample rate, bit depth, duration of file and length of sequence (No. of samples in file) are also determined in this section.

7.3 DETERMINATION OF FFT WINDOW LENGTH AND DISPLAY OF ESTIMATED DATA

Based on the sample rate the FFT window length greater than or equal to N_{min} is determined using **nextpow2()** function and the input sequence of that length is passed on to the function to perform the FFT estimation and end results are displayed on the window and on Axes2 based on the output obtained.

7.4 ESTIMATION OF FFT SPECTRUM, APPLYING A-WEIGHING TO THE FFT SPECTRUM AND COMPUTATION OF DBA

DFT estimation is carried out using fft() function to the input sequence passed from the previous function, as a result the FFT spectrum is obtained. The frequencies f_k are determined for samples of the FFT spectrum for the realistion of A-weighing filter. The A-weighing is applied to the samples of FFT spectrum and the instantaneous average energy is determined using the Parseval's relation and hence, the dBA is calculated.

7.5 A-WEIGHING FILTER REALISATION

The A-weighing filter is realised using equation (4) and the coefficients are evaluated for the frequency of each sample of the FFT sample determined in the previous section. The A-weighing gain is then passed as the output of the function to the calling function.

8. COMPARISON OF SOUND LEVEL ANALYZER WITH COMMERCIALLY AVAILABLE SLM

To verify the reliability of the present Sound Level Analyzer we have compared it with a commercially available sound level meter. As the present work is best suited to work at slow response level (duration of 1 sec.) we have analysed various sounds by setting 'slow' response rate in the said commercial SLM.

Firstly we have taken into consideration a wav file having white noise of the duration 1 min. The sound level meter was placed at a suitable distance from the speakers of PC, the wav file was played keeping the full sound volume of both the media player and the PC's speaker. The output observed using the SLM is noted at various time points such as 0, 5, 10, 15.... 60 seconds. It was observed that the output at 0 sec and 60 sec does not match, that is due to the lower sensitivity of the SLM (because of online processing). The readings of both SLM and SLA for white noise are shown in graph 1.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 65

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

GRAPH 1: COMPARISON OF LOW COST SOUND LEVEL ANALYZER OUTPUT WITH COMMERCIAL SLM (FOR WHITE NOISE)
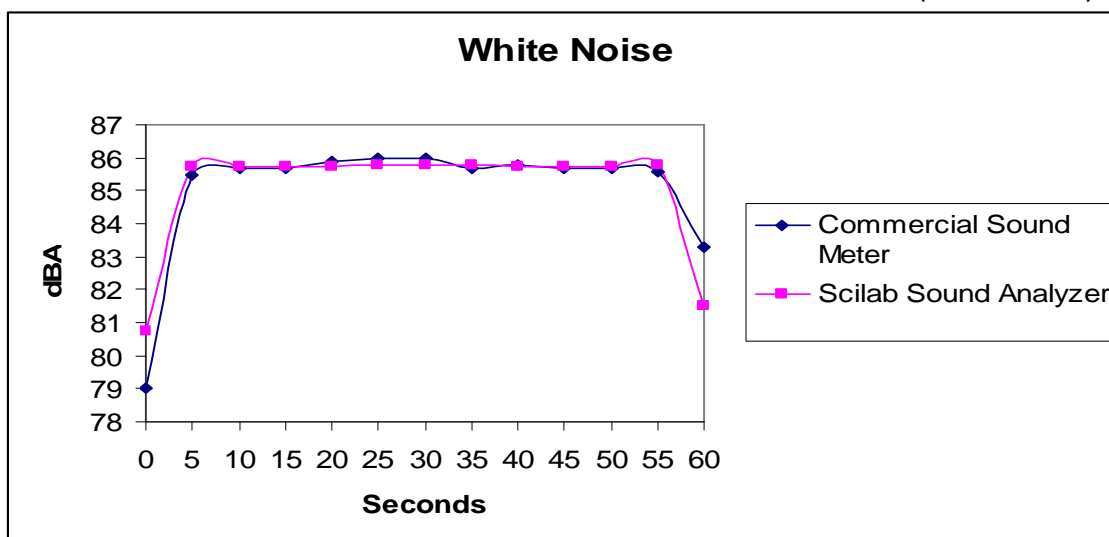
After comparing the SLM and LCSLA for white noise we compared them for normal speech signals. We placed the SLM close to the input microphone of PC and recorded the conversation using the sound recording software Wave Pad Editor. During the recording simultaneously the output of SLM was observed at the intervals of 0, 5, 10, ... 60 sec. At slow response level. The observations of both SLM and LCSLA are compared as given in graph 2.

GRAPH 2: COMPARISON OF LOW COST SOUND LEVEL ANALYZER OUTPUT WITH COMMERCIAL SLM (FOR NORMAL SPEECH SIGNAL)
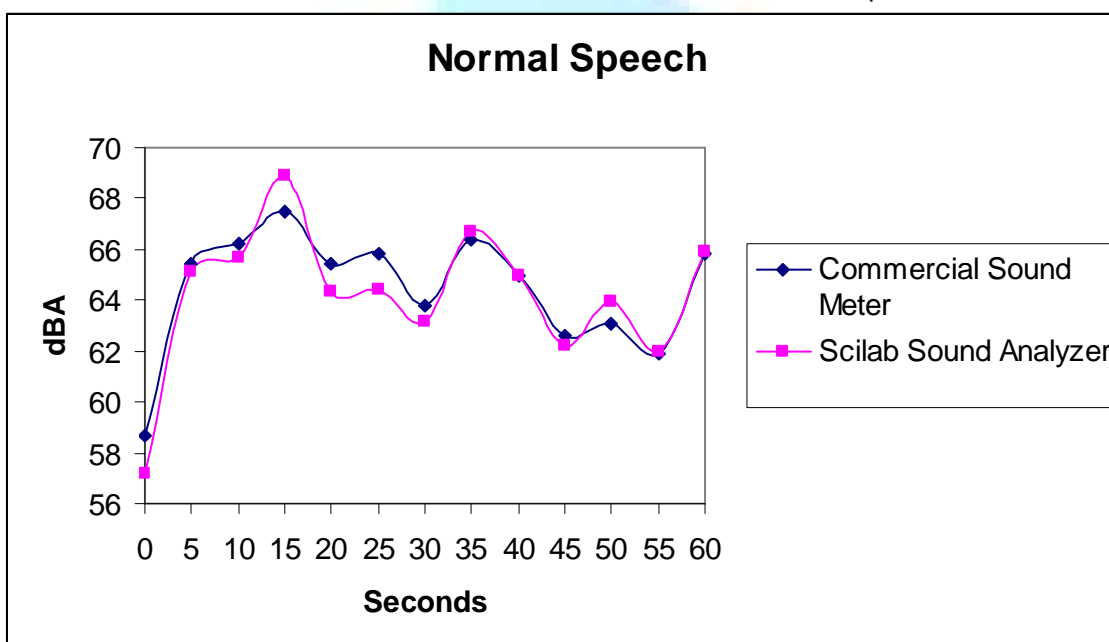
9. CONCLUSION

The results obtained by comparing Low Cost Sound Level Analyzer with commercial Sound Level Meter show that the there is a close proximity between the observation of Sound Pressure Level monitored by SLM and the estimated SPL of LCSLA. There is very minor difference between the results obtained by both the objects under consideration due to different sensitivities and resolutions of the SLM and sound card of a PC and slightly due to minor position difference between both the input microphone of PC and SLM. Hence, it is found out that the LCSLA can be very handy in offline analysis of SPL.

REFERENCES
1.   Douglas R. Lanman, EN 253: "*Matlab Exercise #3, Design of a Sound Level Meter*", mesh.brown.edu/dlanman/courses/decibel_meter.pdf
2.   en.wikipedia.org/wiki/Audio_noise_measurement, "*Audio Noise Measurement*"
3.   Ojas M. Suroo & Mahesh N. Jivani, "*Noise Effluence: Causes, Consequences and Control, National Conference on Environment and Climate*", Feb 2011.
4.   S. K. Mitra, "*Digital Signal Processing: A computer Based Approach.*", McGraw-Hill, New York, 2006

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   66
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

INFLUENCE OF DEMOGRAPHY ON STORE CHOICE ATTRIBUTES OF MADURAI SHOPPERS IN RETAIL OUTLETS

DR. S. SAKTHIVEL RANI
ASSOCIATE PROFESSOR
DEPARTMENT OF MANAGEMENT STUDIES
KALSALINGAM UNIVERSITY
ANAND NAGAR, KRISHNAN KOIL

C.R.MATHURAVALLI
RESEARCH SCHOLAR
DEPARTMENT OF MANAGEMENT STUDIES
KALSALINGAM UNIVERSITY
ANAND NAGAR, KRISHNAN KOIL

ABSTRACT

Traditionally, the store based formats are Kirana shops, Panwalas, Street vendors, Cloth stores and Village mandis. Due to the inception of organized retailing in recent years various types of sophisticated and complex formats have originated in the retailing scenario of India. Each type of retailer is trying to survive and prosper by satisfying a group of customers` needs and expectations more effectively than its competitors. There is a growing need to evaluate the drivers of retail store choice behavior in the Indian context thus the study of consumer helps the retail outlets to improve their marketing strategies by understanding how consumer consider different attributes and make purchase decision that differ between various retail outlets based on the level of importance and interest. This paper aimed at finding out whether there is any difference in the retail choice attributes of Madurai shoppers in the context of their demography. The study was descriptive in nature; structured, self-administered questionnaire is developed on the basis of review of the literature, measuring ten constructs namely pertaining to retail store choice attributes were used to collect primary data from the respondents. The data has been collected from 488 respondents of four major retail outlets in Madurai city. The Percentage analysis and ANOVA Test and t - test were used to analyze the data and the research identified that value for money, promotions and offer, lot of varieties/collection of products are the important store choice attributes. The level of above said attributes are identified as most influencing factors in selecting best retail choice as the outcome of the consumer purchase decision.

KEYWORDS
Demography, Retail, Store Brand, Purchase Behavior and Store choice.

INTRODUCTION

Indian retail industry is the largest industry in India, with an employment of 11.6 percent of all employment and 12.4 percent of all establishments and contributing to 10% of the country's GDP. Retail industry in India is expected to rise 25% yearly being driven by strong income growth, changing lifestyles, and favorable demographic patterns. It is expected that by 2016 modern retail industry in India will be worth US$ 175-200 billion. Shopping in India has witnessed a revolution with the change in the consumer buying behavior and the whole format of shopping also altering. Industry of retail in India which has become modern can be seen from the fact that there are multi- stored malls, huge shopping centers, and sprawling complexes which offer food, shopping, and entertainment all under the same roof (business.mapsofindia.com). Retailing business is greatly affected by the patronage behavior orientations of shoppers. The important factor affecting consumer choice is the store image, an image shaped by store attributes. Decision-Making with regard to retail outlet selection is very similar to consumer decision-making on brands where the consumer goes through a process starting from identifying needs to post-purchase issues Research by Mintel (1996) and East (1995) found that convenience of location might be a stronger motivator in retailing than supermarket loyalty schemes. Sudaporn Sawmong and Ogenyi Omar, (2004) studied the grocery shopper behavior also found that the consumers are conscious with cost and benefit. The review article examined the various value aspects of retail stores in the consumer's selection of a retail outlet, which includes the store attributes, shopping costs and store image. Understanding that people who endorse certain values are more likely than others to prefer certain store attributes can be useful in determining an overall retail marketing strategy based on that image ,e.g. promotional themes, store positioning etc.(Orchan Erdem 1999). Retail choice is the result of a specific purchase task and refers to purchase from a given store, usually after some information search and evaluation of alternative stores.

REVIEW OF LITERATURE

Patronage behavior has been a subject of research for the past few decades. The selectively reviewed studies reveal the complexity of store shopping since it involves a number of factors related to the consumer's motives, orientations and perceptions. These elements have an influence on the consumer's patronization decisions. From a behavioral perspective, patronage and store choice are intertwined concepts that marketing researchers have studied intensively (Mazursky and Jacoby, 1986). The patronage behavior and store choice literature basically focuses on studying the principal attributes that influence a customer's shopping decisions and on investigating the interactions among these attributes like attractive display, value for money, brand name, certain products are available only here, prices are affordable, products are trust worthy, best service by employees, lot of varieties/collection of products, promotions and offer, nearer to residence. This stream of research is guided by the presumption that the consumer's selection decision is not made on the basis of only one attribute; rather, a set of attributes (variables) collectively plays a critical role in how the customer chooses to patronize a specific store and comprises the store image (Abdulla Alhemoud, 2008). Store choice and patronage behavior involve a consumer decision process regarding their purchase on store choices are where, how and what products (Moye, 2000). Initiated by patronage motives, this process is highly influenced by retailer's attributes, consumer characteristics and choice context (Haynes et al., 1994). Convenience and Proximity is one of the major factors /attribute for choosing a grocery store seem to be nearness to place of residence. Many retailers considered that there was a general agreement among the consumers of grocery stores that convenience and brand spread (number of brands available) were the most significant features of the stores. The researchers observed that most of the consumers visit to the nearest provisional stores only based on the principle of proximity and merchandise. (Piyush et al (2004). Some researchers have indicated that consumer' perceptions of retail store attributes influence perceptions of shopping costs and shopping satisfaction which creates store loyalty (Sherman et al., 1997). Consumers shop at the stores where can maximize their satisfaction (i.e. efficiency) considering both retail attributes and shopping costs. An empirical study (Kim and Kang, 1995) suggested that shoppers consider all aspects of shopping efficiency including shopping costs (money, time, and energy) and functional utility (e.g. convenience, low price, a variety of merchandise) and experiential aspects of shopping (e.g. pleasure, prestige) in a specific outlet. In short, these studies suggested that perception of the shopping costs is another dimension that should be taken in to consideration to understand shoppers' store selection. Retail promotion involves a mix of communication activities carried out by retailers in order to make a positive influence on the customers' perception, attitude and behavior which can lead to an increase in store loyalty, store visits and product purchases (Suja Nair, 2008). Sales promotion may also lead to a change of store. In other

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   67
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

words, the consumers buy their purchases in one store instead of another since the sales promotions vary from one store to another (Kumar and Leone 1988, Walters 1991). Research by Macintosh and Lockshin (1997) emphasizes the role of loyalty in retail store selection and presented a model of store loyalty consisting of customer to salesperson and customer to store relationships, so finally conceptualize loyalty as including both positive attitudes and repeat purchase behavior. Martineau (1958) found that consumers have a tendency to select retail stores that reflected their own perceived social status and therefore would it be of interest to add demographic aspects such as age, gender, and profession have an impact on analyzing consumers purchase decision on a particular retail store. Previous research has found that demographic characteristics such as age, gender and education have an impact on consumer behavior (Hyllegard et al., 2005). According to Joyce and Lambert (1996) shoppers' age significantly affects perceptions of store image'. Life stage-ages-analysis could be used to analyze the different evaluations of the store consumers make throughout their lives. According to Foster(2004) gender is an area that lack research in relation to retail stores despite the fact that 'certain retail sectors are gendered'. The level of education of the consumers affects how advertising is interpreted and how consumers behave in society (Gauri and Cateora, 2005). Further, aesthetic preferences influence age, gender and education and affect the image perception of the store and these are also related to age (Joyce and Lambert, 1996). Aesthetic preferences vary among people as they are searching to satisfy their personal needs. Retail environment can be one aspect in which aesthetic preferences can be satisfied according to Lund Holbrook and Schindler (1982).

NEED FOR THE STUDY

Most private brands started with store name labels and offered price concerned consumers a convenient, entry price option. Many retailers have evolved their private brand strategy to offer much more than entry pricing, with higher order benefits and higher prices. Store brands obtained higher market share when the quality relative to the national brands was high, quality variability of store brands was low, the product category was large in absolute terms, percent gross margins were high, there were fewer national manufacturers operating in the category and the national advertising expenditures were low. Hence the study is made to identify the attributes that are influencing in selecting best retail to purchase their products.

OBJECTIVES OF THE STUDY

In this competitive world where global and domestic players are fighting face to face, it is necessary to find out the factors that influence store choice attributes affect the buyer to select a particular store, so how the consumers select between different alternatives (Brands, Products &Retailers) and also to know the significant difference of purchase behaviors (store choice) of consumers with their demographic profile.

RESEARCH METHODOLOGY

The study was descriptive in nature. Primary data has been collected using questionnaire as data collection tool. A self-administered questionnaire was developed on the basis of review of the literature, measuring ten constructs consisting of retail store choice attributes. like attractive display, value for money, brand name, certain products are available only here, prices are affordable, products are trust worthy, best service by employees, lot of varieties/collection of products, promotions and offer, nearer to residence and some information on demographic profile such as gender ,age ,occupation and duration of client visiting a retail outlet. A five-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (5) was related to each of the statement for the respondents to rate. The target population of the study included customers who prefer to shop at retail stores in Madurai such as Reliance ,More ,Spencer's and Shri Kannan A sampling frame from which a random sample could be drawn was unavailable; however convenient sampling method was chosen to serve the purpose of data collection. This method seemed acceptable and appropriate taken into account the descriptive nature of the study and the lack of a sampling frame.

RESULTS AND DISCUSSION

In total 73 percent of the total customers are female whereas the remaining 27 percent are male. The majority of the customers in all four retail outlets are female. In Reliance, it constitutes 70 percent to the total, whereas More it constitutes 59 percent to the total and in case of Spencer's, it constitutes 81 percent and in Kannan 79 percent to the total. In total 44 percent of the total customers belong to 30- 39 years age group. It is followed by 40 – 49 years, 20 – 29 years, 50 – 59 years and 60 & above years which constitute 25, 15,13,3 percent respectively. The majority of the customers in all four retail outlets belong to age group of 30-39 yrs. In Reliance, it constitutes 43 percent to the total, whereas More it constitutes 32 percent to the total and in case of Spencer's, it constitutes 39 percent and in Shri Kannan 55 percent to the total respondents. In total 55 percent of the total customers are home makers. It is followed by salaried, business and professional which constitute 29, 16, and 4 percent respectively. As in case" More" Retail outlet, 41 percent of the respondents are salaried people. The majority customers of the other three retail outlets are homemakers as in Reliance, it constitutes 53 percent to the total, whereas Spencer's it constitutes 67 percent to the total and in case of Shri Kannan 57 percent to the total respondents. In total 34 percent of the total customers are visiting the retail outlet for the last 2-3 years. It is followed by 1-2 years, last 1 year, more than 3 years and last 6 months which constitute 30 18,10 and 7 percent respectively. As in case" More" Retail outlet, 44 percent of the respondents are visiting for 1-2 years to purchase the store brand. The majority of the customers are visiting the store for last 2-3 years and also the respondents are all purchasing store brand from the days of visiting the particular store. In Reliance, it constitutes 36 percent to the total, whereas Spencer's, it constitutes 47 percent to the total and in case of   Shri Kannan 36 percent to the total respondents.

TABLE NO. 1: GENDER AND STORE CHOICE ATTRIBUTES

S.No	Store Choice Attributes	Mean Score Among		t-value
		Male N =131	Female N=357	
1.	Attractive Display	3.98	4.12	-3.452*
2.	Value for money	4.97	4.99	-1.307
3.	Brand Name	4.12	4.12	0.040
4.	Certain products are available only here	2.41	2.66	-2.119*
5.	Prices are affordable	4.29	4.13	2.239*
6.	Products are trust worthy	4.39	4.38	0.085
7.	Best Service by employees	4.19	4.29	-1.534
8.	Lot of varieties / collections of products	4.74	4.75	-0.335
9.	Promotions and offer	4.86	4.87	0.281
10.	Near to My Residence	4.24	3.99	3.018*

*Significant at 5% Level

The above table no.1 shows that the most important store attribute influencing as per the male respondents is value for money factor and it is followed by lot of promotions and offer, lot of varieties/collection of products, since their mean scores are 4.97,4.86, and 4.74 respectively. But the female respondents most influencing store attributes is value for money and it is followed by promotions and offer, lot of varieties/collection of products, since their mean scores are 4.99, 4.87, and 4.75 respectively. The table also shows that there is significant difference in the influencing factor of store choice of consumer based on the gender on attractive display, certain products are available only here, prices are affordable and nearer to the consumer's residence.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   68
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE NO. 2: AGE GROUPS OF THE CONSUMER AND THEIR STORE CHOICE ATTRIBUTE

S.No	Store choice attributes	Mean score of the Age Groups				F-test
		20-29 yrs N =73	30-39 yrs N =214	40-49 yrs N=124	50-59year N = 62	
1	Attractive Display	4.2603	4.0514	4.0887	3.9839	4.367*
2	Value for Money	4.9863	4.9907	4.9839	5	1.184
3	Brand Name	4.1918	4.0701	4.1371	4.1613	1.674
4	Products availability	2.5205	2.5514	2.5806	2.6935	1.536
5	Prices are affordable	3.9726	4.2664	4.1855	4.129	1.799
6	Products are trust worthy	4.3288	4.3879	4.4355	4.3871	0.567
7	Best service by employees	4.4521	4.2243	4.2581	4.1935	1.974
8	Product varieties	4.7945	4.7757	4.7016	4.7903	2.546*
9	Promotion and offer	4.8493	4.8832	4.871	4.8871	0.812
10	Near to my Residence	4.274	3.8598	3.9516	4	2.614*

*Significant at 5% Level

From the above table no.2 it's inferred that the most influencing store choice attributes as per the perception of customers age below 30 years value for money and it is followed by lot of promotions and offer, lot of varieties/collection of products, since their mean scores are 4.98, 4.84, and 4.79respectively. The customers aged between 30-39 years are more influenced by value for money and it is followed by lot of promotions and offers, lot of varieties/collection of products, since their mean scores are 4.99, 4.88, and 4.77 respectively. The customers aged between 40-49 years are more influenced by value for money and it is followed by promotions and offers and lot of varieties/collection of products, since their mean scores are 4.98, 4.87 and 4.70 respectively. The customers aged between 50-59 years are more influenced by value for money and it is followed by lot of promotions & offers and lot of varieties/collection of products, since their mean scores are 5.00, 4.88 and 4.79 respectively. The above table also shows that there is a significant difference in some factors like attractive display, lot of varieties or collection of products and nearness to residence based on the age of the customer.

TABLE NO 3: OCCUPATIONAL LEVEL OF THE CONSUMER AND THEIR STORE CHOICE ATTRIBUTES

S.No	Store choice attributes	Mean Score of the Occupational level				F-test
		Salaried N=142	Business N=56	Professional N=21	Home Maker N=269	
1	Attractive Display	4.0352	4.0893	4.1905	4.1041	1.230
2	Value for Money	4.993	5	4.9048	4.9888	4.396*
3	Brand Name	4.0775	4.1607	4.0952	4.1375	0.861
4	Products availability	2.5493	2.6071	3.1429	2.5762	1.425
5	Prices are affordable	4.2042	4.2321	4.2381	4.1524	0.246
6	Products are trust worthy	4.4225	4.3929	4.2381	4.3829	0.848
7	Best service by employees	4.2465	4.1607	4	4.316	2.306
8	Lot of varieties / Collection of Products	4.8028	4.6607	4.8571	4.7361	2.036
9	Promotion and offer	4.8451	4.8929	4.8571	4.881	0.452
10	Near to my Residence	4.0282	4.1607	4.4286	3.8922	1.912

*Significant at 5% Level

From the above table its inferred that the most influencing store choice attributes as per the perception of salaried people value for money and it is followed by lot of promotions and offer, lot of varieties/collection of products, since their mean scores are 4.99, 4.84, and 4.80 respectively. The consumers doing business are more influenced by value for money and it is followed by promotions and offers and lot of varieties/collection of products. Since their mean scores are 5.00, 4.89 and 4.66 respectively. The professionals such as doctors, lawyers, Engineers and chartered accountants are more influenced by value for money and it is followed by product promotions and offers and lot of varieties/collection of products, since their mean scores are 4.90, 4.85 and 4.85 respectively. The home makers are more influenced by value for money followed by promotions & offers and lot of varieties/collection of products, since their mean scores are 4.98, 4.88 and 4.73 respectively. The above table also shows that there is a significant difference in value for money on the respondent's occupational level. In all the other attributes there is no significance difference found.

TABLE NO 4: DURATION OF CLIENT VISIT AND THEIR STORE CHOICE ATTRIBUTES

S.No	Store choice attributes	Mean score of the duration of the Consumers visit					F-test
		Last 6Months N =34	Last 1yr N=90	1 -2 yrs N = 148	2 -3 yrs N =167	> than 3 yrs N = 49	
1	Attractive Display	4.0882	4.0667	4.0878	4.0539	4.2245	1.551
2	Value for Money	4.9706	4.9889	4.9865	4.9940	4.9796	0.412
3	Brand Name	4.1176	4.0222	4.1419	4.1317	4.2041	1.902
4	Products Availability	2.7647	2.2222	2.2703	3.1018	2.4286	12.795**
5	Prices are affordable	4.4412	4.3778	4.1486	4.0659	4.1224	3.066*
6	Products are trust worthy	4.4706	4.1778	4.4122	4.479	4.3469	5.883**
7	Best service by employees	4.0294	4.1222	4.2905	4.3174	4.4286	3.454*
8	Products varieties	4.8235	4.6667	4.7500	4.7725	4.7959	1.334
9	Promotion and offer	4.9412	4.9889	4.8986	4.7964	4.7755	6.757**
10	Near to my Residence	3.4706	3.8778	4.1622	3.9281	4.2041	3.016*

*Significant at 5% Level   **Significant at 1% Level

From the above table its inferred that the perception of customers who are all visiting the store for the last 6 months were most influenced on value for money followed by lot of promotions and offer, lot of varieties/collection of products, since their mean scores are 4.97, 4.94, and 4.82 respectively. The customers who are all visiting the store for the last 1 year are more influenced by value for money and it is followed by lot of promotions & offers and lot of varieties/collection of products. Since their mean scores are 4.98, 4.98 and 4.66 respectively. The customers who are all visiting the store for 1 to 2 years are more influenced by value for money and it is followed by lot of promotions & offers and lot of varieties/collection of products, since their mean scores are 4.98, 4.89 and 4.75 respectively. The customers who are all visiting the store for 2 to 3 years are more influenced by value for money followed by lot of promotions & offers and lot of varieties/collection of products, since their mean scores are 4.99, 4.79 and 4.77 respectively. The customers who are all visiting the store more than 3 years are more influenced by value for money followed by lot of promotions & offers and lot of varieties/collection of products, since their mean scores are 4.97, 4.79 and 4.77 respectively. The above table no. 4 also shows that there is a significant difference between the duration of the client visit and store choice attributes are certain products are available here only, Prices are affordable, and Products are trust worthy, Best service by employees, lot of promotions and offers and nearness to residence.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   69
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE NO. 5: RETAIL SHOPS AND STORE CHOICE ATTRIBUTES

S.No	Store choice attributes	Mean score of the Retail outlets				F -test
		Reliance N=180	More N=68	Spencer's N=108	Kannan N=132	
1.	Attractive Display	4.0278	4.1324	4.2222	4.0303	5.864*
2.	Value for Money	4.9833	5	4.9722	5	1.638
3.	Brand Name	3.9889	3.9853	4.5185	4.0455	58.128**
4.	Product Availability	2.1778	2.0441	2.7593	3.3182	31.162**
5.	Prices are affordable	4.2778	4.0588	3.2315	4.8864	156.942**
6.	Trust worthy Products	4.1778	4.1618	4.9815	4.3106	109.943**
7.	Excellent service	4.2389	4.2059	4.8981	3.8106	88.007**
8.	Varity of Products	4.6611	4.8382	4.5741	4.9773	24.767**
9.	Promotion and offer	4.9611	4.9559	4.5185	4.9924	74.396**
10.	Location Convenience	4.2611	4.8971	4.5093	2.7121	124.388**

*Significant at 5% Level   **Significant at 1% Level

From the above table no. 5 it is inferred that, the respondents who are visiting "Reliance" retail outlet are more influenced by value for money and it is followed by promotions and offer, lot of varieties/collection of products, since their mean scores are 4.98, 4.96, and 4.66respectively. Respondents who are visiting "More" retail outlet are more influenced by value for money and it is followed by lot of promotions and offer, nearness to residence, since their mean scores are 5.00, 4.95, 4.89 respectively. The respondents who are visiting "Spencer's" are more influenced by products are trust worthy, and it is followed by Value for Money, Best service by employees, since their mean scores are 4.98, 4.97, 4.83 respectively .Respondents who are visiting "Kannan "retail outlet are more influenced by value for money and it is followed by lot of promotions and offer, lot of varieties/collection of products, since their mean scores are 5.00, 4.99, 4.97 respectively. The above table also shows that there is a significant difference in factors influencing store choice attributes among various retail outlets while selecting a particular retail outlet as their purchase decision except the attribute like Value for money but it is most influencing factor in all the four major retail outlets .As consumer point of view, the retailers has to give more importance for the value what they expect from the product with reasonable price.

FINDINGS AND RECOMMENDATIONS

The study revealed that there is a significant difference between the demographics of shoppers in choosing a retail store. The majority of the customers in all four retail outlets are female shoppers and the younger generation shoppers who belongs to age group 30-39 yrs and most of the respondents are home makers also gives importance to value for money and it is followed by promotions and offer, lot of varieties/collection of products **.** The previous some research supporting the above findings in certain aspect are price conscious and location sensitive, female shoppers were of more price sensitive and had given importance for sales promotions, selection of store by brand name of the retail outlet and other store atmosphere were the variables attract the consumers to opt the best retail choice is the outcome of the purchase decision. The majority customers of the other three retail outlets visiting this store for last 2-3 years creates loyalty to visit this store is the most important factor in retail marketing success and store longevity. Since a consumer is loyal to a particular retailer may continue to go to the same retailer every time a research by Michelle Morgan sky and Brenda Cude (1999) also supports the above findings. In their study, respondents were asked about the loyalty to a particular store and most participants strongly agreed that consumer loyalty to a retail store may be one of the factors in determining a retail store selection. The information on store choice attributes and purchasing behavior of shopper groups reveals significant difference and also the most influencing factors are value for money, promotions and offer, lot of varieties/collection of products and least factor is nearness to residence**.** Among the four retail outlets while selecting a particular retail outlet as their purchase decision except the attribute like Value for money but it is most influencing factor and also other factors like best service by employees and products are trusts worthy. But boom in the retail sector and new marketing implication techniques are going good to attract the customers in factors like low price, discount provided and promotions activities. Every retailer has to know that there is a significant difference in factors influencing store choice attributes among various retail outlets and the consumer are giving due consideration while selecting a particular retail choice as their purchase decision. The identified understanding and fulfilling gaps should suggest the areas where the retailer has paid too much or too less attention, and where changes in retailing strategy are necessary, if increased store traffic, convenient location, enhanced store loyalty and improved store performance is to be achieved.

CONCLUSION

The present study attempted to explore the demographic factors that influence the decisions of the consumers on retail store selection in Madurai. The study concludes that demographic factors such as age, gender, occupation, duration of store visit are having significant role in retail store selection. Shopper groups mainly vary in choosing a store based on their significance for store choice attributes of a store. From a strategic perspective, such investigations are essential for gaining value for money about how well the consumers' expectations are much important with affordable prices allows the retailers to align its efforts to emphasis on   store choice attribute elements influenced more important by consumers. Failing to meet consumers' expectations would result in consumer dissatisfaction, increasing the likelihood that a certain proportion of current customers would shop elsewhere.

SCOPE FOR FUTURE RESEARCH

The present study has some limitations namely limited scope and focus only on branded retail sector like Reliance, More, Spencer's and Shri Kannan. However, it is important to suggest a need for further research to investigate the link between consumer perceptions of retailer's performance, satisfaction, store loyalty, purchasing outcomes and store performance, as well as the link between in-store stimuli and purchasing behavior in the Indian retailing scenario. If the scope of the study extended to the regional marketers in Madurai who are unbranded retail shops can adapt and improve their marketing campaigns and marketing strategies to increase their sales and market share and effectively reach the consumer on considering various store choice attributes to get success in modern organized retailing.

REFERENCES

1. Abdulla M. Alhemoud (2008) "Shopping Behavior of Supermarket Consumers in Kuwait", Journal of Business and Economics Research, Volume 6, Number 3, pp 47-58.
2. Berry, L. J. (1969), "The Components of Department Store Image: A Theoretical and
3. East, R., Harris, P., Willison, G., and Lomax, W. (1995), "Loyalty to Supermarket", International Review of Retail Distribution and Consumer Research, Vol 5, pp. 99-109
4. Empirical Analysis", Journal of Retailing, 45, 3-20.
5. Foster, Carely (2004) "Gendered Retailer: a study of customer perceptions", International Journal of Retail and Distribution Management, Vol. 42, No. 9, pp. 442- 447.
6. Gauri, Pervez and Cateoria, Philip (2005), International Marketing, second edition, McGraw- Hill Education, Dubai.
7. Haynes, J. L., Pipkin, A. L, Black, W. C. and Cloud, R. M. (1994), "Application of a Choice Sets Model to Assess Patronage Decision Styles of High Involvement Consumers", Journal of Clothing and Textiles Research, 12, 23-32.
8. Hyllegard, Karen; Eckman, Molly; Descals, Alejandro Molla and Borja, Miguel Angel Joyce, M. and Lambert, D. (1996) "Memories of the way stores were and retail store image", International Journal of Retail and Distribution Management, Vol. 24, No. 1, pp. 24-33.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   70
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

9. Ingene, C. (1984), ``Productivity and functional shifting in spatial retailing: private and social perspectives'', Journal of Retailing, Vol. 60 No. 3, pp. 15-36.
10. Joyce, M. and Lambert, D. (1996) "Memories of the way stores were and retail store image", International Journal of Retail and Distribution Management, Vol. 24, No. 1, pp. 24-33.
11. Kim, Y-K. and Kang, J. (1995), ``Consumer perception of shopping costs and its relationship with retail trends'', Journal of Shopping Center Research, Vol. 2 No. 1, pp. 27-61.
12. Kumar, V. and Leone, R. 1988. "Measuring the Effect of Retail Store Promotions on Brand and Store Substitution", Journal of Marketing Research, 25(May).
13. Lund Holbrook, Studentlitteratur, and Schindler, R. (1982) "The Experimental Aspects of Consumption: Consumer Fantasies, Feelings and Fun". Journal of Consumer Research, Vol. 9, No. 2, pp. 412- 422.
14. Macintosh, G., , Lockshin, L.S. (1997). Retail relationships and store loyalty: A multi-level perspective. International Journal of Research in Marketing, 14(5), 487-497.
15. Martineau, Pierre (1958) "The personality of the retail store", Harvard Business Review, Vol. 36, pp. 47-55.
16. Martineau, Pierre (1958) "The personality of the retail store", Harvard Business Review, Vol. 36, pp. 47-55.
17. Mazursky, D. and Jacoby, J. (1986), "Exploring the Development of Store Image", Journal of Retailing, 62, 145 – 65.
18. McGoldrick, P.J, and Thompson, M.G. (1992), Regional Shopping Centers, Avebury, Aldershot.
19. Mintel (1996), "Customer Loyalty in Retailing 1996", Mintel International Group Ltd, 18-19 Long Lane, London EC1A 9HE.
20. Monroe, K. B. and Guiltinan, J. P. (1975), "A Path-Analytic Exploration of Retail Patronage Influences", Journal of Consumer research, 2, 19-28.
21. Moye, L. N. (2000), "Influences of Shopping Orientations, Selected Environmental Dimensions with Apparel Shopping Scenarios, and Attitude on Store Patronage for Female Consumers", Unpublished Dissertation, Virginia Polytechnic Institute and State University.
22. Omar, O.E, (1999) Retail Marketing, Harlow, England: Pearson Education.
23. Outi Uusitalo, (2001), "Consumer perceptions of grocery retail formats and brands" International Journal of Retail, Distribution Management Volume 29, Number 5, 2001 pp. 214 - 225
24. Piyush Kumar Sinha and Arindam Banerjee, (2004), "Store choice behaviour in an evolving market" International Journal of Retail, Distribution Management Volume 32 Number 10, pp. 482–494.
25. Schiffman, L. G., Dash, J. F. and Dillon, W. R. (1977), "The Contribution of Store Image Characteristics to Store-Type Choice", Journal of Retailing, 53, 3-14.
26. Sherman, E., Mathur, A. and Smith, R.B. (1997), ``Store environment and consumer purchase behavior: mediating role of consumer emotions'', Psychology, Marketing, Vol. 14 No. 4, pp. 361-78.
27. Sudaporn Sawmong and Ogenyi Omar, South Bank University, London, UK (2004), "The Store Loyalty of the UK's Retail Consumers", The Journal of American Academy of Business, Cambridge * September 2004, pp., 503-509
28. Sudaporn Sawmong and Ogenyi Omar, South Bank University, London, UK (2004), "The Store Loyalty of the UK's Retail Consumers", The Journal of American Academy of Business, Cambridge * September 2004, pp., 503-509
29. Suja Nair, Retail Management, Himalaya Publishing House, Third edition, 2008. pp. 197.
30. Susana Marques da Cunha, Jose Crespo de Carvalho, 2006, 5th International Congress Marketing Trends, Venice, January 20-21, 2006

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 71
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TRADE FINANCE AND METHODS & CHARACTERISTICS OF INTERNATIONAL PAYMENTS FOR INDIAN EXPORTERS

RAJENDRA KUMAR JHA
CONSULTANT & HEAD FASHION DESIGNING & PLACEMENT
FOOTWEAR DESIGN & DEVELOPMENT INSTITUTE
CENTRE OF RETAIL MANAGEMENT & FASHION DESIGNING
ROHTAK

ABSTRACT

Trade Finance has been reviewing the global trade market since more than 2 decades now. The remit of what we cover is somewhat broad, and as the market evolves to meet the requirements of financing global trade, so our content has changed. There are various definitions to be found online as to what trade finance is. It is described both as a 'science' and as 'an imprecise term covering a number of different activities'. In one form it is quite a precise science managing the capital required for international trade to flow. Yet within this science there are a wide range of tools at the financiers' disposal, all of which determine how cash, credit, investments and other assets can be utilized for trade. In its simplest form, an exporter requires an importer to prepay for goods shipped. The importer naturally wants to reduce risk by asking the exporter to document that the goods have been shipped. The importer's bank assists by providing a letter of credit to the exporter (or the exporter's bank) providing for payment upon presentation of certain documents, such as a bill of lading. The exporter's bank may make a loan to the exporter on the basis of the export contract. This article is designed to help Indian companies, especially small and medium-sized enterprises (SMEs), learn the basic fundamentals of trade finance to turn their export opportunities into actual sales and to achieve the ultimate goal: to get paid for their export sales, especially on time.

KEYWORDS

Export, Import, International Payments, Letter of Credit, Trade Finance.

INTRODUCTION TO TRADE FINANCE

L imited access to financing, high costs, and lack of insurance or guarantees are likely to hinder the trade and export potential of an economy, and particularly that of small and medium sized enterprises that too in developing nations.

Trade Facilitation aims at reducing transaction cost and time by streamlining trade procedures and processes. One of the most important challenges for traders involved in a transaction is to secure financing so that the transaction may actually take place. The faster and easier the process of financing an international transaction, the more trade will be facilitated.

Traders require working capital (i.e., short-term financing) to support their trading activities.

Exporters will usually require financing to process or manufacture products for the export market before receiving payment. Such financing is known as pre-shipping finance. Conversely, importers will need a line of credit to buy goods overseas and sell them in the domestic market before paying for imports. In most cases, foreign buyers expect to pay only when goods arrive, or later still if possible, but certainly not in advance. They prefer an open account, or at least a delayed payment arrangement. Being able to offer attractive payments term to buyers is often crucial in getting a contract and requires access to financing for exporters.

Therefore, governments whose economic growth strategy involves trade development should provide assistance and support in terms of export financing and development of an efficient financial infrastructure. There are three main types of financial tools and packages designed to facilitate the financing of trade transactions.

• Trade Financing Instruments   • Export Credit Insurances   • Export Credit Guarantees

• TRADE FINANCING INSTRUMENTS

• **Documentary Credit:** This is the most common form of the commercial letter of credit. The issuing bank will make payment, either immediately or at a prescribed date, upon the presentation of stipulated documents. These documents will include shipping and insurance documents, and commercial invoices. The documentary credit arrangement offers an internationally used method of attaining a commercially acceptable undertaking by providing for payment to be made against presentation of documentation representing the goods, making possible the transfer of title to those goods. A letter of credit is a precise document whereby the importer's bank extends credit to the importer and assumes responsibility in paying the exporter.

A common problem faced in emerging economies is that many banks have inadequate capital and foreign exchange, making their ability to back the documentary credits questionable. Exporters may require guarantees from their own local banks as an additional source of security, but this may generate significant additional costs as the banks may be reluctant to assume the risks. Allowing internationally reputable banks to operate in the country and offer documentary credit is one way to effectively solve this problem.

• **Countertrade:** As mentioned above, most emerging economies face the problem of limited foreign exchange holdings. One way to overcome this constraint is to promote and encourage countertrade. Today's modern counter trade appears in so many forms that it is difficult to devise a definition. It generally encompasses the idea of subjecting the agreement to purchase goods or services to an undertaking by the supplier to take on a compensating obligation. The seller is required to accept goods or other instruments of trade in partial or whole payment for its products.

Some of the forms of counter trade include:

• Barter – This traditional type of countertrade involving the exchange of goods and services against other goods and services of equivalent value, with no monetary exchange between exporter and importer.

• Counter purchase – The exporter undertakes to buy goods from the importer or from a company nominated by the importer, or agrees to arrange for the purchase by a third party. The value of the counter purchased goods is an agreed percentage of the prices of the goods originally exported.

• Buy-back – The exporter of heavy equipment agrees to accept products manufactured by the importer of the equipment as payment.

• **Factoring:** This involves the sale at a discount of accounts receivable or other debt assets on a daily, weekly or monthly basis in exchange for immediate cash. The debt assets are sold by the exporter at a discount to a factoring house, which will assume all commercial and political risks of the account receivable. In the absence of private sector players, governments can facilitate the establishment of a state-owned factor; or a joint venture set-up with several banks and trading enterprises.

• **Pre-Shipping Financing:** This is financing for the period prior to the shipment of goods, to support pre-export activities like wages and overhead costs. It is especially needed when inputs for production must be imported. It also provides additional working capital for the exporter. Pre-shipment financing is especially important to smaller enterprises because the international sales cycle is usually longer than the domestic sales cycle. Pre-shipment financing can take in the form of short term loans, overdrafts and cash credits.

• **Post-Shipping Financing:** Financing for the period following shipment. The ability to be competitive often depends on the trader's credit term offered to buyers. Post-shipment financing ensures adequate liquidity until the purchaser receives the products and the exporter receives payment. Post-shipment financing is usually short-term.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   72

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

• **Buyer's Credit:** A financial arrangement whereby a financial institution in the exporting country extends a loan directly or indirectly to a foreign buyer to finance the purchase of goods and services from the exporting country. This arrangement enables the buyer to make payments due to the supplier under the contract.

• **Supplier's Credit:** A financing arrangement under which an exporter extends credit to the buyer in the importing country to finance the buyer's purchases.

- **EXPORT CREDIT INSURANCE**

In addition to financing issues, traders are also subject to risks, which can be either commercial or political. Commercial risk arises from factors like the non-acceptance of goods by buyer, the failure of buyer to pay debt, and the failure of foreign banks to honor documentary credits. Political risk arises from factors like war, riots and civil commotion, blockage of foreign exchange transfers and currency devaluation. Export credit insurance involves insuring exporters against such risks. It is commonly used in Europe, and increasing in importance in the United States as well as in developing markets.

The type of export credit insurance used varies from country to country and depends on traders' perceived needs. The most commonly used are as follows:

• Short-term Export Credit Insurance – Covers periods not more than 180 days. Protection includes pre-shipment and post-shipment risks, the former covering the period between the awarding of contract until shipment. Protection can also be covered against commercial and political risks.

• Medium and Long-term Export Credit Insurance – Issued for credits extending longer periods, medium-term (up to three years) or longer. Protection provided for financing exports of capital goods and services.

• Investment Insurance – Insurance offered to exporters investing in foreign countries.

• Exchange Rate Insurance – Covers losses as a result of fluctuations in exchange rates between exporters' and importers' national currencies over a period of time.

The benefits of export credit insurance include:

• Ability of exporters to offer buyers competitive payment terms.

• Protection against risks and financial costs of non-payment.

• Access to working capital.

• Protection against losses from foreign exchange fluctuations.

• Reduction of need for tangible security when borrowing from banks.

Export credit insurance mitigates the financial impact of the risk. There are specialized financial institutions available that offer insurance cover, with premium dependent on the risk of the export markets and export products.

- **EXPORT CREDIT GUARANTEES**

Export credit guarantees are instruments to safeguard export-financing banks from losses that may occur from providing funds to exporters. While export credit insurance protects exporters, guarantees protect banks offering the loans. They do not involve the actual provision of funds, but the exporters' access to financing is facilitated.

An export credit guarantee is issued by a financial institution, or a government agency, set up to promote exports. Such guarantee allows exporters to secure pre-shipment financing or post-shipment financing from a banking institution more easily. Even in situations where trade financing is commercially available, companies without sufficient track records may not be looked upon favourably by banks. Therefore, the provision of financial guarantees to the banking system for purveying export credit is important elements in helping local companies go into exporting. The agency providing this service has to carefully assess the risk associated in supporting the exporter as well as the buyer.

METHODS OF PAYMENT IN INTERNATIONAL TRADE

To succeed in today's global marketplace, exporters must offer their customers attractive sales terms supported by the appropriate payment method to win sales against foreign competitors. As getting paid in full and on time is the primary goal for each export sale, an appropriate payment method must be chosen carefully to minimize the payment risk while also accommodating the needs of the buyer. As shown below, there are four primary methods of payment for international transactions. During or before contract negotiations, it is advisable to consider which method in the diagram below is mutually desirable for a company and its customer.

KEY POINTS

▪ International trade presents a spectrum of risk, causing uncertainty over the timing of payments between the exporter (seller) and importer (foreign buyer).

▪ To exporters, any sale is a gift until payment is received. Therefore, the exporter wants payment as soon as possible, preferably as soon as an order is placed or before the goods are sent to the importer.

▪ To importers, any payment is a donation until the goods are received. Therefore, the importer wants to receive the goods as soon as possible, but to delay payment as long as possible, preferably until after the goods are resold to generate enough income to make payment to the exporter.

PAYMENT RISK DIAGRAM
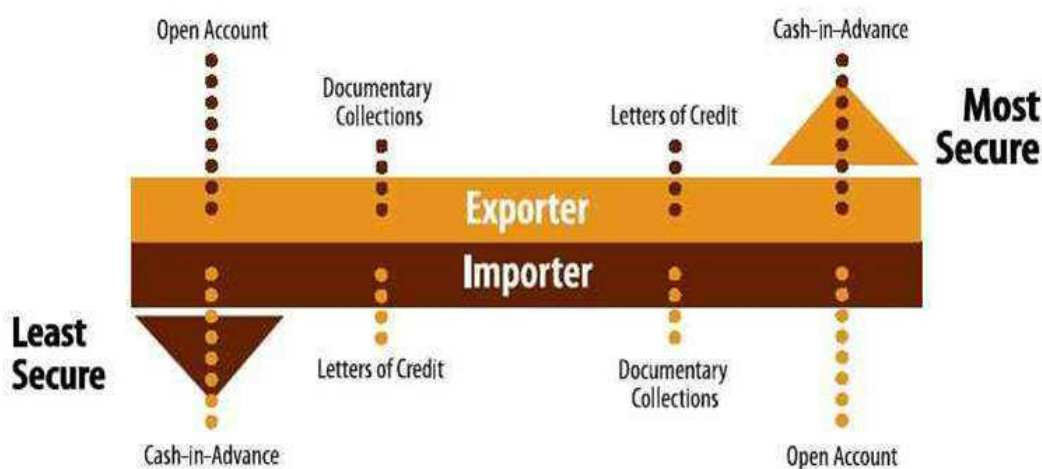
CASH-IN-ADVANCE

With the cash-in-advance payment method, the exporter can avoid credit risk or the risk of nonpayment, since payment is received prior to the transfer of ownership of the goods. Wire transfers and credit cards are the most commonly used cash-in-advance options available to exporters. However, requiring payment in advance is the least attractive option for the buyer, as this method tends to create cash flow problems, and unless the seller sees no other option or

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 73
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

the buyer has other vendors to choose from, it often is not a competitive option. In addition, foreign buyers are often concerned that the goods may not be sent if payment is made in advance. Exporters that insist on this method of payment as their sole method of doing business may find themselves losing out to competitors who may be willing to offer more attractive payment terms.

KEY POINTS

- Full or significant partial payment is required, usually via credit card or bank/wire transfer, prior to the transfer of ownership of the goods.
- Cash-in-advance, especially a wire transfer, is the most secure and favorable method of international trading for exporters and, consequently, the least secure and attractive option for importers. However, both the credit risk and the competitive landscape must be considered.
- Insisting on these terms ultimately could cause exporters to lose customers to competitors who are willing offer more favorable payment terms to foreign buyers in the global market.
- Creditworthy foreign buyers, who prefer greater security and better cash utilization, may find cash-in-advance terms unacceptable and may simply walk away from the deal.
- *Wire Transfer—Most Secure and Preferred Cash-in-Advance Method*

An international wire transfer is commonly used and has the advantage of being almost immediate. Exporters should provide clear routing instructions to the importer when using this method, including the name and address of the receiving bank, the bank's SWIFT, Telex and the seller's name and address, bank account title, and account number. This option is more costly to the importer than other options of cash-in-advance method, as the fee for an international wire transfer is usually paid by the sender.

Credit Card—A Viable Cash-in-Advance Method

Exporters who sell directly to the importer may select credit cards as a viable method of cash-in-advance payment, especially for consumer goods or small transactions. Exporters should check with their credit card company(s) for specific rules on international use of credit cards as the rules governing international credit card transactions differs from those for domestic use. As international credit card transactions are typically placed via online, telephone, or fax methods that facilitate fraudulent transactions, proper precautions should be taken to determine the validity of transactions before the goods are shipped. Although exporters must endure the fees charged by credit card companies, this option may help the business grow because of its convenience.

- *Payment by Cheque—A Less-Attractive Cash-in-Advance Method*

Advance payment using an international cheque may result in a lengthy collection delay of several weeks to months. Therefore, this method may defeat the original intention of receiving payment before shipment. If the cheque is in INR or drawn on an Indian bank, the collection process is the same as any Indian cheque. However, funds deposited by non-local cheque may not become available for withdrawal for up to 21 business days due to RBI Regulation. In addition, if the cheque is in a foreign currency or drawn on a foreign bank, the collection process is likely to become more complicated and can significantly delay the availability of funds. Moreover, there is always a risk that a cheque may be returned due to insufficient funds in the buyer's account.

WHEN TO USE CASH-IN-ADVANCE TERMS

- The importer is a new customer and/or has a less-established operating history.
- The importer's creditworthiness is doubtful, unsatisfactory, or unverifiable.
- The political and commercial risks of the importer's home country are very high.
- The exporter's product is unique, not available elsewhere, or in heavy demand.
- The exporter operates an Internet-based business where the use of convenient payment methods is a must to remain competitive.

Characteristics of a Cash-in-Advance Payment Method

Applicability

Recommended for use in high-risk trade relationships or export markets, and ideal for Internet-based businesses.

Risk

Exporter is exposed to virtually no risk as the burden of risk is placed nearly completely on The importer.

Pros

- Payment before shipment
- Eliminates risk of nonpayment

Cons

- May lose customers to competitors over payment terms
- No additional earnings through financing operations

LETTERS OF CREDIT

Letters of credit (LCs) are among the most secure instruments available to international traders. An LC is a commitment by a bank on behalf of the buyer that payment will be made to the beneficiary (exporter) provided that the terms and conditions have been met, as verified through the presentation of all required documents. The buyer pays its bank to render this service. An LC is useful when reliable credit information about a foreign buyer is difficult to obtain, but you are satisfied with the creditworthiness of your buyer's foreign bank. This method also protects the buyer, since no payment obligation arises until the documents proving that the goods have been shipped or delivered as promised are presented. However, since LCs have many opportunities for discrepancies, they should be prepared by well-trained documenters or the function may need to be outsourced. Discrepant documents can negate payment.

KEY POINTS

- An LC, also referred to as a documentary credit, is a contractual agreement whereby a bank in the buyer's country, known as the issuing bank, acting on behalf of its customer (the buyer or importer), authorizes a bank in the seller's country, known as the advising bank, to make payment to the beneficiary (the seller or exporter) against the receipt of stipulated documents.
- The LC is a separate contract from the sales contract on which it is based and, therefore, the bank is not concerned whether each party fulfills the terms of the sales contract.
- The bank's obligation to pay is solely conditional upon the seller's compliance with the terms and conditions of the LC. In LC transactions, banks deal in documents only, not goods.

ILLUSTRATIVE LETTER OF CREDIT TRANSACTION

- The importer arranges for the issuing bank to open an LC in favor of the exporter.
- The issuing bank transmits the LC to the advising bank, which forwards it to the exporter.
- The exporter forwards the goods and documents to a freight forwarder.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 74
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

- The freight forwarder dispatches the goods and submits documents to the advising bank.
- The advising bank checks documents for compliance with the LC and pays the exporter.
- The importer's account at the issuing bank is debited.
- The issuing bank releases documents to the importer to claim the goods from the carrier.
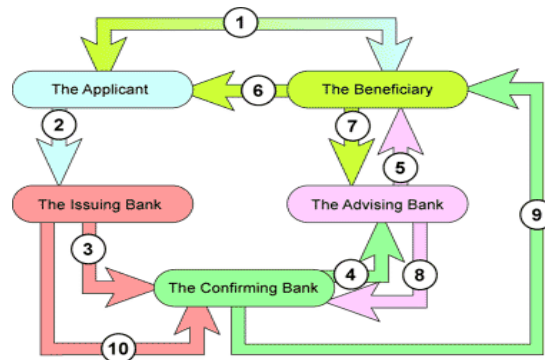
IRREVOCABLE LETTER OF CREDIT

LCs can be issued as revocable or irrevocable. Most LCs are irrevocable, which means they may not be changed or cancelled unless both the buyer and seller agree. If the LC does not mention whether it is revocable or irrevocable, it automatically defaults to irrevocable. Revocable LCs are occasionally used between parent companies and their subsidiaries conducting business across borders.

CONFIRMED LETTER OF CREDIT

A greater degree of protection is afforded to the exporter when a LC issued by a foreign bank (the importer's issuing bank) is confirmed by an Indian bank (the exporter's advising bank). This confirmation means that the Indian bank adds its guarantee to pay the exporter to that of the foreign bank. If an LC is not confirmed, the exporter is subject to the payment risk of the foreign bank and the political risk of the importing country. Exporters should consider confirming LCs if they are concerned about the credit standing of the foreign bank or when they are operating in a high-risk market, where political upheaval, economic collapse, devaluation or exchange controls could put the payment at risk.

SPECIAL LETTERS OF CREDIT

LCs can take many forms. When an LC is issued as transferable, the payment obligation under the original LC can be transferred to one or more "second beneficiaries." With a revolving LC, the issuing bank restores the credit to its original amount once it has been drawn down. Standby LCs can be used in lieu of security or cash deposits as a secondary payment mechanism.

TIPS FOR EXPORTERS

- Consult with your bank before the importer applies for an LC.
- Consider whether a confirmed LC is needed.
- Negotiate with the importer and agree upon detailed terms to be incorporated into the LC.
- Determine if all LC terms can be compiled within the prescribed time limits.
- Ensure that all the documents are consistent with the terms and conditions of the LC.
- Beware of many discrepancy opportunities that may cause nonpayment or delayed payment.

Characteristics of a Letter of Credit

Applicability

Recommended for use in new or less-established trade relationships when you are satisfied with the creditworthiness of the buyer's bank.

Risk

Risk is evenly spread between seller and buyer provided all terms and conditions are adhered to.

Pros

- Payment after shipment
- A variety of payment, financing and risk mitigation options

Cons

- Process is complex and labor intensive
- Relatively expensive in terms of transaction costs

DOCUMENTARY COLLECTIONS

A documentary collection (D/C) is a transaction whereby the exporter entrusts the collection of payment to the remitting bank (exporter's bank), which sends documents to a collecting bank (importer's bank), along with instructions for payment. Funds are received from the importer and remitted to the exporter through the banks involved in the collection in exchange for those documents. D/Cs involve the use of a draft that requires the importer to pay the face amount either on sight (document against payment—D/P) or on a specified date in the future (document against acceptance—D/A). The draft lists instructions that specify the documents required for the transfer of title to the goods. Although banks do act as facilitators for their clients under collections, documentary collections offer no verification process and limited recourse in the event of nonpayment. Drafts are generally less expensive than letters of credit (LCs).

KEY POINTS

- D/Cs are less complicated and less expensive than LCs.
- Under a D/C transaction, the importer is not obligated to pay for goods prior to shipment.
- The exporter retains title to the goods until the importer either pays the face amount on sight or accepts the draft to incur a legal obligation to pay at a specified later date.
- Banks that play essential roles in transactions utilizing D/Cs are the remitting bank (exporter's bank) and the collecting bank (importer's bank).
- While the banks control the flow of documents, they do not verify the documents nor take any risks, but can influence the mutually satisfactory settlement of a D/C transaction.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   75
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TYPICAL SIMPLIFIED D/C TRANSACTION FLOW

- The exporter ships the goods to the importer and receives in exchange the documents.
- The exporter presents the documents with instructions for obtaining payment to its bank.
- The exporter's remitting bank sends the documents to the importer's collecting bank.
- The collecting bank releases the documents to the importer upon receipt of payment.
- Or the collecting bank releases the documents on acceptance of draft from the importer.
- The importer then presents the documents to the carrier in exchange for the goods.
- Having received payment, the collecting bank forwards proceeds to the remitting bank.
- Once payment is received, the remitting bank credits the exporter's account.

DOCUMENTS AGAINST PAYMENT (D/P) COLLECTION

Under a D/P collection, the exporter ships the goods, and then gives the documents to his bank, which will forward them to the importer's collecting bank, along with instructions on how to collect the money from the importer. In this arrangement, the collecting bank releases the documents to the importer only on payment for the goods. Upon receipt of payment, the collecting bank transmits the funds to the remitting bank for payment to the exporter.

Time of Payment: After shipment, but before documents are released

Transfer of Goods: After payment is made on sight

Exporter Risk: If draft is unpaid, goods may need to be disposed

DOCUMENTS AGAINST ACCEPTANCE (D/A) COLLECTION

Under a D/A collection, the exporter extends credit to the importer by using a time draft. In this case, the documents are released to the importer to receive the goods upon acceptance of the time draft. By accepting the draft, the importer becomes legally obligated to pay at a future date. At maturity, the collecting bank contacts the importer for payment. Upon receipt of payment, the collecting bank transmits the funds to the remitting bank for payment to the exporter.

Time of Payment: On maturity of draft at a specified future date

Transfer of Goods: Before payment, but upon acceptance of draft

Exporter Risk: Has no control of goods and may not get paid at due date

WHEN TO USE DOCUMENTARY COLLECTIONS

Under D/C transactions, the exporter has little recourse against the importer in case of nonpayment. Thus, the D/C mechanism should only be used under the following conditions:

- The exporter and importer have a well-established relationship.
- The exporter is confident that the importing country is stable politically and economically.
- An open account sale is considered too risky, but an LC is also too expensive for the importer.

Characteristics of a documentary collection

Applicability

Recommended for use in established trade relationships and in stable export markets.

Risk

Exporter is exposed to more risk as D/C terms are more convenient and cheaper than an LC to the importer.

Pros

- Bank assistance in obtaining payment
- The process is simple, fast, and less costly than LCs

Cons

- Banks' role is limited and they do not guarantee payment
- Banks do not verify the accuracy of the documents

OPEN ACCOUNT

An open account transaction means that the goods are shipped and delivered before payment is due, usually in 30 to 90 days. Obviously, this is the most advantageous option to the importer in cash flow and cost terms, but it is consequently the highest risk option for an exporter. Because of the intense competition for export markets, foreign buyers often press exporters for open account terms. In addition, the extension of credit by the seller to the buyer is more common abroad. Therefore, exporters who are reluctant to extend credit may face the possibility of the loss of the sale to their competitors. However, while this method of payment will definitely enhance export competitiveness, exporters should thoroughly examine the political, economic, and commercial risks, as well as cultural influences to ensure that payment will be received in full and on time. It is possible to substantially mitigate the risk of nonpayment associated with open account trade by using such trade finance techniques as export credit insurance and factoring. Exporters may also wish to seek export working capital financing to ensure that they have access to financing for both the production for export and for any credit while waiting to be paid.

KEY POINTS

- The goods, along with all the necessary documents, are shipped directly to the importer who agrees to pay the exporter's invoice at a future date, usually in 30 to 90 days.
- Exporter should be absolutely confident that the importer will accept shipment and pay at agreed time and that the importing country is commercially and politically secure.
- Open account terms may help win customers in competitive markets, if used with one or more of the appropriate trade finance techniques that mitigate the risk of nonpayment.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 76
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

HOW TO OFFER OPEN ACCOUNT TERMS IN COMPETITIVE MARKETS

Open account terms may be offered in competitive markets with the use of one or more of the following trade finance techniques: (1) Export Working Capital Financing, (2) Government-Guaranteed Export Working Capital Programs, (3) Export Credit Insurance, (4) Export Factoring, and (5) Forfeiting.

<div style="border:1px solid black; border-radius:20px; padding:10px;">

Characteristics of an Open Account

Applicability

Recommended for use (1) in secure trading relationships or markets or (2) in competitive markets to win customers with the use of one or more appropriate trade finance techniques.

Risk

Exporter faces significant risk as the buyer could default on payment obligation after shipment of the goods.

Pros

• Boost competitiveness in the global market

• Establish and maintain a successful trade relationship

Cons

• Exposed significantly to the risk of nonpayment

• Additional costs associated with risk mitigation measures

</div>

CONCLUSION

This Article can be used as a guide to explain the need for trade finance and introduced some of the most common trade finance tools and practices. Also it explained the details on various methods of international payments. However, the best long-term solution in resolving the constraints in trade financing is to encourage the growth and development of a vibrant and competitive financial system, comprising mainly private sector players. The role of the government and other parties involved in trade finance will need to evolve along with the country's economy. We also need to take care of various methods of payment while doing International Trade as this could be used as a backup for Trade Financing. Trade Financing options and International Payment Methods are complimentary to each other. This article can be useful as a Guide for Indian Exporters while Exporting & Importing.

ACKNOWLEDGEMENT

REFERENCES

1.   Trade Finance Book by IIBF, Mumbai
2.   www.export.gov
3.   www.hbr.org
4.   www.icicibank.com
5.   www.unescap.org

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 77
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

CUSTOMER SERVICE THROUGH THE BANKING OMBUDSMAN SCHEME - AN EVALUATION

DR. SUJATHA SUSANNA KUMARI. D
ASST. PROFESSOR
DEPARTMENT OF COMMERCE
SCHOOL OF BUSINESS STUDIES
CENTRAL UNIVERSITY OF KARNATAKA
GULBARGA

ABSTRACT

RBI had introduced the Banking Ombudsman Scheme (BOS) in India on June 14, 1995 to provide an expeditious and inexpensive forum to bank customers for resolution of their complaints relating to deficiency in banking services provided by commercial banks, regional rural banks and scheduled primary co-operative banks. There are 15 Offices of Banking Ombudsman (OBOs), spread across the country. RBI modified the Scheme in 2002, 2006, 2007 and 2009 on the basis of feedback gathered in the course of administering the BOS to include customer complaints on new areas such as credit card complaints, internet banking, deficiencies in providing the promised services by both bank and its sales agents (DSAs), levying service charges without prior notice to the customers, non-adherence to the Fair Practices Code adopted by individual banks, etc. RBI operates the BOS, free of cost, so as to make it common people oriented. In order to increase its effectiveness and utility, BOS is fully staffed and funded by RBI. This paper evaluates the performance of Banking Ombudsman Scheme 2006 in terms of complaints received, complaints handled, nature of complaints, cost of the scheme and complaints pending. The study reveals that BOS the number of complaints received has recorded substantial increase since 2006 and the rate of disposal of complaints is 94 per cent in 2010-11. The majority of cases are pending not more than one month. Complaints relating to card products (ATM, Debit and Credit cards) are the major area of complaints. The cost per complaints showed increasing trend.

KEYWORDS
Complaint, Customer, RBI, Bank, BOS.

INTRODUCTION

The Banking Ombudsmen help to support improvements and reduce disputes, help banks themselves to resolve disputes with consumers, resolve any consumer disputes that banks fail to resolve themselves and reduce the burden on the Courts. Internationally, it is becoming increasingly evident that both consumers and service providers find it easier to resolve disputes through Ombudsmen than through the Courts. The Banking Ombudsman Scheme is an efficient, cost effective and time-tested alternate dispute resolution mechanism. The Scheme is applicable to all commercial banks, regional rural banks and scheduled primary cooperative banks having business in India, covering banking transactions within the national boundaries, including internet transactions.

GOALS OF BANKING OMBUDSMAN SCHEME
- To ensure redressal of grievances of users of banking services in an inexpensive, expeditious and fair manner that will provide impetus to improved customer services in the banking sector on a continuous basis.
- To provide feedback/suggestions to Reserve Bank of India towards framing appropriate and timely guidelines to banks to improve the level of customer service and to strengthen their internal grievance redressal systems
- To enhance the awareness of the Banking Ombudsman Scheme
- To facilitate quick and fair (non-discriminatory) redressal of grievances through use of IT systems,   comprehensive and easily accessible database and enhanced capabilities of staff through training.

GROUNDS OF COMPLAINT
Any person, whose grievance against a bank is not resolved to his/her satisfaction by that bank within a period of one month after submitting the complaint, can approach the Banking Ombudsman if his complaint pertains to any of the following grounds alleging deficiency in banking including internet banking as specified in Clause 8 of BOS :-
- Non-payment or inordinate delay in the payment or collection of cheques, drafts, bills etc.
- Non-acceptance, without sufficient cause, of small denomination notes tendered for any purpose, and for charging of commission in respect thereof;
- Non-acceptance, without sufficient cause, of coins tendered and for charging of commission in respect thereof;
- Non-payment or delay in payment of inward remittances;
- Failure to issue or delay in issue of drafts, pay orders or banks' cheques;
- Non-adherence to prescribed working hours;
- Failure to provide or delay in providing a banking facility (other than loans and advances) promised in writing by a bank or its direct selling agents;
- Delays, non-credit of proceeds to parties' accounts, non-payment of deposit or non-observance of the RBI directives, if any, applicable to rate of interest on deposits in any savings, current or other account maintained with a bank ;
- Complaints from Non-Resident Indians having accounts in India in relation to their remittances from abroad, deposits and other bank-related matters;
- Refusal to open deposit accounts without any valid reason for refusal;
- Levying of charges without adequate prior notice to the customer;
- Non-adherence by the bank or its subsidiaries to the instructions of RBI on ATM/Debit card operations or credit card operations;
- Non-disbursement or delay in disbursement of pension
- Refusal to accept or delay in accepting payment towards taxes, as required by RBI/Government;
- Refusal to issue or delay in issuing, or failure to service or delay in servicing or redemption of Government securities;
- Forced closure of deposit accounts without due notice or without sufficient reason;
- Refusal to close or delay in closing the accounts;
- Non-adherence to the fair practices code as adopted by the bank and
- Non-adherence to the provisions of the Code of Bank's Commitment to Customers issued by BCSBI and as adopted by the bank
- Non-observance of RBI guidelines on engagement of recovery agents by banks; and
- Any other matter relating to the violation of the directives issued by the RBI in relation to banking or other services.

The BO may also deal with any complaint on any one of the following grounds alleging deficiency in banking service in respect of loans and advances:
1. Non- observance of RBI Directives on interest rates;
2. Delays in sanction, disbursement or non-observance of prescribed time schedule for disposal of loan applications;

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 78
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

3. Non- acceptance of application for loans without furnishing valid reasons to the applicant; and
4. Non- observance of any other direction or instruction of the RBI, as may be specified by the RBI for this purpose, from time to time.

OBJECTIVES OF THE STUDY

The present study is based on the following objectives:

- To know the number of complaints received
- To know the nature of complaints handled
- To know rate of disposal of complaints
- To know the cost of handling complaints
- To know the pending period of complaints

METHODOLOGY OF THE STUDY

The present study is mainly based on the secondary data. The relevant data have been collected from the annual reports of the Banking Ombudsman Scheme and Report on Trend and Progress of Banking in India. A reference has also been made to various other journals and magazines. Apart from this, different editions of daily newspapers such as Economic Times, Business Standard, Financial Express, Business Line etc., have been used for the purpose of collecting information.

The study is intended to examine the performance of Baking Ombudsman Scheme in terms of number of complaints received, nature of complaints, number of complaints handled, cost of running the scheme and pending period the complaints. For the purpose of study the researcher has choosen five year i.e. 2007 to 2011. In order to analyse the data and to draw conclusions various statistical tools like percentage, graphs and charts have been extensively used.

ANALYSIS OF THE PERFORMANCE OF BANKING OMBUDSMAND SCHEME

1. Receipt of Complaints: The Banking Ombudsman Offices receive complaints pertaining to deficiency in service provided by banks. The number of complaints received has recorded substantial increase since 2006 as new grounds of complaints such as credit card issues, failure in providing the promised facilities, non-adherence to fair practices code and levying of excessive charges without prior notice, etc were included in the Scheme. Further, internet banking related complaints were added as a new ground for complaint as per the February 3, 2009 amendment of the Scheme. Increased awareness among the public about the BOS and online accessibility to BO office through internet also contributed to the increase in receipt of complaints. The percentage of complaints received increased from 22% in 2006-07 to 44% in 2009-10. However, the number of complaints received decreased by 10% during 2010-11 compared to previous year. The small drop in the number of complaints does not point to any specific visible trend.

TABLE 1: NUMBER OF COMPLAINTS RECEIVED BY THE OBOS

	2006-07	2007-08	2008-09	2009-10	2010-11
No. of OBOS	15	15	15	15	15
Complaints received during the year	38638	47887	69117	79266	71274
Increase/decrease over previous year (%)	22%	24%	44%	15%	-10%
Average No. of Complaints received per BO Office	2576	3192	4608	5284	4752

CHART 1: NUMBER OF COMPLAINTS RECEIVED BY OBOS
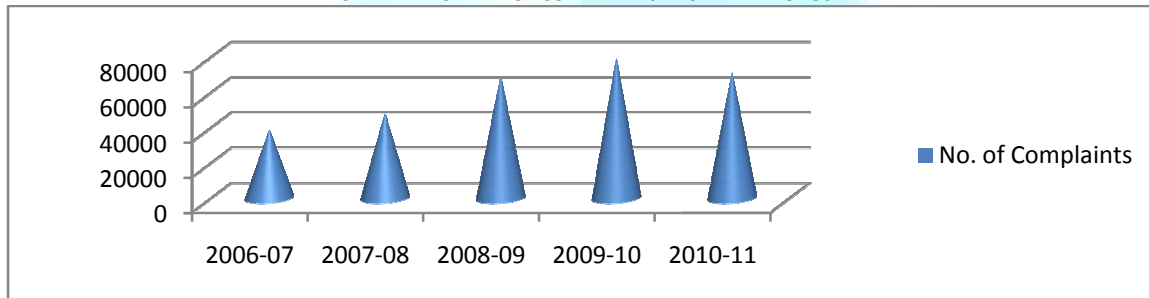
Average number of complaints received per BO office is also increased from 2576 in 2006-07 to 5284 in 2009-10. This increase due to enlargement of the scope of the Scheme coupled with the awareness programmes undertaken by the BO offices on a regular basis. The increase in overage number of complaints per BO Office indicates popularity of the Scheme.

2. Nature of Complaints Handled: Table 2 gives the broad category wise complaints received during the five years. From the above it is clear that more number of complaints is about credit cards during study period. These complaints include complaints related to debit cards and ATM cards also. The types of card-related complaints consists of items like issuance of unsolicited credit cards and unsolicited insurance policies and recovery of premium charges, charging of annual fee in spite of being offered as 'free' card and issuance of loans over phone, disputes over wrong billing, settlement offers conveyed telephonically, non-settlement of insurance claims after the demise of the card holder, abusive calls, excessive charges, wrong debits to account, non-dispensation of money from ATM, etc.

Complaints about deposit accounts, loans and advances, remittance, levy of charges without prior notice, failure to meet commitments, DSA and recovery Agents have declined during the study period.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 79
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE 2 – COMPLAINT CATEGORY-WISE DISTRIBUTION OF COMPLAINTS RECEIVED

Ground of Complaint concerning	No of complaints received				
	2006-07	2007-08	2008-09	2009-10	2010-11
Deposit accounts	5803 (15%)	5612 (12%)	6706 (10%)	3681 (5%)	1727 (2%)
Remittances	4058 (11%)	5213 (11%)	5335 (8%)	5708 (7%)	4216 (6%)
ATM/ Debit Cards/ Credit cards	7688 (20%)	10129 (21%)	17648 (25%)	18810 (24%)	17116 (24%)
Loans and advances	5151 (13%)	6054 (13%)	8174 (12%)	6612 (8%)	4564 (6%)
Levy of Charges without prior notice	2594 (7%)	3740 (8%)	4794 (7%)	4764 (6%)	4149 (6%)
Pension Payments	1070 (3%)	1582 (3%)	2916 (4%)	4831 (6%)	5927 (8%)
Failure to meet commitments	1469 (4%)	6388 (13%)	11824 (17%)	11569 (14%)	2962 (4%)
DSAs and recovery Agents	1039 (3%)	3128 (7%)	3018 (4%)	1609 (2%)	1722 (2%)
Notes and coins	130 (0%)	141 (0%)	113 (0.2%)	158 (0.2%)	146 (0.2%)
Others	9636 (25%)	5900 (12%)	8589 (12%)	18840 (24%)	20541 (29%)
Out of Subject	-	-	-	2684 (3%)	8204 (11%)
Total	**38638**	**47887**	**69117**	**79266**	**71274**

(*Figures in bracket indicate percentage to total complaints of respective years.)

Complaints relating to delay in payment of pension, pension arrears / wrong pension calculations etc. have increased from increased from 3% of the total complaints in 2006-07 to 8% in 2010-11. Complaints under the head 'Others 'decreased from 25 % of the total complaints in 2006-07 to 12% in 2008-09 and again it increased to 24% and 29% in 2009-10 and 2010-11 respectively. These include mainly non-adherence to prescribed working hours, refusal to accept or delay in accepting payments towards taxes as required by RBI/ Government of India, refusal to accept/delay in issuing or failure to service or delay in servicing or redemption of Government securities, refusal to close or delay in closing of accounts, etc. These complaints are of very primary in nature and need not had to be escalated to the offices of BOs and should have been redressed at individual banks' level.

3. Disposal of Complaints by BOS: A snap shot of the profile of complaints disposed off by the OBOs during the past five years is given in Table 3 and Chart 2. The rate of disposal has increased from 84% in 2006-07 to 94% in 20010-11. In absolute terms, the number of complaints pending disposal has declined from 7105 in 2006-07 to 4617 in 2010-11. This indicates promptness in disposal of cases at all the BO offices. Conscious efforts are being made to ensure minimum turnaround time (TAT) for grievance redressal at all the OBOs and the position in this regard is monitored through the Complaint Tracking Software (CTS).

TABLE 3: DISPOSAL OF COMPLAINTS BY BO OFFICE

No. of Complaints	Year				
	2006-07	**2007-08**	**2008-09**	**2009-10**	**2010-11**
Received during the year	38638	47887	69117	79266	71274
Brought forward from previous year	6128	7105	5892	9433	5364
Handled during the year	44766	54992	75009	88699	76638
Disposed of during the year	37661	49100	65576	83335	72021
Rate of Disposal (%)	84%	89%	87%	94%	94%
Carried forward to the next year	7105	5892	9433	5364	4617

CHART 2: DISPOSAL OF COMPLAINTS BY BO OFFICES
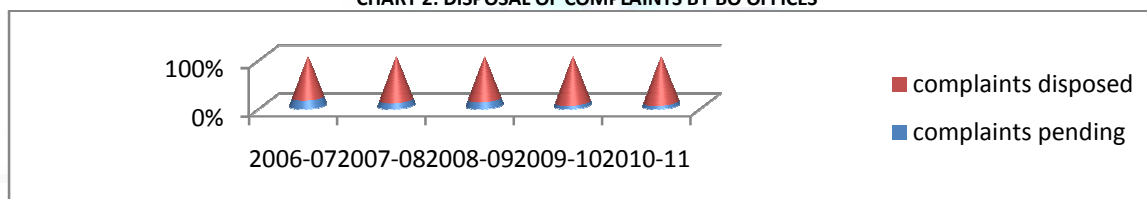
4. Cost of Running the Scheme: From January 1, 2006, the total expenditure in operationalizing the BOS is fully borne by the RBI in terms of the revised BOS 2006. The cost includes the revenue expenditure and capital expenditure incurred in running the OBOs. The revenue expenditure includes establishment items like salary and allowances of the staff attached to OBOs and non-establishment items such as rent, taxes, insurance, law charges, postage and telegram charges, printing and stationery expenses, publicity expenses, depreciation and other miscellaneous items. The capital expenditure items include furniture, electrical installations, computers/related equipments, telecommunication equipments and motor vehicle.

TABLE 4: THE COST OF HANDLING THE COMPLAINTS

Year	Total Cost (Rs. In Cr.)	No. of Complaints disposed	Cost per Complaint (in Rs.)
2006-07	9.81	37661	2604
2007-08	12.50	49100	2546
2008-09	15.29	65576	2331
2009-10	19.74	83336	2368
2010-11	26.07	72021	3619

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   80
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

CHART 3: COST PER COMPLAINT
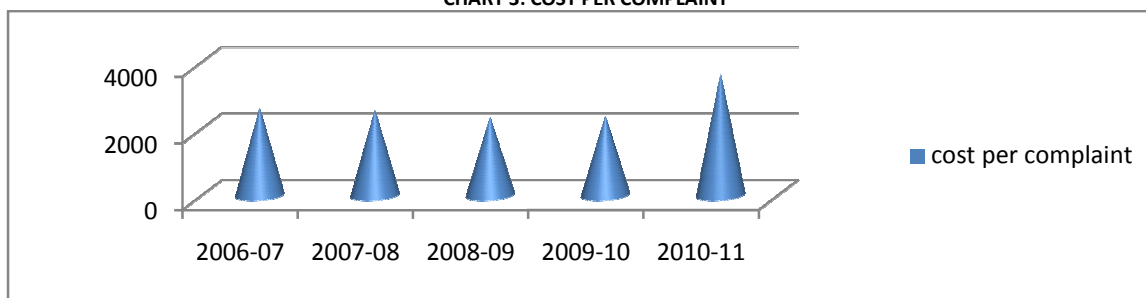
The Table 4 shows that the total cost of running the 15 OBOs has increased from 9.81 crore in 2006-07 to 26.07crore in 2010-11. The increase in total cost is due to increase in number of complaints disposed. The number of complaints disposed increased from 37661 in 2006-07 to 72021 in 2010-11. The cost per complaint shows declining trend up to 2009-10 and it increased more in 2010-11. This highlights a need for strengthening the grievance redressal machinery in banks so that minimum number of complaints gets escalated to the OBOs. This can be achieved through a more proactive and customer centric approach by frontline staff of banks which will be helpful in resolving grievances at the initial touch point itself.

5. Complaints Pending: As regards pendency, the percentage of complaints pending more than three months has declined from 28% in 2006-07 to 1% in 2010-11. In absolute number it has declined from 1964 complaints in 2006-07 to just 35 complaints in 2010-11.This indicates substantial improvement in prompt disposal of complaints due to the close follow-up, both by the BOs and Top Management. The percentage of complaints pending for 2-3 months shows fluctuating trend. It is only 6% during 2010-11. Absence of adequate supporting documentary evidence, delayed response by banks to queries raised by BOs / complainants, etc. were the main reasons for delay in disposing the complaints

TABLE 5: DETAILS OF THE COMPLAINTS PENDING AT THE END OF THE YEAR

Period of Pending	No. of Cases Pending									
	2006-07	% to total pending	2007-08	% to total pending	2008-09	% to total pending	2009-10	% to total pending	2010-11	% to total pending
Up to 1 month	2262	32	2712	46	5041	54	2787	52	2888	63
1-2 months	1936	27	1394	24	2751	29	1526	28	1397	30
2-3 months	943	13	861	15	956	10	808	15	297	6
More than 3 months	1964	28	925	15	685	7	242	5	35	1
Total	7105	100	5892	100	9433	100	5363	100	4617	100

CHART 4: COMPLAINTS PENDING AT THE END OF THE YEAR
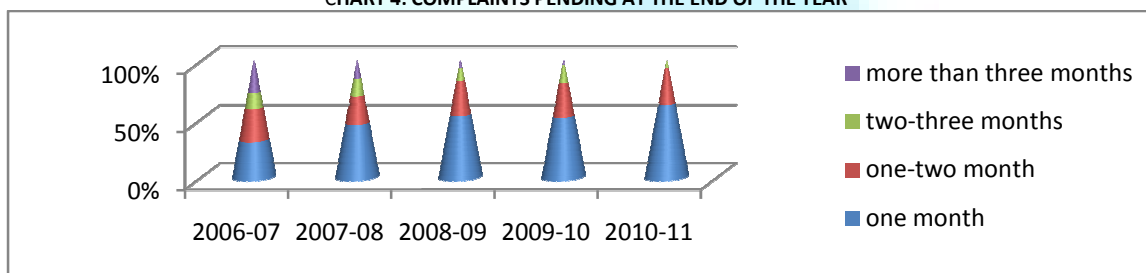
CONCLUSION

This paper Evaluated the performance of Banking Ombudsman Scheme in terms of complaints received, nature of complaints received, complaints disposed, cost the scheme and complaints pending period. The study found that the total number of complaints received and handled under the BOS has been growing steadily. The Offices of the Banking Ombudsmen have been rendering excellent service over the years in redressing customer grievances in an impartial and efficient manner.

REFERENCES
1.   Banking Ombudsman Annual Reports
2.   Banking Ombudsman Scheme 2006, RBI
3.   Banking Ombudsman Scheme Report, RBI
4.   Report on Trend and Progress of Banking in India 2010-11

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   81
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

MEASURING THE FINANCIAL HEALTH OF SELECTED LARGE SCALE IRON AND STEEL COMPANIES IN INDIA USING Z-SCORE MODEL

DR. P. THILAGAVATHI
ASST. PROFESSOR
DEPARTMENT OF COMMERCE (CA)
VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS)
ERODE

DR. V. RENUGADEVI
ASST. PROFESSOR
POST GRADUATE AND RESEARCH DEPARTMENT OF COMMERCE
VELLALAR COLLEGE FOR WOMEN (AUTONOMOUS)
ERODE

ABSTRACT

In order to survive and continue to be in business, it is essential that an organization should successfully manage its finance which requires more attention and care. The prediction and prevention of financial distress is one of the major factors, which will help to avoid bankruptcy. Therefore, it is important to monitor the financial position and health of a company through its financial statements. This paper analyses the financial health of selected large scale Iron and Steel Companies in India for twelve years from 1997-98 to 2008-09 by using Z-score, developed by Altman. The Z score is a measure of a company's health and it utilizes several key ratios for its formulation. The findings indicate that the financial health of RINL SAIL and UGSL were good and there is no scope of bankruptcy, where as the financial health of other selected companies were not in healthy Zone in many years.

KEYWORDS
Financial Health, Financial Performance, Steel Industry, Z score.

INTRODUCTION

urvival of the business in the modern world is possible only when, apart from other things, it has sufficient finance. In order to survive and continue to be in business, it is essential that an organization should successfully manage its finance which requires more attention and care. Thus, Finance is a significant facet of every business, both excessive as well as inadequate finance position are dangerous from the business point of view. Ineffective management is one of the important factors causing industrial sickness. Many variables are available to indicate the business sickness. The prediction and prevention of financial distress is one of the major factors, which will help to avoid bankruptcy. Therefore, it is important to monitor the financial position and health of a company through its financial statements. The principal objective of this research is to ascertain the financial health of selected large scale Iron and Steel Companies in India and consistency of financial performance for twelve years from 1997-98 to 2008-09.

Ratio analysis is one of the most commonly used tool to evaluate the various aspects of the financial performance of the companies. Single ratio does not convey much of the sense. Therefore Edward I. Altman (1968) combined a number of accounting ratios to form an index of the profitability, which is an effective indicator of corporate performance in predicting bankruptcy which is called Z score analysis. Various studies have been conducted over the period by applying Z score analysis to measure the financial health.

OBJECTIVES OF THE STUDY
1. To evaluate the efficiency of financial performance of selected companies of steel industry in India.
2. To examine the overall financial performance of the selected companies of steel industry in India.
3. To predict the financial health and viability of the selected companies of steel industry in India.

METHODOLOGY OF THE STUDY
The iron and steel industry is selected for the present study, considering its importance as the backbone of economic growth in any country. At the end of March 2008, the database of capita line has made compilation for 27 large companies and 270 small and medium companies. The criteria adopted for the selection of companies in the present study is market share above 1 per cent. Eleven companies satisfied the criteria of market share above 1 per cent. Due to non-availability of financial data, in the present study only eight large companies have been selected.

TABLE 1: LIST OF SAMPLE COMPANIES INCLUDED IN THE PRESENT STUDY

S.No.	Company Name	Sector	Market share as on March 2008 (%)
1.	Steel Authority of India Limited. (SAIL)	Public	21.83
2.	Tata Iron and Steel Company (TISCO)	Private	8.58
3.	JSW Steel Limited (JSWSL)	Private	6.33
4.	Essar Steel Limited (ESL)	Private	5.87
5.	Rastriya Ispat Nigam Limited (RINL)	Public	5.05
6.	Ispat Industries Limited (IIL)	Private	4.67
7.	Bhushan Steel Limited (BSL)	Private	2.17
8.	Uttam Galva Steel Limited (UGSL)	Private	1.10
Total Market Share of Sample companies		**55.60**	

Source: CMIE

The study covers a period of twelve years from 1997 - 1998 to 2008 - 2009. The study is based on secondary data. Secondary data were collected from capita line and Centre for Monitoring Indian Economy (CMIE) database. The 'Z' Score analysis has been adopted to monitor the financial health of the company to predict as well as to avoid business failure and subsequent bankruptcy.

LIMITATIONS OF THE STUDY
The following are the limitations of the study.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 82
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

1. The study is based on secondary data taken from database of capita line and CMIE as its findings depends entirely on the accuracy of such data.
2. The study was limited to only eight large iron and steel companies.

REVIEW OF LITERATURE

The review of literature plays an important role in establishing the backdrop for any research work in social sciences. It also enables the present researcher to find out the scope for further study and to frame appropriate objectives for the proposed evaluation. Since the proposal of the study is to measure the financial health, the previous studies made in this area of research are briefly reviewed.

Johah Aiyabei (2002) undertook a study on " Financial Distress: Theory, Measurement and Consequence" and applied Z score model to examine the financial performance of small business firms based in Kenya and discussed the theoretical aspect of financially distressed firm based on a cyclical concept.

Krishna chaitanya V (2005) in his study on "Measuring Financial Distress of IDBI using Altman Z Score Model" used Z Score Model to measure the financial distress of IDBI and concluded that IDBI is likely to become insolvent in the years to come.

Thirunarayanasamy (2006) in his study entitled "Co-operative Sugar Mills in Tamil Nadu an analysis of Sickness and Revival Measures" revealed that the sickness in co-operative sugar mills was found to be increasing year by year. It is reflected by Altman's Z- Score. He also revealed that the accumulated losses, Absolute technology, mismanagement in finance and production factors were the important causes for sickness in the mills. The deviation from HCL (High Level Commission) norms was due to the above mentioned factors, which clearly revealed the weak position of the mills. The study concluded that better management practices and strict implementation of HCL norms would produce better results.

Kannadhasan M (2007) carried out a study on "Measuring Financial Health of a Public Limited Company Using 'Z' Score Model - A Case Study". The principal objective of his study is to ascertain the financial health of Wendt (India) Limited company and consistency of financial performance for five financial years 2001-02 to 2004-05. The study concluded that the company is maintaining good financial performance throughout the study period.

Dheenadhayalan.V (2008) in his study on "Financial Health of Steel Authority of India Limited" adopted 'Z' Score to predict the corporate failure of steel authority of India Limited. The Z score of SAIL showed a rising trend throughout the study period and it was concluded that the financial health of the SAIL was good.

Venkat Janardhan Rao and Durga Prasad (2009) carried out a study on "Z- Score Analysis – A Tool to Predict Financial Health" and examined the overall financial performance of Mahindra and Mahindra Limited and Eicher Motors. They compared the financial performance of both the companies and revealed that the performance of Eicher Motors Limited is better than Mahindra and Mahindra Limited.

Suriamurthi and Velavan, (2010) in their study on "Measuring Financial Health of E.I.D Parry Sugar Limited using 'Z'- Score Model – A Case Study" examined the financial health of E.I.D Parry Sugar Limited for a period of ten years from 1998-99 to 2007-08. He arrived at a conclusion that the financial health of the E.I.D Parry Sugars Limited during the study period is healthy.

Maheswara reddy. D and Reddy C.R (2011), in their study on "Application of Z score Analysis in evaluating the financial health of pharmaceutical companies- A case study " made an attempt to predict the financial health of two selected sample pharmacy companies (Aubindo Datong Bio- Pharmacy limited and Ranbaxy Laboratories Limited) for five years from 2005-06 to 2009-10 using modified Altman's model. The study concluded that the overall financial health of both the companies was good.

Z – SCORE ANALYSIS

The financial health of the company can be determined through multiple discriminate analysis of Edward Altman who has indicated the financial health of an organization through Z scoring. The formula used to evaluate the Z score analysis as established by Altman is

Z = 1.2 x_1 + 1.4x_2 + 3.3 x_3 + 0.6 x_4 + 0.99 x_5

Where as

Z	= Overall index.
X_1	= Ratio of Working Capital to Total Assets (WC/TA)
X_2	= Ratio of Net Operating Profit to Sales (NOP/S)
X_3	= Ratio of Earnings Before Interest And Taxes to Total Assets (EBIT/ TA)
X_4	= Ratio of Market Value of Equity to Book Value of Debt. (MVE/ BVD)
X_5	= Ratio of Sales to Total Assets (S/TA)

MEASUREMENT OF FINANCIAL HEALTH

According to Altman, the following three situations are considered for studying financial health of selected companies of steel industry in India.
1. Below 'Z' score of 1.8, the company is considered to be in the bankruptcy Zone. Its failure is certain and extremely likely and would occur probably within a period of two years.
2. If a company has a 'Z' score between 1.8 and 2.99, its financial viability is considered to be healthy. The failure in this situation is uncertain to predict.
3. Above 'Z' score of 2.99, the company is in a too healthy Zone. Its financial health is viable and there is no risk of a fall.

TABLE 2: ALTMAN GUIDELINES

Situation	Z score	Zones	Remarks
1.	Below 1.8	Bankruptcy Zone	Certain to fall
2.	1.8 – 2.99	Healthy Zone	Uncertain to Predict
3.	Above 2.99	Too Healthy Zone	Not to fall

Source: Altman (1968)

ANALYSIS AND RESULTS

SAIL (STEEL AUTHORITY OF INDIA LIMITED)

The Z score with respect to SAIL has been computed and presented in Table 3. The final Z score indicates that the company was sick from 1997-98 to 2002-03, since its Z score values were less than 1.8. Where as in 2003-04, the financial health of the company was in healthy Zone, since the Z score are between 1.8 and 2.99. It is also found that the Z score during the period 2004-05 reached too healthy Zone.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   83

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

TABLE 3: Z SCORE VALUE OF SAIL

YEAR	X1 (WC/TA)	X2 (NOP/S)	X3 (EBIT/TA)	X4 (MVE/BVD)	X5 (S/TA)	Z score
1997-98	0.26	0.19	0.08	0.21	0.45	1.43
1998-99	0.24	0.11	0.03	0.20	0.47	1.14
1999-00	0.10	0.08	0.01	0.27	0.70	1.14
2000-01	0.08	0.15	0.06	0.29	0.76	1.45
2001-02	0.02	0.08	-0.01	0.30	0.81	1.10
2002-03	0.00	0.13	0.07	0.32	1.09	1.71
2003-04	-0.05	0.22	0.26	0.48	1.55	2.97
2004-05	0.26	0.39	0.62	0.72	1.78	5.16
2005-06	0.29	0.26	0.36	0.96	1.66	4.19
2006-07	0.44	0.32	0.45	0.99	1.59	4.70
2007-08	0.50	0.33	0.45	1.36	1.52	4.95
2008-09	0.49	0.25	0.28	0.55	1.23	3.45

Source: Computed

TISCO (TATA IRON AND STEEL COMPANY)

The Z scoring of the five key ratios of the TISCO from 1997-98 to 2008-09 are calculated and shown in Table 4. It can be seen from the analysis that the Z scores for TISCO is in bankruptcy zone (below 1.8) till 2001-02 and in 2008-09. It is also found that only in 2004-05 and 2005-06 the financial health of the company lies in too healthy zone (above 2.99) and in the remaining period the Z scores for TISCO is in the healthy Zone.

TABLE 4: Z SCORE VALUE OF TISCO

YEAR	X1 (WC/TA)	X2 (NOP/S)	X3 (EBIT/TA)	X4 (MVE/BVD)	X5 (S/TA)	Z Score
1997-98	0.16	0.18	0.10	0.08	0.66	1.49
1998-99	0.10	0.19	0.09	0.07	0.61	1.34
1999-00	0.04	0.21	0.11	0.11	0.64	1.42
2000-01	0.03	0.22	0.11	0.11	0.72	1.50
2001-02	0.01	0.18	0.08	0.08	0.82	1.40
2002-03	-0.07	0.25	0.22	0.09	1.18	2.24
2003-04	-0.19	0.33	0.37	0.11	1.36	2.90
2004-05	-0.12	0.42	0.56	0.20	1.48	3.92
2005-06	-0.08	0.41	0.44	0.22	1.23	3.31
2006-07	0.30	0.42	0.27	0.06	0.74	2.63
2007-08	0.64	0.45	0.18	0.34	0.43	2.65
2008-09	0.01	0.40	0.15	0.23	0.43	1.65

Source: Computed

JSWSL (JSW STEEL LIMITED)

The Z score of five important variables in Altman's Z score equation for JSWSL are analyzed and presented in Table 5. It is imperative from the analysis that the financial health of the company was highly critical till 2002-03 and also in 2008-09 since the Z values were less than 1.8 whereas in the remaining years, the financial health are noticed as likely to be sick since its Z score values are from 1.8 to 2.99.

TABLE 5: Z SCORE VALUE OF JSWSL

YEAR	X1 (WC/TA)	X2 (NOP/S)	X3 (EBIT/TA)	X4 (MVE/BVD)	X5 (S/TA)	Z score
1997-98	-0.06	0.19	0	0.44	0.06	0.54
1998-99	-0.14	0.15	0.01	0.31	0.13	0.40
1999-00	-0.14	0.16	0.01	0.26	0.16	0.42
2000-01	-0.13	0.19	0.02	0.27	0.19	0.54
2001-02	-0.05	0.12	0.01	0.24	0.27	0.56
2002-03	-0.03	0.18	0.06	0.27	0.37	0.96
2003-04	0.02	0.44	0.17	0.34	0.52	1.94
2004-05	0.04	0.36	0.27	0.12	0.91	2.44
2005-06	0.05	0.33	0.20	0.12	0.73	1.99
2006-07	0.02	0.33	0.25	0.12	0.88	2.28
2007-08	-0.07	0.32	0.20	0.07	0.75	1.82
2008-09	-0.15	0.17	0.08	0.05	0.73	1.09

Source: Computed

ESL (ESSAR STEEL LIMITED)

The Z scores of ESL has been computed and presented in Table 6. It can be seen from the analysis that the Z scores for ESL are less than 1.8 during the period from 1997-98 to 2008-09 except during 2004-05 and 2007-08. In 2004-05 and 2007-08 it touches healthy Zone. The financial health of the ESL is never in the too healthy Zone during the study period.

TABLE 6: Z SCORE VALUE OF ESL

YEAR	X1 (WC/TA)	X2 (NOP/S)	X3 (EBIT/TA)	X4 (MVE/BVD)	X5 (S/TA)	Z Score
1997-98	0.01	0.36	0.07	0.01	0.35	1.11
1998-99	0.16	0.16	-0.01	0.07	0.31	0.74
1999-00	0.04	0.18	0	0.07	0.37	0.71
2000-01	-0.01	0.26	0.05	0.07	0.41	0.97
2001-02	-0.21	-0.12	0.06	0.07	0.62	0.44
2002-03	0.13	0.31	0.04	0.06	0.26	1.02
2003-04	0.14	0.28	0.08	0.10	0.63	1.52
2004-05	0.22	0.29	0.19	0.21	0.94	2.38
2005-06	0.12	0.28	0.1	0.38	0.55	1.66
2006-07	0.08	0.26	0.11	0.2	0.69	1.64
2007-08	0.05	0.23	0.13	0.19	0.99	1.93
2008-09	0.15	0.16	0.07	0.16	0.96	1.70

Source: Computed

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 84
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

RIN L (RASTRIYA ISPAT NIGAM LIMITED)

The Z score with respect to RINL for the study period has been computed and presented in Table 7. It is imperative from the analysis that Z score for the RINL is not less than 1.8 during the study period. It shows that financial health of RINL during the study period is never in bankruptcy zone. It is also revealed that till 1999-2000 the financial health is in healthy zone. It touches too healthy zone in 2000-01

TABLE 7: Z SCORE VALUE OF RINL

YEAR	X1 (WC/TA)	X2 (NOP/S)	X3 (EBIT/TA)	X4 (MVE/BVD)	X5 (S/TA)	Z score
1997-98	-0.10	0.3	0.04	2.91	0.29	2.59
1998-99	-0.18	0.01	-0.02	2.88	0.52	2.09
1999-00	0.08	0.10	-0.03	3.34	0.46	2.73
2000-01	0.09	0.17	0.01	3.41	0.57	3.13
2001-02	0.10	0.18	0.04	3.93	0.74	3.76
2002-03	0.14	0.26	0.15	6.59	0.99	6.24
2003-04	0.30	0.38	0.32	12.28	1.11	10.93
2004-05	0.68	0.45	0.30	14.73	0.98	12.85
2005-06	0.77	0.32	0.22	14.41	0.84	12.17
2006-07	0.80	0.33	0.21	8.54	0.76	8.35
2007-08	0.72	0.39	0.25	17.76	0.76	14.37
2008-09	0.52	0.25	0.16	7.77	0.69	7.17

Source: Computed

IIL (ISPAT INDUSTRIES LIMITED)

The Z scores of IIL has been computed and presented in Table 8. It can be seen from the analysis that the Z scores for IIL is in the healthy zone during the period 2004-05 and rest of the period, it is in the bankruptcy zone.

TABLE 8: Z SCORE VALUE OF IIL

YEAR	X1 (WC/TA)	X2 (NOP/S)	X3 (EBIT/TA)	X4 (MVE/BVD)	X5 (S/TA)	Z Score
1997-98	0.08	0.21	0.04	0.04	0.26	0.81
1998-99	0.10	0.17	0.02	0.15	0.21	0.73
1999-00	0.03	0.14	0.02	0.19	0.20	0.62
2000-01	0.12	0.12	0.01	0.17	0.27	0.72
2001-02	-0.02	-0.03	-0.03	0.15	0.23	0.16
2002-03	0.06	0.21	0.05	0.15	0.37	1.00
2003-04	0.07	0.18	0.05	0.14	0.43	1.02
2004-05	0.11	0.34	0.19	0.19	0.73	2.09
2005-06	0.01	0.08	-0.02	0.28	0.49	0.73
2006-07	0.06	0.23	0.09	0.28	0.66	1.53
2007-08	0.01	0.22	0.11	0.32	0.82	1.71
2008-09	-0.08	0.09	0.00	0.31	0.88	1.11

Source: Computed

BSL (BHUSHAN STEEL LIMITED)

The Z scores of BSL has been computed and presented in Table 9. It can be seen from the analysis that the Z scores for BSL is in the healthy Zone during the period 1999-2000 to 2004-05 and 2006-07 and rest of the period, it is in the bankruptcy Zone.

TABLE 9: Z SCORE VALUE OF BSL

YEAR	X1 (WC/TA)	X2 (NOP/S)	X3 (EBIT/TA)	X4 (MVE/BVD)	X5 (S/TA)	Z score
1997-98	0.28	0.17	0.12	0.08	0.56	1.58
1998-99	0.27	0.19	0.13	0.06	0.72	1.78
1999-00	0.30	0.19	0.12	0.06	0.83	1.89
2000-01	0.30	0.19	0.11	0.05	0.84	1.86
2001-02	0.35	0.18	0.11	0.06	0.95	2.03
2002-03	0.3	0.18	0.09	0.05	0.86	1.80
2003-04	0.34	0.18	0.12	0.04	1.02	2.11
2004-05	0.33	0.16	0.13	0.03	1.29	2.36
2005-06	0.22	0.15	0.1	0.02	0.93	1.75
2006-07	0.21	0.18	0.15	0.01	0.85	1.86
2007-08	0.16	0.21	0.13	0.01	0.57	1.50
2008-09	0.09	0.21	0.14	0.01	0.49	1.36

Source: Computed

UGSL   (UTTAM GALVA STEEL LIMITED)

The Z scores of UGSL has been computed and presented in Table 10. The Z score value of UGSL indicates that less than 1.8 during the period from 1997-98 to 2001-02. It is also found that the Z scores during the period 2003-04 and 2004-05 was in the too healthy Zone, since the Z scores were more than 2.99 where as in the remaining years the Z scores for UGSL were in the healthy Zone.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 85

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

TABLE 10: Z SCORE VALUE OF UGSL

YEAR	X1 (WC/TA)	X2 (NOP/S)	X3 (EBIT/TA)	X4 (MVE/BVD)	X5 (S/TA)	Z score
1997-98	0.22	0.11	0.07	0.13	0.88	1.61
1998-99	0.09	0.12	0.04	0.11	0.73	1.21
1999-00	0.11	0.08	0.04	0.10	1.02	1.46
2000-01	0.04	0.07	0.04	0.15	1.31	1.69
2001-02	0.10	0.07	0.03	0.20	1.15	1.60
2002-03	0.12	0.11	0.13	0.20	1.63	2.49
2003-04	0.16	0.09	0.14	0.19	2.10	3.01
2004-05	0.18	0.10	0.23	0.17	2.72	3.95
2005-06	0.30	0.11	0.14	0.10	1.49	2.53
2006-07	0.19	0.12	0.19	0.11	1.68	2.78
2007-08	0.04	0.11	0.2	0.11	1.84	2.78
2008-09	0.02	0.09	0.18	0.08	1.95	2.75

Source: Computed

FINANCIAL HEALTH OF SELECTED IRON AND STEEL COMPANIES - COMPARISON

The final Z score of the eight steel companies from 1997-98 to 2008-09 are separately analyzed to compare the financial health of the selected steel companies from 1997-98 to 2008-09. The Z scores of the eight companies for the above said period are shown in Table 11.

TABLE 11: FINANCIAL HEALTH OF THE SELECTED STEEL COMPANIES

YEAR	SAIL	TISCO	JSWSL	ESL	RINL	IIL	BSL	UGSL
1997-98	1.43	1.49	0.54	1.11	2.59	0.81	1.58	1.61
1998-99	1.14	1.34	0.40	0.74	2.09	0.73	1.78	1.21
1999-00	1.14	1.42	0.42	0.71	2.73	0.62	1.89	1.46
2000-01	1.45	1.50	0.54	0.97	3.13	0.72	1.86	1.69
2001-02	1.10	1.40	0.56	0.44	3.76	0.16	2.03	1.60
2002-03	1.71	2.24	0.96	1.02	6.24	1.00	1.80	2.49
2003-04	2.97	2.90	1.94	1.52	12.28	1.02	2.11	3.01
2004-05	5.16	3.92	2.44	2.38	12.85	2.09	2.36	3.95
2005-06	4.19	3.31	1.99	1.66	12.17	0.73	1.75	2.53
2006-07	4.70	2.63	2.28	1.64	8.35	1.53	1.86	2.78
2007-08	4.95	2.65	1.82	1.93	14.37	1.71	1.50	2.78
2008-09	3.45	1.65	1.09	1.70	7.17	1.11	1.36	2.75

Source: Computed

It is inferred from the table that the financial health of RINL was better than others since its scores were greater than 2.99 in 9 years out of the total period of the study which consists of 12 years. The next best company according to financial health analysis is SAIL whose financial health had been good for 5 years out of 12 years. In UGSL, the financial health had been good for 2 years but for 5 years the financial health was likely to be sick. In TISCO the financial health was good for 2 years and the financial health was likely to be sick for 4 years. In BSL, JSWSL, ESL and IIL the financial health was moderate for 7 years, 5 years, 2 years and 1 year respectively. The worst situation was noticed in IIL where the financial health was very poor for 11 years, since Z scores were less than 1.8.

CONCLUSION

Financial health of a firm is a centre theme for shareholders. In this context, an attempt has been made in the present study to have an insight into the examination of financial health of sample companies drawn from Indian Steel Industry. To evaluate the performance of a company, this study uses Z score model, which captures the predictive viability of a company's financial health by using a combination of financial ratios that ultimately predicts a score, which can be used to determine the financial health of a company. The study concluded that the financial health of RINL SAIL and UGSL were good and there is no scope of bankruptcy, where as the financial health of other selected companies were not in healthy Zone in many years.

REFERENCES

1. **Altman E.I** "Financial Ratios, Discriminant Analysis and Prediction of Corporate Bankruptcy*", Journal of Finance*, September 1968, pp.589-609.
2. **Dheenadhayalan.V** "Financial Health of Steel Authority of India Limited", *Indian Journal of Accounting*" Vol.XXXVI(1),   December 2008, pp.48-52.
3. **Johah Aiyabei** "Financial Distress: Theory, Measurement and Consequence", *The Eastern Africa Journal of Humanities and sciences*, 2002, Vol. 1, No.1.
4. **Kannadhasan**, M "Measuring Financial Health of a Public Limited Company Using 'Z' Score Model - A Case Study". *The Management Accountant,* Vol. 42, No. 6, June 2007, pp. 469-473.
5. **Krishna chaitanya V** "Measuring Financial Distress of IDBI using Altman Z Score Model" *The ICFAI Journal of Bank Management,* August 2005, Vol. IV, No. 3, pp 7-17.
6. **Maheswara reddy. D and Reddy C.R.**, "Application of Z score Analysis in evaluating the financial health of pharmaceutical companies- A case study " , *International Journal of Research in Commerce & Management,* Vol.2, Issue 5, May 2011, pp.104-107.
7. **Suriamurthi. S and Velavan. M.,** "Measuring Financial Health of E.I.D Parry Sugar Limited using 'Z'- Score Model – A Case Study", *Indian Journal of Finance*, Vol.4, No.11, November 2010, pp.30-42.
8. **Thirunarayanasamy** "Co-operative Sugar Mills in Tamil Nadu an analysis of Sickness and Revival Measures" *Unpublished Ph.D Thesis*, December 2006, Annamalai University.
9. **Venkat Janardhan Rao.k and Durga Prasad. M.,** "Z Score Analysis – A Tool to Predict Financial Health", *The Management Accountant*, Vol.44, No.08, August 2009, pp. 608-610.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   86
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

DESIGN AND DEVELOPMENT OF 4-TIER ARCHITECTURE OF VIRTUAL NETWORK MODEL FOR FINANCIAL AND BANKING INSTITUTIONS

SARANG JAVKHEDKAR
ASST. PROFESSOR
DR. AMBEDKAR INSTITUTE OF MANAGGEMENT STUDIES & RESEARCH
DEEKSHABHOOMI

ABSTRACT

Core Banking Solutions is new jargon frequently used in banking circles of India. Not only the business customers but also the individual (household) customers are dealt with various financial institution and banking systems like farmers, workers, businessmen, industrialist, housewives, politicians and non financial sectors.. Normal core banking functions will include deposit, loans, insurances, mortgages and payments etc. Since the customers open their account in more than one Financial Institution and invest their money in Insurance, Provident Fund, Mutual Funds, Post Office etc, The regulatory bodies like Banking, Insurance, Income Tax Department cannot keep track of individual or groups transaction. This affects the irregularities in maintaining the income of individuals or groups. Thus to overcome the above drawback, here 4-tier architecture model will maintain the transparency in each and every transaction of customer by introducing "Customer Unique Identification Number" (CUID). 4 tier architecture models have 4 layers, with the use of biometric tool and the Data Warehouse (where the data of customers are stored) in physical layer. The Online Transaction and Analytical Processing are easier and flexible through this model. The advantageous part of this model is the CUID, which can easily composite with current financial system. This new platform will change the working of banking and financial system. This model can bring technological revolution in banking and financial system over current system.

KEYWORDS

4-Tier Architecture, Core, Banking, Customer Unique Identification.

1. INTRODUCTION

Technological development is an added advantage for banking sector and the core banking applications is an example of technological development. The real time transaction processing is the need of real-time exchange in banking and financial institution. The real time application, means that the result will be reflected immediately on the bank's servers whatever the transactions made by the customer in any of the bank's branch throughout the world. The application is based on Centralized Data Storage. This means, all the branches are interconnected with each other with the Centralise HUB (Server) as Data Storage. The core banking has the inbuilt facility to fulfil the needs of customers, as an automated banking solution. Still the current core banking solution has some loopholes and limitations of identification of the transactions of different bank's branches for the same customer. The New Model i.e. 4-tier architecture model is design for Financial and Banking institution for the process of account opening. In 4 tier architecture the advanced tools like biometric and data storage to generate "Customers unique identification"–(CUID) for each and every customer and group. Each and every transaction of a customer or group with any bank across any path or passage like E-Banking, Investments, Deposits, M-Banking, e-Governance, internet banking etc, using CUID will be tracked. All these facilities provided to customer by maintaining individual as well as global Data Storage. Maintaining the data storage not only to keep the information of individuals and groups more secured but also helps to improve the operational (transactional) efficiency, this can answer any improved, complex, statistical or analytical queries. Both the summarized and detailed information is situated at the centre of a DSS of an organisation and contains integrated historical data.

For the betterment of the current core financial and banking system we have used the customer unique identification code in 4-tier architectural model and the core system has radically changed the way in which financial system works (functions). The advantageous part of the core bank system is its features and functionalities with use of advance technologies which can be very easily integrated with present system. The management of personal finance and transaction with any bank or financial institution the CUID card of proposed system will be used. The government authorities like Income Tax Department, Financial Industry Regulatory Authority, Financial Services Authority, Reserve Bank of India, Forward Markets Commission (India)(FMC), Insurance Regulatory and Development Authority(IRDA), etc, can managed centrally to control overall financial system through maintain data storage of either individual or a group.

The ECS between banks, online transaction processing in stock market, Fund transfer from wireless devices etc, can be done using CUID, which were unheard in present era of core banking system. The data warehouse manages all the communication between financial organisations with customers to share information within organisation from top to bottom.

2. CURRENT CORE BANKING SYSTEM

Advancement in Information Technology (IT) helps in change in structure of the current banking system in particular and financial sector in general.

FIGURE 1 - : CURRENT CORE BANKING SYSTEM

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   87
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in
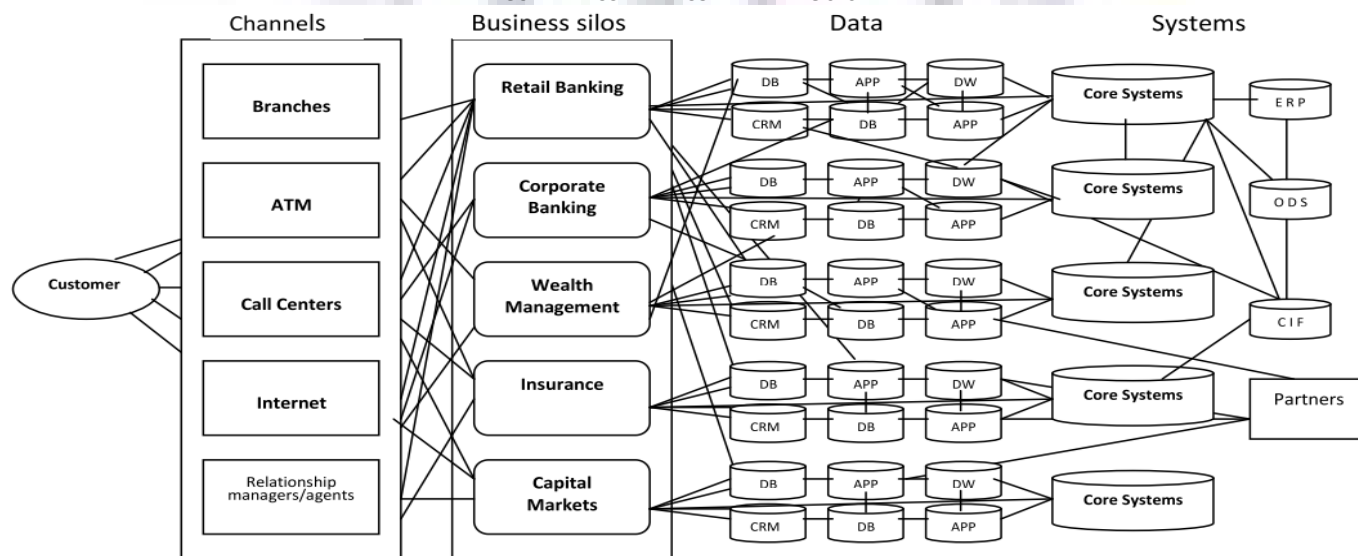
Core Banking System or CBS is one of the recent developments in the field of banking, and has proved to be very useful as Financial System. Core banking is another way of saying the core function of a bank. Utilisation of Advance Technologies and Internet for the transactions in banking system tends to new ways of doing business. It puts a new energy in increasing transactional efficiency in banking system by saving a lot of time and cost. The Core banking system is multiprocessing, multiprogramming as a service provider when measured as transactional efficiency. Technically we can say that, the Core banking solutions is an integration of information and communication technology. Here, computer software is developed module wise to perform core operations of banking like the bank's own books, or general ledger (recording of daily routine transactions), represents the bank as a business concern and should show the normal business activities, as well as the balances its holds on behalf of customers, interest and charges that have accrued and other assets, liabilities, income and expenses items. All the communication between each every bank is done through this software by means of latest technologies like internet, satellite, telephones etc and stored huge volume of data storage in data warehouse. The core advantage of this system is that, a customer can operate his/her account from any branch of the bank and if the banks owns internet banking or ATM facilities, then the customer can operate on his account from virtually anywhere. The core banking solution helps the customers to operate accounts from any bank of any branch.

A core banking system will maintain linkages between accounts and customers. A banking system that holds a single instance of a customer's record and then relates all of that customer's accounts to that record is said to be 'customer centric'. A core system that holds a list of accounts without linking them back to a single instance of a customer is said to be 'account centric'. In this day of integrated banking services and cross-selling there is little scope for account centric systems, although these may exist in other, more specialised areas of the bank.

The Core banking system is a platform independent. Developing the robust application the huge investment in technological infrastructure is required and this investment has contributed to expansion as well as growth of banking business. The return on such huge investment is yet to be realized. As the versatility in technology, core banking need to move forward in technological changes and offers the services which help in value addition in core banking services. Maintaining the consistency in services provided to the customers the development of alternative units (branches/channels) for the expansion and growth while serving to the customers. The technology provides helping hand to maintain data storage for the use of inter-switch transactions, its, an essential for the banking business to continue as service business where customers prefer to feel the personal touch.

As the change in the technology it is essential for every organisation to adapt the core banking technology as earliest. By successful implementation of a secure way of Electronic Fund Transfer Mechanism the core banking solutions entered and makes revolution in Secured Banking System. The pressure on banks is to increased regulatory requirement to sustain growth; therefore it is essential to have an error free and fully secured core banking system for continued regulatory requirements.

3.   FLAWS IN PRESENT ACCOUNT OPENING SYSTEM

In present system it is necessary for the customer to make the personnel contact with the financial institution for the request to open account, the first step ends with the direct contact for the process of request of account opening form. The account opening process starts after completing the request from customer. The process ends with the issuing allotment of new account number to the customer within few days by recording the first transaction of opening account with some initial amount in financial system. Finally the documents like chequebook, debit card, etc received by the customer from the bank.

3.1. In above process there are various flaws in present account opening system, these are –

While opening a new account the following flaws are measured –

1. There is no check whether the customers have an account in same branch/bank.
2. The system is account based not a transaction based.
3. Bank is not aware of any details of the other accounts of the customers in different branch, bank, and financial institution.
4. No Unique Identification is provided by bank to customer for the individual unique identification other than allotted account number.
5. Consolidated record of customers having more than one account with various financial institutions is not generated.
6. The customers are not uniquely identified if having more than one account in one place or in different institution.

4.   4-TIER ARCHITECTURAL MODEL

To make the current financial core system more secured and powerful this 4-tier architecture helps to solve make the present account opening process simpler. Each of these 4 steps of this architectural model has several processes to complete the above task. It is very helpful to control the flaws in the present system which are mention above as well as it control and monitor the each and every transaction, personal details of customers with their income. Using this model it is possible to maintain the past records (previous transaction done by the customers) though centralized data storages. The efficient and effective decision making using Online Transaction Processing and Online Analytical Processing is the prime advantage of Data Storage. The model provides a complete and fully secured solution over the present system to overcome all the drawbacks.

FIGURE 2: 4-TIER ARCHITECTURE MODEL

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   88
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in
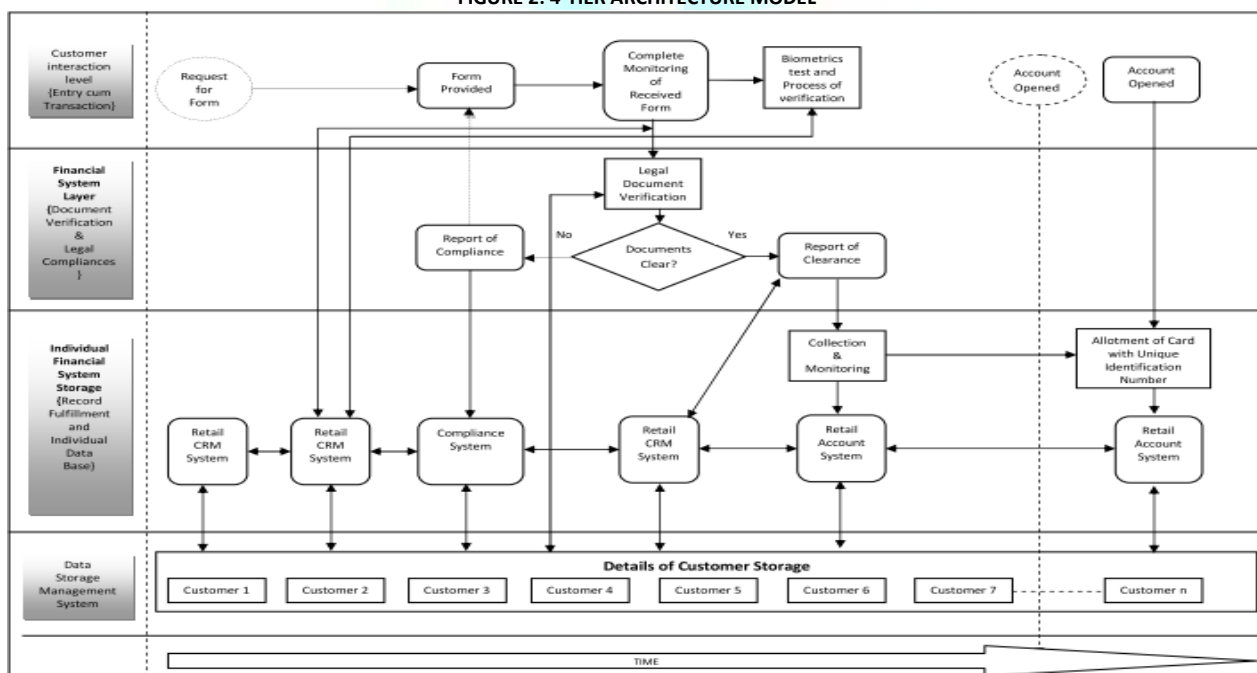
4.1 Model Description –

The model has four layers; these are customer interaction layer, financial System Layer (where document verification and legal compliances are checked), financial system storage (here record fulfilment and Individual data maintenance is done) and Data Warehouse (data storage management system), elaborate in detail with each and every process of individual steps.

Layer–1- Customer Interaction Level- It is entry point in the 4-tier architectural model, where the direct interaction of the customer's (   ) with the particular financial institution for the new account opening (transaction).

a) "The requests from the customer at registration counter for the account opening form in any financial institution or bank."

b) The Customers provide his/her details in the form which will be provided by institute for new account opening after hearing the request.

c) Provided details are verified and the form will be accepted after verification of details.

d) For maintain the unique identification, the customer is requested for "Biometric Test" and "Process of Verification" by the institute for each & everyone who wants to open a new account.

e) The details provided by the customer are saved in the individual data base maintained by the institute. After receiving the request of new account opening the report of compliance and clearance report is verified.

Layer-2- Financial System Layer (Legal Compliances and Document Verification)- The second layer of 4-tier architecture model start its working process after receiving the request of new account opening form.

a) On the request of customer, if the account open for the first time in his life then the legal compliances of the documents received from him will be scrutinized and if ok, then the Unique Identification is allotted as "Customer Unique Identification"-(CUID).

b) If customer already registered with any of the financial institution (i.e. already a CUID holder) then the record will be verified by the system itself using CUID.

c) In case of wrong information provided by the customer the system itself search the past record using biometric details already stored in the data storage as unique identification.

d) Then the report generated by the system will be used for further processing in the next layer.

e) In case of non satisfactory report the compliance report is generated by the system and sends it to customer online otherwise further process is done.

f) All the reports generated by the system for each individual is stored in respective data storage.

Layer-3-Financial System Storage (Fulfilment and Data Base)- The layer is meant for the individual data storage maintain in every financial institution and banking system.

a) The form received with complete legal information stored in individual data storage, where the customer unique identification is generated to the new account holder only.

b) All the future transactions were going through the legal procedure defined in layer-2 and layer-3.

c) The data and information generated in this layer finally stored in the Database Management System in layer-4.

d) In data storage the record of each and every transactions of individual customer is maintain.

e) The monitoring of track record of every customer stored in independent unit, (i.e. independent financial institute) where customer makes the transaction.

Layer-4- Data Warehouse (Data Storage Management System)-it is an exit point of a system. All the reports and information generated in the individual institution will be stored in the Data Warehouse.

a) The centralised data storage facility is provided by the higher Government Authority and maintain by (RBI) Reserve Bank of India for monitoring the lapses and defaulters.

b) All types of data, information queries which are statistical and analytical of every financial institution are stored here.

c) The details of all customers as well as financial institution are stored in the data warehouse globally.

d) Each and every type of report generation is possible by maintaining the data warehouse.

4.2 steps for opening new account for customer according to 4-tier architecture

1. Initial request from the customer for new Account Opening Form at registration counter for account opening in any financial institution.

2. The form will fill up by the customer and submitted at the registration counter.

3. After receiving the form the officials asks for his biometric details. The details of biometric will be attached to the form for the further processing.

4. In case of any compliance marked in the customers' documents, then the system generates the compliance report which will be given to the customer from the counter itself.

4.3 steps for opening new account for Financial Institute/System according to 4-tier architecture model

1. The registration counter of institute / system will received request to open a new account. The request is fulfilled by the system and the details will be stored in data storage. Filled form will be received by the system from customer.

2. To complete this process the biometric details are asks to the customer and the detail report will be stored in retail CRM system. The biometric details are sending for the verification and legal process. The documents and details are verified and checked by the authorities.

3. If the documents are clear without any compliance will be sent for the further process otherwise, the detailed compliance report will be given to the customer from the counter itself.

4. Here after all verification and clearance report the customer will received the CUID, Number, cards, books, and other required documents. Fulfilment step generate CUID of customer (if not found registered previously with any other institution or system) and stored data in retail account system. Registration counter will get the confirmation of new account open with institution / system and customer will also get the documents like cheques, cards etc with Customer Unique Identification (CUID).

Advantages of CUID using 4-tier architecture model

1. The new model and new CUID can easily blend with the present system, so that it is very easy to integrate the system with present system.

2. The concept of CUID allotted to the customer will be used to monitor all future transaction i.e. individual, group, society etc.

3. In this module, clear transference is maintained while its processing of transaction and opening an account by the customer.

4. It is an advantageous for the Government to monitor on financial crises and to make quick decisions at any point of time.

5. Further, it is not necessary for the income tax department to maintain and control the individual details and transactions of customer accounts for the purpose of tax dues.

6. The CUID card is better option than the PAN card, or Aadhar Card as the CUID card maintains biometric details required for unique identification as well as the income details of individuals or groups.

7. Under this model, all the financial sectors, including Government, Private, and Public will work under one roof at same level

8. Detection of defaulters is an easy task for the financial system to take suitable action using this model.

9. Efficient decision making process by maintaining Data Base Management System is advantageous for the Online Transaction Processing and Online Analytical Processing.

There are number of advantages after implementing the 4-tier architecture model. The above advantages focus light on only architecture for account opening process.

My in-depth study focus on many other aspects like security, transactions, implementation and software development which will highlight many benefits about the complete system.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 89

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

CONCLUSION

The paper is focused on design and development of virtual network banking model i.e. 4-tier architectural model and benefits of customer unique identification (CUID) code. The four layers of architecture model show transparency which can be maintained while generating account number and CUID code. We have made an effort to focus to remove the drawbacks by launching the concept of Customer unique identification code (CUID code). This model will help in decision making process by using OLAP and OLTP tools, the main advantage of this model is that the 4-tier architecture model with CUID can easily blend with current banking and finance system. The 4-tier architectural model has become a robust to perform a role to enhance the present account opening process in financial core system by using CUID.

REFERENCES

1. AIBUMA Publishing - African Journal of Business & Management (AJBUMA) http://www.aibuma.org/journal/index.htm Vol. 1 (2010), 16 pages
2. Finacus Solution Pvt. Ltd. Finacus powered by innovation. "FINcore core banking system". Online Available: http://www.finacus.co.in/fincore.html
3. IBM Global Business Services. "IBM Institute for business value". Online available: http://www-05.ibm.com/de/financialservices/pdf/ibv_soa_banking.pdf
4. M/S S. Sathnanakrishanan, 2005. Information System for Banks, 2005, M/S/, Taxman publication, Pvt. Ltd.
5. Scott Simmons "Modernizing banking core systems" online available: http://www-05.ibm.com/developerworks/websphere/techjournal/0809_col_simmons/ 0809_col_simmons.html

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 90
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

IMPACT OF FACE BOOK ADVERTISEMENT AND AWARENESS LEVEL AMONG THE CLIENTS WITH SPECIAL REFERENCE TO ERODE CITY

S.KOWSALYADEVI
ASST. PROFESSOR
DEPARTMENT OF MANAGEMENT STUDIES
NANDHA COLLEGE OF TECHNOLOGY
ERODE

ABSTRACT

The study entitled "Impact of FACE BOOK advertisement and awareness level among the clients with special reference to Erode city" is to find out the awareness about various companies face book advertisement among the clients.   The main objectives of the study are to find out the factors influenced effectiveness of face book advertisement among the clients in Erode city. The design for the research study was descriptive in nature and non- probability convenience sampling method was used to collect survey from respondents. The data is collected from the respondents through the personal interviewing technique. This is done through a self administered questionnaire. The collected data was analyzed by using statistical tools such as simple percentage analysis and chi-square test and they are well interpreted. The data collected is analyzed and a hypothesis statement was built. The main findings and suitable suggestions were given to the company for improvement. Thus the study concludes that FACE BOOK advertisements are satisfied by the clients and they have time to watch those advertisements. In a nutshell, Facebook is playing an efficient role in advertising and connectivity. They are the one social network for helping advertisers to enumerate massive traffic and build relationships more easily than ever and it is a great place for the customers to have a look on the products and prices and have good choice of products for their better purchase and their satisfaction.

KEYWORDS
Face book advertisement, erode city.

INTRODUCTION

Online media advertising is one of the upcoming and growing segments in Indian advertisement sector. Internet is one such medium which is accessible by anyone and everyone and that too in any part of the country. This is the reason why online media advertising is catching up with the audience. With its vast accessibility and reach it is easy to reach millions of users at one go.

Sensing its reach and importance many online business publications or magazines have taken online media advertising as a hot topic and keep a close look at the changing trend. Being the newest and hottest field online media advertising has become the talk of the town.

Face book Advertising has started to come into existence and successful in Ad Words program for a long time.

Businesses and affiliate marketers are starting to see the unique benefits offered by Face book, so here is a brief introduction to what makes Face book Ads different than Ad Words.

Firstly, Face book Ads IS very similar to Ad Words in that they operate a PPC (pay per click) or CPC (cost per click) advertising model. In other words, advertisers only pay Face book money when someone actually clicks on one of their ads, rather than paying for general exposure. This is a very attractive advertising option for many advertisers, because it allows you to only pay to show your ads to people who are genuinely interested in your offer and who take the extra step of actually clicking on your ad to learn more.

(More Specific =More Leads, More Leads = More Traffic, More Traffic = More Money)

Face book Ads also has a CPM model (cost per 1,000 impressions), which is similar to the ever-popular banner ad form of marketing developed in the earlier days of the World Wide Web. In this scenario, the advertiser pays Face book a fee for every 1,000 times their ad is shown, RATHER than every time it is clicked on. In certain circumstances, this can be more cost-effective to advertisers, depending on their market place, demographics & budget.

When placing your Face book advertisement, the form makes it very easy to select the demographic profile of your target audience. It has the added feature of targeting very specific audiences. Here, less is more.

Better results are achieved by having less much targeted people, rather than having large numbers of people who are not interested. Gaining smaller but very specific target audiences, even at the risk of reducing the size of your audience, can be more effective.

Let's say you want to promote an event at your business. It would be more effective to target people who are already fans of your page, who may be more likely to respond to a local offer. Besides targeting people by location, you may want to also use names of popular local businesses, colleges and clubs in the ad manager to find the people that don't put their city and zip code in their profiles.

Face book is the highest targeted ads money can buy and that is because of their proprietary tracking of each person's movement and what that person is looking at or looking for.

This is truly an advertising amazement and is exactly what we need as advertisers in order to have the most targeted ads.

INTRODUCTION OF THE STUDY

Advertising is a form of communication used to persuade an audience (viewers, readers or listeners) to take some action with respect to products, ideas, or services. Most commonly, the desired result is to drive consumer behavior with respect to a commercial offering, although political and ideological advertising is also common. Advertising messages are usually paid for by sponsors and viewed via various traditional media; including mass media such as newspaper, magazines, television commercial, radio advertisement, outdoor advertising or direct mail; or new media such as websites and text messages.

Commercial advertisers often seek to generate increased consumption of their products or services through "Branding," which involves the repetition of an image or product name in an effort to associate certain qualities with the brand in the minds of consumers. Non-commercial advertisers who spend money to advertise items other than a consumer product or service include political parties, interest groups, religious organizations and governmental agencies. Nonprofit organizations may rely on free modes of persuasion, such as a public service announcement (PSA).

Modern advertising developed with the rise of mass production in the late 19th and early 20th centuries. In 2010, spending on advertising was estimated at more than $300 billion in the United States and $500 billion worldwide.

Internationally, the largest ("big four") advertising conglomerates are Interpublic, Omnicom, Publics, and WPP.

ADVERTISING THEORY

1) Hierarchy of effects model

It clarifies the objectives of an advertising campaign and for each individual advertisement. The model suggests that there are six steps a consumer or a business buyer moves through when making a purchase. The steps are:

- Awareness
- Knowledge

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   91
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

- Liking
- Preference
- Conviction
- Purchase

2) Means-End Theory

This approach suggests that an advertisement should contain a message or means that leads the consumer to a desired end state.

3) Leverage Points

It is designed to move the consumer from understanding a product's benefits to linking those benefits with personal values.

4) Verbal and Visual Images

5) Main Types of Advertising Techniques Online

Many people are confused by the different types of advertising techniques online. In today's blog post, my aim is to classify all the techniques into 5 main types. I will also discuss the key to success in each of them.

1) Content Advertising

The first type of advertising technique is content advertising. It basically uses content to draw visitors' attention. It is the main type of advertising technique because the entire internet is made up of content (or information).

The following traffic strategies all fall under content advertising technique:

- Submitting articles to article directories
- Posting articles to Squidoo, Hub pages or Blogger
- Posting articles to your own blog or content website
- Press release
- Paid reviews at other people's website
- Yahoo answers
- Social bookmarking at Digg, Propeller etc
- Post videos in video sites
- Posting comments in forums

2) Link Advertising

This type of advertising technique typically uses a short link with some description to attract the visitors directly to your website. The following traffic strategies all fall under link advertising technique:

- PPC advertising
- Leads Leap advertising
- Classified advertising
- Submission to directories
- Link exchange partnership
- Banner advertising (image version of link advertising)
- Craigslist advertising
- Email signature

3) Viral advertising

This kind of advertising technique is similar to word of mouth advertising in the offline world. The idea is to encourage your existing traffic to bring more traffic to your website. The following traffic strategies all fall under viral advertising technique:

- Offer your products' affiliate program, including finding joint venture partners
- Place a "Tell-a-friend" script on your website
- Distribute viral screensaver, software or eBooks.

4) Incentivized advertising

The forth type of advertising technique is incentivized advertising where the traffic is rewarded to visit your website. The following traffic strategies all fall under incentivized advertising technique:

- Traffic exchange programs
- Auto-surf advertising
- Paid to read advertising
- Safe list advertising

5) Obtrusive advertising

The last type of advertising technique is obtrusive advertising where the traffic is forced to view your ad. The most typical examples are popup and pop under advertising.

REVIEW OF LITERATURE

"Mr. kaspersky" (2012) has identified an internet security firm has criticized face book for releasing details of the alleged members of a gang behind the koobface worm,a piece of malicious software that attacked hundreds of thousands of computers through the social network's profiles .In an unusual step in January, face book named six Russian men it said had been running the two million dollar scam against its members for the past three years.

"Amartya sen" (2010) After falling victim to identify theft on face book, Nobel laureate Amartya sen has said he got no help from the managers of the social networking site in closing the "fraudulent" page of someone impersonating him.sen said he never intends to open any account at a site where it is difficult to check the "genuineness" of a participant. According to recent news report, an 'imposter' pretending to be Amartya sen had created a page on face book, which showed sen as having 490 fans, and was liberally posting views that radically contradicted the political and economic views held by the economist.

"Reuters" (2012) Late this January, some 75,000 people around the planet sat in front of their computers and pondered how to make anagrams from a bowl of alphabet soup. They were participants in the hacker cup, an international programming battle that face book organized to help it find the brightest young software engineers before competitors like Google do. After three more rounds of brain teasers, face book will fly the top 25 coders to its head office in Menlo park, for an adrenaline-soaked finale.

"David carr" face book has largely managed to avoid being seen as greedy, or potentially dangerous, but that gets complicated when you are sitting on billions of dollars in market value.

"Rachelle J. Hruska" (2012) social network face book has made compulsory its Timeline feature through which all of a user's photographs and wall posts would be seen by friends on their homepage. The feature had been voluntary till now and face book has given all of its 800 million users a seven-day period to delete content before Timeline goes online, the sun reported. Timeline makes everything a person has ever done on face book appear on a single screen thst scrolls down year by year right back to when the person was born.

STATEMENT OF THE PROBLEM

Advertising is the promotion of a company's products and services carried out primarily to drive sales of the products and services but also to build a brand identity and communicate changes or new product /services to the customers. Advertising has become an essential element of the corporate world and hence the companies allot a considerable amount of revenues as their advertising budget. There are several reasons for advertising some of which are as follows:

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 92

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

- Increasing the sales of the product/service
- Creating and maintaining a brand identity or brand image.
- Communicating a change in the existing product line.
- Introduction of a new product or service.
- Increasing the buzz-value of the brand or the company.

Thus, several reasons for advertising and similarly there exist various media which can be effectively used for advertising. Based on these criteria there can be several branches of advertising, but how facebook acts as one of the best media for advertisements is the need for the study.

OBJECTIVES OF THE STUDY

➢ To study the factors influenced effectiveness of face book advertisement among the clients in Erode city.
➢ To identify the problems and prospectors about the utilization of face book.
➢ To find out the awareness about various companies face book advertisement among the clients.
➢ To identify at what extend it reaches the public.
➢ To furnish suitable recommendation and suggestion to improve the performance of face book advertisement.

HYPOTHESIS

H_0: There is no close relationship existing between age and frequency of updating the face book account.
H_1: There is a close relationship existing between age and frequency of updating the face book account.
H_0: There is no significant relationship between Sex and level of satisfaction towards face book advertisement
H_1: There is a close significant relationship between Sex and Level of satisfaction towards face book advertisement.
H_0: There is no significant relationship between Marital status and disturbing the advertisement in face book.
H_1: There is a close significant relationship between marital status and disturbing the advertisement in face book.
H_0: There is no significant relationship between Occupation and types of advertisement prefer to watch.
H_1: There is a close significant relationship between Occupation and Types of advertisement prefer to watch.

RESEARCH METHODOLOGY

Research methodology is a way to systematically solve the research problem is to how research is done scientifically. It consists of the different steps that are generally adopted by the researcher to the study his research problem along with logic behind them. It is necessary to the researcher to develop certain tests.

RESEARCH DESIGN

Research design is a plan to answer whom, when, where, and how the subject under investigation conceived so as to obtain answers to research questions. The type of research design involved in this study is descriptive research studies.

DESCRIPTIVE RESEARCH STUDIES

Descriptive research studies are those studies, which are concerned with describing the characteristics of a particular individual, or of a group, where as diagnostic research study determine the frequency with which something occurs or its association with something else. The studies concerning whether certain variables are associated are example of diagnostic research studies. As against this, study concerned individual, group or situation are all example of descriptive research studies. Most of the social research studies come under this category from the point of view of the research design.

DATA COLLECTION METHOD

The required data was collected by the primary sources.
The data objective are describe from the research objectives and their determination rests mainly on the research to translate what the decision marker wants into specific descriptive of the needed data.

PRIMARY SOURCES

➢ The primary data was collected in ERODE CITY. The Respondents were met personally and questionnaire has been given to them and answered questionnaires were collected back.
➢ Primary data is the data gathered for the first time by the researcher by using questionnaire.

RESEARCH INSTRUMENTS

Instrument : Questionnaires (personal administered)
Instrument Design : Both open and close ended Questions are used in questionnaires.

QUESTIONNAIRE DESIGN

A well structured questionnaire was used for this study. The types of questions used in the questionnaire were open-ended, multiple-choice questions.

- Open-end questions are questions, which are entitled to give a free response to their choice.
- Multiple-choice questions are question, which contain a list of answer and permit the subject to select the best answer.

SAMPLING

Sampling is the process of selecting a sufficient number of elements from the population, so that a study of sample and an understanding of its properties or characteristics would make it possible for us to generalize such properties or characteristics to the population elements.

SAMPLING PLAN

➢ Sampling technique : Random sample
➢ Sample size : Sample size chosen is 200.
➢ Sample unit : Erode city
➢ Time Dimension : period of February and March 2012

SAMPLE DESIGN

A Sample design is a definite plan for obtaining a sample from given population. It refers to the technique or the procedure the researcher would adopt in selection items for the sample. Sample may as well lay down the number of items to be included in the sample namely, the size of the sample.

SAMPLING SIZE

The total numbers of respondents are termed as sample size. The sample size for this analysis is 200 respondents.

SAMPLING UNIT

Sampling unit is that of "who is to be surveyed". The survey is done in ERODE CITY.

PERIOD OF STUDY

➢ The research is carried out on February and March 2012

SATISTICAL TOOLS

The collected data has been analyzed by using the following appropriate tool such as:

➢ **PERCENTAGE ANALYSIS**

Percentage refers to a special kind of ratio. It is used to make comparison between two or more series of data. They can be used to compare the relative items, the distribution of two or more series of data since the percentage reduce everything as common base and allow the meaningful comparisons to be made.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 93
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

Percentage refers to the special kind of ratio percentage are used in making comparison between two or more series of data. Percentages are used to describe relationship.

FORMULA

Percentage =No. Of respondents / Total*100.

Bar chart and Pie charts are used to explain the tabulation clearly.

CHI – SQUARE TEST

This test is one of the simplest and most widely used non – parametric in Statistical work, when certain observed values of the variable are to be compared with the expected value.

The chi – square is computed on the basis of frequencies in a sample and thus the value of chi – square. So, obtained in a statistic chi – square is not a parameter as its value is not derived from the observations in population,

Hence chi – square test is a non – parametric test. Chi – Square test is not concerned with any population distribution and its observation.

The chi – square test was first used in testing statistical hypothesis by karl person in the year. 1900 it is defined as,

Chi-square=$\sum (O-E)^2/E$

Where,

Oi = Observed frequency of ith event

Ei = Expected frequency of ith event

ANOVA

Analysis of variance (ANOVA) is a collection of statistical models, and their associated procedures, in which the observed variance in a particular variable is partitioned into components attributable to different sources of variation. In its simplest form, ANOVA provides a statistical test of whether or not the means of several groups are all equal, and therefore generalizes t-test to more than two groups. Doing multiple two-sample t-tests would result in an increased chance of committing a type I error. For this reason, ANOVAs are useful in comparing two, three, or more means.

The F-test is used for comparisons of the components of the total deviation. For example, in one-way or single-factor ANOVA, statistical significance is tested for by comparing the F test statistic

$$F = \frac{\text{variance between items}}{\text{variance within items}}$$

$$F^* = \frac{\text{MSTR}}{\text{MSE}}$$

Where

$$\text{MSTR} = \frac{\text{SSTR}}{I-1},$$ I = number of treatments

And

$$\text{MSE} = \frac{\text{SSE}}{n_T - I},$$ n_T = total number of cases

To the F-distribution with $I-1, n_T - I$ degrees of freedom. Using the F-distribution is a natural candidate because the test statistic is the ratio of two scaled sums of squares each of which follows a scaled chi-squared distribution.

RESULTS AND DISCUSSIONS

CHI-SQUARE TEST

AGE AND FREQUENCY OF UPDATING THE FACE BOOK ACCOUNT:

Null Hypothesis (H₀)   :   There is no significant relationship between Age and frequency of updating the face book account.

Alt. Hypothesis (H₁)   :   There is a close significant relationship between Age and Frequency of updating the face book account.

TABLE 4.2.1: AGE AND FREQUENCY OF UPDATING THE FACE BOOK ACCOUNT

S. No.	Age	Frequency of updating the face book account				Total
		Daily	Twice a week	Weekly	Monthly	
1	13-23	18	12	65	14	109
2	23-33	12	26	14	10	62
3	Above 33	2	0	23	4	29
	Total	32	38	102	28	200

CHI-SQUARED TEST

Calculated χ2 value   :   44.569

Degrees of Freedom   :   6

Table value   :   12.592

Significant   :   Significant at 5% level

INTERPRETATION

It is cleared from the above analysis that calculated chi-squared value is greater than the table value and the result is significant at 5% level. So the null hypothesis is rejected. Hence, there exists a close significant relationship between age of the respondents and frequency of updating the face book account.

SEX AND LEVEL OF SATISFACTION TOWARDS FACE BOOK ADVERTISEMENT

Null Hypothesis (H₀)   :   There is no significant relationship between Sex and level of satisfaction towards face book advertisement.

Alt. Hypothesis (H₁)   :   There is a close significant relationship between Sex and Level of satisfaction towards face book advertisement.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 94

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

TABLE 4.2.2: SEX AND LEVEL OF SATISFACTION TOWARDS FACE BOOK ADVERTISEMENT

S. No.	Sex	Level of satisfaction towards face book advertisement			Total
		Neutrally satisfied	**Satisfied**	**Neutral**	
1	Male	17	96	15	128
2	Female	4	58	10	72
	Total	**21**	**154**	**25**	**200**

CHI-SQUARED TEST

Calculated $\chi2$ value	:	2.978
Degrees of Freedom	:	2
Table value	:	5.991
Significant	:	Not Significant

INTERPRETATION

It is cleared from the above analysis that calculated chi-squared value is less than the table value and the result is not significant. So the null hypothesis is accepted. Hence, there exists no significant relationship between sex of the respondents and level of satisfaction towards face book advertisement.

FINDINGS
SIMPLE PERCENTAGE ANALYSIS
1. Majority (54.5 %) of the respondents belong to the age group of 13-23.
2. Majority 64.0 % of the respondents are male.
3. Take from the analysis it is found that (58.5%) of the respondents are married.
4. Take from the analysis it is found that (48.0%) of the respondents are qualified under graduate level.
5. From the analysis it is found that (70.0%) of the respondents are student.
6. Majority (65.5%) of the respondents aware about facebook through friends.
7. Majority (80.5 %) of the respondents are having a facebook account.
8. Take from the analysis it is found that (58.5%) of the respondents are using a face book to be contact with friends.
9. Take from the analysis it is found that (51.0%) of the respondents are updating a facebook account weekly.
10. Majority (78.5 %) of the respondents aware about facebook advertisements.
11. Majority (100.0%) of the respondents having time to watch the facebook advertisements.
12. It found from the analysis that the majority (41.5%) of the respondents preferred fashion related advertisement to watch in facebook.
13. It found from the analysis that the majority (77.0%) of the respondents are satisfied towards advertisement on facebook.
14. Majority (60.0) of the respondents watch all the above company's advertisement.
15. It is found from the analysis that most (54.5) of the respondents liked the advertisements and also joined membership.
16. Take from the analysis it is found that most (56.5) of the respondents are not satisfied with the choice of products given through company in facebook advertisement.
17. It is found from the analysis that majority (71.5) of the respondents are not disturbed through the advertisement in facebook.
18. Majority (73.5) of the respondents are opined that the advertisement shouldn't be ignored at the right side of facebook account.
19. It is found from the analysis that majority (50.9) of the respondents opined that the advertisement should be displayed before login facebook.
20. Majority (92.0) of the respondents are satisfied with the advertisement provided by the company.

CHI-SQUARE
21. There exists a close significant relationship between age of the respondents and frequency of updating the face book account.
22. There exists no significant relationship between sex of the respondents and level of satisfaction towards face book advertisement.
23. There exists a close significant relationship between marital status of the respondents and disturbing the advertisement in face book.
24. There exists a close significant relationship between occupation of the respondents and types of advertisement prefer to watch.
25. There exists a close significant relationship between reason for behind using face book of the respondents and frequency of updating the face book account.

ANOVA

$F_1=$ It is identified from the above analysis that the calculated value (F_1) is more than the table value ($F\alpha_1$), so null hypothesis is rejected. Hence there is close Relation between educational qualification and study factors.

$F_2=$ It is identified from the above analysis that the calculated value (F_2) is more than the table value ($F\alpha_2$), so null hypothesis is rejected. Hence there is close Relation between educational qualification and study factors.

SUGGESTIONS
❖ Face book will became the "bureau" for advertisements in upcoming years.
❖ Face book advertisement can give more information regarding products and its price.
❖ Face book can improve more number of advertisements in daily basis.
❖ Face book advertisements helps to glance about new products availability.
❖ Face book advertisements should be sited at the bottom of the page.
❖ Face book covers all age categories, so it is a best place for advertising the product.
❖ Face book can approve more number of companies' advertisement.

CONCLUSION
In a nutshell, Facebook is playing an efficient role in advertising and connectivity. They are the one social network for helping advertisers to enumerate massive traffic and build relationships more easily than ever and it's a great place for the customers to have a look on the products and prices and have good choice of products for their better purchase and their satisfaction.

REFERENCES
1. www.docstoc.com
2. www.facebook.co.in
3. www.slideshare.com

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   95
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

APPENDIX

QUESTIONNAIRE

A STUDY ON IMPACT OF FACEBOOK ADVERTISEMENT AND AWARENESS LEVEL AMONG THE CLIENTS WITH SPECIAL REFERENCE TO ERODE CITY.

1. Age:
   a) 13-23   b) 23-33   c) 33+
2. Gender:
   a) male   b) female
3. Marital Status:
   a) single   b) married   c) divorced
4. Educational Qualification:
   a) Primary   b) secondary   c) higher secondary
   d) U.G   e) P.G   f) no schooling
5. Occupation:
   a) Student   b) job-holder   c) self-employed   d) home maker
6. How do you come to know about face book?
   a) friends   b) relatives   c) work place   d) internet
7. Do you have face book account?
   a) yes   b) no
8. The reason behind using face book:
   a) Entertainment purpose   b) to be in contact with friends
   c) to see advertisement   d) all the above
9. How often you update your face book account?
   a) Daily   b) twice a week   c) weekly   d) monthly
10. Are you aware of face book advertisements?
    a) Yes   b) no
11. Do you have time to watch those advertisements?
    a) Yes   b) no
12. What kind of advertisement you would prefer to watch?
    a) fashion   b) electronics   c) food   d) drinks   e) others
13. what attracts you most in face book advertisement?

S.NO	FACTORS	HIGH	MEDIUM	LOW
1	logo			
2	Web design			
3	images			
4	color			
5	creativity			
6	price			

14. To what extent you are satisfied with advertisement on facebook?
    a) Highly satisfied   b) satisfied   c) neutral   d) dissatisfied
    e) Highly dissatisfied
15. Have you seen the following company's advertisement?
    a) yebhi   b) pantaloons   c) live India   d) fast track   e) Samsung galaxy   f) nokia n8
    g) all the above   h) others.
16. Have you 'LIKED' or 'joined membership' in any of the advertisement?
    a) Yes   b) no
17. Are you satisfy with the choice of products givfen through company in facebook advertisement?
    a) Yes   b) no
    If yes,
    HS-highly satisfied   S-satisfied   NS-not satisfied

S.NO	FACTORS	HS	S	NS
1	JEWELLERY			
2	CLOTHES			
3	UTENSILS			
4	ELECTRONICS			

18. Is this helpful?

S.NO	FACTORS	YES	NO
1	offers		
2	discounts		
3	vouchers		
4	Lucky draws		

19. Do advertisement in face book disturbs you?
    a) Yes   b) no
20. Do you think, an advertisement can be ignored, ac it is cornered to right side of face book account?
    a) Yes   b) No
If Yes, how to solve this problem
    a) By changing the place, other than corner.
    b) Before log in face book, advertisement should be displayed.
    c) Others.
21. Are you satisfied with the advertisement provided by the company?
    a) Yes   b) No
If no, please specify_____
Comments:
_____

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 96

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

HUMAN RESOURCES IN SIX SIGMA - A SPECIAL LOOK

DR. B.SUMATHISRI
ASST. PROFESSOR
DEPARTMENT OF COMMERCE & MANAGEMENT STUDIES
SASTRA UNIVERSITY
SRINIVASA RAMANUJAN CENTRE
KUMBAKONAM

ABSTRACT

Every business enterprise attempts to survive and grow. But survival and growth are becoming increasingly difficult in a global economy characterized by cut-throat competition, increasing costs, growing customer expectations, expanding power of labor, fast-changing technology, etc.　Technological advancements have allowed companies to relocate operations at places with lower wages.　As the centre of gravity in employment is shifting from manual workers to knowledge workers, new human resources practices and policies are needed. Six Sigma can be applied in all industries/companies as work always takes place in processes.　A process with a Sigma level of Six generates a maximum defect probability of 3.4 parts per million. Six Sigma uses Project Teams to work on solving problems or improving processes in an effort to produce zero defects. The next wave in Six sigma is Lean Six Sigma. It is a methodology that maximizes shareholder value by achieving the fastest rate of improvement in customer satisfaction, cost, quality, process speed, and invested capital.　So it can be conclude that if used intelligently Six Sigma can enhance results, dramatically by targeting improvements through breakthrough projects. It is the system that combines science, technology, quality and profitability. It changes the way a company works by pulling it into the cycle of culture change.

KEYWORDS

Breakthrough, Culture change, Defect- free, Knowledge-based worker, Lean Six Sigma.

INTRODUCTION

Every business enterprise attempts to survive and grow. But survival and growth are becoming increasingly difficult in a global economy characterized by cut-throat competition, increasing costs, growing customer expectations, expanding the power of labor, fast-changing technology, etc. Business leaders, experts, researchers are continually discovering new management techniques and practices to meet this challenge.　Globalization and technological changes are causing significant changes in the nature of jobs and work.　Technological advancements have allowed companies to relocate operations at places with lower wages. A major change in the nature of work is the shift from manual to knowledge work.　Organizations are becoming increasingly knowledge-based wherein specialists direct and discipline their own performance through organized feedback from the customers and headquarter.　In the knowledge economy, there is growing emphasis on human capital (the knowledge, education, training, skills and expertise of employees) in place of physical capital (equipment, plant and machinery, furniture).　By the knowledge driven and service-oriented economy, jobs require greater brain power (skills, expertise and creativity). Thus in the changing economic scenario, jobs demand a certain level of expertise that is far beyond that required of most workers 20 or 30years ago.　This means that companies are relying more on employee's creativity and skills. i.e, employee's brain power.(Khanka.S.S ,2009)

CHANGE AGENT

Any organization that attempts transformational change will have to encounter many challenges. The success or failure of change efforts lies in handling these challenges. As the center of gravity in employment is shifting from manual workers to knowledge workers, the new human resources practices and policies are needed.　Human resources professionals have a central role in this scenario. (Srinivasa.et.al, 2009).　They have to play an active role as change agents in any programme of organizational changes and which the development involves human resource issues.　They have to persuade, mobilize and negotiate people for change. For this purpose human resources professionals require diagnostic and behavioral skills. They must provide emotional support and reassurance to employees who feel stressed during the change process and thereafter. (Gupta.C.B, 2009)

Human Resources (HR) processes have a major impact on the employee's efforts for delivering services or product.　HR people handle the responsibility of retaining the employees while balancing the financial needs of the company. Six Sigma has been around for over a decade and as such it has been deployed at lots of companies around the world.　It can be applied in all industries/companies as work always takes place in the processes and the following holds true for every company (in any industry). Everything that anyone does is a part of a process. A process is efficient or inefficient depending on the output to input ratio (this ratio could be productivity measure, cost measure, time measure or any other useful metric).　Very few processes are defect free and most have unacceptable levels of defects or delays (as per industry standards, companies own philosophy towards defects or based on customer expectations). Here, for many processes there is an internal customer (instead of or in addition to an external customer). Meeting customer (internal, external or both) expectations with reasonable cost is a key success criterion.　Variation in process inputs or improper controls result in reduced efficiency or dissatisfied customers, which increases costs and breeds further inefficiency.　Six Sigma requires that define success criteria for key processes, eliminate defects (or reduce their severity or occurrences), and measure outcomes for exceeding industry standards or creating new benchmarks, thereby leading to competitive advantage in terms of cost or value for customers.　Project situations are common in companies and functions that carry out construction, commissioning and installations, software development, plant and machinery development and manufacture, research & development etc. Although these sectors have significant differences in challenges that they face, the common element is that they carry out projects and each project is unique in itself. (Abhishek Kamd, 2010).

CONCEPT AND SIGNIFICANCE OF SIX SIGMA

Six Sigma is a concept coined by the Motorola corporation to describe improvement initiatives which express process capability in parts per million.　A process with a Sigma level of Six generates a maximum defect probability of 3.4 parts per million. Sigma levels of performance are also often expressed in Defects Per Million Opportunities or DPMO　. It indicates how many errors would show up if an activity were to be repeated a million times, by factoring in opportunities for defects in the calculation. Six Sigma in many organizations simply means a measure of quality that strives for near perfection. It is also a disciplined, data-driven approach and methodology for eliminating defects in any process from manufacturing to transactional and from product to service. It is a business-driven, multi-faceted approach to process improvement, reduced costs, and increased profits.　With a fundamental principle to improve customer satisfaction by reducing defects, its ultimate performance target is virtually defect- free processes and products. (Gupta. C. B, 2009). Its philosophies are related to statistical process control, stochastic control (relating to probability) and engineering process, control.　In addition, it requires process and data analysis, optimization methods, lean manufacturing, design of experiment, analysis of variance, and statistical methods, mistake-proofing, on time and or on-schedule, waste reduction and consistency assurance.

Success in Six Sigma is dependent on an active senior management leadership and mentoring , an established infrastructure including, the so-called 'Judo-like black and green belts', a continuing project focus on 'bottom line' opportunities and results, with established teams trained in using a structured approach and methodology to achieve positive results. Six Sigma does not normally require significant capital expenditure other than for investment in the training and development of the participants in the process.　It does, however, require long-term commitment from management in the on-going process of continual

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 　97
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

improvement through active interest, support and review and the provisioning of appropriate resources. However, financial benefits should begin to be experienced with the completion of the first set of projects undertaken. Results, from organizations committed to the six sigma initiative indicate that the financial benefits make a very significant effort on the 'bottom-line' (William T. Truscott, 2009)

Six Sigma uses Project Teams to work on solving problems or improving processes in an effort to produce zero defects. Similar to Total Quality, Six Sigma differentiates itself by using statistical analysis of lots of data to help measure the current and desired outcomes of a process. Project Teams are comprised of individuals that are identified by their knowledge of Six Sigma concepts in the form of a ranking. Different belt colors signify different levels of interaction within a Six Sigma Team. Team members learn the roles and techniques needed for Six Sigma transformation in varying levels. The levels in Six Sigma are:

- White Belt - has been taught a high level overview of Six Sigma and how it works. A great introduction for all employees in an organization utilizing Six Sigma.
- Yellow Belt - considered a subject matter expert, these individuals have a specific knowledge about an area that might not be of primary focus on a Project Team, but bring specific knowledge about their function or area.
- Green Belt - usually earned by a project member who needs to have a good grasp of the Six Sigma concepts to be productive in Team discussions.
- Black Belts - are Team leaders who have learned Six Sigma techniques of facilitation in great detail. They are trained in change management and are taught leadership skills needed to run a successful Project Team.
- Master Black Belts - are individuals who are authorized to teach other Black Belts. They can also mentor and oversee projects using their deep understanding of the statistical needs of the Project Team. (Debbie Hatk, 2009)

RESOURCE COMMITMENT

The typical full-time commitment of personnel to Six Sigma efforts is roughly 1% of the company's population, though the situations where it reached 3%because there were sufficient opportunities for achieving significant gains. But far more important than the number of people, is the quality of the commitment. Black belts and champions must be full time to achieve sustainable results. Six Sigma requires that champions and black belts be selected based on their potential for becoming the future leaders of the corporation. So this makes managers, who have got to get out their billings, need to make sure the projects selected are of the highest priority to the organization and its customer's i.e devoting current resources to the highest priorities based on their potential to contribute to shareholder value. Those projects always get a lot more effort than is currently the case, whereas lower-value projects may be delayed. Ultimately, the champion will present the opportunities to his Profit &Loss manager for approval. One of the benefits of selecting the future leaders as black belts and champions is that they will receive an exemplary experience in every facet of business management and effective use of resources. They will develop a customer-centric process, rather than a departmental view of the business. Further, the potential for fast-track advancement based on a few years' success as a black belt works to retain this intellectual capital of the corporation.

EXECUTION INFRASTRUCTURE

Six Sigma possesses an infrastructure that effectively translates the Chief Executive Officer's (CEO's) agenda into a customer-centric set of projects chosen to maximize shareholder value and provides effective management and monitoring of results versus plan.

- The corporate champions are armed with the CEO and Profit &Loss (P&L) manager's an agenda for financial performance and shareholder value increase.
- These strategic goals are translated to an operational agenda by the business unit champions (sometimes called 'deployment champions') who report to the P&L managers. These unit champions are trained in the methods of identifying key value streams and prioritizing projects based on net present value (their potential contribution to shareholder value). The P&L manager has the ultimate authority for value stream identification and project selection, since his or her commitment to the process is essential for success.
- The customer critical-to- quality issues and the time traps within the key value stream are developed into projects and then prioritized. These projects (to execute cost reduction, quality improvements, etc.) are then executed by the black belts, who have been trained in the tools and team leadership skills of Lean Six sigma.
- Projects sponsors (who are report to the P&L manager) own the process that is to be improved by a specific project. They have the specific authority to implement improvements and have ultimate long- term accountability for ensuring that the improvements and financial benefits stick.
- Implementation is accomplished by a mix of team members, including green belts (team members), black belts, and master black belts. Whereas the black belts and champions are assigned full time to improvement activities, the green belts who support black belt projects are generally part time and have received less training.

PREDICTING TEAM SUCCESS, PREVENTING TEAM FAILURE

The success of Six Sigma is ultimately dependent on the ability of teams to execute projects effectively. It might be thought that the assembly too many brilliant individuals would be a satisfactory approach, but that perspective has been proven false time and time again. Even the Six Sigma culture can't overcome poor team composition. Now the companies have a number of different psychological models which point in the same direction and provide insight into the prediction of team success and failure. One area of common agreement is that it is possible to get much better results from a team if each member is playing his or her "preferred role", and if there is a balance of these essential roles on a team. Inexpensive software is available which facilitating relatively simple testing, which makes it possible to determine an individual's preferred role, both in his eyes and those of his peers. To draw the best out of the team, master black belts and black belts must hone individual leadership skills, such as the ability to balance inquiry and advocacy in the pursuit of superior results from teams. So organization experienced in the implementation of Six Sigma programs have recognized the importance of team and individual leadership skills in the Six Sigma process and include training in this area as a basic requirement. (Michael L. Georg, 2002)

THE NEXT WAVE IN SIX SIGMA

In any organization customer satisfaction is the number one priority and which means profitability. The success of any company depends on the ability to ensure the highest quality at the lowest cost. In the 1980s, when most companies believed that producing quality products was too costly, Motorola believed the opposite: "the better, the cheaper". It realized that by producing a higher-quality product, the cost of producing goes down. Today the competitive market leaves no space for error. It is now necessary to implement the concepts of Lean Six Sigma. Lean Six Sigma is a business strategy in which the focus is to improve the bottom line and increase customer satisfaction.

The now-dominant standing of Lean indicates that companies are increasingly relying on that as the core foundation for their continuous improvement efforts to help them face the challenges of today's economic downturn. Six Sigma is one of the most widely recognized quality improvement methods used in businesses today. Lean up to this point is a discipline that has been used primarily in the manufacturing sector to focus specifically on process speed and efficiency. Specifically, it is the body of knowledge and tools businesses use to remove all non-value-added time and activity from their processes. Many companies often use Lean Six Sigma, to help meet their business goals and customer needs.

Trends in the industry are often telegraphed into candidate requirements in job postings, and they can serve as a window into the latest corporate initiatives. Demand for Lean talent has surpassed Six Sigma by a substantial margin as the more desired skill set, accelerating an already growing shift in talent demand toward Lean. The fusion of Lean and Six Sigma is that Lean cannot bring a process under statistical control and Six Sigma alone cannot dramatically improve process speed or reduce invested capital. Thus Lean Six Sigma is a methodology that maximizes shareholder value by achieving the fastest rate of improvement in customer satisfaction, cost, quality, process speed, and invested capital. It is a process capability that continuously improves the quality of the product and maximizes productivity. In simple terms, Lean Six Sigma is the following:

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 98
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

- It is a data-driven approach methodology to analyze the root causes of manufacturing and business problems/process of eliminating defects (driving, towards six standard deviation between the mean and the nearest specification limit), and dramatically improving the product.
- It improves the employees' knowledge of business management to distinguish the business from the bottom line, customer satisfaction, and on-time delivery. Thus Six Sigma is not just process improvement techniques but a management strategy to manage the projects to financial goals.
- It combines robust design engineering philosophy and techniques with low risks (Lean Six Sigma tools: Design, Measure, Analyze, Improve and Control)
- It would be very difficult to achieve this goal without team work and proper training of the entire organization to a higher level of competency. (Salman Taghizadegan,2009)

CONCLUSIONS

Six Sigma can be applied to any organization and to any area of an organization from Manufacturing to IT. Nearly 150 companies have so far successfully implemented the six sigma. If used intelligently Six Sigma can enhance results, dramatically by targeting improvements through breakthrough projects. No other system gives an integrated approach to what a company must do in order to satisfy the customer. It focuses on both top line and bottom line. The Six Sigma methodology provides a complete structures framework for implementation, with a cookbook step-by-step approach. Under Six Sigma, qualities becomes a tangible and measurable product. It is applicable to all processes. It identifies the root of the problem and then proceeds to remove it completely from the system. It is the system that combines science, technology, quality and profitability. It changes the way a company works by pulling it into the cycle of culture change. First, it changes the behavior of the people, who then translate this into better results for the projects that they work on. That, in turn, changes the corporate culture.

REFERENCES

1. Abhishek Kamdi (2010) , "Six Sigma in HR", available at http://hrmba.blogspot.in/2010/01/six-sigma-in-hr.html
2. Debbie Hatke, MA, "Six Sigma: Achieving near Perfection", available at http://www.strategichrinc.com/articles/Dec09.htm
3. Gupta.C.B (2009), "Human Resource Management", Sultan chand & Sons, NewDelhi ISBN 81-8054-601-3), pp 38.21
4. Gupta.C.B (2009), "Management, Theory and Practice", Sultan Chand &sons, New Delhi, ISBN 978-81-8-54-726-3, pp 52.20, 52.21.
5. Khanka, S.S (2009), "Human Resource Management (Text and Cases)", S. Chand, New Delhi,   ISBN 81-219-2300-X, pp 395.
6. Michael L. George (2002), "Lean Six Sigma: combining Six Sigma Quality with Lean Speed", Tata McGraw-Hill Publishing Company Limited, New Delhi, ISBN 0-07-052893-4, pp. 21-24
7. Salman Taghizadegan, (2009), " Essentials of Lean Six Sigma, Butter worth- Heinemann", An imprint of Elsevier, New Delhi,ISBN 10:81-312-0669-6,pp 2
8. Srinivas R.Kandula (2009), "Human Resourse Management-with Models, Techniques and Tools", PHI Learning Private Ltd., New Delhi, pp.314
9. William T. Truscott, (2009), "Six Sigma: continual improvement for Businesses-A Practical Guide, Butter-Heinemann", An imprint of Elsevier, ISBN-978-81-312-1193-9, Elsevier, Noida, pp.2.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   99
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

MOBILITY AND RETENTION OF FEMALE FACULTIES IN PRIVATE COLLEGE

POOJA
ASST. PROFESSOR
BORA INSTITUTE OF MANAGEMENT SCIENCES
LUCKNOW

ABSTRACT

It is universally accepted that female teachers are critical actors in education processes. But in past few years, it is observed that female faculties are frequently switching their academic institution especially in private colleges. Mobility of female faculty lead to disruption of a program's continuity&planning decreased student learning and increased costs for recruiting new faculties. The main aim of this study is to identify the factors influencing the high rate of mobility of female faculty working in private colleges. A survey has been conducted among 60 faculties of different private colleges of Lucknow by using questionnaire. The study indicate that the common factors related to the mobility of female faculty are-work family conflict, stress, low salary, work environment, lack of career advancement opportunity, job satisfaction, job security and others issues like gender discrimination, favouritisms, higher studies and personal issues (marriage, pregnancy &in- laws attitude).Further the study emphasis on the various retention strategies which can be adopted by the private university to retain their female faculties. This study reveals that for improving the quality of education in private college it is essential that management should retain their good resources especially female members. Organisation should understand the causes of mobility and use the best retention strategies to retain their female faculties.

KEYWORDS

Female Faculty, Mobility, Private College, Retention Strategies.

INTRODUCTION

High rate of faculty mobility can be costly to the reputation of an institution and to the quality of instruction. So, it is paramount important for any educational institutes to retain their faculty. The problem of availability of proper qualified and experienced faculty members is becoming extremely acute in the private colleges. One of the reasons is   female faculty members are frequently switching their academic institutions. So, the study was conducted in order to gain insight into the factors influencing female faculty mobility in private colleges.

FEMALE FACULTY AND PRIVATE COLLEGES IN LUCKNOW

Education sector is dominated by female members .There are over 15000000 women workforce in schools and other education sector consisting just over two thirds of the workforce. Talking about Private colleges Lucknow than it is obvious that every year number of student pass out from the Private colleges in Lucknow. Covering almost every area and course of education the Private colleges of Lucknow are way ahead in offering wide range of courses to their student's. These colleges are not completely outside government control. They are affiliated with any university (Government/ Private). Though the number of private colleges increased in recent decade, but the performance of the majority of these private colleges are found below the standard average (Khan, Ahemed, and Sarkar 2010).

LITERATURE REVIEW

Faculty mobility means switching of jobs by the faculty members from one university/college to another locally or internationally university /college (Khan, Ahemed&Sarker2010).Williams (1998) refers to faculty mobility or migration as the tendency of moving from one college to another. For the purpose of the present study, faculty mobility does not refer to a female faculty who has quit the teaching profession, but who moves between the colleges. Moreover,Faculty attrition and turnover are components of teacher mobility (Williams 1998).In private college/university the faculty turnover is quite higher almost between 16 to 17% in comparison to public universities which is somewhere 2to3%(Jalil2009).One of the important reason for high turnover is, female Faculty members are moving from one educational institute to another(Khan, Ahemed &Sarker2010).

Research has shown that the career of teaching is characterized by very high mobility(Theobald and Michael,2001).Mobility patterns differ between women and men,men who move prior to tenure tend to leave academe,while women tend to enter adjunct positions.For women faculty members, feeling of isolation, lack of respect of colleagues and difficulty integrating family and professional responsibilities and major factors in attrition from university career.(Committee on science, Engineering and Public Policy(COSEPUP2007) .

McKenna and Sikula (1981) suggest that faculty change institutions to get higher salaries and higher rank, and to distance themselves from a variety of administration practices. Some even move for the opportunity to work with better student, even though such a personal agenda may reflect institutional market power (D'Aveni1996).

OBJECTIVES OF THE STUDY

1)   To understand and investigate the current situation of female faculty mobility in private colleges.
2)   To analyse the factors influencing mobility of female faculties in private colleges
3)   To suggest the best retention strategies to overcome the problems identified.

NEED OF THE STUDY

Faculty mobility is one of the educational constraints, needs to be understood and addressed for the purpose of improving the quality of education. As education sector is dominated by female and they are frequently switching the educational institution. Therefore, there is need to study concerning factors influencing female faculties mobility in private college. Further, the finding of this study could be useful to the college management&management might, devise means and ways of dealing with the problem for the wellbeing of the colleges.

STATEMENT OF THE PROBLEM

Improving the quality of education is one of the salient contemporary issues in the country. Teachers are of paramount importance in carrying out this process. However, there is a dearth of knowledge concerning certain factors affecting the process of female faculty mobility.The present problem is the study of factors influencing mobility of female faculty in private college.

SCOPE OF THE STUDY

The scope of the study is restricted to-
1.   Female faculty working only in private colleges .It does not include other staff like administration, library etc.
2.   The study covers the factors influencing the mobility of female faculty working in private colleges.
3.   Finally, the study includes retention strategies which can be adopted by college management to overcome the problem of mobility of female faculty.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   100

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

RESEARCH METHODOLOGY

The research design of the study is descriptive in nature. The female faculty working in private colleges were considered as source of population for the study.

SAMPLING METHOD

Random sampling method is adopted for this study. A sample size of 60 female faculties was selected from different private colleges of arts,management and engineering situated in Lucknow. Data were collected from A.P Sen Memorial Girls Degree College, Aryakul College of Management, Bhalchandra Institute of Education And Management, Institute of Environment And Management, Charak Institute of Business Management, Dr M,C Sexena College of Education,Goel Institute of Higher Studies , G.C.R.G Memorial Trusts Group of Institution and Nimbus School of Technology Management.

SOURCES OF DATA

The primary and secondary data were used for this study. The study used both quantitative and qualitative research techniques in collecting data.Data were mainly collected through questionnaires, interviews and direct observation.

PRIMARYDATA

Primary data mainly include structured questionnaires and interviews schedule.

QUESTIONNAIRE

Primary data was collected by carrying out a survey among 60 female faculties of different private colleges by using structured questionnaire. The questions used in the questionnaire were pre-tested. The constructed questions were closed and multiple choices in nature.

INTERVIEW

Using interviews as a qualitative research technique enabled the researcher to gain more in-depth knowledge from the respondents. A semi structured interview schedule was used. The response from the respondent was written, at the time of interview and then analysed in the systematic and iterative manner to identify the issues behind female faculty mobility.

SECONDARY DATA

The secondary data were obtained through published books, magazines, national &international journals, statistical reports, text books and internet.

TOOLS OF DATA ANALYSIS

The primary data collected from the structured questionnaire was analysed by using percentages and averages. The results of analysis were interpreted and findings were made for the study.

DATA ANALYSIS AND INTERPRETATION

TABLE 1: SHOWS DEMOGRAPHIC PROFILE OF THE RESPONDENTS

Sr. No.	Demographic Profile	Frequency	Number of Respondents	Percentage to Total
1	**Age**	Less than 35 years	35	59
		35-45 years	20	33
		Above 45 years	5	8
		Total	60	100
2	**Experience**	Less than 2 years	30	50
		2-5 years	22	37
		Above 5 years	8	13
		Total	60	100
3	**Educational qualification**	Graduates	18	28
		Post graduates	40	61
		Doctorates	7	11
		Total	60	100
4	**Designation**	Lecturers	38	63
		Asst. professors	15	25
		Professors	7	12
		Total	60	100
5	**Income**	Less than Rs 25,000	25	36
		Rs25,000-40,000	35	50
		AboveRs 40,000	10	14
		Total	60	100
6	**Marital status**	Unmarried	24	40
		Married	36	60
		Total	60	100

Source: Computed Primary Data

Regarding the age category of respondents, it is inferred from table 1.0 that 59 percent of respondents belong to the age category of less than 30 years, 33 percent are in the category of 35 to 45 years and remaining 8 percent are above 45 years. It can also be seen that 50 percent of them have less than 2 years of experience, 37 percent of them have 2 to 5 years of experience and 13 percent of them have above 5 years of experience. Regarding the educational qualification of respondents, 28 percent of female employees have Graduates 61 percent have post graduates and 11 percent of female faculty either pursuing or completed their doctoral degree. About 63 percent of respondents are working as lecturer, 25 percent of them working as AssT. professor and remaining 12 percent of them working as Professor. And with regard to annual income ,36 percent of respondents have less than Rs.25,000, 50 percent of them have between Rs.25,000 to Rs. 40,000 and 14 percent have above Rs. 40,000 .It is evident from the table that 78 percent of them were married and 22 percent were unmarried.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 101
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in
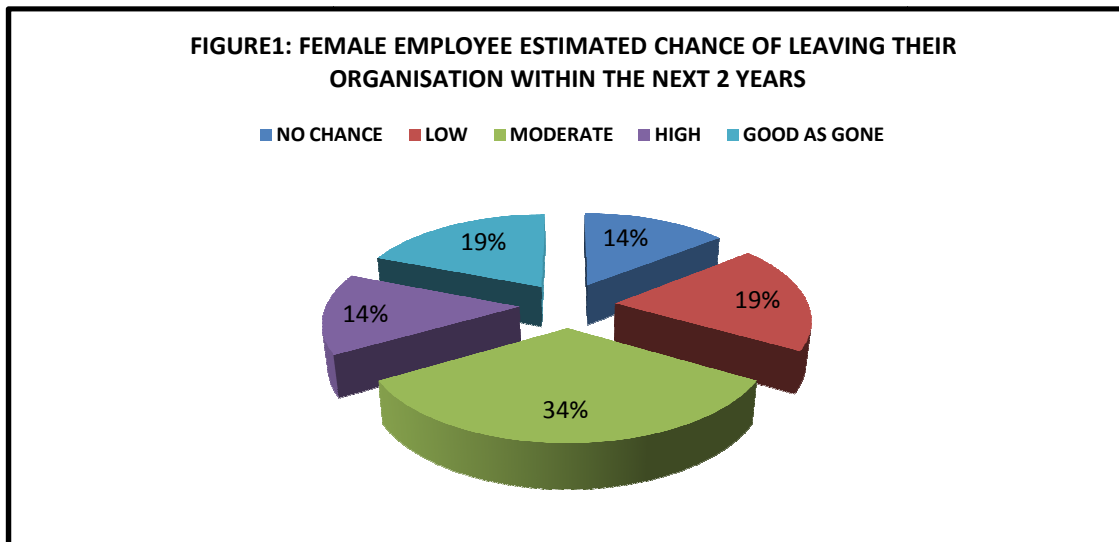
Source: Computed Primary Data

Figure 1 shows that about 50 percent of respondents surveyed expect to leave their college within next 2 years. Only 15 percent of respondents denied the chance of changing their current college. So, this high mobility rate of faculties adversely affects the performance of students, academic planning and most important learning process.
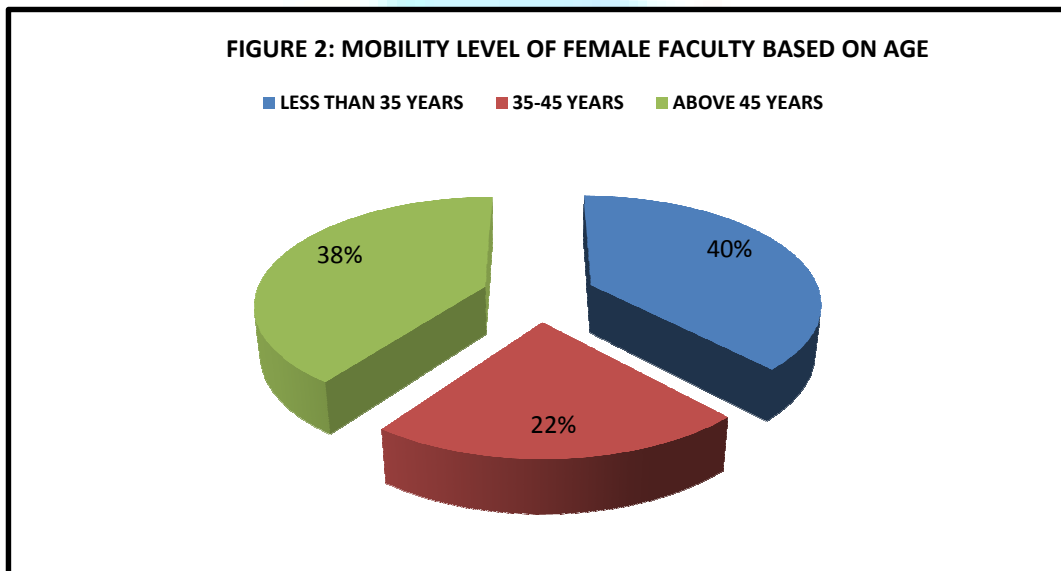
Source: Computed Primary Data

Figure 2 shows that 40 percent of young female faculties frequently changing the institutes may be because they seek opportunities for growth and advancement or personal reasons like –marriage or pregency. On the other hand 22 percent of respondents of age group 35 -45years & 38 percent of respondents are above 45 years are frequently changing their college .

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   102
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

FIGURE 3: FACTORS INFLUCENCING MOBILITY OF FEMALE FACULTY IN PRIVATE COLLEGES
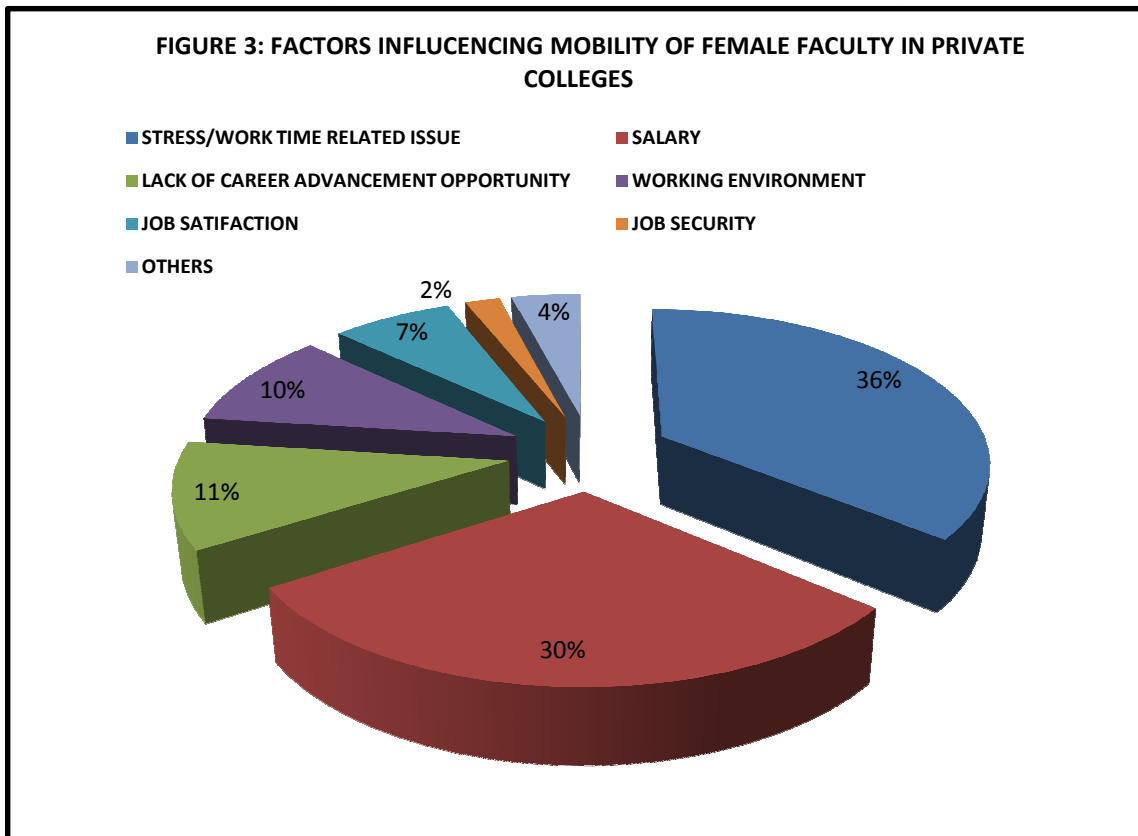
Source: Computed Primary Data

Figure3 shows, 36 percent of respondents are facing the high level of stress and work –time related issues. Actually most of the female members join education sector because they believe that they can maintain the work-life balances, as the teaching profession is stress free and less working hour compare to other sectors. But that is not true. Even there are many women employees who face stress because of working in the education sector also. Most of the private colleges are working 9 hours per day and 6 days in a week. Due to long working hour they do not have enough time for leisure activities and family which causes work family conflict.The other factors contributing to stress to female faculty are unequal distribution of course, work related to counselling and admission of student, leading a meeting, organizing cultural programs, off campus work and placement duty.According to survey 30 percent of the respondents are moving to other colleges because of poor compensation package.They think that their salary is not equitable with the others working in similar positions in other colleges. Other financial issues like legitimate bases of reward allocation, lack proper rules for salary increase and lack of transparent and clear parameter for faculty evaluation, cost cutting, reducing hike in salary in the name of poor performance arealso demoting thefemale faculties.11 percent of respondents are dissatisfied with lack of career advancement opportunity in private colleges. It is mainly due to lack of consultancy, lack of support from top management for further studies and lack of research and publication facilities. Most of the respondents are unable to pursue their PhD or higher studies because of work load and lack of top management support.

About 10 percent of respondents are dissatisfied with working environment. It includes both physical and social environment of the college. Majority of the respondents were dissatisfied with social environment because of work politics which creates unhealthy relation with peers and superiors. Most of these respondents switched to another private college in search of politic -free environment. On the other hand, physical environment such as computer, classroom condition, staff room condition are also demotivates the female faculty.According to the survey about 7 percent of the respondents are not satisfied with the present job. Most of the respondents are dissatisfied with performance appraisal system. They claim that their appraisal and promotional system is a victim of "Favouritism".About 2 percent of the respondents reported that lack of job security in private college also cause high turnover.Rest 4 percent of respondents pointed other issues like quality of the students; lack of faculty autonomy and lack of transportation facility and gradual decrease in causal leaves are important factor in faculty mobility. .On the other hand they pointed personal problems like-marriage, pregnancy, transfer of husband, negative attitude of laws are also significant factor influencing their mobility.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   103

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

FIRURE 4:GENDER BASED MANAGEMENT PROBLEMS

■ TRUE   ■ FALSE   ■ TO SOME EXTENT
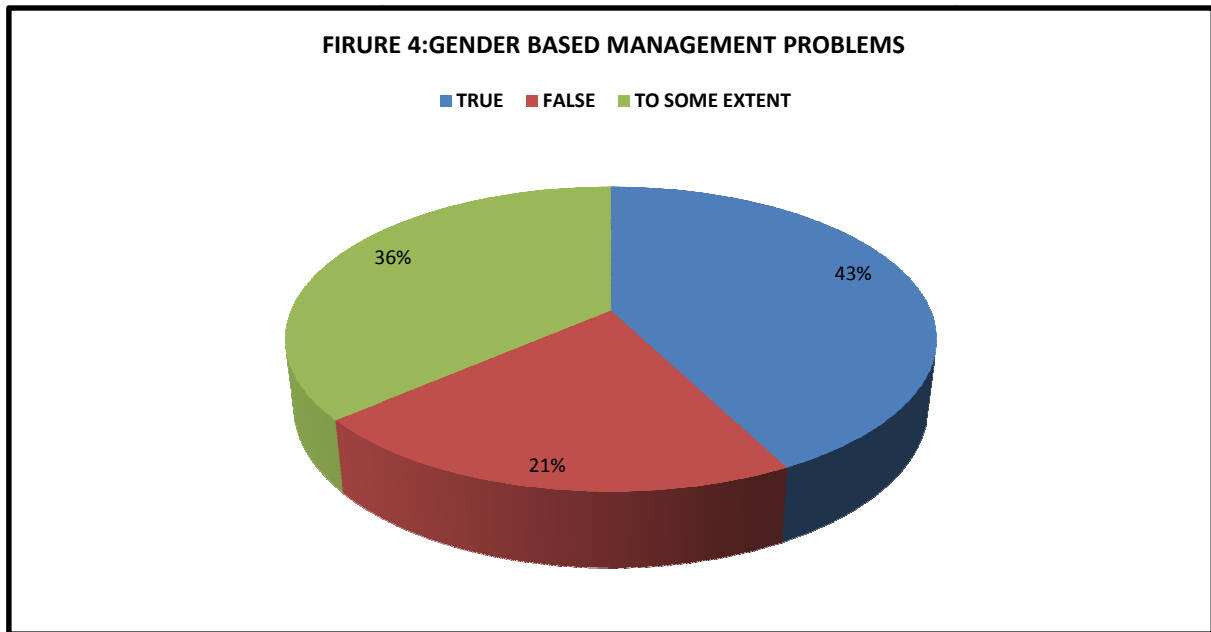
Source: Computed Primary Data

Figure4 evidently indicates that 42 percent female faculty encounters some problems while working with male members. Right from allocation of work to promotion there has been a gender discrimination which demotivates the female faculty.

FIGURE 5:PROBLEM RATIO ACCORDING TO MARITAL STATUS

■ YES   ■ NO
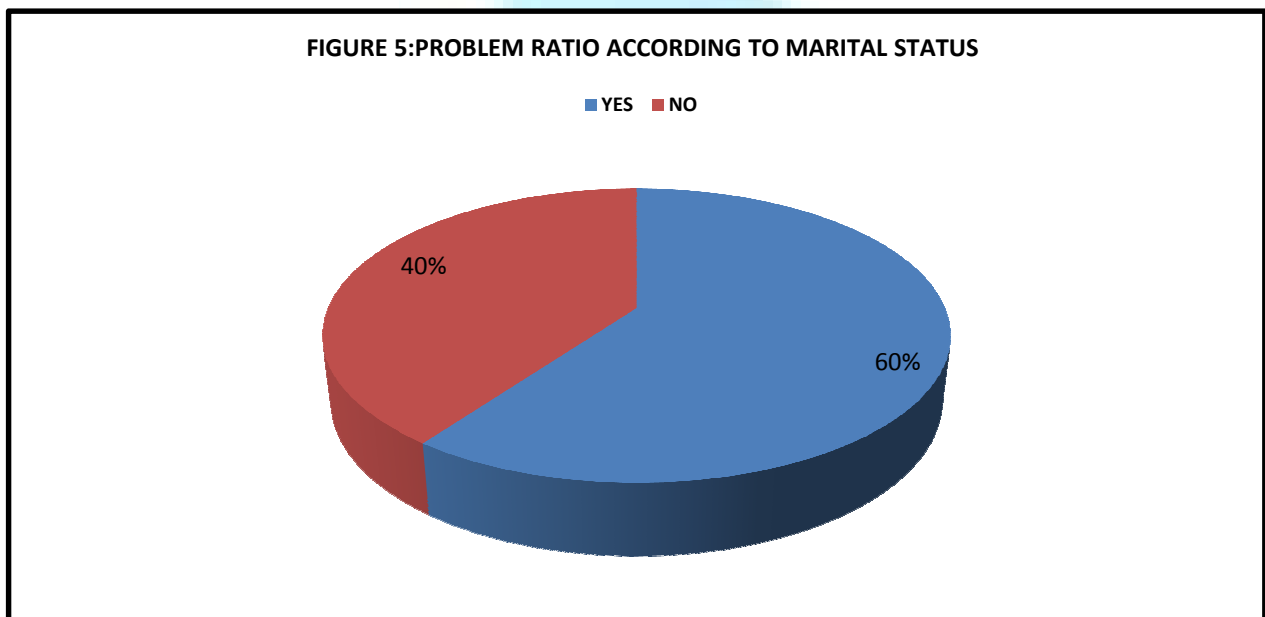
Source: Computed Primary Data

Figure 5 shows that 60 percent of married female faculty face more problems than an unmarried female faculty. The underlying problem of the all working married female is that their children and personal life have been highly neglected.

FIGURE 6: ORGANISATION EFFORT TO RETAIN FEMALE FACULTIES

■ YES   ■ NO   ■ TO SOME EXTENT   22

Source: Computed Primary Data

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

104
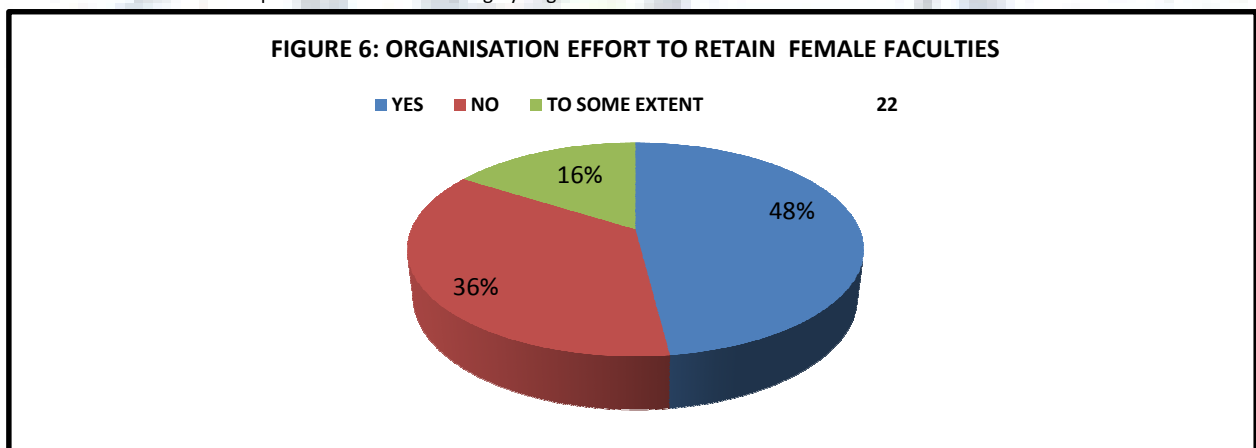
Figure 6 shows that only 48 percent of college management adopt some strategies to retain their good resources while 36 percent of them do not make any effort to retain their good female faculties. About 16 percent of organisations try to retain their female faculties at some extent.

FIGURE 7 : STRATEGIES ADOPTED BY PRIVATE COLLEGES TO RETAIN THEIR FACULTY
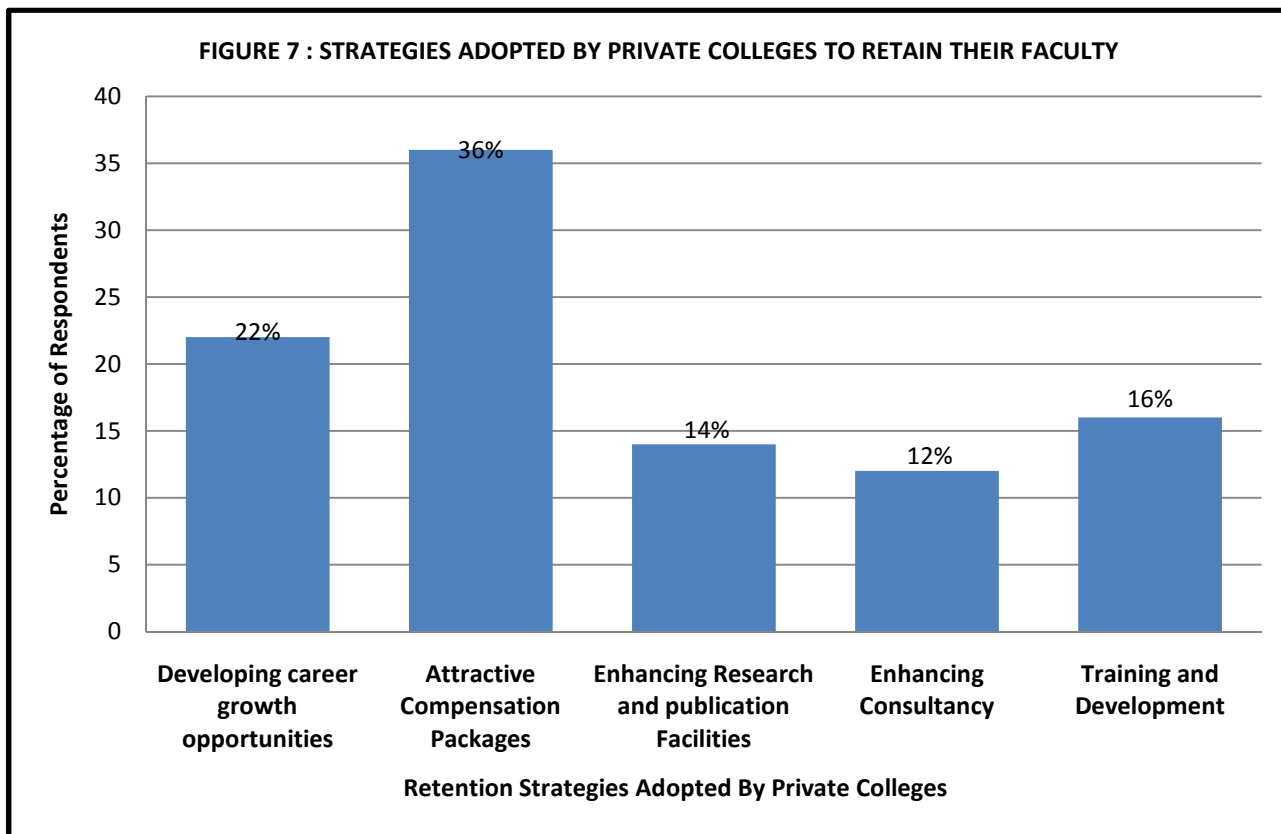
Figure7 shows that 36 percent of the respondents reported that their colleges, improving compensation package, 22 percent developing career growth opportunities, 14 percent enhancing research and publication facilities, 16 percent providing training and development and rest enhancing consultancy to retain their female faculties.

RECOMMENDATIONS

In the light of the findings of the study, the following recommendations are made:

1. The first step in improving retention is to understand causes of mobility. Management need to interact to female faculties and measure their opinion to see why turnover is happening.
2. To reduce stress and work related issues management can introduce flexible work schedule and feasible time table. Female faculties should be involved in decision making and their suggestions should be considered by the management.
3. Transportation facilities should be provided to female faculties.
4. In response to female facultie's desire for growth and advancement opportunities, management can introduce training and development programs, seminars, proper facilities of research and development and scholarship for higher studies.
5. Quality of compensation, benefits and special perks should be improved in order to lower the facultie's mobility. The compensation must be equitable with other faculties working to other colleges in similar positions.
6. Salary and recognitions should be directly linked with performance of the female faculties.
7. Every employee in the world wants recognition for job well done. Special bonuses, rewards and recognition should be given, so that they should work with enthusiasm.
8. Female faculties want to work where they get conducive environment and mental satisfaction (Khan, Ahmed, Sarker2010). Enhancing face to face interaction with superior ,high involvement at work place, gender equality and politics free environment can improve overall work environment.
9. Management must enforce a transparent and proper system for performance appraisal. Appraisal system should be free from "Gender discrimination" and "Favouritism".
10. Promotion system should be made more purified and filtered, so that female faculty has also equal opportunity for promotion.
11. According to the interest of the female faculties management can distribute work like-cultural activities, student counselling, arranging meeting, sports event or examination related work.Female faculties should not be given off campus work, industrial visit or placement duty because it creates work family conflict.
12. Last but not the least mobility of female faculties can be reduced by providing overall job satisfaction and job security.

CONCLUSION

Faculty members, as significant human resources, can play a crucial role in enhancing output in different social establishments, including universities and educational systems, if they are satisfied with their job condition (Ahmad, Masood2011**)**. Education sector is dominated by female members. For improving the quality of education in private college it is essential that management should retain their good resources especially female members. Organisation should understand the causes of mobility and use the best retention strategies to retain their female faculties. However, still organisation might not be using the best approach to improve the retention of female faculty.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

One of the shortcomings of this study is the use of convenient sample size of 60 within Lucknow only. The respondent's replies tend to be biased and most of the respondents were reluctant to mention their education, age and salary. . Further, a limited number of respondents were interviewed in this study. Researcher-designed structured questionnaires were used. The questionnaires had many closed questions.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   105
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

The next study could be conducted using a qualitative approach in order to get information directly from the respondents in other city or states of India. In that way, it might be possible to collect rich data from the respondent's views on the subject, instead of reacting to closed questions where they were confined to certain responses only. It is recommended that future researchers perform a study to examine causes of mobility of female employees from others sector to education. So, further research could be undertaken along those lines.

REFERENCES

1. Alam, S.S., Talha, M., Sivanand C.N., Ahsan, M.N (2005). "Job Satisfaction of University Woman Teachers in Bangladesh". Journal of Social Sciences, Vol 1 (2), pp 88-91.
2. Anglin, W. L., Goldman, R., Anglin, J.S. (1982). "Teaching: what it's all about".New York: Harper & Row.
3. Burke RJ.(2001) "Organizational values, work experiences and satisfactions among managerial and professional women". Journal ofManagement Development; Vol-20, pp46–54.
4. Drechsler, D., Jütting, J. and Lindberg, C. (2008): "Gender, Institutions and Development –Better"
5. Jakimow Tanya and Patrick Kilby. 2006. "Empowering Women: A Critique of the Blueprint for Self Help Groups in India." Indian Journal of Gender Studies .Vol13 (3), pp-375.
6. Lalitha Devi (2006), "Women in Family and attitude on Work", HR Digest, Vol.IV, Issue.No.3, pp.38-42.
7. Luthans, F. and Davis, K. (1992). "Organizational behaviour". (6th ed.). NewYork: McGrawhill Inc.
8. Manger, T. & Eikeland, O. (1990). "Factors predicting staffs' intentions to leave The University," Higher education, 19: 281-291.
9. Presser, Harriet. 1986. "Shift Work among American Women and Child Care." Journal of Marriage and the Family" Vol V, pp 48-63.
10. Ramanna A, Bombawale U. "Transitory status images of working women in modern India". Indian J Soc Work. 1984; pp189–202.
11. Rust, Val d. and Per Dalin. (1990). "Teachers and teaching in the developing world". New York: Garland Publishing.
12. Sarvananaraj M.G.,(2012), "Faculty Perception Regarding Gender Equality with Reference to Women Empowerment in College, SouthIndia, "European Journal of Social Science,Vol.31,No-4,pp270-278.
13. Srivastava V., 1978. "Employment of educated women in India; its causes and consequences." New Delhi: National Publishing House.
14. Thorat, M. 1995. "Labour administration, enforcement and gender", in K.V. Easwara Prasad and C. Joseph (eds.): Women, work and inequity: The reality of gender, (NOIDA, NationalLabour Institute).

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   106
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

EFFECT OF WORKING CAPITAL MANAGEMENT ON PROFITABILITY OF PHARMACEUTICALS FIRMS IN INDIA

NILESH M PATEL
ASST. PROFESSOR
SAL INSTITUTE OF MANAGEMENT
AHMEDABAD

MITUL M. DELIYA
ASST. PROFESSOR
S. K. COLLEGE OF BUSINESS MANAGEMENT
HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY
PATAN

ABSTRACT

Working capital management is vital role in firm financial management decision. An optimal working capital management is expected to give positively to the creation of firm value. Working capital management has its effect on liquidity as well on profitability of the firm. The purpose of this study is to look into the relationship between working capital management and firm profitability. In this research, I have selected a sample of 31 pharmaceuticals Indian firms listed on national stock exchange for a period of 10 years from 2002-2011. I have studied the effect of different variables of working capital management including the average collection period, inventory turnover in days, average payment period, cash conversion cycle and current ratio on the net operating profitability. I have also used control variable like debt ratio, size of the firm (measured in terms of natural logarithm of sales) and financial assets to total assets. I have considered pearson's correlation coefficient and regression as a statistical tools. The coefficient results of regression analysis provide a strong negative significant relationship between cash conversion cycle and firm profitability. This reveals that reducing cash conversion period results to profitability increase.

KEYWORDS

Working Capital Management, Cash Conversion Cycle, Average Collection Period, Inventory Turnover in Days, Average Payment Period, Profitability and Liquidity.

1. INTRODUCTION

In common, it is possible to discuss finance theory under three main threads as capital budgeting, capital structure and working capital management. The first two of them are mainly related with financing and managing long-term investment. However, financial decisions about working capital are mostly related with financing and managing short-term investment and undertake both current assets and current liabilities simultaneously. So, most of the time, it is reasonable to term short-term financial management as working capital management.

Working capital management is a very important component of corporate finance because it directly affects the liquidity and profitability of the company. It deals with current assets and current liabilities. Working capital management is important due to many reasons. For one thing, the current assets of a typical manufacturing firm accounts for over half of its total assets. For a distribution company, they account for even more. Excessive levels of current assets can easily result in a firm's realizing a substandard return on investment. Efficient working capital management involves planning and controlling current assets and current liabilities in a manner that eliminates the risk of inability to meet due short term obligations on the one hand and avoid excessive investment in these assets on the other hand (Eljelly, 2004). With regard to current liabilities, the firm is responsible for paying these obligations on a timely basis. Liquidity for the on going firm is not reliant on the liquidation value of its assets, but rather on the operating cash flows generated by those assets (Soenen, 1993).

The ultimate objective of any firm is to maximize the profit. But, preserving liquidity of the firm is an important objective too. The problem is that increasing profits at the cost of liquidity can bring serious problems to the firm. Therefore, there must be a trade off between these two objectives of the firms. One objective should not be at cost of the other because both have their importance. If we do not care about profit, we can not survive for a longer period. On the other hand, if we do not care about liquidity, we may face the problem of insolvency or bankruptcy. For these reasons working capital management should be given proper consideration and will ultimately affect the profitability of the firm.

Another component of working capital is accounts payable. Delaying payments to suppliers allows a firm to assess the quality of bought products, and can be an inexpensive and flexible source of financing for the firm. On the other hand, late payment of invoices can be very costly if the firm is offered a discount for early payment. A popular measure of Working Capital Management (WCM) is the cash conversion cycle, i.e. the time lag between the expenditure for the purchases of raw materials and the collection of sales of finished goods. The longer this time lag, the larger the investment in working capital (Deloof 2003). A longer cash conversion cycle might increase profitability because it leads to higher sales. However, corporate profitability might also decrease with the cash conversion cycle, if the costs of higher investment in working capital rise faster than the benefits of holding more inventories and/or granting more trade credit to customers. This discussion of the importance of working capital management, its different components and its effects on profitability leads us to the problem statement which I have analysed.

The problem statement to be analysed in this study is:

"Does Working Capital Management Affect Profitability of Indian pharmaceuticals Firms?"

To analyse this problem statement, I have developed objectives of my research, which will hopefully contribute towards a very important aspect of financial management known as working capital management.

This research is focusing on working capital management and its effects on profitability for a sample of Indian Pharmaceuticals firms. The main objectives are:

- To review a relationship between Working Capital Management and Profitability over a period of ten years for 31 Indian Pharmaceuticals companies listed on National Stock Exchange.
- To find out the effects of different components of working capital management on profitability
- To establish a relationship between the two objectives of liquidity and profitability of the Indian Pharmaceuticals firms.
- To find out the relationship between profitability and size of the Indian Pharmaceuticals firms.
- To find out the relationship between debt used by the Indian firm and its profitability.

2. LITERATURE REVIEW

Many researchers have studied working capital from different views and in different environments. The following ones were very interesting and useful for my research:

Garcia-Teruel and Martinez-Solano collected a panel of 8,872 small to medium-sized enterprises (SMEs) from Spain covering the period 1996 - 2002. They tested the effects of working capital management on SME profitability using the panel data methodology. The results, which are robust to the presence of

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   107

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

endogeneity, demonstrated that managers could create value by reducing their inventories and the number of days for which their accounts are outstanding. Moreover, shortening the cash conversion cycle also improves the firm's profitability.

Falope and Ajilore used a sample of 50 Nigerian quoted non-financial firms for the period 1996 -2005. Their study utilized panel data econometrics in a pooled regression, where time-series and cross-sectional observations were combined and estimated. They found a significant negative relationship between net operating profitability and the average collection period, inventory turnover in days, average payment period and cash conversion cycle for a sample of fifty Nigerian firms listed on the Nigerian Stock Exchange. Furthermore, they found no significant variations in the effects of working capital management between large and small firms.

Deloof (2003) discussed that most firms had a large amount of cash invested in working capital. It can therefore be expected that the way in which working capital is managed will have a significant impact on profitability of those firms. Using correlation and regression tests he found a significant negative relationship between gross operating income and the number of days accounts receivable, inventories and accounts payable of Belgian firms. On basis of these results he suggested that managers could create value for their shareholders by reducing the number of days' accounts receivable and inventories to a reasonable minimum. The negative relationship between accounts payable and profitability is consistent with the view that less profitable firms wait longer to pay their bills.

Ali Uyar (2009) This study, which was conducted on listed companies in the Istanbul Stock Exchange, presents the mean values of cash conversion cycle for various industries comparatively. The paper showed that retail/wholesale industry has shorter CCC than manufacturing industries. The main reason for this is that retail/wholesale industry do not manufacture goods, rather it keeps ready-for-sale goods in its warehouse. Hence, it has shorter days in inventory. Secondly, the retail/wholesale industry makes cash sales or credit sales with short maturity. Moreover, the retail/wholesale industry is slower in paying its accounts payable to its suppliers. Another important finding of the study is that the textile industry has the longest CCC, therefore, the industry may have liquidity problems.

3. METHODOLOGY

The purpose of this research is to contribute towards a very important aspect of financial management known as working capital management with reference to Indian pharmaceuticals Firms. Here I have seen the relationship between working capital management practices and its affects on profitability of 31 Indian pharmaceuticals Firms listed on National stock Exchange for a period of ten years from 2002 – 2011.

3.1 DATA SET & SAMPLE

The study is based on secondary data. The data are collected mainly for the variables, viz, Net Operating Profitability (NOP), Average Collection Period (ACP) , Inventory turnover in days (ITID), Average Payment Period (APP), Cash Conversion Cycle (CCC), Current Ratio (CR), Size (Natural logarithm of Sales (LOS)), Debt Ratio (DR), financial assets to total assets (FATA). The purpose of this research is to contribute towards a very important aspect of financial management known as working capital management with reference to Indian Pharmaceuticals firms. Here I have seen the relationship between working capital management practices and its affects on profitability of 31 Indian pharmaceuticals firms listed on National stock Exchange as per CNX 500 index for a period of ten years from 2002 – 2011.

3.2 VARIABLES

All the variables stated below have been used to test the hypotheses of my study. They include dependent, independent and some control variables:

Net Operating Profitability (NOP) which is a measure of Profitability of the firm is used as dependant variable. It is defined as Operating Income plus depreciation, and divided by total assets minus financial assets.

Average Collection Period (ACP) used as proxy for the Collection Policy is an independent variable. It is calculated by dividing account receivable by sales and multiplying the result by 365 (number of days in a year).

Inventory turnover in days (ITID) used as proxy for the Inventory Policy is also an independent variable. It is calculated by dividing inventory by cost of goods sold and multiplying with 365 days.

Average Payment Period (APP) used as proxy for the Payment Policy is also an independent variable. It is calculated by dividing accounts payable by purchases and multiplying the result by 365.

The Cash Conversion Cycle (CCC) used as a comprehensive measure of working capital management is another independent variable, and is measured by adding Average Collection Period with Inventory Turnover in Days and deducting Average Payment Period.

Current Ratio (CR) which is a traditional measure of liquidity is calculated by dividing current assets by current liabilities.

In addition , Size (Natural logarithm of Sales (LOS)), Debt Ratio (DR) will be use as proxy for Leverage and is calculate by dividing Total Debt by Total Assets, and ratio of financial assets to total assets (FATA) are included as control variables. Fixed financial assets are the shares in other firms, intended to contribute to the activities of the firm holding them by establishing a lasting and specific relationship and loans that were granted for the same purpose. For some firms such assets are a significant part of their total assets.

3.3 HYPOTHESES TESTING

Since the objective of this study is to examine the relationship between profitability and working capital management, the study makes a set of testable hypothesis {the Null Hypotheses H0 versus the Alternative ones H1}.

HYPOTHESIS 1

H01: There is no relationship between efficient working capital management and profitability of Indian Pharmaceuticals firms.

H11: There is a possible positive relationship between efficient working capital management and profitability of Indian Pharmaceuticals firms. Firms more efficient in managing their working capital is expected to pose high level of profitability and vice versa.

HYPOTHESIS 2

H02: There is no relationship between liquidity and profitability of Indian Pharmaceuticals firms.

H12: There may exist a negative relationship between liquidity of Indian Pharmaceuticals firms and profitability. Firms with high level of liquidity are expected to post low level of profitability and vice versa.

HYPOTHESIS 3

H03: There is no relationship between size of Indian Pharmaceuticals firms and profitability.

H13: There may exist a positive relationship between the firm size and its profitability. This may be due to the ability of large firms to reduce liquidity levels and cash gaps.

HYPOTHESIS 4

H04: There is no relationship between debt used by Indian Pharmaceuticals firms and profitability

H14: There is a possible negative relationship between debt used by Indian Pharmaceuticals firms and profitability. Firms with high level of debt usage are expected to post low level of profitability and vice versa.

3.4 MODEL SPECIFICATIONS

The general form of model is:

$$NOP_{it} = \beta_0 + \sum_{all}^{n} \beta_i X_{it} + \varepsilon$$

NOP_{it} : Net operating profitability of firm I at time t; I = 1, 2,..31 firms.

β_0 : The intercept of equation

β_i : Coefficients of X_{it} variables

X_{it} : The different independent variables for working capital management of firm i at time t

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 108

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

t   : Time = 1,2,.....10 years.

ε   : The error term

Specifically, when i convert the above general least squares model into my specified variables it becomes:

$NOP_{it} = \beta_0 + \beta_1(ACP_{it}) + \beta_2(ITID_{it}) + \beta_3(APP_{it}) + \beta_4(CCC_{it}) + \beta_5(CR_{it}) + \beta_6(DR_{it}) + \beta_7(LOS_{it}) + \beta_8(FATA_{it}) + \varepsilon$

Where:

NOP	: Net Operating Profitability	FATA: Financial Assets to Total Assets
ACP	: Average Collection Period	DR : Debt Ratio
ITID	: Inventory Turnover in Days'	LOS : Natural logarithm of Sales
APP	: Average Payment Period	ε : The error term.
CCC	: Cash Conversion Cycle	
CR	: Current Ratio	

3.5 ANALYSIS USED IN STUDY

In this research I have provided two types of data analysis; descriptive and quantitative.

3.6 DESCRIPTIVE ANALYSIS

Descriptive analysis is the first step in my analysis; it will help me to describe relevant aspects of phenomena of cash conversion cycle and provide detailed information about each relevant variable. Lot of raw information is already available, and I am going to used SPSS software for analysis of the different variables in this study.

3.7 QUANTITATIVE ANALYSIS

In quantitative analysis I am going to apply two methods: First: I used correlation models, specifically Pearson correlation to measure the degree of association between different variables under consideration. Second: I used multiple Regression analysis to estimate the causal relationships between profitability variable, liquidity and other chosen variables.

4. DATA ANALYSIS AND DISCUSSION

I have performed two types of analysis, descriptive and quantitative. The results of these two types of analysis are discussed in this section.

4.1 DESCRIPTIVE ANALYSIS

In the analysis I have consider ideal measurement of central tendency is mean (Average) as well as proven measurement of dispersion is standard deviation to find the how far this different values are spread from the average value. I have also consider the extreme value of data to understand the range of each value.

Table 1 presents descriptive statistics for 31 Indian pharmaceuticals firms for a period of ten years from 2002 to 2011 and for a total 310 firms year observations. The mean value of net operating profitability is 29% of total assets, and standard deviation is 15%. It means that value of the profitability can deviate from mean to both sides by 15%. The maximum value for the net operating profitability is 81.30% for a company in a year while the minimum is -23%.

The cash conversion cycle used as a proxy to check the efficiency in managing working capital is on average 86 days and standard deviation is 97 days. Firms receive payment against sales after an average of 83 days and standard deviation is 39 days. Minimum time taken by a company to collect cash from receivables is 8 day while the maximum time for this purpose is 206 days. It takes an average 114 days to sell inventory with standard deviation of 64 days. Here, maximum time taken by a company is 667 days, which is a very large time period to convert inventory into sales. Firms wait an average 111 days to pay their purchases with standard deviation of 53 days. Here, minimum time taken by a company is 5 days, and maximum time taken for this purpose is 319 days.

TABLE 1: DESCRIPTIVE STATISTICS

Descriptive Statistics					
31 Indian - Pharmaceuticals firms, 2002-2011, 310 firms – year					
	N	Minimum	Maximum	Mean	Std. Deviation
NOP	310	-0.230	0.813	0.290	0.150
ACP	310	8.007	206.302	83.009	39.378
IITD	310	34.608	666.939	114.174	69.355
APP	310	4.823	319.426	111.244	52.880
CCC	310	-138.331	589.599	85.919	96.800
CR	310	1.335	19.562	4.525	2.692
FATA	310	0.000	0.311	0.047	0.039
DR	310	0.000	0.813	0.308	0.238
LOS	310	20.393	24.848	22.732	0.896

To check the size of the firm and its relationship with profitability, natural logarithm of sales is used as a control variable. The mean value of log of sales is 22.73 while the standard deviation is 0.90. The maximum value of log of sales for a company in a year is 24.85 and the minimum is 20.39.

In the same way to check the liquidity of the companies, a traditional measure of liquidity (current ratio) is used. The average current ratio for Indian pharmaceuticals firms are 4.53 with a standard deviation of 2.69. The highest current ratio for a company in a particular year is 19.56 times and in the same way the minimum ratio for a company in a year is 1.34.

To check the debt financing and its relationship with the profitability the debt ratio (obtained by dividing the total debt of the company by the total assets) is used as a control variable. The results of descriptive statistics show that the average debt ratios for Indian pharmaceuticals are 31% with a standard deviation of 24%. The maximum debt financing used by a company is 81% which is unusual but may be possible if the equity of the company is very less. The minimum level of the debt ratio is 0.00% it means company prefer 100 equity in there capital structure.

To check the ratio of fixed financial assets to the total assets of Indian pharmaceuticals firms, the financial assets to total assets ratio is used as a control variable. The mean value for this ratio is 4.7% with a standard deviation of 3.9. The maximum portion of assets in the form of financial assets for a particular company is 31% and the minimum is 0.00.

4.2 PEARSON'S CORRELATION COEFFICIENT ANALYSIS

Pearson's Correlation analysis is used for data to see the relationship between variables such as those between working capital management and profitability. If efficient working capital management increases profitability, one should expect a negative relationship between the measures of working capital management and profitability variable. There is a negative relationship between gross profitability on the one hand and the measures of working capital management on the other hand. This is consistent with the view that the time lag between expenditure for purchases of raw material and the collection of sales of finished goods can be too long, and that decreasing this time lag increases profitability.

Appendix 1 Presents Pearson correlation coefficients for all variables considered.

Appendix 1 shows correlation analysis between the average collection period and net operating profitability. The correlation coefficient indicates negative (– 0.518) relationship between two variables, with p-value of 0.000. It indicates that the result is highly statistically significant ά. = 1 % level of significance. It means if the average collection period increases it will have a negative impact on the profitability. Correlation results between inventory turnover in days and the net operating Profitability also indicate the same type of result. The correlation coefficient is – 0.174 and the p value is (0.002). This again shows that the result is highly significant ά. = 1%. It also indicates that if the firm takes more time in selling inventory, it will adversely affect its profitability. Correlation results among

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   109

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

the payable turnover in days or average payment period also indicate the same trend. Here again, the coefficient is negative and highly significant. The coefficient is - 0.141 and the p value is (0.013). But it is significant at ά. = 5%. It means that the less profitable firms wait longer to pay their bills. The cash conversion cycle which is a comprehensive measure of working capital management also has a negative coefficient – 0.259 and the p value is (0.000).It means that if the firm is able to decrease this time period known as cash conversion cycle, it can increase its profitability.

By analysing the results I conclude that if the firm is able to reduce these time periods, then the firm is efficient in managing working capital. This efficiency will lead to increasing its profitability.

Current ratio is a traditional measure of checking liquidity of the firm. In this analysis the current ratio has a negative relationship with profitability (measured by net operating profitability). The coefficient is – 0.104 and p-value of (0.067). The result is not significant statistically. It indicates that the two objectives of liquidity and profitability have inverse relationships. So, the Indian Pharmaceuticals firms need to maintain a balance or trade-off between these two measures.

In case of financial assets to total assets ratio, it has a significant positive relation with profitability. The coefficient is 0.171 with significant at ά. = 1% and p-value is (0.003). It reflects that is this ratio increase then the profitability will be increase. So firms need to increase the proportion of financial assets in the total assets but it should be maintain trade off between these two.

I used the debt ratio as proxy for leverage; it shows a significant negative relationship with net operating profitability. The coefficient is -0.622 and p-value is (0.000). The result is significant at ά. = 1%. It indicates that, when leverage of the firm increases it means the proportion of debt increase in the capital structure of the firm, it will adversely affect its profitability. So the Indian pharmaceutical firm need to maintain a balance between equity & debt.

One should not overlook the positive association that exists between NOP and LOS (the measures of size). This in turn indicates a positive relationship between size and profitability. The coefficient is positive 0.072; with p-value of (0.206). The result is not significant statistically. It shows that as size of the firm increases, it will increase its profitability.

A negative relationship between number of day's accounts payable and profitability is consistent with the view that less profitable firms wait longer to pay their bills. In that case, profitability affects the account payables policy and vice versa. An alternative explanation for a negative relationship between the number of days accounts payable and profitability could be that Indian pharmaceuticals firms wait too long to pay their accounts payable. Speeding up payments to suppliers might increase profitability because firms often receive a substantial discount for prompt payment.

Pearson's correlation also displays a significant positive relationship between the average collection period and cash conversion cycle; the correlation coefficient is 0.469 and the p-value is (.000). That ratio is highly significant at ά. = 1% , which means that if a firm takes more time to collect cash against the credit sales it will increase its operating or cash conversion cycle.

There is also a positive relationship between Inventory turnover in days and the cash conversion cycle which means that if the firm takes more time to sell inventory it will lead to increase in the cash conversion cycle as well. The correlation coefficient is positive and is 0.807, the p-value is again (.000) showing that it is highly significant at ά. = 1%.

The average payment period and cash conversion cycle have a negative relationship. The coefficient is – 0.423, the p-value is (.000), highly significant at ά. = 1%. It means that if firms take more time to pay their purchases than the time for collection and selling inventory, the cash conversion cycle will be reduced.

Now, these negative relationships between Cash conversion cycle, Average collection period, Average payment period and Inventory turnover in days with the profitability of companies are consistent with the literature review and have significant effect on the profitability of company.

The results of correlation analysis indicate that as far as Indian pharmaceuticals firms are concerned, the working capital management very significantly and strongly affects their profitability.

4.3 REGRESSION ANALYSIS

The determinants of net operating profitability are investigated for all 310 firm-year observations. A number of different regression coefficients are estimated for selected independent variables.

Appendix 2 Presents Regression for all variables considered.

This regression is estimated using the pooled least squares method. The model that i have applied is as follows:

$NOP_{it} = β_0 + β_1(ACP_{it}) + β_2(LOS_{it}) + β_3(CR_{it}) + β_4(DR_{it}) + β_5(FATA_{it}) + ε$

The results of this regression indicate that the coefficient of accounts receivable is negative (-0.002) and is highly significant at ά. = 1%. It implies that the increase or decrease in accounts receivable will significantly affect profitability of the firm. The current ratio which is a traditional measure of liquidity has also a negative (-0.003) relationship with profitability but the result is not significant statistically which confirms my hypotheses that liquidity and profitability has inverse relationship.

I used the Debt ratio as a substitute for leverage; it shows a significant negative (-0.305) relationship with the dependent variable, which means that, when leverage of the firm increases, it will adversely affect its profitability. Log of sales used as proxy for size of a company shows a positive (0.013) relationship with profitability which means that bigger size firms have more profitability compared to firms of smaller size. In case of financial assets to total assets ratio, it also has a positive relation with profitability. It reflects that if this ratio increases the operating profitability will increase.

The result shows that adjusted R^2 , also called the coefficient of multiple determinations, is the percent of the variance in the dependent explained uniquely or jointly by the independent variables and is weighted is (43.7%) which shows that there is 43.7% variation in the dependent variable attributable to the independent variables . The C is the constant, where the regression line intercepts the y axis, representing the amount the dependent y will be when all the independent variables are 0. Here C is 0.763; the probability of the coefficient is significant. The F statistic is used to test the significance of R. Overall; the model is significant as F-statistics is 47.257.

The second regression is run using the inventory turnover in days as an independent variable as a replacement for average collection period. The other variables are the same as they have been in the first regression. The model we have used is shown below:

$NOP_{it} = β_0 + β_1(ITID_{it}) + β_2(LOS_{it}) + β_3(CR_{it}) + β_4(DR_{it}) + β_5(FATA_{it}) + ε$

The coefficient of intercept C is significant and equals 0.746. The coefficient of inventory turnover in days (a proxy for inventory policy) is negative (-0.0002) but not significant, and implies that the increase or decrease in the inventory turnover in days, significantly affects profitability of the firm. It can be interpreted that if the inventory takes more time to sell, it will adversely affect profitability as in case of our first regression. All the other variables are also affecting profitability as in case of our first regression. Increase in sales has a positive (0.015) impact on profitability which means size of the firms increase; it will increase its profitability. While all other control variables like current ratio, debt ratio, have a significant negative affect on profitability of the firm. The coefficient of current ratio -0.002 showing that, when the liquidity position is better this has a negative affect on profitability of a firm. The variable has a not significant statistically. The debt ratio shows a negative relationship with coefficient -0.385, which means that, when the leverage of the firm's increases, profitability of the firm decreases. The variable has a p-value of 0.000 which is highly significant at ά. = 1%. In case of financial assets to total assets ratio, it also has a positive (0.226) relation with profitability. It reflects that if this ratio increases the operating profitability will increase. The adjusted R^2 is 40.3, and it shows the variation in the dependant variable's explained by the independent variables. The F-statistic has a value equal to (40.98) that reflects the highly significance of the model or significance of R-square.

Third regression is run using the average payment period as an independent variable as a substitute of inventory turnover in days. The other variables are same as they have been in first and second regression.

$NOP_{it} = β_0 + β_1(APP_{it}) + β_2(LOS_{it}) + β_3(CR_{it}) + β_4(DR_{it}) + β_5(FATA_{it}) + ε$

Here, the coefficient of C is 0.694 and it has a p-value of 0.000 which is highly significant at ά. = 1%. The result indicates that the coefficient of average payment period is negative (-0.003) and it is highly significant at ά. = 1%, and implies that the increase or decrease in the average payment period, significantly affects profitability of the firm. The negative relationship between the average payment period and profitability indicates that the less profitable firms wait longer to pay their bills. All the other variables are also affecting the profitability. The size of the firm has a positive (0.01) impact on profitability, which means size of the firms increase; it will increase its profitability and the current ratio has a negative (-0.005) impact on profitability, showing that, when the liquidity position is better this has a negative affect on profitability of a firm.; while other control variables like debt ratio shows a negative relationship with coefficient -0.384 ,

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   110
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

which means that, when the leverage of the firm's increases, profitability of the firm decreases. The variable has a p-value of 0.000 which is highly significant at $\acute{\alpha}$. = 1%. The financial assets to total assets have positive affect on profitability of the firm. The adjusted R^2 weighted is (42.6%) which shows that there is 42.6% variation in the dependent variable attributable to the independent variables. The F-statistic has a value of 45.069. It also reflects the high significance of the model.

In fourth regression, cash conversion cycle is used as an independent variable instead of average collection period, inventory turnover in days and average payment period. It is the comprehensive measure of checking efficiency of working capital management. The other variables are kept the same as they were in the first three regressions. The model I have used is shown herewith:

$$NOP_{it} = \beta_0 + \beta_1(CCC_{it}) + \beta_2(LOS_{it}) + \beta_3(CR_{it}) + \beta_4(DR_{it}) + \beta_5(FATA_{it}) + \varepsilon$$

Taking the cash conversion cycle as an independent variable, the result indicates that the coefficient of cash conversion cycle is negative (-0.0002) and is not significant statistically. It means that if the firm is able to decrease this time period known as cash conversion cycle, it can increase its profitability and implies that the increase or decrease, in the cash conversion period, affects profitability of the firm. All the other variables are also affecting profitability. The increase in sales has a positive (0.014) impact on profitability; current ratio has a negative (-0.003) impact on profitability while other control variables like debt ratio have a significant negative -0.39 affect on profitability of the firm. The variable has a p-value of 0.000 which is highly significant at $\acute{\alpha}$. = 1%. Financial to total assets have a significant positive affect on profitability of the firm. The adjusted R^2 is 40.3%. The value of F-statistic is 40.97, and it also reflects the high significance of the model.

Under the pooled least squares method, I have seen the independent variables in the individual regression. The individual regression for each variable showed the significant effect on profitability. In general, the results of pooled least squares are indicating the same interpretation that working capital management affects profitability of the firm. If a firm can effectively manage its working capital, it can lead to increase in profitability. It can also be interpreted that the liquidity and profitability moves in opposite direction. And, there is a need to maintain a trade-off between these two objectives of the firm. It is further interpreted that if the firm increases its debt financing, it will lead to decreasing profitability of the firm in terms of financial cost. The size of the firm has a direct positive relationship with profitability of the firm. If the size (measured in terms of log of sales) increases, it will lead to increasing profitability of the firm.

5. CONCLUSION

In financial management, it is possible to mention that studies regarding working capital management are not as popular as the ones related with capital budgeting and capital structure. Working capital management is important part in firm financial management decision. The ability of the firm to continuously operate in longer period is depends on how they deal with investment in working capital management. The optimal of working capital management is could be achieve by firm that manage the trade off between profitability and liquidity. The purpose of this study is to investigate the relationship between working capital management and firm profitability.

Most of the Indian pharmaceutical firms have large amounts of cash invested in working capital. It can therefore be expected that the way in which working capital is managed will have a significant impact on profitability of those firms. I have found a significant negative relationship between net operating profitability and the average collection period, inventory turnover in days, average payment period and cash conversion cycle for a sample of 31 Indian pharmaceutical firms listed on National Stock Exchange. These results suggest that managers can create value for their shareholders by reducing the number of days accounts receivable and inventories to a reasonable minimum. The negative relationship between accounts payable and profitability is consistent with the view that less profitable firms wait longer to pay their bills.

Regarding my hypotheses, I conclude that my Alternate hypothesis (H11) that working capital management significantly affects profitability of Pakistani firms is the one to be accepted; and therefore I reject null hypothesis (Ho1). In the same way I accept my research hypotheses (H12) that there is a negative relationship between liquidity and profitability of the firm; therefore I reject null hypotheses (H02). It is found that in Indian Pharmaceutical firms current ratio is the most important liquidity measure that affects profitability. The Indian Pharmaceutical firms must set a trade-off between these two objectives so that neither the liquidity nor profitability suffers. I also accept my research hypotheses (H13) regarding the size and profitability. As the size (measured in terms of natural logarithm of sales) increases, it will lead to an increase in profitability of the firm; therefore i reject null hypotheses (H03). I do accept my research hypotheses (H14) concerning the debt financing that when the debt financing increases, profitability goes down; therefore I reject null hypotheses (H04) here also. This is interpreted that debt financing will affect the financial cost which will lead to decreasing profitability.

The conclusions are in confirmation with (Deloof 2003), (Eljelly 2004), (Shin and Soenan 1998) who found a strong negative relationship between the measures of working capital management including the average collection period, inventory turnover in days, average payment period and cash conversion cycle with corporate profitability.

On basis of the above analysis I may further conclude that these results can be further strengthened if the firms manage their working capital in more efficient ways. Management of working capital means "management of current assets and current liabilities, and financing these current assets". If these firms properly manage their cash, accounts receivables and inventories in a proper way, this will ultimately increase profitability of these companies.

6. REFERENCES

1. Abdul Raheman and Mohamed Nasr, March 2007," Working Capital Management And Profitability – Case Of Pakistani Firms" International Review of Business *Research Papers*, Vol.3 No.1. March 2007, Pp.279 – 300.
2. Ali Uyar, 2009 "The Relationship of Cash Conversion Cycle with Firm Size and Profitability: An Empirical Investigation in Turkey" International Research Journal of Finance and Economics, ISSN 1450-2887 Issue 24 (2009).
3. Bhattacharya, H. 2001. Working Capital Management: Strategies and Techniques, Prentice Hall, New Delhi.
4. Deloof, M. (2003). "Does Working Capital Management Affect Profitability of Belgian Firms?" *Journal of Business Finance & Accounting, 30*(3&4), 573-587.
5. Eljelly, A. 2004. "Liquidity-Profitability Tradeoff: An empirical Investigation in an Emerging Market", International Journal of Commerce & Management, Vol 14 No 2 pp. 48 - 61
6. Falope and Ajilore, (2009) "Working Capital Management and corporate Profitability: Evidence from panel data analysis of selected quoted Companies in Nigeria" Research journal of Business Management, 3 (3): 73-84.
7. Garcia-Teruel, P. J., & Martinez-Solano, P. (2007). "Effects of Working Capital Management on SME Profitability". International Journal of Managerial Finance, 3, 164-177.
8. Kesseven Padachi, October 2006, "Trends in Working Capital Management and its Impact on Firms' Performance: An Analysis of Mauritian Small Manufacturing Firms" International Review of Business *Research Papers*, Vo.2 No. 2, Pp. 45 -58
9. Soenen, L. A. 1993. "Cash conversion cycle and corporate profitability", Journal of Cash Management, Vol 13 No 4 pp. 53-58

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   111

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

APPENDIX

APPENDIX 1: PEARSON'S CORRELATION COEFFICIENT

		NOP	ACP	IITD	APP	CCC	CR	FATA	DR	LOS
NOP	Pearson Correlation	1	-.518**	-.174**	-.141*	-.259**	-.104	.171**	-.622**	.072
	Sig. (2-tailed)		.000	.002	.013	.000	.067	.003	.000	.206
	N	310	310	310	310	310	310	310	310	310
ACP	Pearson Correlation	-.518**	1	.270**	.241**	.469**	-.010	-.253**	.572**	.041
	Sig. (2-tailed)	.000		.000	.000	.000	.861	.000	.000	.472
	N	310	310	310	310	310	310	310	310	310
IITD	Pearson Correlation	-.174**	.270**	1	.035	.807**	.169**	-.151**	.260**	-.143*
	Sig. (2-tailed)	.002	.000		.536	.000	.003	.008	.000	.011
	N	310	310	310	310	310	310	310	310	310
APP	Pearson Correlation	-.141*	.241**	.035	1	-.423**	-.316**	-.021	-.004	.150**
	Sig. (2-tailed)	.013	.000	.536		.000	.000	.711	.945	.008
	N	310	310	310	310	310	310	310	310	310
CCC	Pearson Correlation	-.259**	.469**	.807**	-.423**	1	.290**	-.200**	.421**	-.168**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.003
	N	310	310	310	310	310	310	310	310	310
CR	Pearson Correlation	-.104	-.010	.169**	-.316**	.290**	1	-.116*	.081	.070
	Sig. (2-tailed)	.067	.861	.003	.000	.000		.041	.154	.218
	N	310	310	310	310	310	310	310	310	310
FATA	Pearson Correlation	.171**	-.253**	-.151**	-.021	-.200**	-.116*	1	-.143*	-.206**
	Sig. (2-tailed)	.003	.000	.008	.711	.000	.041		.012	.000
	N	310	310	310	310	310	310	310	310	310
DR	Pearson Correlation	-.622**	.572**	.260**	-.004	.421**	.081	-.143*	1	-.048
	Sig. (2-tailed)	.000	.000	.000	.945	.000	.154	.012		.400
	N	310	310	310	310	310	310	310	310	310
LOS	Pearson Correlation	.072	.041	-.143*	.150**	-.168**	.070	-.206**	-.048	1
	Sig. (2-tailed)	.206	.472	.011	.008	.003	.218	.000	.400	
	N	310	310	310	310	310	310	310	310	310

Notes: *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).
Notes: 1- Net Operating Profitability = (Operating Income + Depreciation) / (Total Assets – Financial Assets). 2- Average collection period = (account receivable * 365) / Sales. 3- Inventory Turnover in days = (inventories * 365) / Cost of sales. 4- No. of days accounts payable = (accounts payable * 365) / purchases. 5- Cash conversion cycle = (Average collection period + Inventory turnover in days – Average payment period). 6- Current Ratio = current assets / current liabilities. 7- Debt Ratio = Total Debt / Total Assets. 8- Financial assets to Total Assets =e financial assets / Total assets.

APPENDIX 2: RESULT OF REGRESSION ANALYSIS

REGRESSION	CONSTANT	CR	DR	LOS	FATA	ACP	ITID	APP	CCC	R^2	F- VALUE
1	0.763	-0.003	-0.305	0.013	0.075	-0.002				0.437	47.257
t- Statistics	4.468	-1.368	-9.135	-1.751	0.424	-4.339					
P-value	.000	.172	.000	.081	.672	.000					.000
2	0.746	-0.002	-0.385	0.015	0.226		-0.0002			0.403	40.979
t- Statistics	4.135	-0.876	-13.216	-1.908	1.259		-0.265				
P-value	.000	.382	.000	.057	.209		.791				.000
3	0.694	-0.005	-0.384	0.01	0.22			-0.003		0.426	45.069
t- Statistics	4.018	-2.06	-13.788	-1.285	1.261			-3.506			
P-value	.000	.040	.000	.200	.208			.001			.000
4	0.725	-0.003	-0.39	0.014	0.241				-0.0002	0.403	40.977
t- Statistics	4.010	-0.962	-12.615	-1.784	1.334				0.255		
P-value	.000	.337	.000	.075	.183				.799		.000

Notes: 1- Net Operating Profitability = (Operating Income + Depreciation) / (Total Assets – Financial Assets). 2- Average collection period = (account receivable * 365) / Sales. 3- Inventory Turnover in days = (inventories * 365) / Cost of sales. 4- No. of days accounts payable = (accounts payable * 365) / purchases. 5- Cash conversion cycle = (Average collection period + Inventory turnover in days – Average payment period). 6- Current Ratio = current assets / current liabilities. 7- Debt Ratio = Total Debt / Total Assets. 8- Financial assets to Total Assets =e financial assets / Total assets.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   112
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

AWARENESS OF TAX PLANNING - A STUDY WITH SPECIAL REFERENCE TO GOVERNMENT EMPLOYEES

DR. K. UMA
ASST. PROFESSOR
DEPARTMENT OF COMMERCE
SCHOOL OF BUSINESS STUDIES
MADURAI KAMARAJ UNIVERSITY
MADURAI

G. LINGAPERUMAL
SCHOLAR
DEPARTMENT OF COMMERCE
SCHOOL OF BUSINESS STUDIES
MADURAI KAMARAJ UNIVERSITY
MADURAI

ABSTRACT
"Tax is what we pay for civilization and with tax, we buy civilization" Golden words of Justice Holmes. Income tax is a composite Tax that is paid on all incomes received by or accruing or arising to a taxpayer during a year. As the Tax rate is high and due to the revision in the provisions of income tax, Tax planning play a vital role, which reduce the tax liability. Deduction from gross total income were allowed to assesses if they contribute to specified investments such as National Savings Certificate, Provident fund, Life insurance premium and the like. The most important problem of income Tax is that the Tax payers are in the infant stage of awareness. This research paper analyses the awareness of government employees in tax-planning and the prevailing deductions.

KEYWORDS
Tax planning, government employees.

INTRODUCTION
The taxation system in the Republic of India is quite well structured. The Department of Revenue of the Finance Ministry of the Government of India is responsible for the computation; levy as well as collection of most the taxes in the country. However, some of the taxes are even levied solely by the Local State Bodies or the respective governments of the different states in the nation. Tax planning may be defined as an arrangement of one's financial affairs in such a way that without violating in any way the legal provisions of an Act, full advantage is taken of all exemptions, deductions, rebates and reliefs permitted under the Act, so that the burden of the taxation on an assessee, as far as possible, the least. Actually the exemptions, deductions, rebates and reliefs have been provided by the legislature to achieve certain social and economic goals. The deduction has been provided to encourage savings and investments for economic development of the country. Thus, if a person takes the advantage of the aforesaid deduction, he not only reduces his tax liability but also helps in achieving the objective of the legislature, which is lawful, social and ethical.

NEED FOR TAX PLANNING
- Reduction in tax liability
- Minimization of litigation
- Productive investment
- Reduction in cost
- Healthy growth of economy
- Employment generation

Thus, the tax planning is not only the need of the tax payer but also of the society as a whole and the Government.

CHARGE OF INCOME TAX
Every one whose income exceeds the maximum amount and shall be chargeable to the income tax at the rate of rates prescribed under the finance act for the relevant assessment year, shall be determined on basis of his residential status.

All income received as salary under employer-employee relationship is taxed under the head income from salary. While exemptions is on income some deduction in calculation o taxable income is allowed for certain payments. Section 80C of the income tax let allows certain investments and expenditure to be deducted from total income upto the maximum of one lac. From April 1, 2011 a maximum of Rs.20,000 is deductible under section 80CCF provided that amount is invested in infrastructure funds. This is in addition to the 1,00,000 deduction allowed under section 80C. health insurance, popularly known as medicalim policies, provide a deduction of upto Rs.35,000 under section 80D. For self occupied properties, interest paid on a housing loan upto Rs.1,50,000 per year is exempt from tax.

OBJECTIVES OF THE STUDY
- To study the awareness of the government employees towards various provisions of income tax deductions applicable to them.
- To examine the socio-economic background and awareness of the respondents about tax planning in the study area.

METHODOLOGY
This study is based on both the primary and secondary data. The researcher   selected the individual assesses who are government employees and residing in Madurai city. The sample was selected on the basis of convenient sampling. The primary data is collected by using interview schedule. It is collected during January-March 2012. Secondary data were collected from Income-tax books, Journals and various websites.

HYPOTHESIS FRAMED
- H_0:There is no significant relationship between Age and level of awareness
- H_0: There is no significant relationship between Educational qualification and level of awareness.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   113
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

- H_0: There is no significant relationship between Gender and level of awareness.
- H_0: There is no significant relationship between Occupation and level of awareness.

TOOLS FOR ANALYSIS

For the purpose of analysis, percentage analysis and chi-square test was applied. Here null hypothesis is framed that there is no relationship between the factors and level of awareness. The calculated value is compared with the table value if the calculated value is less than the table value null hypothesis is accepted. If the calculated value is more than the table value null hypothesis is rejected.

TABLE 1: RESPONDENTS OPINION OF AWARENESS TOWARDS INCOME TAX DEDUCTIONS

S.No.	Opinion	No. of Respondents	Percentage of Respondent
Awareness on Provident Fund (Sec.80C)			
1	Yes	50	100
2	No	0	0
	Total	50	100
Awareness on Life Insurance Premium(Sec.80C)			
1	Yes	50	100
2	No	0	0
	Total	50	100
Awareness on National Saving Certificate(Sec.80C)			
1	Yes	38	76
2	No	12	24
	Total	50	100
Awareness on Tution Fees (Sec.80C)			
1	Yes	45	90
2	No	5	10
	Total	50	100
Awareness on Contributory Pension Scheme(Sec.80CCD)			
1	Yes	40	80
2	No	10	20
	Total	50	100
Awareness on Long Term Infrastructure Bond(Sec.80CCF)			
1	Yes	27	54
2	No	23	46
	Total	50	100
Awareness on Medical Insurance Premium(Sec.80D)			
1	Yes	28	56
2	No	22	44
	Total	50	100
Awareness on Medical Treatment with Disability(Sec.80DD)			
1	Yes	29	58
2	No	21	42
	Total	50	100
Awareness on Medical Treatment for Specified Disease(Sec.80DDB)			
1	Yes	27	54
2	No	23	46
	Total	50	100
Awareness In Education Loan(Sec.80E)			
1	Yes	13	26
2	No	37	74
	Total	50	100
Awareness on Donations(Sec.80G)			
1	Yes	30	60
2	No	20	40
	Total	50	100
Awareness on Contribution to Political Parties(Sec.80GGC)			
1	Yes	17	34
2	No	33	66
	Total	50	100
Awareness on Housing Loan(Sec.24)			
1	Yes	27	54
2	No	23	46
	Total	50	100

Source: Primary Data

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   114

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

TABLE 2: RESPONDENTS SOCIO ECONOMIC BACKGROUND AND LEVEL OF AWARENESS

S.NO.		HIGH	MEDIUM	LOW	TOTAL
AGE					
1	20 – 30	3	6	3	12
2	31 – 40	3	14	2	19
3	41 – 50	2	11	0	13
4	51 – 60	0	6	0	6
	TOTAL	8	37	5	50
EDUCATIONAL QUALIFICATION					
1	SCHOOL LEVEL	0	0	0	0
2	UG LEVEL	2	12	2	16
3	PG LEVEL	3	8	1	12
4	ABOVE PG	3	17	2	22
	TOTAL	8	37	5	50
GENDER					
1	MALE	7	28	1	36
2	FEMALE	1	9	4	14
	TOTAL	8	37	5	50
OCCUPATION					
1	CLERK	2	11	3	16
2	DEVELOPMENT OFFICER	3	10	0	13
3	TEACHER	1	4	2	7
4	PROFESSOR	2	12	0	14
	TOTAL	8	37	5	50

Source: Calculated from the Primary Data

TABLE 3: RELATIONSHIP BETWEEN SOCIO-ECONOMIC FACTOR AND LEVEL OF AWARENESS

S.No.	Socio-economic factor	Chi-square Value	Results	H_0 accepted / Rejected	d.f
1	Age	7.85	Insignificant	Accepted	6
2	Educational Qualification	1.078	Insignificant	Accepted	6
3	Gender	7.906	Significant	Rejected	2
4	Occupation	7.505	Insignificant	Accepted	6

Source: Calculated from the Primary Data

FINDINGS OF THE STUDY

1. It is inferred that 100 percentage of respondents aware of recognized provident fund because it is deducted directly from the salary.
2. It is quite natural that 100 percentage of the respondents aware of life insurance premium.
3. The majority of 76 percentage of respondents are aware of National Saving Certificate is helps to reduce their tax liability and 24 percentage of them are in aware about National Saving Certificate.
4. Most of the respondents i.e. 90 percentage know about the deduction for tutition fee paid to Education Institutions.
5. The respondents are having awareness about 80 percentage on contributory pension scheme and only 20 percentage are unaware.
6. The respondents are not build much awareness towards long term infrastructure fund. Only 54 percentage of the respondents are aware about this deduction 80CCF.
7. The awareness level on medical insurance premium is also low. Only 56 percentage of employees are having awareness on medical insurance premium.
8. Only 56 percentage of the respondents are aware on medical treatment with disability.
9. 54 percentage of the respondents are aware about the deduction on interest on housing loan and 46 percent age respondents are not aware on it.
10. It is understood that middle age group (31-40 years) experienced a medium level of awareness towards the tax planning.
11. Majority of the respondents (3 out of 8) with high level attitude, possessed post graduate and above post graduate level education.
12. It is inferred that majority of males and females recorded medium level of attitude. Large member of females recorded low level awareness.
13. Occupation is also another important yard stick to measure the awareness level majority of sample respondents belong to professors were experienced medium awareness level.
14. The analysis, through the testing of null hypothesis, revealed that the following factors do not influence the level of awareness towards the tax planning.
a. Age of the respondents
b. Educational level
c. Occupation
15. Again, the analysis shows that the factor, gender of the respondent influence the level of awareness.

SUGGESTIONS OF THE STUDY

- A majority of respondent says that chartered accountant is the responsible person for calculating their tax liability in that case the major role played by the auditors; they can educate the employees on various deductions available to them.
- Respondents expect a higher quantum of deduction u/s 80C. Deduction u/s 80 C gives quantum of deduction up to Rs.100,000 it should be increased to Rs.1,50, 000.
- Awareness of Tax planning helps to reduce Tax evasion in order to reduce Tax evasion, Government will create awareness among Government employees.
- Most of the Government employees are known the 80C deduction only. Employees should also concentrate on 80D, 80E, and 80G to 80U.

CONCLUSION

It can be concluded that the Investment pattern and Tax planning vary from person to person and will depend upon the age of the Individual his nature of employment, sources of Income, family background, and quantum of income. Each of individual will have to decide his own pattern of Investment.

What is suitable for one person may not be suitable for another for various reasons. Tax planning with regard to Investments requires intelligent analysis, judicious decision making and the sixth sense of visualization.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   115
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

REFERENCES

BOOKS
1.   Dr.Mehrotra H.C & Goyal. P. "Income tax law and practice", 2011 – 2012. Sahitya Bhawan Publications, Agra
2.   Gaur V.P. & Narang D.B. "Income tax law and Practice" 2011 – 2012. Kalyani Publishers, New Delhi.

ARTICLES
3.   Lubhakably. (2012) "The tedious and convoluted provisions of the finance bill", Economic times Apr 27.
4.   The charted accountants of India ICAI – e-journal, various issues

WEBSITES
5.   www.incometaxindia.gov.in
6.   www.pankajkatra.com
7.   www.rerifios.com
8.   www.tax4india.com

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   116

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

A STUDY ON ADOPTION OF INTERNET BANKING AMONG STUDENTS IN INDORE

HARDEEP SINGH CHAWLA
ALUMINI
INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV
INDORE

DR. MANMINDER SINGH SALUJA
ASST. PROFESSOR
INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV
INDORE

ABSTRACT

The use of internet banking is very essential especially when the entire world is shifting to electronic devices leaving pen and paper behind. The purpose of this study is to identify the factors that affect the use of internet banking among college students and to analyse their preference towards internet banking. The paper presents the analysis of 200 customers (students) of three segments i.e. undergraduate, graduate and post graduate in the city of Indore. It has been observed that all the three segments were almost equal in number when it comes to usage of internet banking. Factor analysis has been applied for analysis in order to explore the result. It is seen that the usage of internet banking services among young generation is on a growing stage and the number of internet banking users have increased in number. The five major factor seen is perceived ease of use, trust, perceived usefulness, promptness and perceived enjoyment that impacts the behaviour of an individual on adoption of internet banking services.

KEYWORDS

Factor analysis, Indore, Internet banking, Students.

INTRODUCTION

The improvement and up gradations in the technology has helped the user for easy access to the internet. Today students are interested in using a technology that helps them to save their time, cost and energy. Internet banking has emerged as an effective tool to provide them with the needful. Internet banking has a simple meaning at the basic level. Internet banking can mean the setting up of a web page by a bank to give information about its product and services (Jasimuddin, 2000). At an advance level, it involves provision of facilities such as accessing accounts, funds transfer, booking an air or rail ticket and much more.

Internet banking nowadays can be seen as an interesting area to be studied upon. Over the years several studies have been conducted on the adoption of internet banking a few of the studies on internet banking reviewed here indicates a lot of progress on the nature and scope of online banking. Ample research has been done in different nations regarding the adoption of internet banking.

Initialising the research regarding adoption of internet banking Tan and Teo (2000) in their title 'Factors Influencing the Adoption of Internet Banking' worked upon the theory of planned behaviour that included attitude, subjective norms and perceived behavioural control. The findings revealed that attitudinal and perceived behavioural control are the two factors that have a positive impact on a customers' intention to use Internet banking services whereas subjective norms that largely depend upon social influence that may affect a person's intention to use Internet banking has no significant impact on the adoption of internet banking. With the passage of time various researches have been done in order to understand the adoption of an emerging new technology called as internet banking.

Amin (2007) in his title, "Internet banking adoption among young intellectuals" studies acceptance of internet banking among undergraduate students in Malaysia. This study worked upon a Technology acceptance and the results indicate that perceived usefulness, perceived ease of use have positive effect on behavioural intention. It also suggested that internet banking should be free from effort. Sufficient guidelines are needed to make sure the customers feel convenient while using internet banking. Further improvement in the quality of security and privacy should be done in order to increase the usage of internet banking.

In the same year when Amin (2007) worked upon a model, Keffala (2007) in his title 'Barriers to the Adoption and the Usage of Internet Banking by Tunisian Consumers' worked upon extension of the technology acceptance model that involves perceived usefulness, perceived ease of use, intention, trust, and awareness. According to him these factors are responsible for the usage and non usage of internet banking in Tunisia, also perceived risk and security did not made any effect on the usage of internet banking. Like Hanudin (2007) Tat *et al.*(2008) in their title 'Predictors of Intention To Continue Using Internet Banking Services' also tries to find out the factors that may affect usage of internet banking among existing customers. They revealed that trust has the strongest positive impact among the three factors studied, followed by compatibility and ease of use with reference to customers' intention of using internet banking services.

Researchers have been watchful in developing countries too as Qureshi (2008) in his title 'Customer Acceptance of Online Banking in Developing Economies' states that there has been a tremendous growth in internet banking seen these days. The Customers' acceptance rate of internet banking is very high in Pakistan. Majority of the banks provide internet banking services. Banking websites provide information regarding internet banking. He applied TMQ model in evaluating factors that manipulate the nature of customers towards internet banking. The amount of information provided to the customers through various media is useful in deciding the adoption for internet banking. As half of the customers shifted from traditional banking to online banking, therefore it is proved that perceived usefulness, ease of use, security and privacy plays a vital role in acceptance of internet banking.

Various researches held in India also contributed towards the perception of internet banking. Srivastava (2007) in his title 'Customer's perception on usage of internet banking' believes that internet banking is at its starting stage in India. The study revealed that education, gender, income plays an important role in usage of internet banking. Trust is the major factor which helps to use internet banking. The perception of the consumers can be improved by organising various awareness programs, charging less, improving security. The customer that do not use internet can be converted into potential customers if proper guidance is provided to them.

While Srivastava (2007) stated that internet is in the initial stage, Singhal and Padhmanabhan (2008) states that now customers have started perceiving internet banking services as a prime feature when compared to other features of the bank. Study revealed that internet banking is convenient, flexible, has transaction related benefits and also digital signature is the best way of providing security. Factor analysis results indicate that 'utility request', 'security', 'utility transaction', 'ticket booking' and 'fund transfer' are major factors that saves time and provides security to the customers and also contribute to the usage of internet banking.

Similarly, Sudeep (2008) is of the view that Internet is one of the latest technologies for customers to interact with their banks. A model developed in order to explain the behavioural intention that influence internet banking adoption proved that perceived usefulness, perceived ease of use, consumer awareness, quality of facilities and subjective norms help in the acceptance of internet banking use.

Whereas Gupta and Islamia (2008) in their title 'Internet banking in India' tried to examine the consumers behaviour with respect to Internet banking in comparison to conventional banking. Their study revealed that foreign banks are superior in providing services that private banks lack. Conventional banking

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   117
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

lacks speed especially in case of public sector banks. Trust is the most important factor followed by accuracy and confidentiality that effect usage of internet banking. Safety and speed is a matter of concern whereas accuracy is not a concern. Providing a different prospect on internet banking current scenario in India Khan *et al.* (2009) says that less number of studies have been done in India on the concept of internet banking as compared to other countries. They found that customers are satisfied with the reliability of the services provided by internet but are not satisfied with the user-friendliness of the services; also privacy and security are the two factors that are not contributing towards the service quality of internet banking. They concluded that the service quality provided by internet banking in India is still in its initial stage and lot of homework is to be done by banks in order to improve the customer's satisfaction level that they have towards internet banking in India.

Different from the view given by Khan and Mahapatra (2009), Safeena and Abdullah (2010) in their title 'Customer Perspectives on e-business value' says that many people are shifting to online banking and are readily accepting the usefulness of this improvement in technology. Customers are more likely to use internet banking when it is easy to use and when it is perceived as useful. Adding utilities to their previous research Safeena *et al.* (2011) in their present title 'Internet Banking Adoption in an Emerging Economy' aims at examining the impact of perceived usefulness, perceived ease of use and perceived risk on the acceptance of internet banking among customers. Perceived usefulness and perceived ease of use have positive effect on the use of internet banking and perceived risk have negative effect on the use of internet banking. Individuals are reluctant to adopt the system because of the risk associated with it. Customers are not ready to take any risk on using this new system. Banks need to make the customers aware about the system by providing them about the benefits associated with it and also ensuring security of the system.

Internet Banking is one of the best alternative channels available to customers for quick, correct and efficient service at anytime and anywhere (Uppal 2011). The whole study focused on five categories of banks where new private sector banks have highest number of computerised branches offering internet banking and also the number of customers using internet banking followed by foreign banks, SBI & associate banks, old private sector banks and other nationalised banks. Foreign banks have the highest profit per employee, followed by new private sector banks, Other Nationalized Banks, Old Private Sector Banks and SBI associate banks. Among various bank groups, new private sector banks and foreign banks are on the top position in providing more internet banking services and their efficiency is also high as compared to other bank groups.

Putting emphasis on cost incurred when using internet banking Kumbhar (2011) in his title 'Determinants of internet banking adoption' tried to identify and understand the attitudinal, behavioural, cost, service quality and awareness factors that are significant in explaining intentions to adopt internet banking services in India. In recent day's internet banking has become more popular service because of its utility and convenience. Results show that gender, age, level of education, level of income, profession, level of IT literacy are the demographic factor which influence adoption of internet banking. Customers' education for using internet banking and their awareness towards internet banking should also be increased. Reflecting on utilities and convenience internet banking provides Sharma (2011) in his title 'Concentration of online banking' stated that internet banking helps in performing banking transactions anytime and anywhere. His study revealed that people believe that online transactions are secure, advantageous, trust worthy and are available in understandable language. Banks must make their services customized in order to make their customers committed to deal online. A problem solving approach should be followed by banks for their customers.

Being focused on customer satisfaction Sehgal and Chawla (2011) in their title 'Impact of internet banks on customer satisfaction' suggested that customers want improved, convenient, and easy service. The study worked upon all age groups and at all educational levels from students to retired persons in order to arrive at a generalised result. Maximum respondents believe that the service quality and satisfaction level of their respective service providers is at its maximum and excellent level. Their study also revealed that there are customers who use internet banking almost every day. There is no significant relation that can be seen between age and choice of bank of customers and also it is proved that there is no significant relation between occupation and choice of bank of customers. Majority believes and prefers internet banking to traditional banking.

NEED OF THE STUDY

Indore is a major city and commercial centre of the state of Madhya Pradesh in central India. It is the largest city of Madhya Pradesh, the 15th largest city in India and the 147th largest city in the world. Also known by the name of Ahilyanagri, the city of Indore has an average literacy rate of 87.38 percent, higher than the national average of 74 percent. Male literacy is 91.84 percent, and Female literacy is 82.55 percent. With latest technological advancements, city is about to become the IT hub of the state of Madhya Pradesh. The perception of students residing in Indore is different regarding internet; they witness the technological updates in various aspects ranging from an electronic ticket they get while travelling in a city bus to the usage of internet services at information technology centre located in the University campus. As most of the students studying in Indore are basically from other cities residing far from their home town therefore their banking need is high. The study therefore tries to study the adoption and preference of students in Indore towards internet banking.

OBJECTIVES OF THE STUDY

The major objectives of this research are as follows:
1. To identify the factors affecting the adoption of internet banking among students in the city of Indore
2. To analyze and understand the usage of internet banking among students
3. To identify the major purpose of internet banking usage among young generation
4. To identify the scope of internet banking services among students in the city of Indore

RESEARCH METHODOLOGY

SELECTION OF THE SAMPLE
While selecting the sample all students were taken into consideration in order to constitute the total population. The sample comprised of under-graduates, graduates and post graduates. The students who use internet banking were taken as the sample size. A convenience sampling is used to gather response from 200 students residing in Indore who use internet banking.

SOURCE AND COLLECTION OF DATA
The present study is based upon primary as well as secondary data

SECONDARY SOURCES: Secondary sources provided the required information and reference to work on the objectives of the study. The various secondary information sources used for the present research include various businesses, commerce, international, global and national journals. Further the secondary data was collected from various websites such as www.arraydev.com, www.mendeley.com, www.ssrn.com

PRIMARY SOURCES: A well structured questionnaire was prepared and distributed to selected students of different colleges in the city of Indore. The students selected were those who use internet banking at least four to five times in a month. The survey was conducted among 200 students of different management colleges in the city of Indore. The questionnaire contained demographic details of the respondent as well as questions in order to measure the efficiency and performance of their internet banking services provided by the banks. All items were measured on a five-point likert scale in agreement/ relevance with statements, ranging from 1= strongly disagree/ completely Irrelevant to 5= strongly agree/ completely relevant.

TOOLS USED FOR DATA ANALYSIS: The present study has analyzed internet banking services by using factor analysis as a tool to identify the different factors that are responsible for the adoption of internet banking among the respondents. Factor analysis helped in the process of factor loading, a process that helps to remove all the insignificant items from the study. Factor loading removes the items whose values are less than 0.5 in the rotated component matrix. Factor analysis in this study also helped in identifying the number of factors that are responsible for the adoption of internet banking.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 118

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

DATA ANALYSIS AND INTERPRETATION

The introduction section of this paper had stated various empirical studies that show a strong relationship between demographic factors and adoption of internet banking across the globe. The current section therefore firstly tries to test this relationship for the students of Indore city.

Distribution of educational qualification of respondents using internet banking

The educational qualification details of respondents have been presented in **Table 1.**The perusal of the data reveals that out of the total respondents, the percentage of under graduates using internet banking is 32, the percentage of graduates using internet banking is 33 and the percentage of post graduates using internet banking is 35. The percentage of internet banking users is almost equal; this is a favourable indication towards the adoption of internet banking service as there is a contribution made by respondents with different levels of educational qualification with them. It indicates that internet banking is used by almost all who are taking education.

Distribution of sex of respondents using internet banking

The gender of 200 respondents described in **Table 2** depicts that out of the total respondents, the percentage of males using internet banking is 60 percent whereas the percentage of females using internet banking is 40 percent. This figure indicates that the usage of internet banking is not limited to male only, these services are also utilised by female. This may be due to the fact many students reside far from their homes and internet banking services provide an easy and convenient method to perform cash as well as non cash transactions. It also indicates that the time spent in visiting bank for each and every transaction is a lengthy and time consuming process for students.

Distribution of name of banks of respondents

Table 3 depicts that out of total respondents 102 students use SBI, 34 student use AXIS Bank, 24 student use ICICI, 20 student use IDBI whereas 20 student use HDFC for accessing internet banking services. State bank of India due to its vast presence across the nation over the years has gained its share in providing internet banking services. The other five banks have a respectable amount of share with them and are giving a tough competition to each other when it comes to providing internet banking services. It is interesting to see that there is a wide range of banks providing internet banking services. Therefore it is important that banks improve upon their services in order to increase their market share.

Distribution of frequency of usage by respondents using internet banking

Table 4 throws light upon the fact that out of total respondents 130 respondents are those who use internet banking services up to 5 times in a month, 48 respondents are those who use internet banking services 5-10 times in a month and 22 respondents are those who use internet banking services more than 10 times in a month. There is a reasonable number of respondents using internet banking services between 5-10 times in a month and also there are 1/9 of the users that use the services for more than 10 times in a month, this signifies that the internet banking services is gaining its popularity day by day and respondents have started perceiving it as an effective tool to save time and energy. The figure also indicates that students are willing to use internet banking services whenever they have some transaction to be done.

Distribution of length of Usage by respondents using internet banking

On one hand where **Table 4** shows that frequency of usage is increasing, **Table 5** observes that the number of respondents who started using internet banking services recently are large in number. Out of total respondents the number of respondents using internet banking from less than 3 months are 90, those using from last 3-12 months are 60 whereas those using from more than a year are 50. It is seen clearly that the respondents have started increasing in number from past three months when it comes to internet banking. There are respondents who are using these services from last 3- 12 months and also there are respondents using these services from more than 12 months. It indicates a growing market for these services in the future.

Distribution of different purpose of use by respondents using internet banking

Complementing to **Table 4** and **Table 5** which shows growth seen in frequency and length of usage, **Figure 1** highlights the different purpose of using internet banking. There were respondents who used internet banking for a single purpose and also there were ample number of respondents who used internet banking for more than a single purpose. There are majority of respondents' who use internet banking especially for booking their railway tickets, this is due to the fact that majority of the students reside away from their home and always seek an opportunity to visit their homes by using trains as a means of transport. The purpose to use internet banking services also involves getting information about the accounts, funds transfer and making utility payments; also there are a reasonable number of respondents using services such as trading activity, requesting and maintaining Demat account.

The table suggest that there is a diversified objective that can be fulfilled once a person starts using internet banking services. Initially the study comprised of 30 items that were included in order to test and analyse the various parameters of internet banking services including availability, convenience, ease, and reliability and satisfaction level of the user. Before the principal component analysis Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity were performed with the help of SPSS 16.0. The K-M-O test and Bartlett's Test of Sphericity found that all extractions values are as per the expected values; therefore all items were used for further analysis. Item communalities also found good in the data set. Item communalities are considered "High" if they are all 0.8 or greater although this is unlikely to occur in the social Sciences. **Table** 6 indicates K-M-O test is significant (because test value is greater than .700 at .926) and Bartlett's Test of Sphericity was also found significant ($\chi = 3.232E3$ DF = 435 P < .001.) This indicates that the data set was adequate to perform factor analysis.

PRINCIPAL COMPONENT ANALYSIS

In the process of factor analysis of the scale, the Varimax rotation technique was employed to examine the obtained factors and all items with loadings above 30. **Table 7**, labelled "Total Variance Explained," shows total variance of the observed variables as is explained by each of the principal components. The first principal component explains the largest part of the total variance, this account to 40.21% of the total variance, second component explains 6.23% of the total variance, third component explains 4.9% of the total variance, fourth component explains 4.3% of the total variance and fifth component explains 3.76% of the total variance. A component that displays an eigenvalue greater than 1.00 is accounting for a greater amount of variance therefore, only those components are considered as principal components which are having eigenvalue greater than 1.00. Thus the five factors were identified and had been taken for further research.

Initially the study comprised of 30 items that were included in the questionnaire but after performing factor analysis, the result that came in factor loading removed the items whose VALUES were less than 0.5 in the rotated component matrix as seen in **TABLE 9**. The rotated component matrix describes the situation loading; the total items removed due to insignificancy from the study were seven in numbers and the study was left with 23 items that were used for further research work.These 23 items were then combined in five factors with the help of rotated component matrix. The five factors were taken because there were five values that fulfilled the criteria of EIGEN VALUES greater than 1 and also with the help of the scree plot that suggested that there are five factors explaining the study.

The reliability of the data is also tested with the help of Cronbach's alpha **(Table 8)**, a popular method use to check the internal reliability of the data collected from the respondents. It takes all the values above 0.6 as significant and reliable values. The data was found to be significant and reliable. The results are in line with the findings made by Safeena, Date and Kammani (2010), Keffala (2007), Qureshi (2008) where they found that perceived ease of use, perceived usefulness and trust play an important part in adoption of internet banking.

FRAMEWORK OF THE FACTORS

The five factors that were taken to measure the perception of respondents towards internet banking are:

1. **Perceived ease of use**: Perceived ease of use refers to the degree to which a user believes that a service is simple to use and free of effort. Study reveals that students are able to use the services provided by their banker with ease. They have easy access to the website all round the clock.
2. **Trust**: Trust can be defined as the degree to which the user believes that the security of the system; private information is kept safe by the bank, free from any internal and external threats. Students are ready to provide their personal information as they have full trust on their banks.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   119

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

3. **Perceived Usefulness**: Perceived usefulness refers to the degree to which a user believes that a service is useful and fruitful and supports the cause for which the service was taken. It is seen with the help of present study that students are making use of different services provided by internet banking range from getting information to transfer of funds

4. **Promptness**: Promptness is the degree to which a user believes that the services are provided timely and any error made is immediately made known and are rectified. Students are of the opinion that any failed transaction if charged is refunded back into the accounts in less than 72 hours.

5. **Perceived Enjoyment**: Perceived enjoyment refers to the degree to which a user believes that services are enjoyable. It can also refer to a situation when person using the service is overjoyed with the level and type of services he is getting. Students are taking great pleasure in making use of internet banking services to the fullest.

FINDINGS

1. Students have good and sound knowledge of internet banking services
2. The ratio of usage of internet banking between males and females is in the ratio of 3:2
3. Internet banking services are getting recognized by the students as almost 45 percent of them started using internet banking services from less than 3 months
4. There are many banks that provide internet banking services these days
5. Internet banking is commonly used by students specially for booking railway tickets, getting information, transferring funds and making utility payments
6. Out of total number of students surveyed almost half of them make use of State bank of India for getting internet banking services.

CONCLUSION

There are various banks providing internet banking services to students. The study reflects that the students have high knowledge and awareness towards internet banking services. The factors responsible for the scope of Internet banking had been analyzed with the help of factor analysis. It can be concluded from the study that students demand ease, trust, usefulness, promptness and enjoyment while using their internet banking services. The Study reveals the fact that there is a growing demand towards this wireless technology, unlike past trends students nowadays do not worry to keep their personal information with the bank. Thus it could be concluded that students are of the opinion that these services are efficient and help in saving time; they feel satisfied while using the internet banking services.

REFERENCES

1. Amin (2007), "Internet banking adoption among young intellectuals", Journal of Internet Banking and Commerce, Vol. 12, No.3
2. Gupta and Islamia (2008), "Internet banking in India", Global journal of business research Volume 2 Number 1
3. Khan, Mahapatra, and Sreekumar (2009) 'Service quality evaluation in internet banking: an empirical study in India', Int. J. Indian Culture and Business Management, Vol. 2, No. 1, pp.30–46.
4. Kumbhar (2011), "Determinants of internet banking adoption", Indian Journal of Commerce & Management Studies, Vol.2, Issue -4
5. Qureshi (2008), "Customer Acceptance of Online Banking in Developing Economies", Journal of Internet Banking and Commerce, vol. 13, No.1
6. Safeena and Kammani (2010), "Customer Perspectives on e-business Value", Journal of Internet Banking and Commerce Vol. 15, No.1
7. Safeena, Date and Kammani (2011), "Internet Banking Adoption in an Emerging Economy", International Arab Journal of e-Technology, Vol. 2, No. 1
8. Sehgal and Chawla (2011), "Impact of internet banking on customer satisfaction", International journal of research in commerce, I.T & management, Volume: 1, issue No. 2
9. Sharma (2011), "Concentration of online banking", Sri Krishna International Research & Educational Consortium Vol. 1, Issue 1
10. Singhal and Padhmanabhan (2008), "A Study on Customer Perception towards Internet Banking", the Journal of Nepalese Business Studies, Vol. 1, No. 1
11. Srivastava (2007), "Customer's perception on usage of internet banking", Innovative Marketing, Volume 3, Issue 4
12. Tan and Teo (2000), "Factors Influencing the Adoption of Internet Banking", Journal of the Association for Information Systems, Volume 1, Article 5
13. Tat, Yang, Yong (2008), "Predictors of Intention to Continue Using Internet Banking Services", International Journal of Business and Information, Vol. 3, No.2
14. Uppal (2011), "Internet banking in India", Business Administration and Management Vol. 1 No.3

ANNEXURE

TABLE 1: DISTRIBUTION OF EDUCATIONAL QUALIFICATION OF RESPONDENTS USING INTERNET BANKING

Educational qualification	No of respondents	Percentage
Under-graduate	64	32
Graduate	66	33
Post- graduate	70	35

TABLE 2: DISTRIBUTION OF SEX OF RESPONDENTS USING INTERNET BANKING

Sex	No of respondents	Percentage
Male	120	60
Female	80	40

TABLE 3: DISTRIBUTION OF NAME OF BANKS OF RESPONDENTS

Name of bank	No of customer	Percentage
State bank of India	88	44
Axis Bank	30	15
Industrial credit and investment corporation of India	22	11
Industrial development bank of India	20	10
Housing development financial corporation	20	10
Punjab National Bank	20	10

TABLE 4: DISTRIBUTION OF FREQUENCY OF USAGE IN A MONTH BY RESPONDENTS USING INTERNET BANKING

Frequency of usage in a month	No of respondents	Percentage
Up to 5 Times	130	65
5-10 Times	48	24
more than 10 Times	22	11

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 120
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE 5: DISTRIBUTION OF LENGTH OF USAGE BY RESPONDENTS USING INTERNET BANKING

Length of usage	No of respondents	Percentage
Less than 3 months	90	45
Between 3- 12 months	60	30
More than 12 months	50	25

Figure1
Distribution of different purpose of use
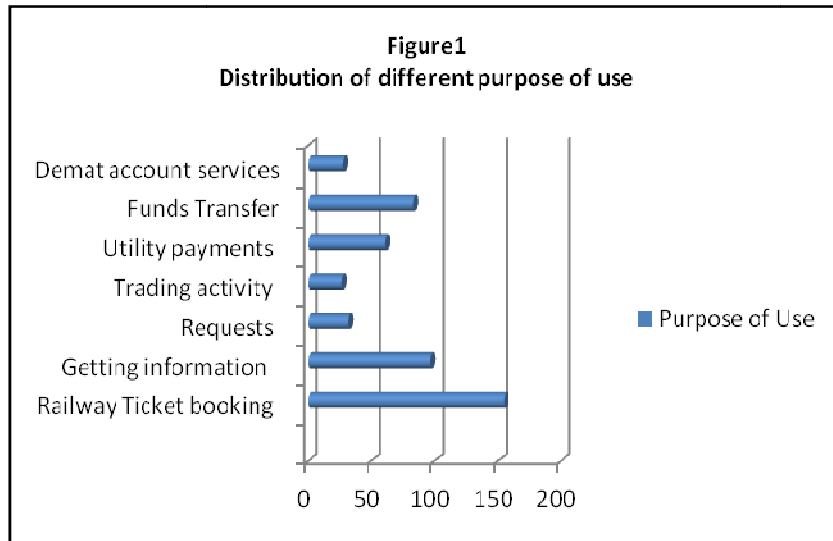
TABLE 6: KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.926
Bartlett's Test of Sphericity	Approx. Chi-Square	3.232E3
	df	435
	Sig.	.000

Figure 2 EIGEN VALUES

Scree Plot

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   121
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in
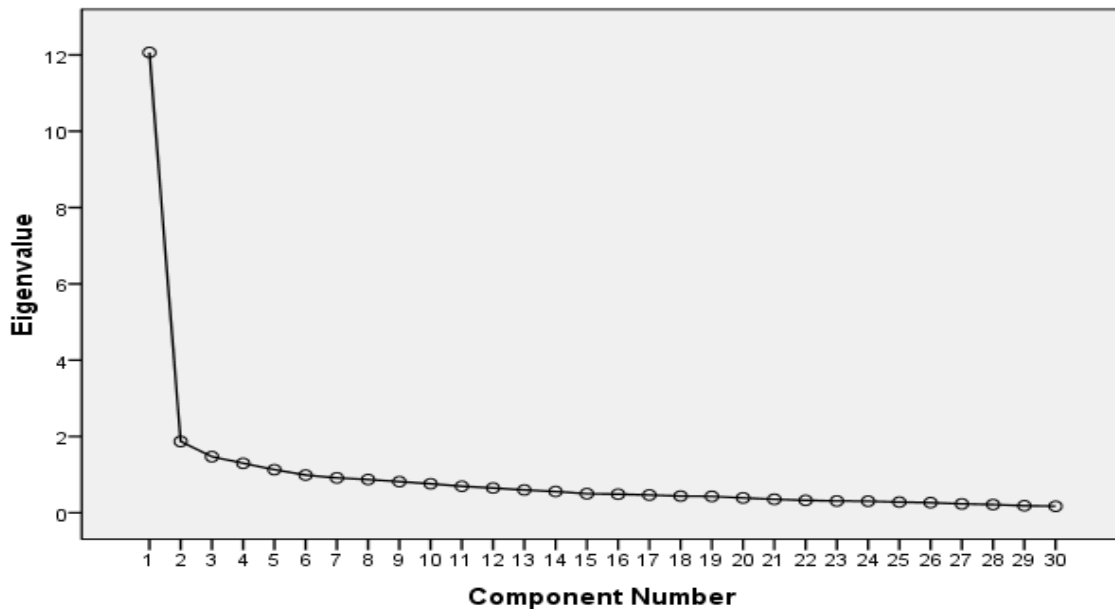
TABLE 7 TOTAL VARIANCE EXPLAINED

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.064	40.215	40.215	12.064	40.215	40.215
2	1.869	6.230	46.445	1.869	6.230	46.445
3	1.470	4.900	51.345	1.470	4.900	51.345
4	1.296	4.320	55.665	1.296	4.320	55.665
5	1.130	3.765	59.430	1.130	3.765	59.430
6	.986	3.287	62.717			
7	.914	3.047	65.764			
8	.872	2.907	68.671			
9	.814	2.714	71.386			
10	.761	2.536	73.922			
11	.692	2.308	76.230			
12	.648	2.159	78.389			
13	.598	1.993	80.381			
14	.556	1.853	82.234			
15	.499	1.663	83.897			
16	.487	1.622	85.519			
17	.464	1.547	87.065			
18	.437	1.456	88.521			
19	.428	1.426	89.948			
20	.387	1.291	91.239			
21	.352	1.174	92.413			
22	.325	1.082	93.496			
23	.308	1.027	94.523			
24	.302	1.007	95.530			
25	.279	.931	96.460			
26	.264	.880	97.340			
27	.231	.770	98.110			
28	.214	.715	98.825			
29	.182	.608	99.433			
30	.170	.567	100.000			

Extraction Method: Principal Component Analysis.

TABLE 8   RELIABILITY STATISTICS (CRONBACH'S ALPHA)

Construct	Perceived ease of use	Trust	Perceived Usefulness	Promptness	Perceived Enjoyment
Items	10	6	3	2	2
Alpha	.887	.881	.719	.612	.713

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 122
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE 9: ROTATED COMPONENT MATRIX

	Component					
	1	2	3	4	5	Labelled as
PEOU 1	.706					
PEOU 2	.669					
PEOU 3	.660					
PEOU 4	.622					
PEOU 5	.608					PERCEIVED EASE OF USE
PEOU 6	.607					
PEOU 7	.593					
PEOU 8	.582					
PEOU 9	.520					
PEOU 10	.515					
T 1		.816				
T 2		.756				
T 3		.747				TRUST
T 4		.674				
T 5		.639				
T 6		.512				
PU 1			.744			
PU 2			.711			PERCEIVED USEFULNESS
PU3			.508			
P 1				.733		PROMPTNESS
P 2				.656		
PE 1					.723	PERCEIVED ENJOYMENT
PE 2			.		.677	
	1	2	3	4	5	Labelled as
% of Variance	40.215	6.230	4.900	4.320	3.765	

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 123
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

IMPACT OF MERGERS ON STOCK RETURNS: A STUDY WITH REFERENCE TO MERGERS IN INDIA

KUSHALAPPA. S
ASST. PROFESSOR
DEPARTMENT OF MBA
ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY
MIJAR

SHARMILA KUNDER
ASST. PROFESSOR
DEPARTMENT OF COMMERCE & MANAGEMENT
ALVA'S COLLEGE
MOODBDRI

ABSTRACT

The practice of mergers and acquisitions has attained considerable significance in the contemporary corporate scenario which is broadly used for reorganizing the business entities. Indian industries were exposed to plethora of challenges both nationally and internationally, since the introduction of Indian economic reform in 1991. The cut-throat competition in international market compelled the Indian firms to opt for mergers and acquisitions strategies, making it a vital premeditated option. It is believed that mergers and acquisitions are strategic decisions leading to the maximization of a company's growth by enhancing its production and marketing operations. They have become popular in the recent years because of the enhanced competition, breaking of trade barriers, free flow of capital across countries and globalization of business as a number of economies are being deregulated and integrated with other economies. Research on mergers has made considerable progress over the last 50 years and has produced a vast body of literature, especially in the developed markets of the world. Target shareholders usually gain when a merger, acquisition or tender offer is announced. Research in the area of mergers has more than kept pace with the increasing number of mergers in the economy, investigating the motivation, cyclical nature, profitability, and determination of the negotiated exchange ratios for mergers. This study identifies whether the industries will benefit from the mergers and acquisitions. This in turn will benefit the stakeholders in the companies, i.e. shareholders. This study basically focuses on the shareholders reactions to the merger announcement. The core objective of this study is to evaluate the impact of mergers on stock returns. The study examines the returns to the shareholders in case of mergers and acquisitions in India during the period, 2009 and 2011. The study contributes to understand the effect of the mergers on the industries during the different peaks and troughs. The study covers merged companies of different sectors like; financial companies, non-financial companies, construction and real estate and electricity sector.

KEYWORDS
Acquisition, abnormal returns, derivatives, merger.

INTRODUCTION

The practice of mergers and acquisitions has attained considerable significance in the contemporary corporate scenario which is broadly used for reorganizing the business entities. Indian industries were exposed to plethora of challenges both nationally and internationally, since the introduction of Indian economic reform in 1991. The cut-throat competition in international market compelled the Indian firms to opt for mergers and acquisitions strategies, making it a vital premeditated option. It is believed that mergers and acquisitions are strategic decisions leading to the maximization of a company's growth by enhancing its production and marketing operations. They have become popular in the recent years because of the enhanced competition, breaking of trade barriers, free flow of capital across countries and globalization of business as a number of economies are being deregulated and integrated with other economies.

Research on mergers has made considerable progress over the last 50 years and has produced a vast body of literature, especially in the developed markets of the world. Target shareholders usually gain when a merger, acquisition or tender offer is announced. Research in the area of mergers has more than kept pace with the increasing number of mergers in the economy, investigating the motivation, cyclical nature, profitability, and determination of the negotiated exchange ratios for mergers.

Since India is a fast developing economy and the industries in India are also developing, they are trying to compete with the global giants like Wal-Mart, IBM, for recognition in the world market. One of the methods in which the Indian industries can cope with the foreign market leaders is mergers and acquisitions. This study identifies whether the industries will benefit from the mergers and acquisitions. This in turn will benefit the stakeholders in the companies, i.e. shareholders. This study basically focuses on the shareholders reactions to the merger announcements.

OBJECTIVES
The core objective of this study is to evaluate the impact of mergers on stock returns. However in order to achieve the main objective, the following subsidiary objectives have been framed:
➢ To study the behavior of stock returns before the merger and after the merger.
➢ To find out the correlation between the pre-merger stock returns and post-merger returns.

SCOPE OF THE STUDY
The study examines the returns to the shareholders in case of mergers and acquisitions in India during the period, 2009 and 2011. The study contributes to understand the effect of the mergers on the industries during the different peaks and troughs. The study covers merged companies of different sectors like; financial companies, non-financial companies, construction and real estate and electricity sector.

METHODOLOGY
In this study the researchers have taken the merger announcements made by acquiring companies included in the BSE SENSEX index from 1-1-2009 to 19-10-2011. The effects of merger announcements of the companies on equity share prices was examined by taking daily adjusted market price data for the sample stocks 15 days before and 15 days after the merger announcement date. BSE SENSEX is used as the surrogate for the market portfolio. The merger dates of companies which are announced in the various media is collected from the CMIE Prowess database. Also the share prices as well as the SENSEX values of acquiring companies were collected from the former.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   124
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TECHNIQUES OF ANALYSIS

Daily returns for each sample company has been computed for the estimation period and also for the event period as

$$R_{it} = \frac{MP_{it} - MP_{i(1-t)}}{MP_{i(1-t)}}$$

Where, MP_{it} = Market price (closing) of security 'i' on day t and $MP_{i(1-t)}$ = Market price of security on day (t-1). Comparatively, the actual returns for the market are also computed as :

$$R_{mt} = \frac{I_{it} - I_{i(1-t)}}{I_{i(1-t)}}$$

Where I_{it} an $I_{i(1-t)}$ are daily BSE index values at time t and t-1 respectively

In the next step the market model has been utilized to calculate the expected returns on the stock.

Daily expected return

E (R_{it}) = α + β × R_m + $\mathcal{E}_t$

In the Equation **E(R)** is the expected return of a particular company on day t,

α and **β** are calculated as follows

$$\beta = \frac{n \sum xy - \sum x \times \sum y}{n \sum x^2 - (\sum X)2}$$

α = y − βx

R (m) = Return on the market

Then the abnormal return on day t is calculated as

Abnormal returns

Daily abnormal return on a particular day *t* is the excess of the actual return on the day t over the expected return on that day.

AR= R_{it} − E(R_{it})

Where, **R_{it}** is the actual daily return for the share of a company i at time t, & **E(R_{it})** is the expected return on the same day in the absence of an acquisition.

The study period used in this analysis is a 31working days. In this, the day on which a merger announcement appears in the press is designated as 0. Trading days prior to the merger announcement are numbered event days -1, -2 and so on. The event days following the merger are numbered +1, +2 and so on. The maximum time involved in this study is -15 days to +15 days. First, the average excess returns (AAR) for each relative day t are calculated across the securities. Daily average cumulative abnormal returns (CAAR) are the sum of the average excess returns over event time. In other words, CAAR is defined as the sum of previous daily average residuals for each trading day.

Average abnormal return (AAR's) for each relative day is calculated by

$$AAR_t = \sum_{t=1}^{n\sum} \frac{AR_{it}}{N}$$

Where, i = the number of securities in the study

N = Total number of securities

t = the days surrounding the event study.

Cumulative Average Abnormal Returns (CAARs) are derived by summing the AARs over various time intervals. For Example, CAARs for a time interval t_n to t_t, are derived as follows

CAARs = $\sum_{t=1}^{n} AAR_t$

Where t = -15,…. 0,..... +15

The data which is collected after the calculations which are explained above is a representation of the period Jan 2009 to Oct 2011. This data is then further segregated into sectors, namely Construction and Real estate, Power, Non-Financial, and Financial Services**.**

In addition to the above techniques other statistical tools such as averages, and correlation coefficients have been used to make the analysis more effective.

LIMITATIONS

Every research has its own limitations. The following are the limitations of this study.

➢ The study covers only few sectors which are taken for studying the impact of merger.

➢ This study is restricted only to Indian companies.

ANALYSIS AND INTERPRETATION

This part of the study deals with the analysis of the study. For the purpose of analysis the companies taken for the study are categorized into sectors. The sectors taken for the study is Construction and Real Estate, Power, Financial and Non-Financial. The returns of each company under each sector are shown in the annexure. Sector wise analysis is being made and then correlation between pre-merger Average Abnormal Return (AAR) and post-merger AAR is calculated for each company and then for each sector. For the above purpose, statistical tools, like, mean, and correlation has been used.

TABLE 1: AAR BEFORE AND AFTER MERGER AND CORRELATION & STANDARD DEVIATION BETWEEN PRE-MERGER AND POST-MERGER AAR

Company	Pre-merger AAR	Post-merger AAR	Correlation between pre and post merger AAR	Standard Deviation
Nila Infrastructures Ltd.	0.386	-0.64867	0.30398	4.321693
I V R C L Assets & Holdings Ltd.	-0.26067	0.620667	-0.31651	4.275105
Unitech Ltd.	1.108667	0.038667	-0.49102	1.996009
Ashiana Housing Ltd.	-0.144	0.137333	-0.11156	2.386286
Correlation between pre-merger and post-merger AAR		**-0.43821**		
Standard Deviation between pre and post merger AAR				**0.547391**

From Table 1 it is clear that only in case of Unitech Ltd. the AAR is positive under both pre-merger and post-merger period. In all other cases the returns are reverse to each other under pre and post-merger period. Except in Nila Infrastructure Ltd, in all other cases the correlation between pre-merger and post-merger AAR is negative and the correlation between pre-merger and post-merger AAR is also negative.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   125

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

TABLE 2: AVERAGE ABNORMAL RETURNS AND CUMULATIVE AVERAGE ABNORMAL RETURNS FOR CONSTRUCTION INDUSTRY

DAYS	AAR	CAAR	DAYS	AAR	CAAR
-15	2.021466	2.021466	1	3.115191	7.468374
-14	0.829841	2.851307	2	-1.12171	6.346665
-13	0.367391	3.218698	3	0.985341	7.332006
-12	-1.62693	1.591765	4	1.172716	8.504723
-11	-1.76346	-0.17169	5	3.817666	12.32239
-10	0.576141	0.404447	6	1.302466	13.62485
-9	0.315616	0.720063	7	-3.00491	10.61995
-8	2.684541	3.404604	8	-0.82746	9.792487
-7	1.310741	4.715345	9	0.419816	10.2123
-6	-0.02168	4.693661	10	-1.59193	8.620369
-5	0.510191	5.203852	11	0.084341	8.70471
-4	-1.19143	4.012419	12	-1.46638	7.238327
-3	0.312916	4.325335	13	-1.37278	5.865543
-2	0.961091	5.286426	14	-0.61606	5.249484
-1	-1.20838	4.078042	15	-0.33461	4.914875
0	0.275141	4.353183			
Average	**0.27187**			**0.03745**	

As per the Table 2, it is understood that the AAR before the merger is higher than AAR after merger.

TABLE 3: CORRELATION & STANDARD DEVIATION BEFORE AND AFTER MERGER AND AAR OF POWER SECTOR

Company	Pre-merger AAR	Post-merger AAR	Correlation between pre and post merger AAR	Standard Deviation
Jaiprakash Power Ventures Ltd.	1.100667	-1.53267	-0.13688	5.16401
Energy Development Co. Ltd.	-0.05	-0.136	0.288952	3.922375
Maximaa Systems Ltd.	-1.314	0.024	-0.16001	4.755289
U T V Software Communications	-0.64533	1.266	-0.19687	2.563297
B F Utilities Ltd.	0.882	-0.086	0.103975	3.382348
Correlation Between Pre-Merger and Post merger AAR			**-0.6463**	
Standard Deviation between pre and post merger AAR				**0.948045**

It is crystal clear from the above table that Energy Development Co. Ltd. has positive AAR under pre and post merger period. In all other cases AAR is reverse to each other under pre and post-merger period. It is also clear that in case of Energy Development Co. Ltd. and B.F Utilities Ltd, the correlation between pre-merger and post-merger AAR is positive. In all other cases it is negative.

TABLE 4: AVERAGE ABNORMAL RETURNS AND CUMULATIVE AVERAGE ABNORMAL RETURNS FOR POWER SECTOR

Days	AAR	CAAR	Days	AAR	CAAR
-15	4.413018	4.413018	1	0.667781	4.95191
-14	0.485268	4.898285	2	-0.51278	4.439131
-13	0.478801	5.377086	3	-3.5635	0.875633
-12	2.248984	7.62607	4	1.801181	2.676814
-11	-2.70222	4.923855	5	0.757741	3.434556
-10	0.063751	4.987605	6	0.940941	4.375497
-9	-0.56917	4.41844	7	-0.03298	4.342519
-8	-1.50715	2.911291	8	-0.92454	3.41798
-7	2.241518	5.152808	9	0.479541	3.897522
-6	-2.50955	2.643259	10	0.051941	3.949463
-5	-1.59528	1.047977	11	-2.55686	1.392605
-4	1.287701	2.335678	12	-1.23322	0.159386
-3	-0.51493	1.820745	13	0.091741	0.251128
-2	-0.44992	1.370829	14	1.768981	2.020109
-1	-0.46748	0.903347	15	0.975381	2.995491
0	3.380781	4.284128			
Average	**0.060223**			**0.08591**	

As shown in the above table it is clear that the AAR after merger is higher than AAR before merger in power sector and on the date of merger announcement the AAR is much higher than the post-merger and pre-merger AARs.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   126

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

TABLE 5: PRE-MERGER AAR POST-MERGER AAR AND CORRELATION & STANDARD DEVIATION BETWEEN POST-MERGER AND PRE-MERGER AAR FOR FINANCE SECTOR

Company	Pre merger average return	Post merger average return	Correlation between post- merger and pre-merger AAR	Standard Deviation
State Bank Of India	-0.274	-0.158	-0.3839	3.565618
Rane Holdings Ltd.	-0.38067	-0.184	-0.1781	5.075748
Walchand Peoplefirst Ltd.	0.112	0.339333	0.162484	6.164923
Federal Bank Ltd.	0.516667	-0.056	-0.06461	1.936642
Delta Corp Ltd.	-1.19667	-0.03067	0.349828	3.692445
Intec Capital Ltd.	2.689333	-1.60067	0.034451	3.434422
S R E I Infrastructure Finance	-0.18067	-1.11667	-0.02306	2.294617
India Lease Devp. Ltd.	0.986667	-0.156	0.32626	3.852637
I C I C I Bank Ltd.	-0.022	-0.16333	-0.02266	4.211378
Kama Holdings Ltd.	0.420667	-0.724	0.090697	4.023519
India Securities Ltd.	-0.424	0.516667	-0.66391	4.00805
Clarus Infrastructure Realties	3.638667	0.138667	-0.1265	3.785194
I D B I Bank Ltd.	0.288667	-0.034	-0.0266	0.92728
Correlation between Pre-merger and Post-merger AAR		**-0.28142**		
Standard Deviation between pre and post merger AAR				**1.065204**

From Table 5 it is found that in case of Walchand Peoplefirst Ltd. and Clarus Infrastructure Realties the correlation between post-merger AAR and pre-merger AAR is positive and State Bank of India, Rane Holdings Ltd., Delta Corp Ltd., SREI infrastructure finance and ICICI Bank Ltd. the AAR is negative under both the situations and in all other cases the AAR is reverse to each other during these situations. There is a positive correlation between pre-merger and post-merger AAR in case of Walchand Peoplefirst Ltd, Delta Corp Ltd, Intec Capital Ltd., India Lease Devp. Ltd.and Kama Holdings Ltd. But in all other cases it is negative. The correlation between the post-merger and pre-merger AAR of the sector is positive.

TABLE 6: AVERAGE ABNORMAL RETURNS AND CUMULATIVE AVERAGE ABNORMAL RETURNS FOR FINANCIAL SERVICE INDUSTRY

Days	AAR	CAAR	Days	AAR	CAAR
-15	-0.61778	-0.61778	1	-0.13051	6.391433
-14	0.924365	0.306581	2	-1.63661	4.754826
-13	1.027899	1.33448	3	-0.58195	4.172875
-12	-0.29811	1.036367	4	-0.87234	3.300535
-11	0.726877	1.763244	5	0.579032	3.879567
-10	0.086193	1.849437	6	0.34176	4.221327
-9	-0.70941	1.140025	7	-0.22355	3.997781
-8	0.470032	1.610057	8	0.944654	4.942436
-7	-0.06024	1.549817	9	0.307865	5.250301
-6	0.853815	2.403632	10	0.154349	5.40465
-5	0.404415	2.808048	11	-0.66262	4.742032
-4	1.335665	4.143713	12	-0.42915	4.312881
-3	0.876615	5.020329	13	0.369054	4.681935
-2	0.17341	5.193739	14	-0.10928	4.572651
-1	-0.13631	5.057432	15	0.465365	5.038016
0	1.464508	6.52194			
Average	**0.337162**			**0.09893**	

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   127

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

It is crystal clear from the above table that pre-merger AAR is higher than post-merger AAR on the date of merger announcement the AAR is quite higher than both the averages.

TABLE 7: PRE-MERGER AAR, POST-MERGER AAR, AND CORRELATION & STANDARD DEVIATION BETWEEN PRE AND POST MERGER AAR OF NON-FINANCIAL SECTOR

Company	Pre merger AAR	Post merger ARR	Correlation between AARs	Standard Deviation
H C L Infosystems Ltd.	0.716667	-0.71933	-0.01381	3.453658
My Fair Lady Ltd.	-1.52867	0.272	-0.03542	4.114891
Entegra Ltd.	2.843333	-0.718	-0.04972	6.816974
3I Infotech Ltd.	2.734667	3.090667	0.583089	5.717312
Pyramid Saimira Theatre Ltd.	2.786	1.633333	0.360445	7.274553
Trent Ltd.	-0.08533	-0.052	-0.02453	1.99583
Wipro Ltd.	0.34	0.408667	-0.22779	1.626487
Zensar Technologies Ltd.	0.986667	1.268667	-0.29129	3.701165
Modern India Ltd.	-0.37267	1.916667	0.198199	2.967677
Aptech Ltd.	0.009333	-0.88267	-0.11277	2.925301
Visesh Infotecnics Ltd.	-1.64733	0.008	-0.51153	2.44662
Glodyne Technoserve Ltd.	-0.86733	-0.82067	-0.09315	3.299867
Taneja Aerospace & Aviation Ltd.	0.273333	-0.60867	0.170335	2.504303
Vishal Retail Ltd.	0.322	-0.51867	-0.13879	5.010084
Era E-Zone (India) Ltd.	-0.166	3.988	-0.01998	4.464879
Mphasis Ltd.	-0.85867	-0.654	0.23574	2.467089
Shirpur Gold Refinery Ltd.	-0.902	1.482667	-0.1513	3.50768
E T C Networks Ltd. (1999)	1.697333	0.442667	0.224544	3.90509
Zee Entertainment Enterprises Ltd.	0.075333	0.149333	-0.17276	2.251551
H C L Technologies Ltd.	-0.31533	-0.03	0.267065	2.574015
Allcargo Global Logistics Ltd.	-0.26267	-0.36667	0.042754	1.323099
N R International Ltd.	0.378667	-0.506	0.131082	3.827924
Eco Recycling Ltd.	-0.53933	-0.882	0.362638	4.468197
Varun Industries Ltd.	0.808667	-0.488	-0.25752	4.451825
Weizmann Ltd.	1.148	0.942667	-0.07224	3.418569
Accentia Technologies Ltd.	-0.572	-0.91067	0.153438	2.529002
Adani Enterprises Ltd.	1.099333	0.727333	-0.25377	1.730888
New Delhi Television Ltd.	-0.10867	-0.46467	-0.25847	1.202444
K P I T Cummins Infosystems Ltd.	-0.10467	-1.66333	0.351485	2.434599
D M C Education Ltd.	-2.17867	-1.44733	-0.22447	4.383398
Hinduja Ventures Ltd.	-0.65333	0.318	0.512791	2.879935
S Kumars Unitexx Ltd.	0.431333	-0.38333	0.034785	3.645752
Essar Shipping Ports & Logistics	2.914667	-1.294	0.400459	5.226097
Genesys International Corpn. Ltd.	1.231333	0.042	-0.4016	2.903055
Correlation between Pre-Merger AAR and Post-Merger AAR of the sector		**0.218052**		
Standard Deviation between pre and post merger AAR				**1.238967**

It is clear from the Table 7 that correlation coefficient between pre-merger and post-merger AAR of 19 companies are negative remaining 15 companies have positive correlation between pre-merger and post-merger AAR.

TABLE 8: AVERAGE ABNORMAL RETURNS AND CUMULATIVE AVERAGE ABNORMAL RETURNS FOR NON-FINANCE SERVICES SECTOR

Days	AAR	CAAR	Days	AAR	CAAR
-15	0.164256	0.164256	1	-0.19339	5.602445
-14	0.482656	0.646911	2	0.722079	6.324524
-13	-0.17803	0.468882	3	0.09832	6.422845
-12	0.348485	0.817367	4	-0.77913	5.643718
-11	-1.33193	-0.51456	5	-0.70146	4.942256
-10	0.347232	-0.16733	6	-0.09646	4.845797
-9	0.596603	0.429275	7	0.22955	5.075347
-8	-0.70063	-0.27135	8	0.803817	5.879164
-7	-0.00623	-0.27758	9	0.428456	6.30762
-6	-0.56974	-0.84731	10	-0.65123	5.656393
-5	1.172717	0.325403	11	-0.43218	5.224213
-4	2.194691	2.520094	12	0.358814	5.583028
-3	0.089482	2.609576	13	0.839106	6.422133
-2	1.109912	3.719488	14	0.584167	7.006301
-1	0.524535	4.244023	15	0.222638	7.228939
0	1.551817	5.79584			
Average	**0.282934**			**0.09554**	

As per the above table it is known fact that pre-merger AAR is quite higher than the post-merger AAR and both the AARs are less than the AAR on the date of merger announcement.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   128

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

TABLE 9: AAR OF EACH SECTOR BEFORE AND AFTER MERGER AND AAR OF ALL THE COMPANIES TAKEN TOGETHER

Sector	Pre-merger AAR	Post-merger AAR
Construction and real estate	0.27817	0.03745
Power	0.060223	0.08591
Finance	0.337162	0.09893
Non-finance	0.282934	0.09554
AAAR	0.239622	0.079458
Correlation coefficient between pre and post merger	-0.01724	
Standard Deviation between pre and post merger AAR	0.11137	

It is crystal clear from the Table 9 that Post-merger ARR of all the industries under study, except power industry, are more than the Pre-merger ARR. It is also being identified that there is a negative correlation between Post-merger ARR and Pre-merger ARR.

FINDINGS OF THE STUDY
After analyzing the impact of mergers on the returns of the stocks, the authors have drawn the following findings:

CONSTRUCTION AND REAL ESTATE
- It is clear from the study that only in construction and real estate, in case of Unitech Ltd. the AAR is positive under both pre-merger and post-merger period. In all other cases the returns are reverse to each other under pre and post-merger period.
- As per the study it is understood that the AAR before the merger is higher than AAR after merger in construction and real estate sector.
- Except in Nila Infrastructure Ltd, in all other cases the correlation between pre-merger and post-merger AAR is negative and also the correlation between pre-merger and post-merger AAR is negative

POWER SECTOR
- It is crystal clear from the study that in power sector, Energy Development Co. Ltd. has negative AAR under pre and post merger period. In all other cases AAR is reverse to each other under pre and post-merger period. It is also clear that in case of Energy Development Co. Ltd. and BFUtilities Ltd. the correlation between pre-merger and post-merger AAR is positive and in all other cases it is negative.
- The AAR after merger is higher than AAR before merger in power sector and the date of merger announcement the AAR is much higher than the post-merger and pre-merger AARs.

FINANCE SECTOR
- It is found from the study that in case of finance sector, Walchand Peoplefirst Ltd. and Clarus Infrastructure Realties, the correlation between post-merger AAR and pre-merger AAR is positive and State Bank of India, Rane Holdings Ltd., Delta Corp Ltd., SREI infrastructure finance and ICICI Bank Ltd. the AAR is negative under both the situations and in all other cases the AAR is reverse to each other during these situations.
- There is a positive correlation between pre-merger and post-merger AAR in case of Walchand Peoplefirst Ltd, Delta Corp Ltd, Intec Capital Ltd., India Lease Devp. Ltd.and Kama Holdings Ltd. But in all other cases it is negative.
- The correlation between the post-merger and pre-merger AAR of the finance sector is positive.
- The pre-merger AAR is higher than post-merger AAR on the date of merger announcement the AAR is quite higher than both the averages in this sector.

NON-FINANCIAL SECTOR
- It is found in the study that in non-financial sector, correlation coefficient between pre-merger and post-merger AAR of 19 companies are negative, remaining 15 companies have positive correlation between pre-merger and post-merger AAR.
- As per the study, it is known fact that pre-merger AAR is quite higher than the post-merger AAR and both the AARs are less than the AAR on the date of merger announcement.
- Finally it is concluded as per the study that mergers have not met the expectations of the investors as the study reveals that the post-merger abnormal returns are less than pre-merger abnormal returns.

REFERENCES
1. CMIE Prowess data base
2. Ravindhar Vadapalli (2007), Mergers, Acquisitions and Business Valuation, Excel Books.
3. Sudi sudarsanam (2002) Value Creation from Mergers and Acquisitons, Pearson Education.
4. Weston, Mitchel and Mulceril (2003), Takeovers, Restructuring and Corporate Governance, Pearson Education.

WEBSITES
5. http://answers.yahoo.com/question/index?qid=20080211070937AAMuY0d
6. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1012299
7. http://uoa.academia.edu
8. http://www.inderscience.com/search/index.php?action=record&rec_id=16288

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   129
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

SECURING E-COMMERCE WEBSITES THROUGH SSL/TLS

PRADEEP KUMAR PANWAR
LECTURER
DEPARTMENT OF MCA
IEC GROUP OF INSTITUTIONS
GREATER NOIDA

ABSTRACT

Since the Web came into usage, more and more organizations are looking forward for providing services 24 by7 and 365 days to their users or customers. Updating the information as and when necessary has become need of the hour. Now a day's all the different transactions can be done online without much delay. Due to which, security has become a concern for the organizations that are providing services to the customer's online using e-commerce websites. But, as more and more options are coming up, websites are becoming vulnerable to attacks by eavesdropper, hackers whose main motive is to collect the information and tampering with the data, which leads to loss in business. Organizations are investing billions of money in securing their businesses. This paper gives an insight about how security could be provided to the E-commerce websites using different security techniques like SSL, basic concepts of SSL working and the existence of TLS for better security

KEYWORDS
Web, Eavesdropper, Hackers, E-commerce, SSL.

INTRODUCTION

The basic prerequisite of successful E-commerce website is the security it provides. And to prevent important information of users such as credit card number and transaction information from stealing and modifying on the internet, the security mechanisms like SSL or TLS have been adopted in present E-commerce websites. The reason for using such security techniques are, that there are many threats to the E-commerce application which takes place each time data is entered. Secure Sockets Layer (SSL), are cryptographic protocols that provide communication security over the Internet. TLS and SSL encrypt the segments of network connections at the Transport Layer, using asymmetric cryptography for key exchange, symmetric encryption for privacy, and message authentication codes for message integrity.

1. LIFE ON THE WEB WITHOUT SSL

Let us compare communications between computers on the Internet and communications between people over the telephone. Without SSL, your computer-to-computer communications suffer from the same security problems from which your telephone communications suffer:

➔ **Who are you talking to?** In a phone conversation, how can you be sure that the person who picks up the phone at the other end is really the person you are trying to call (especially if you have never spoken to them before)? What if your phone call was intercepted or re-routed, or what if someone else is answering your call recipient's phone? There really is no way to be sure you have reached the right person, especially if they are actively trying to fool you.

➔ **Eavesdropping?** As you are aware of from watching TV or reading, it is very easy to tap phone lines: the police and spies do this all the time to covertly gather information. It is not easy to detect if your lines are tapped. The same applies with communications over the Internet — how can you be sure that your communications are not being "tapped" and recorded? This is especially problematic in public wifi hotspots.

This results in two very real security issues for communications over the Internet:
1. Knowing for sure that you are connecting to the right servers (i.e. those at your bank and not those at a hacker's or phisher's web site).
2. Knowing that your data is safe from prying eyes during transit to those computers. This is where SSL comes in

2. HOW SSL CAME INTO EXISTENCE

SSL is a Netscape protocol created in 1992, which is basically used to exchange information securely between client browser and the server machine. It is a solution which is provided to implement security over the network to the users who are accessing the web. This is a protocol which sits between the transport layer and the application layer. There are two approaches to implement this protocol. Firstly, it could be provided as part of the underlying protocol suite and therefore be transparent to applications. Secondly, SSL can be embedded in specific packages.

2.1 UNDERSTANDING SSL

Varied options are available to access the Internet, as there exists dozens of independent systems. Due to easy availability unauthorized users can steal credit card numbers, PIN numbers, personal data, and other confidential information.

The Secure Sockets Layer (SSL) protocol was developed to transfer information privately and securely across the Internet. SSL is layered beneath application protocols such as HTTP, SMTP, and FTP and above the connection protocol TCP/IP. It is used by the HTTPS access method. Transport Layer Security (TLS) is the successor of Secure Sockets Layer (SSL); they are both cryptographic protocols that provide secure communications on the Internet for such things as web browsing, e-mail, Internet faxing, instant messaging, and other data transfers.

SSL uses public/private keys to provide a flexible encryption scheme that can be setup at the time of the secure transaction.

In typical encryption schemes the client and server would be required to use a secret key that has been preconfigured in the client and the server machines. In such a scheme, the client would use the secret key to encrypt the data. The server would use the same secret key to decrypt the data. Same logic applies in the server to client direction. These types of preconfigured secret keys are not suitable for Web based secure services that involve millions of users who have no prior secret key arrangement with the secure server.

SSL solves this problem by using asymmetric keys. These keys are defined in pairs of public and private keys. As the name suggests the public key is freely available to anybody. The private key is known only to the server. The keys have two important properties:

(1) Data encrypted by the client using the pubic key can be decrypted only by the server's private key. Due to this property of the keys, the client is able to send secure data that can be understood only by the server.

(2) Data encrypted to by the server's private key can only be decrypted using the public key. This property is useful in a client level authentication of the server. If the server sends a known message (say the name of the server), the client can be sure that it is talking to the authentic server and not an imposter if it is successfully able to decrypt the message using the public key.

Note that property (1) allows us to use conventional secret keys. A secret key can be sent by the client as data that has been encrypted using the public key. This secret key can be decrypted only by the server. Once the server gets the key, the client and the server are able to communicate using this secret key.

The public/private key based encryption is used only for handshaking and secret key exchange. Once the keys have been exchanged the symmetric secret keys are used. This is done for two reasons:

(1) Public/private key based encryption techniques are computationally very expensive thus their use should be minimized.

(2) The secret key mechanism is needed for server to client communication.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT
130
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

SSL/TLS runs on top of TCP but below the end user protocol that it secures such as HTTP or IMAP as shown in following Figure:
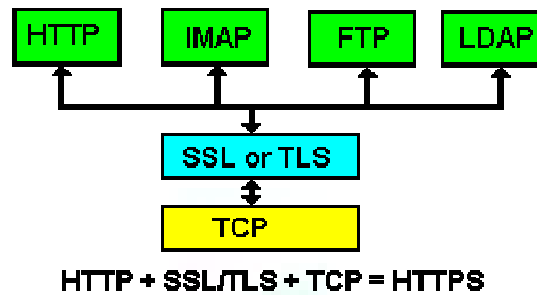
2.2 HOW SSL WORKS

The working of the SSL requires a client machine in the form of web server and web site server. The client side initiates the transaction and the server responds to the request for the transaction. During the request- response process SSL follows three different steps.

1.   A session is initialised between the client and the server by Handshake protocol.
2.   When the server authenticates the handshake protocol, data is transferred under the Record Protocol phase.
3.   Alert protocol describes the severity of the message and description of the alert. I there are any alarms during the session, the alert is attached to the questionable packet and handled according to the alert protocol.

The four protocol layers of the SSL protocol (Record Layer, ChangeCipherSpec Protocol, Alert Protocol, and Handshake Protocol) encapsulate all communication between the client machine and the server.

2.2.1 RECORD LAYER

The record layer formats the Alert, ChangeCipherSpec, Handshake and application protocol messages. This formatting provides a header for each message, and a hash, generated from a Message Authentication Code (MAC) at the end. The fields that comprise the five-byte header of the Record Layer are: Protocol Definition (1byte), Protocol Version (2 bytes) and the Length (2 bytes). The protocol messages that follow the header cannot be longer than 16,384 bytes, as specified by the SSL protocol.(Thomas, 70)

2.2.2 CHANGECIPHERSPEC PROTOCOL

The ChangeCipherSpec layer is composed of one message that signals the beginning of secure communications between the client and server. Though the ChangeCipherSpec Protocol uses the Record Layer format, the actual ChangeCipherSpec message is only one byte long, and signals the change in communications protocol by having a value of '1'.

2.2.3 ALERT PROTOCOL

This protocol sends errors, problems or warnings about the connection between the two parties. This layer is formed with two fields: the Severity Level and Alert Description.

- **Severity Level**

The Severity Level sends messages with a '1' or '2' value, depending on the level of concern. A message with a value of '1' is a cautionary or warning message, suggesting that the parties discontinue their session and reconnect using a new handshake. A message with a value of '2' is a fatal alert message, and requires that the parties discontinue their session.

- **Alert Description**

The Alert Description field indicates the specific error that caused the Alert Message to be sent from a party. This field is one byte, mapped to one of twelve specific numbers, and can take on one of the following meanings. Those descriptions that always follow a "fatal" alert message are underlined. (Thomas, 73)

CloseNotify	UnexpectedMessage	BadRecordMAC	DecompressionFailure
HandshakeFailure	NoCertificate	BadCertificate	UnsupportedCertificate
CertificateRevoked	CertificateExpired	CertificateUnknown	IllegalParamete

2.2.4 SSL HANDSHAKE

The client always authenticates the server, and the server has the option of also authenticating the client. In general, Web servers do not authenticate the client during the Handshake Protocol because the server has other ways to verify the client other than SSL. For e-commerce, the Web-site server can verify the credit card number externally from the SSL session. In this way, the server can reserve precious processing resources for encrypted transactions.

During the Handshake Protocol, the following important steps take place: the session capabilities are negotiated, meaning the encryption (ciphers) algorithms are negotiated; and the server is authenticated to the client.

SSL uses symmetric cryptography for the bulk data encryption during the transfer phase; however, asymmetric cryptography, (that is, PKI) is used to negotiate the key used for that symmetric encryption. This exchange is critical to the Handshake Protocol. Note that the server may optionally ask the client to authenticate itself. However, it is not necessary to the protocol.

1.   The handshake begins when a client connects to an SSL-enabled server, requests a secure connection, and presents a list of supported ciphers and versions.
2.   From this list, the server picks the strongest cipher and hash function that it also supports and notifies the client of the decision.
3.   Additionally, the server sends back its identification in the form of a digital certificate. The certificate usually contains the server name, the trusted certificate authority (CA), and the server's public encryption key. The server may require client authentication via a signed certificate as well (required for some on-line banking operations); however, many organizations choose not to widely deploy client-side certificates due to the overhead involved in managing a public key infrastructure (PKI).
4.   The client verifies that the certificate is valid and that a Certificate Authority (CA) listed in the client's list of trusted CAs issued it. These CA certificates are typically locally configured.
5.   If it determines that the certificate is valid, the client generates a master secret, encrypts it with the server's public key, and sends the result to the server. When the server receives the master secret, it decrypts it with its private key. Only the server can decrypt it using its private key.
6.   The client and server then convert the master secret to a set of symmetric keys called a key ring or the session keys. These symmetric keys are common keys that the server and browser can use to encrypt and decrypt data. This is the one fact that makes the keys hidden from third parties, since only the server and the client have access to the private keys.
7.   This concludes the handshake and begins the secured connection allowing the bulk data transfer, which is encrypted and decrypted with the keys until the connection closes. If any one of the above steps fails, the SSL handshake fails, and the connection is not created.

Though the authentication and encryption process may seem rather involved, it happens in less than a second. Generally, the user does not even know it is taking place. However, the user is able to tell when the secure tunnel has been established since most SSL-enabled web browsers display a small closed lock at the bottom (or top) of their screen when the connection is secure. Users can also identify secure web sites by looking at the web site address; a secure web site's address begins with https rather than the usual http.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 131
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

4.   SSL CRYPTO ALGORITHMS

SSL supports variety of cryptographic algorithms or ciphers.

→Key exchange algorithm: The asymmetric key algorithm used to exchange the symmetric key. RSA and Diffie Hellman are common examples.

→ Public key algorithm: The asymmetric key algorithm used for authentication. This decides the type of certificates used. RSA and DSA are common examples.

→ Bulk encryption algorithm: The symmetric algorithm used for encrypting data. RC4, AES, and Triple-DES are common examples.

→ Message digest algorithm: The algorithm used to perform integrity checks. MD5 and SHA-1 are common examples.

5.   SSL VERSIONS

SSL brought different versions like SSLv2.0, SSLv3.0 but these protocols suffered from various vulnerabilities.

The SSLv2.0 protocol suffers from

- Re-usage of key material (message authentication and encryption) thus, in case of EXPORT ciphers unnecessarily weakening the MAC (not required by export restrictions)
- Ciphers marked as "Export" have an arbitrary small key size and can be cracked easily with today's hardware.
- weak MAC construction and supports only MD5 hash function
- padding length field is unauthenticated
- Downgrade attack – an attacker may downgrade the encryption to the lowest available and after doing so crack the keys.
- Truncation attacks – The attacker may reset the TCP connection.

Then the SSLv3.0 came into existence. In the:

1. SSL Version 3.0 handshake protocol flows are different than SSL Version 2.0 handshake flows.
2. SSL Version 3.0 uses the BSAFE 3.0 implementation from RSA Data Security, Inc. BSAFE 3.0 includes a number of timing attack fixes and the SHA-1 hashing algorithm. The SHA-1 hashing algorithm is considered to be more secure than the MD5 hashing algorithm. Having SHA-1 allows SSL Version 3.0 to support additional cipher suites which use SHA-1 instead of MD5.
3. SSL Version 3.0 protocol reduces man-in-the-middle (MITM) type of attacks from occurring during SSL handshake processing. In SSL Version 2.0, it was possible, though unlikely, that a MITM attack could accomplish cipher specification weakening. Weakening the cipher could possibly allow an unauthorized person to break the SSL session key since the secret material within the generate secret key would be considerable shorter.

Differences between SSLv3 and SSLv2

- Key material is no longer reused in both Message authentication and encryption making suites marked as EXPORT," stronger".
- MAC construction enhanced and support for SHA1 added
- SSLv3 adds protection of the Handshake, server-side can detect downgrade attacks
- SSLv3 adds support for a closure alert.

Both SSL2 and SSL3 have 16-bit (two-byte) version number fields.SSL2 interprets this as a single 16-bit integer, and the official number is 2, e.g. 0x0002.SSL3 interprets two-byte version numbers as a one byte "major" number and a one byte "minor" (or fractional) number. So the value 0x0002 is interpreted by SSL3 as version

Differences between TLS v1and SSLv3

0.2, not2.0.

After SSL, TLS came into existence which supersedes SSL. SSL v3.0 was actually renamed into TLS. SSL version 3.0 and its designated successor protocol Transport Layer Security (TLS) 1.0, which the Internet Engineering Task Force(IETF) published for the first time in 1999 [RFC2246]. The IETF published the most recent Internet-Draft for TLS 1.1 in Oct. 2002 [TLS].The TLS 1.0 specification described itself as being similar to but not backwards compatible with the SSL 3.0 specification. It did include a fallback mechanism for SSL 3.0 if TLS was not available. The IETF made some small changes and clarifications and publishedRFC4346 in 2006 detailing TLS 1.1. There is currently a working draft for TLS 1.2 (RFC Draft 4346) which expired in September 2007. Then came different versions of TLS and every new version is loaded with more security parameters providing safe data transfer over web.

Differences between TLS v1and SSLv3

- Expansion of cryptographic keys from the initially exchanged secret was improved
- MAC construction mechanism modified into an HMAC
- Mandatory support for Diffie-Hellman key exchange, the Digital Signature Standard, and Triple-DES encryption

Differences between TLS v1.1 and TLS v1 3

- The implicit Initialization Vector (IV) is replaced with an explicit IV to protect against CBC attacks4
- Handling of padding errors is changed to use the bad_record_mac
- Alert rather than the decryption_failed alert to protect against CBC attacks
- IANA registries are defined for protocol parameters.
- Premature closes no longer cause a session to be nonresumable.
- Additional informational notes were added for various new attacks on TLS

Differences between TLSv1.2 and TLSv1.1 5

- SHA-256 is the default digest method
- Several new cipher suites use SHA-256
- It has better ways to negotiate what signature algorithms the client supports
- Alerts are mandatory now be sent in many cases
- After a certificate_request, if no certificates are available, clients now MUST send an empty certificate list
- TLS_RSA_WITH_AES_128_CBC_SHA is now the mandatory to implement cipher suite
- Added HMAC-SHA256 cipher suites
- Removed IDEA and DES cipher suites, they are now deprecated.
- Support for the SSLv2 backward-compatible is now optional only.

RECOMMENDATION

After studying about SSL and TLS , it has been seen in paper that TLS provides better security measures for the websites which provides transactions and minimize the risk of tampering the data by the hackers, eavesdropper.

6.   CONCLUSION

Security has always been a concern to the organizations which are dealing with the transactions at bulk. And to provide security they are looking for different security techniques which are successful in E-commerce websites. This paper highlights how SSL worked and the algorithms being used and how TLS takes the place and supersedes SSL and provide better security measures before the final transactions take place.

REFERENCES

1.   Bartlett, Alan and Richard Silverman "SSH: The Secure Shell The Definitive Guide." 31 July 2001. URL: http://www.snailbook.com/ (3 March 2003)

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 132

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

2. Coleman, Mirean. "HIPAA Electronic Transactions Standards, Code Sets, and the Clinical Social Worker." National Association of Social Workers. July 2002. http://www.socialworkers.org/practice/hipaa/hippa.PDF(9 February 2003)
3. Cotter, Sean. "SSL Reference." 18 October 2000. URL: http://www.mozilla.org/projects/security/pki/nss/ref/ssl/ (10 March 2003).
4. Deitel, Harvey M., Paul J. Deitel & Tem R. Nieto. e-Business & e-Commerce How to Program. Upper Saddle River: Prentice Hall. 2001.
5. Dierks, T. & C. Allen. "The TLS Protocol Version 1.0." January 1999. (16 February 2003)
6. Elgamal, Taher. "The Secure Sockets Layer Protocol (SSL)." April 1995. URL:http://www.ietf.org/proceedings/95apr/sec/cat.elgamal.slides.html (3 March 2003)
7. "How Does Secure Socket Layer (SSL or TLS) Work ",http://luxsci.com/blog/how-does-secure-socket-layer-ssl-or-tls-work.html.
8. HTTP Essentials- *by Stephen Thomas*
9. Network Security with OpenSSL- *by John Viega, et al*
10. "SANS Institute InfoSec Reading Room",http://www.sans.org/
11. SSL & TLS Essentials- *by Stephen A. Thomas*
12. SSL and TLS-*by Eric Rescorla (Author)*
13. "SSL: Foundation for Web Security", The Internet Protocol Journal – Volume 1, No. 1 http://www.phaos.com/sslresource.html
14. "Supported SSL and Transport Layer Security (TLS) protocols", http://publib.boulder.ibm.com/iseries/v5r1/ic2924/index.htm?info/rzain/rzainrzaintls.htm
15. Thomas, Stephen. SSL and TLS Essentials: Securing the Web. New York: John Wiley & Sons, Inc. 2000
16. TLS/SSL hardening and compatibility report 2011, Author Thierry ZOLLER, www.g-sec.lu

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 133
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

EFFICIENT ARCHITECTURE FOR STREAMING OF VIDEO OVER THE INTERNET

HEMANT RANA
RESEARCH SCHOLAR
SCHOOL OF COMPUTER AND INFORMATION SCIENCE
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
NEW DELHI

ABSTRACT

Due to enormous growth of the Internet and growing demand of multimedia contents worldwide, introducing the concept of streaming over the transmission channel. The streaming of multimedia contents such as Audio, Video, and Animation files over the internet has received huge attention from academic as well as industry point of view. The main purpose of the paper is to stream video over the internet. As video has been play an important role for communication & entertainment for many years. We proposed as architecture for streaming Audio / Videos over the internet efficiently. In our architecture, if we compare it with other, it has capabilities to support live streaming as well as pre recorded Video / Audio poses many challenges, we addressed some of these challenges occur in streaming. We cover issues related to the streaming techniques. To introduced this issue with necessary information and provide on detailed view on the streaming techniques. We also discuss previous research in streaming.

KEYWORDS

Streaming Challenges, Streaming video, Streaming Architecture.

INTRODUCTION

Recent advancement in computer technology, video compression techniques, high capacity storage devices and high speed internet work have made internet feasible to provide real – time streaming over the internet. The real-time multimedia consists of time varying constraints because video data must be played out continuously. Real-Time multimedia of live video or stored pre-recorded video is the important part of real-time multimedia. [1]

Video has been playing an important role in entertainment and communications for past decades. Initially videos are transferred in analog form. The evolution of digital integrated circuits and computers forced the digitization of videos. Digitalization creates revolution in the field of compression and communication of videos. In mid 90's the popular and growing internet motivate the video communication over networks. The conventional approach to deliver multimedia contents streaming such as audio and video streaming used the best effort approach [2] and a buffer for solving the problem of delay jitter. However the current best-effort internet does not offer any quality of service (QoS) guarantee to streaming video over the internet. [1] [3]

Real time transportation of live video or stored pre recorded video is the part of real time multimedia. In this paper, we are proposing an architecture for video streaming, which transmit stored video as well as live videos. There are two modes of transmission of stored or live video over the internet, namely the download mode and streaming mode. In streaming mode, due to the real-time nature of the video typically have bandwidth, delay and loss requirements. [1]

There are mainly three ways to stream video over a computer networks: a point-to-point, broadcast and multicast transmission. The common form of communication is point-to-point such as videophone and unicast video streaming over the internet. The most popular form of the video communication is broadcasting of videos i.e. one-to-many. For example of broadcasting videos is live TV and cable network. Another form of video communication is multicasting. Multicasting has a properties lie between point-to-point and broadcasting. For example of multicast is IP-Multicast over the internet. Multicast is not much popular or not widely used, but other approaches with capability of multicasting are being developed, e.g. application-layer multicast via overlay networks. [4]

For storing the digitalized video are used multimedia databases for proper storage and retrieval of the videos. The intension behind the development of the VDBMS (Video Database Management System) is providing a database which can be searched contents according to different criteria, so videos can be retrieved by contents and can be streamed to the users. In VDBMS uses a real time stream manager for streaming requests. Initially a video is stored in raw data form, but when video is captured a set of features is computed at real-time. These features are extensible and can be extended at any time. A recorded video is passed down to storage manger which stores it in a hard disk. VDBMS provides a query manager to process all users query related to video. A video can be retrieved by name or by providing keywords which is compared against the metadata fields. [5] [6]

Video streaming is always preferred over to file download. Video streaming attempts to overcome the problems associated with file download and also provide some additional capabilities. Video streaming has lots of advantages including low delay and low storage requirements. File download mode of transmission used stored videos to transmit over the internet, they downloaded entire file at once. The files download waste downloading time, transmission bandwidth and storage. So we usually support streaming mode to transfer videos over internet that reduced the overheads of storage, bandwidth and downloading time.

We continue by providing a brief overview of the challenges of video streaming, architecture and techniques to stream videos over the internet. Section 2 reviews video streaming challenges. Section 3 introduces architecture that supports real-time and non real-time video streaming over the internet. We have concluded our discussion and mention some scope for future research.

STREAMING VIDEOS: SOME CHALLENGES

Video streaming is difficult because the internet offers best effort service only to transfer videos over the internet. Due to this, it provides no guarantee on bandwidth, delay jitter and loss rate. The main purpose of video streaming is to design a system to deliver high quality video reliably over the internet. Bandwidth play an important role as it is unknown and time varying. If the sender transmits faster than the available bandwidth then congestion occurs, packets are lost, and there is a severe drop in video quality. If sender transmits slower than the available bandwidth then the receiver produces sub-optimal video quality. To overcome the bandwidth problem is to estimate the available bandwidth and then match the transmitted video bit rate to the available bandwidth [4]. Scalable videos are more preferred over non-scalable videos because scalable videos adapt the available bandwidth variations in the network.

The variation in end to end delay is referred to as delay jitter. Delay jitter occurred due to receiver doesn't receive frames at a constant rate. Any delay in frames resulting produce jitter, so it can produces problems in reconstruction of videos. This problem is resolved by introducing playout buffer before decoding at the receiver.

The third problem is losses. Different types of losses depending on the network type. For example if we have wired packet networks such as internet are affected by packet loss. On the other hand, wireless channel are affected by bit errors and burst errors. To overcome the problem of losses, a video streaming system is designed with error control mechanisms.

These are the challenges related to the transmission of videos over an internet. These are:

[8] Netapp streaming media solution overview
- Low quality streaming.
- High storage costs.
- Stream servers/networks unable to handle large demand.
- Multi-protocol means expensive, replicated systems.
- Bandwidth expensive and used inefficiently.
- VCR functionality.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 134
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

As per Gorden Bell [7], the challenges today is not storing the information, but accessing it. It is no need to store thousands of hours of videos, later on it is not possible to retrieve particular frame. The conventional system has many problems associated with the accessing and retrieval of videos for streaming purpose. Therefore, new kinds of databases are needed: multimedia database. As our paper is particular about videos, so we used VDBMS to store over videos for accessing later on. A video database is very much different from the textual database. The way to access information in both the databases is different. In textual databases every word can be used as index. In video databases, we need to store metadata which is describing the data. Apart from finding information on the internet, delivery of the information as a stream creates a challenge, so it can be replayed immediately. [5]
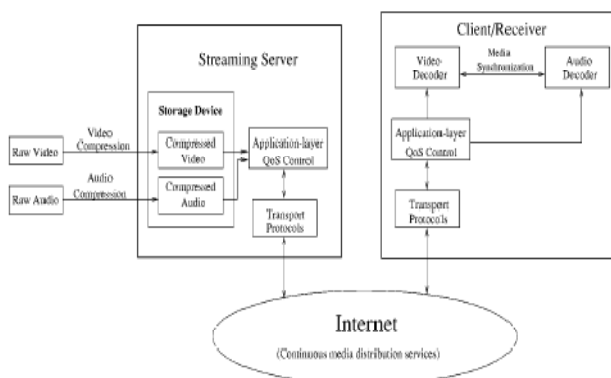
STREAMING ARCHITECTURE

FIGURE 1: STREAMING ARCHITECTURE
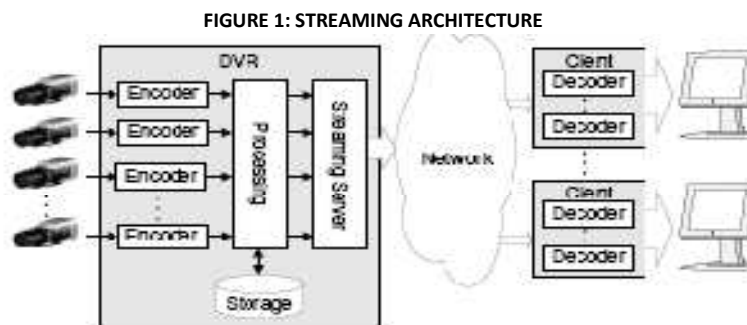
As shown in Figure 1, the proposed architecture for an embedded streaming server that is independent of the used source coders and type of network connected. Multiple users can connect and multiple video channels can be transmitted at the same time for each user. In this system, we used multiple independent encoders per channel, creating streams at different frame rates. For each requested channel, one stream has to be selected. We support live streaming contents of video for surveillance purpose. **[9]**

As shown in Figure 2, the proposed architecture for video streaming that used real-time transmission of only *stored video*. In this system, live streaming of video content is not supportable. [1]
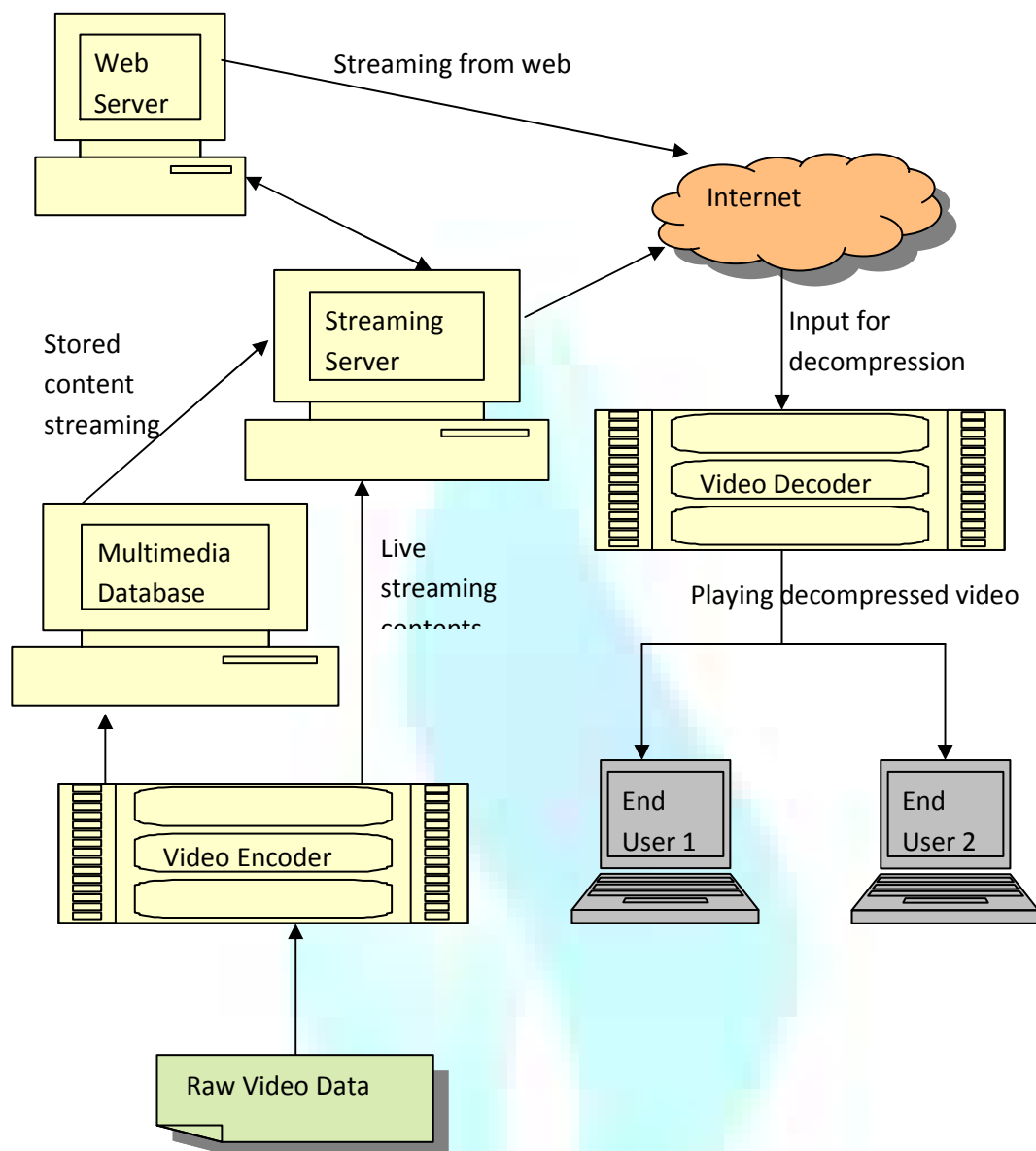
FIGURE 2: VIDEO STREAMING ARCHITECTURE

As we discuss two previously proposed architecture for streaming videos has supported either live or stored video. Both the system can not be able to transmit the live video and stored video as well. According to the current need of both type of real-time transmission of video contents over the internet, we proposed architecture to provide streaming of both type of video contents i.e. live or stored. Figure 3 shows architecture proposed by us to stream videos over internet. In Figure 3 we take raw video data as input to the video compressors such as MPEG2/MPEG4/H.264 Video Encoder etc. The video compressor pre-compressed the raw video data and get stored in storage devices or databases upon the clients request, a streaming server is used to retrieve compressed videos data from storage devices or databases and then send the video packets to the internet.

A compressed video data has to be stored in multimedia database server first, and then the streaming server will be able to use the final compressed video on demand. In on demand distribution of stored video user allowed to rewind and/or forward the video. In our architecture, we can also directly send the compressed videos to the streaming server for transmission over the internet. In this manner we stream videos as a live streaming content. In live streaming there is a direct connection between encoder and the streaming server established first. There is no forward and backward option allowed in live streaming of video.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 135

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

FIGURE 1: PROPOSED STREAMING ARCHITECTURE

In this condition, our architecture is helpful to provide high quality video transmission over the internet. They consist of:

- Raw Video Data
- Multimedia Database Server
- Encoder,
- Streaming Server
- Web Server
- Decoder
- End User

Raw Video Data: raw video data is a simply a data in analog form. A raw data is uncompressed data which we can not transmit it over the internet. Before transmission of raw video data we need to digitalize the video first. In this proposed architecture, we need high quality videos such as MPEG2/MPEG4/H.264 video encoder storing it into multimedia databases after compression to make it available to different clients on the same network. We also need to stream live video contents to feed it directly to the streaming server with some non-stored videos which is already in compressed form.

Multimedia Database Server: Multimedia database server is used to store the videos after been compressed by an encoder. We maintained a database to store videos where we keep records of all the videos after compressing videos. These video contents are capable of streaming on demand of clients. We keep updated our database with the latest videos related to every popular field such as education, movies, sports, politics etc.

Encoder: the encoder play out an important role in video streaming. Encoder is used to transform our raw video data into compressed and transferred form, so we can easily transmit this video over the internet. The encoder compressed video in Mpeg2/MPEG4/H.264 format which is perfect for high quality video storage and streaming. The output of the encoder can be saved to the multimedia database for further retrieval of video on demand and/or streamed directly through streaming.

Streaming Server: streaming server plays an important role to stream videos over the internet. To provide high quality video streaming, streaming server required t process real-time multimedia video under timing constraints in order to restrict artifacts (e.g. jerk in video) during playback at the clients. In addition to support high quality video streaming, streaming server also need to support

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   136
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

VCR [10] like control operation such as stop, play, pause, fast forward and fast backward. Streaming server also need to retrieve real-time multimedia components in a synchronous manner. A streaming server typically consists of the following three parts: [1]

- Communicator
- Operating System
- Storage devices

The streaming server is used to transmit video from the encoder directly, or play video from the multimedia database on demand. Server is able to play stored videos as well videos which are not stored but real-time converted into a playable format.

Web Server: a web server is used to delivered content to clients connected to it. It is using the Hypertext Transfer Protocol (HTTP) to deliver web pages to the clients over the internet. In this architecture, we can access video contents from the web server. A streaming server communicates with web server for video streaming over the internet.

Decoder: the decoder also plays out an important role in video streaming. Decoder is used to transform stream compressed video data into decompressed form to play out video in end users system. In decoder, decompressed video converted MPEG2/MPEG4/H.264 format into analog video which is perfect to play in end user video player (VCR).

End User: The end users are basically a machine, which request a server for videos from server. A server can be a streaming server and/or web server. The end users are large in numbers. Multiple users can access same video at a time. Whenever end users need video, it sends a request to the web server or streaming server which manages to respond to a request made by an end user. The server handles multiple clients at a time.

The architecture used to play videos on a LAN, keeping records on all the videos stored in central server i.e. multimedia database. It also used to customize and atomize the playback of the stream video.

SUMMARY

Video has been playing an important role in entertainment and communications for past decades. Initially videos are transferred in analog form. The evolution of digital integrated circuits and computers forced the digitization of videos. The two mode of transmission of digital videos over the internet are download mode and streaming mode. We have three ways to stream video over a computer networks: a point-to-point, broadcast and multicast transmission.

There are few challenge areas in the field of streaming videos over the internet are bandwidth, delay jitter and loss rate. We have compared our architecture to previously known architecture; we find that the previous architecture weren't capable of live streaming. But in our proposed architecture we have both kind of streaming i.e., live video streaming and stored video streaming. The proposed architecture consists of raw data video, Multimedia Database Server, Encoder, Streaming Server, Web server, Decoder, and End User to facilitate live as well as stored video streaming over the internet.

REFERENCES

1. Depang Wu, Yiwei Thomas Hou, Wenwu Zhu, Ya-Qin Zhang, Jon M. Peha,"Streaming video over the internet: Approaches and directions", IEEE transactions on circuits and systems for video technology, vol. 11, No. 3, March 2001.
2. Pawan Goyal and Gisli Hjalmtyssony,"QoS Routing for Best-Effort Flows," Proceedings of international Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV), 1999.
3. G. J. Conklin, G. S. Greenbaum, K. O. Lillevold, A. F. Lippman, and Y. A. Reznik, "Video coding for streaming media delivery on the Internet," *IEEE Trans. Circuits Syst. Video Technol.*, vol. 11, Mar. 2001.
4. John G. Apostolopoulos, Wai-Tian Tan, Susie J. Wee, "Video streaming: concepts, algorithms and systems," Hewlett-Packard Laboratories Technical Report (hpl-2002-260), Sept. 2002.
5. Margarita Esponda, "Streaming databases for audio and video," Technical Report B-07-15, Freie Univ ersität Berlin, Fachbereich Mathematik und Informatik, Oct.2007.
6. Walid G. Aref, Ann C. Catlin, Jianping Fan, Ahmed K. Elmagarmid, Moustafa A. Hammad, Ihab F. Ilyas, Mirette S. Marzouk and Xingquan Zhu, "A video database management systems for advancing video database research," In Proceedings of the International Workshop on Management Information Systems, Nov. 2002.
7. MyLifeBits: Fulfilling the Memex Vision, Jim Gemmell, Gordon Bell, Roger Lueder, Steven Drucker and Curtis Wong," ACM Multimedia '02, December 1-6, 2002, Juan-les-Pins, France, pp. 235-238.
8. Netapp streaming media solution overview, "Network Appliances, "http://www.olivercom.com/pdf/solutions/NetApp%20Streaming%20Media.pdf", April 2010.
9. R. G. J. Wijnhoven, E. G. T. Jaspers, and P. H. N. de With, "Multi-Channel Video Streaming Server for Surveillance Systems", 2004 IEEE International Symposium on Consumer Electronics "(Symposium Papers).
10. C.-W. Lin, J. Youn, J. Zhou, M. - T. Sun, and I. Sodagar, "MPEG video streaming with VCR functionality," IEEE Trans. Circuits Syst. Video Technolo., Vol. 11,., Mar. 2001.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 137

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

A STUDY ON INDIAN FOREIGN EXCHANGE MARKET EFFICIENCY – APPLICATION OF RANDOM WALK HYPOTHESIS

ANSON K.J
TEACHING ASSOCIATE
DEPARTMENT OF TOURISM STUDIES
CHRIST UNIVERSITY
BANGALORE

ABSTRACT

This main purpose behind this research study is to test for the weak form efficiency of the Indian foreign exchange market and for this purpose daily exchange rate of four nominal exchange rates which are US Dollar, Japanese Yen, Euro, and Pound Sterling from April 2004 to December 2011 are analyzed using unit root tests i.e., Augmented Dickey Fuller Test and Phillip Perron test. As per the results all the exchange rate currencies such as US dollar, Japanese Yen, Euro, and Pound Sterling are found to be stationary in 1st difference. This implies that all exchange rate currencies support the hypothesis of weak form inefficiency and information of any nature that can have an impact on the market will take more time to reflect or create an impact on the prices or rates existing in the market. So this time gap and the constant movement of change between the data points can be used to create a pattern of movement before the markets could adjust to new information, and this constant rate of change can be used by investors to predict future exchange rates of respective currencies with the use of past data and thus leading to super normal profits.

KEYWORDS

Efficient market hypothesis, foreign exchange market, random walk hypothesis, India.

INTRODUCTION

Information has always been a source for change and improvisation throughout all activities of human life, and as such information pays a very important role in the change that occurs throughout the world markets. World markets evolved and connected itself overtime due to globalization undertaken by all nations to expand their horizons of operation. Therefore any information in the world can lead to a chain of reactions minor or major throughout the world markets, i.e., information triggers a change in the demand and supply of assets and instruments existing in the market thereby creating volatility and fluctuation which is a resultant effect of the overreactions or under reactions of the investors or traders based on such information. So information should reflect all aspects of change that occur in the market and it should adjust itself to the changing past, present and future circumstances. Any sort of information can create certain expectations and reactions which will be speculated on, some may be over reactions and others under reactions. These expectations and reactions are a continuous chain of events and also form information for every other change. And hence if this information does not adapt itself to the changes in the corresponding factors, then this would lead to the improper functioning of the world markets, which is nothing but exploitation of markets based on patterns of information which can result in abnormal profitability of few investors or traders. So the information as it occurs should change and adapt itself such that it can sustain the operations of the world markets and hence prevent predictability. This adaptation and change of the information to the various occurrences in the world markets is referred to as the efficient market hypothesis.

The concept of efficient market hypothesis (EMH) was developed by Prof. Eugene Fama at the university of Chicago booth school of business as part of his Ph.D. thesis work. Now according to this concept the financial markets are "informationally efficient". In an informationally efficient market, price changes must be unforecastable if they are properly anticipated, that is, if they fully incorporate the information and expectations of all market participants therefore, one will not be in a position to consistently achieve returns in excess of average market returns on a risk-adjusted basis, given the information available at the time the investment is made.

The concept of efficient market hypothesis is associated with the idea of random walk which implies that if the flow of information is uninterrupted and information is immediately reflected in stock prices, then tomorrow's price change will reflect only tomorrows news and will be independent of the price changes today. But the news is unpredictable and random and thus the resulting changes in prices must also be unpredictable and random. As a result, the prices will fully reflect all known information.

The efficient market hypothesis also states that when faced with new information, some investors may overreact and some may under-react. All that is required by the efficient market hypothesis is that investors' reactions be random and follow a normal distribution pattern so that the net effect on market prices cannot be reliably exploited to make an abnormal profit, especially when considering transaction costs (including commissions and spreads). Thus, any one person can be wrong about the market and indeed, everyone can be. But the market as a whole is always right. There are three common forms in which the efficient-market hypothesis is commonly stated; again this classification is based on the different forms of information that is available to the participants and how efficient is the market in using this information to reflect random change. Therefore the classifications are weak-form efficiency, semi-strong-form efficiency and strong-form efficiency, each of which has different implications for how markets work.

In weak-form efficiency, future prices cannot be predicted by analyzing prices from the past. Excess returns cannot be earned in the long run by using investment strategies based on historical share prices or other historical data. But there have been researches that claim to have found patterns, but this does not mean the markets are inefficient. Over a period of time any movement of rates or prices can shows possible patterns, but once discovered they seem not to exist anymore since everyone tries to capitalise on the opportunity and the market will adjust itself to phase out such a pattern with the available information

In semi-strong-form efficiency, it is implied that share prices adjust to publicly available new information very rapidly and in an unbiased fashion, such that no excess returns can be earned by trading on that information. Semi-strong-form efficiency implies that neither fundamental analysis nor technical analysis techniques will be able to reliably produce excess returns. And if semi strong form exists it implies that weak form efficiency also exists. But if weak form exists it does not mean semi strong form efficiency exists.

In strong-form efficiency, share prices reflect all information, public and private, and no one can earn excess returns. If there are legal barriers to private information becoming public, as with insider trading laws, strong-form efficiency is impossible, except in the case where the laws are universally ignored. This is one area that is not yet researched mainly due to the non availability of reliable and significant data. And if strong form exists, semi-strong form also exists. But if semi-strong form exists it does not mean strong form exists. And thus the concept of efficiency will vary according to how these three forms of information are incorporated into the prices or rates that prevail in the market

RANDOM WALK HYPOTHESIS

The concept of random walk does not imply price change "randomly," but what it implies as per the efficient market hypothesis is that, price changes due to a lot of factors such as prospect change of companies or a general economic change and investor perception change because of these characteristics and prospect changes. In other words what it implies is that an investors knowledge evolves with the continuous supply of new information and with revisions of old information. So this means that at any given moment in time the next period price change is random with respect to the state of knowledge at this moment.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 138
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

Moreover the hypothesis of efficiency asserts that the current price fully reflects the present state of knowledge in the sense that it is equal to the discounted mean value of the distribution of the next period's price as given by the present state of knowledge.

Therefore under the efficient market hypothesis all the information available at any given moment is discounted into the current market price. The market price at any moment is an unbiased estimate of the next period price. In an efficient market no investor can expect consistently to obtain information not already discounted into the market price by actions of other investors. Consequently no investor can consistently achieve abnormal returns, which are returns in excess of that paid for risk taking.

REVIEW OF LITERATURE

Kamaiah (2011) has tried to study the weak form efficiency of Indian foreign exchange market. Parametric as well as non parametric tests have been used to analyse the data. And form the results it can be concluded that, randomness exists in GBP, CHF, AUD, NZD and JPY in Indian market, while USD and HKD rejects Random Walk, suggesting predictability for these two currencies with respect to INR.

Kumar (2011) attempted to examine the weak form of market efficiency in the Indian foreign exchange market using a family of variance ratio tests. Monthly Nominal Effective Exchange Rate (NEER) data from April 1993-June 2010 were used for the analysis. NEER series was considered for the analysis as it is supposed to capture more information compared to the bilateral exchange rates. Three individual variance ratio tests as well as three joint variance ratio tests were used for the purpose of analysis. After analyzing the results from both individual and joint variance ratio test, it was concluded that Indian foreign exchange market does not exhibit weak form of market efficiency.

Ibrahim, Long, Ghani, and Mohd Salleh (2011) have tried to study the weak-form efficiency of the foreign exchange market in thirty, Organizations for Economic Cooperation and Development (OECD) countries. And from the results they were able to conclude that the current value of the exchange rate cannot be predicted using its past values. In addition, the OECD foreign exchange market is consistent with the weak-form of the Efficient Market Hypothesis.

Li, Bihong, and Jing (2010) tried to study china's foreign exchange market efficiency by using U.S. dollars, Japanese yen and Hong Kong dollars from 1997 to 2007 daily quote data. The result showed that China's foreign exchange market has not reached the validity of the weak form. And as such the empirical results show that, China's foreign exchange market does not satisfy weak-form efficient, and it is also in the developmental stages of market inefficiencies.

Noman, and Ahmed (2008) tried to examines the weak form efficiency of the foreign exchange markets in seven SAARC countries, which are India, Pakistan, Bangladesh, Sri- Lanka, Nepal, Bhutan, Maldives, using monthly return series for each of these markets over a period of 21 years (1985 – 2005). Unit root tests and variance ratio tests (individual and multiple) were applied to see whether the return series (and also, the raw data) follow random walk process. The results arrived at suggest that the increments of the return series are not serially correlated. Therefore, it is possible to conclude that foreign exchange markets in SAARC countries are weak form efficient.

Kühl (2007) investigated the market efficiency of the foreign exchange market since the introduction of Euro against seven most important exchange rates, The author takes into consideration an argument provided by Granger (1986) as a Base, which states that, a market is not efficient if co integration between pairs of exchange rates can be considered, because the observation of co integration means the predictability of atleast one exchange rate. From the analysis he was able to conclude that, the foreign exchange market is broadly consistent with market efficiency as per Granger (1986). As a result it was considered that the introduction of Euro has not resulted in an inefficient market.

Belkacem, Meddeb, and Boubaker (2005) have tried to investigate the weak efficiency hypothesis in the case of the Tunisian exchange market. Fractional co-integration tests based essentially on estimation of an error correction bi-variate ARFIMA model has been used. And from the results they have been able to conclude that there exists evidence of fractional co-integration between the one-month forward rate and the spot rate relative to these parities (TND/USD) and (TND/Euro). And therefore the Tunisian forward exchange market is efficient

Wickremasinghe (2004) has questioned the weak and semi-strong form efficiency of the foreign exchange market in Sri Lanka during the recent float using six bilateral exchange rates. The results of this study indicate that the exchange rates follow a random walk and the Sri Lankan market is weak form efficient. But the results of co-integration tests, error-correction model estimates, and variance decomposition analysis indicate that the movement in one or more of the currencies can be predicted using the other exchange rates. These results are inconsistent with the efficient market hypothesis in its semi-strong form.

Jeon, and Seo (2003) have tried to investigate whether the Asian financial crisis in the second half of 1997 affected the foreign exchange market efficiency in four Asian countries hit hard by the crisis, which are Thailand, Indonesia, Malaysia and Korea. From the results arrived at they were able to conclude that within country market efficiency also appears to have become weaker immediately after the crisis than before the crisis, but market efficiency was recovered quickly, evidenced by the regained co-integrating relationship for the pairs of the spot-forward exchange rates in the Asian countries. The findings of the threshold effects in the forward market equation and asymmetrical responses of the spot rate to the forward spread imply that there has been a strong force of recovering new equilibrium exchange rate levels in the Asian foreign exchange markets once the rates have been disturbed, especially when their currencies are significantly undervalued compared to the rationally expected level of exchange rates.

Balaban and Kunter, (1997) tried to study semi strong form efficiency in the stock market, the foreign exchange market and inter- bank money market in Turkey. The results suggest significant deviations from the efficient market hypothesis with respect to changes in market liquidity in all these markets for the period of January 1989 to July 1995. The empirical results further go on to convey that Turkish financial markets are not informationally efficient with respect to daily changes in market liquidity. Hence proving it as semi strong form inefficient.

Burt, Kaen and Booth, (1979) tried to investigate the price changes of the Canadian dollar, German mark, and British pound to determine whether the efficient market hypothesis is applicable for these currencies. The hypothesis was tested using weak form. And from the analysis it can be concluded that the efficient market hypothesis can be accepted for the mark and the pound but it is rejected for the Canadian dollar. And this inefficiency of the Canadian dollar could be because it tends to under respond to new information.

STATEMENT OF THE PROBLEM

The theory of Efficient Market Hypothesis came about as an extension of the random walk model, which has been tested to a vast extent in the stock markets of world economies. Most of the earlier studies were directed towards developed economies and in the recent years of financial crisis the concept of efficient market has been contended to know the validity of its existence in the market.

This particular theory has its origins from the stock market and in the recent years there has been a slow and steady growth in the research towards extending this theory to other forms of markets. And once again the majority of research in terms of foreign exchange markets are directed towards developed economies and as such research of this concept in the Indian context is of recent origin with very few literatures in this front. And hence a study is undertaken to test the theory of random walk of efficient market as given by Fama (1965) on the foreign exchange market of India.

NEED OF THE STUDY

This particular research study is mainly directed towards testing the random walk hypothesis of stock market with respect to the foreign exchange market in the Indian context. So though the evolution of efficient market hypothesis with reference to stock market has taken place over a period of time with many theoretical and conceptual advancement, all such factors are not taken into consideration. In the Indian context a study pertaining to the foreign exchange market is still in its developing stages with very few researches in this front. And hence it opens a wide area for research and development with respect to these aspects.

OBJECTIVE OF THE STUDY

1.   To examine the random walk process of the foreign exchange rate series of India to analyse weak form efficiency.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   139

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

HYPOTHESIS
1. a) Ho – Dollar rate series follow random walk process
2. a) Ho – Euro rate series follow random walk process
3. a) Ho –Japanese Yen series follow random walk process
4. a) Ho – Pound Sterling series follow random walk process

RESEARCH METHODOLOGY
Data source: The data for the study comprises of secondary data that is daily data of foreign exchange rates of Euro, pound sterling, Japanese yen, US dollar taken from past 7 years i.e., 2004-2011 and it is collected from RBI. The purpose behind the kind of data that is used is to test for stationarity and non-stationarity and for better results of the occurrence of these factors smaller time horizons must be undertaken. Hence daily data has been used for this study. Apart from that, the concept of 7 years has been used due to the data availability of foreign exchange rates and it is as per the available published data by the RBI.

ECONOMETRIC TECHNIQUE
The usage of unit root test is substantiated by the fact that if the variables are non stationary the regression model will be spurious or meaningless. If the variables don't have unit root problem or it is stationary then the explanatory power of independent variable on dependant variables can be found by using ordinary least squares. But this final process is not applied in this study since the main objective of the study is to investigate random walk process of each exchange rate series. For this purpose two techniques of unit root is used i.e., the Augmented Dickey Fuller Test and the Philip Perron test. Now both these test are conducted in level series and 1st difference in three forms, which is unit root with Drift, unit root with drift and trend, unit root without drift and trend. The results of the study will be obtained with the use of E- Views Software.

UNIT ROOT TEST
A. AUGMENTED DICKEY FULLER TEST
If ut which is the error term is correlated then Dickey and Fuller have developed a test, known as the augmented Dickey–Fuller (ADF) test. This test is conducted by "augmenting" the preceding three equations by adding the lagged values of the dependent variable. It is an augmented version of the Dickey–Fuller test for a larger and more complicated set of time series models. The augmented Dickey–Fuller (ADF) statistic, used in the test, is a negative number. The more negative it is, the stronger the rejection of the hypothesis that there is a unit roots at some level of confidence.

The testing procedure for the ADF test is the same as for the Dickey–Fuller test but it is applied to the model

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \cdots + \delta_{p-1} \Delta y_{t-p+1} + \varepsilon_t,$$

Where α is a constant, β the coefficient on a time trend and p the lag order of the autoregressive process. Imposing the constraints $\alpha = 0$ and $\beta = 0$ corresponds to modelling a random walk and using the constraint $\beta = 0$ corresponds to modelling a random walk with a drift.

Consequently, there are three main versions of the test,

1. Test for a unit root:

$$\nabla y_t = \delta y_{t-1} + u_t$$

2. Test for a unit root with drift:

$$\nabla y_t = a_0 + \delta y_{t-1} + u_t$$

3. Test for a unit root with drift and deterministic time trend:

$$\nabla y_t = a_0 + a_1 t + \delta y_{t-1} + u_t$$

Each version of the test has its own critical value which depends on the size of the sample. In each case, the null hypothesis is that there is a unit root, δ = 0. The tests have low statistical power in that they often cannot distinguish between true unit-root processes (δ = 0) and near unit-root processes (δ is close to zero). This is called the "near observation equivalence" problem.

The intuition behind the test is as follows. If the series y is stationary (or trend stationary), then it has a tendency to return to a constant (or deterministically trending) mean. Therefore large values will tend to be followed by smaller values (negative changes), and small values by larger values (positive changes). Accordingly, the level of the series will be a significant predictor of next period's change, and will have a negative coefficient. If, on the other hand, the series is integrated, then positive changes and negative changes will occur with probabilities that do not depend on the current level of the series; in a random walk, where you are now does not affect which way you will go next.

By including lags of the order p the ADF formulation allows for higher-order autoregressive processes. This means that the lag length p has to be determined when applying the test. One possible approach is to test down from high orders and examine the t-values on coefficients. An alternative approach is to examine information criteria such as the Akaike information criterion, Bayesian information criterion or the Hannan-Quinn information criterion.

The unit root test is then carried out under the null hypothesis $\gamma = 0$ against the alternative hypothesis of $\gamma < 0.$

$$DF_\tau = \frac{\hat{\gamma}}{SE(\hat{\gamma})}$$

Once a value for the test statistic is computed it can be compared to the relevant critical value for the Dickey–Fuller Test. If the test statistic is less (this test is non symmetrical so we do not consider an absolute value) than (a larger negative) the critical value, then the null hypothesis of $\gamma = 0$ is rejected and no unit root is present.

PHILLIPS-PERRON (PP)
The Dickey–Fuller test involves fitting the regression model

Δyt = ρyt−1 + (constant, time trend) + ut ……………………………………………… (1)

by ordinary least squares (OLS), but serial correlation will present a problem. To account for this, the augmented Dickey–Fuller test's regression includes lags of the first differences of yt. The Phillips– Perron test involves fitting (1), and the results are used to calculate the test statistics. They estimate not (1) but:

yt = πyt−1 + (constant, time trend) + ut ………………………………………(2)

In (1) ut is I(0) and may be heteroskedastic. The PP tests correct for any serial correlation and heteroskedasticity in the errors ut non-parametrically by modifying the Dickey Fuller test statistics.

Phillips and Perron's test statistics can be viewed as Dickey–Fuller statistics that have been made robust to serial correlation by using the Newey–West (1987) heteroskedasticity- and autocorrelation-consistent covariance matrix estimator.

Under the null hypothesis that ρ = 0, the PP Zt and Zπ statistics have the same asymptotic distributions as the ADF t-statistic and normalized bias statistics. One advantage of the PP tests over the ADF tests is that the PP tests are robust to general forms of heteroskedasticity in the error term ut. Another advantage is that the user does not have to specify a lag length for the test regression.

The Dickey Fuller test produces two test statistics. The normalized bias T (π− 1) has a well defined limiting distribution that does not depend on nuisance parameters it can also be used as a test statistic for the null hypothesis H0 : π = 1. This is the second test from DF and relates to Zπ in Phillips and Perron. This

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 140
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

perspective helps us understand that the PP test corrects the DF one for autocrrelation amongst error terms non-parametrically (i.e. outside of a regression framework). The critical values have the same distribution as the Dickey–Fuller statistic.

DATA ANALYSIS

TABLE 1.1 - SHOWING RESULTS OF AUGMENTED DICKEY FULLER TEST IN LEVEL SERIES

	Dollar[1]	EURO[2]	JAPANESE YEN[3]	POUND[4]
Test statistics	-0.507035^a	-1.734237^a	$0.301569a$	$-2.115857a$
	-0.929992^b	-2.576094^b	$-1.534798b$	$-2.428040b$
	0.961913^c	0.890773^c	$1.301380c$	$0.014017c$
Probability	0.8874^a	0.4138^a	$0.9784a$	$0.2385a$
	0.9510^b	0.2915^b	$0.8175b$	$0.3647b$
	0.9113^c	0.9004^c	$0.9516c$	$0.6871c$
Critical values	**1%**	**5%**	**10%**	
	-3.433628^{a1}	-2.862874^{a1}	-2.567527^{a1}	
	-3.962931^{b1}	-3.412200^{b1}	-3.128025^{b1}	
	-2.566193^{c1}	-1.940992^{c1}	-1.616586^{c1}	
	-3.433631^{a2}	-2.862876^{a2}	-2.567528^{a2}	
	-3.962936^{b2}	-3.412203^{b2}	-3.128027^{b2}	
	-2.566194^{c2}	-1.940992^{c2}	-1.616586^{c2}	
	-3.433628^{a3}	-2.862874^{a3}	-2.567527^{a3}	
	-3.962931^{b3}	-3.412200^{b3}	-3.128025^{b3}	
	-2.566193^{c3}	-1.940992^{c3}	-1.616586^{c3}	
	-3.433628^{a4}	-2.862874^{a4}	-2.567527^{a4}	
	-3.962931^{b4}	-3.412200^{b4}	-3.128025^{b4}	
	-2.566193^{c4}	-1.940992^{c4}	-1.616586^{c4}	

*MacKinnon (1996) one-sided p-values

TABLE 1.2 - SHOWING RESULTS OF AUGMENTED DICKEY FULLER TEST IN FIRST DIFFERENCE

	Dollar1	EURO2	JAPANESE YEN3	POUND4
Test statistics	-42.81750^{a1}	-37.73718^{a2}	-44.77711^{a3}	-33.12931^{a4}
	-42.83928^{b1}	-37.72706^{b2}	-44.83524^{b3}	-33.12395^{b4}
	-42.80720^{c1}	-37.72729^{c2}	-44.74692^{c3}	-33.13788^{c4}
Probability	0.0000^{a1}	0.0000^{a2}	0.0001^{a3}	0.0000^{a4}
	0.0000^{b1}	0.0000^{b2}	0.0000^{b3}	0.0000^{b4}
	0.0001^{c1}	0.0000^{c2}	0.0001^{c3}	0.0000^{c4}
Critical values	1%	5%	10%	
	-3.433629^{a1}	-2.862875^{a1}	-2.567527^{a1}	
	-3.962933^{b1}	-3.412202^{b1}	-3.128026^{b1}	
	-2.566193^{c1}	-1.940992^{c1}	-1.616586^{c1}	
	-3.433631^{a2}	-2.862876^{a2}	-2.567528^{a2}	
	-3.962936^{b2}	-3.412203^{b2}	-3.128027^{b2}	
	-2.566194^{c2}	-1.940992^{c2}	-1.616586^{c2}	
	-3.433629^{a3}	-2.862875^{a3}	-2.567527^{a3}	
	-3.962933^{b3}	-3.412202^{b3}	-3.128026^{b3}	
	-2.566193^{c3}	-1.940992^{c3}	-1.616586^{c3}	
	-3.433631^{a4}	-2.862876^{a4}	-2.567528^{a4}	
	-3.962936^{b4}	-3.412203^{b4}	-3.128027^{b4}	
	-2.566193^{c4}	-1.940992^{c4}	-1.616586^{c4}	

*MacKinnon (1996) one-sided p-values
[a]- intercept ,[b]- intercept and trend, [c]- none
[1]-DOLLAR ,[2]-EURO ,[3]-JAPANESE YEN ,[4]-POUND

TABLE 1.3: SHOWING RESULTS OF PHILIP PERRON TEST IN LEVEL SERIES

	Dollar1	EURO2	JAPANESE YEN3	POUND4
Test statistics	-0.663529a1	-1.680694a2	0.528698a3	-2.064047a4
	-1.069355b1	-2.758262b2	-1.381225b3	-2.378844b4
	0.909765c1	0.838851c2	1.432842c3	0.016815c4
Probability	0.8537a1	0.4410a2	0.9877a3	0.2596a4
	0.9323b1	0.2132b2	0.8663b3	0.3906b4b4
	0.9034c1	0.8919c2	0.9627c3	0.6880c4
Critical values	1%	5%	10%	
	-3.433628a1	-2.862874a1	-2.567527a1	
	-3.962931b1	-3.412200b1	-3.128025b1	
	-2.566193c1	-1.940992c1	-1.616586c1	
	-3.433628a2	-2.862874a2	-2.567527a2	
	-3.962931b2	-3.412200b2	-3.128025b2	
	-2.566193c2	-1.940992c2	-1.616586c2	
	-3.433628a3	-2.862874a3	-2.567527a3	
	-3.962931b3	-3.412200b3	-3.128025b3	
	-2.566193c3	-1.940992c3	-1.616586c3	
	-3.433628a4	-2.862874a4	-2.567527a4	
	-3.962931b4	-3.412200b4	-3.128025b4	
	-2.566193c4	-1.940992c4	-1.616586c4	

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 141
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE 1.4: SHOWING RESULTS OF PHILIP PERRON TEST IN FIRST DIFFERENCE

	Dollar1	EURO2	JAPANESE YEN3	POUND4
Test statistics	-42.87752a1	-60.13313a2	-44.95423a3	-42.57215a4
	-42.88524b1	-60.11606b2	-45.11190b3	-42.56317b4
	-42.87176c1	-60.06895c2	-44.87338c3	-42.58383c4
Probability	0.0000a1	0.0001a2	0.0001a3	0.0000a4
	0.0000b1	0.0000b2	0.0000b3	0.0000b4
	0.0001c1	0.0001c2	0.0001c3	0.0001c4
Critical values	1%	5%	10%	
	-3.433629a1	-2.862875a1	-2.567527a1	
	-3.962933b1	-3.412202b1	-3.128026b1	
	-2.566193c1	-1.940992c1	-1.616586c1	
	-3.433629a2	-2.862875a2	-2.567527a2	
	-3.962933b2	-3.412202b2	-3.128026b2	
	-2.566193c2	-1.940992c2	-1.616586c2	
	-3.433629a3	-2.862875a3	-2.567527a3	
	-3.962933b3	-3.412202b3	-3.128026b3	
	-2.566193c3	-1.940992c3	-1.616586c3	
	-3.433629a4	-2.862875a4	-2.567527a4	
	-3.962933b4	-3.412202b4	-3.128026b4	
	-2.566193c4	-1.940992c4	-1.616586c4	

[a]- intercept ,[b]- intercept and trend, [c]- none
[1]-DOLLAR ,[2]-EURO ,[3]-JAPANESE YEN ,[4]-POUND

FINDINGS AND CONCLUSION

In this paper the main focus has been to test the weak form efficiency of the Efficient Market Hypothesis concept on the foreign exchange market of India. For this purpose daily data from 2004- 2011 was taken and analyzed with the use of unit root test (Augmented Dickey Fuller and Philips Perron). As per the results all the exchange rate currencies such as US dollar, Japanese Yen, Euro, and Pound Sterling are found to be Non-stationary in their levels and after 1st differencing, become stationary. And this implies that all exchange rate currencies support the hypothesis of weak form inefficiency. Now this means that the information of any nature that can have a impact on the market takes more time to reflect or create an impact on the prices or rates existing in the market, so this time gap and the constant movement of change between the data points can be used to create a pattern of movement or before the market could adjust, investors by assuming the future change will also be constant as it has been in the past can take advantage of the available information and therefore it becomes easy for the investors to forecast or predict the future exchange rates of respective currencies with the use of past data and thereby leading to super normal profits.

SCOPE FOR FURTHER RESEARCH

The concept of efficient market hypothesis as given by Eugene Fama (1965) has grown and evolved to accommodate the various anomalies that were spotted in the initial theory. From the year of 1965 this particular concept has been tested in many of the developed economies and also with respect to the different methodologies to identify inefficiency. Now this concept has slowly and steadily grabbed the attention of the developing economies to test their market efficiency and since this theory has evolved over a period of time it's just a matter of application. But this is completely possible in the stock market front but in terms of foreign exchange market it's still an evolving concept and hence the scope of future research could be to check for covered interest parity, uncovered interest parity and risk premia effects on market efficiency of India. Studies can also be directed towards finding various anomalies such as interest rate differentials and its effect on market efficiency of Indian foreign exchange market.

REFERENCES

1. Balaban, E. and Kunter, (1997) A note on the efficiency of financial markets in a developing country.*Applied economics letters*, 4 p.109- 112.
2. Belkacem, L. et al. (2005) Foreign exchange market efficiency: fractional cointegration approach .*International Journal of Business*, 10 (3).
3. Burt, J. et al. (1979) Foreign exchange market efficiency under flexible exchange rates: Reply. *The Journal of Finance*, 34 (3), p.791-793.
4. Ibrahim, J. et al. (2011) Weak-form efficiency of foreign exchange market in the organisation for economic cooperation and development countries: Unit root test. *International Journal of Business and Management*, 6 (6).
5. Jeon, B. and Seo, B. (2003) The Impact of the Asian Financial Crisis on Foreign Exchange Market Efficiency: The case of east asian countries. *Pacific Basin Finance Journal*, 11 p.509- 525.
6. Kamaiah, B. (2011) Is there a random walk in indian foreign exchange market? . *International Journal of Economics and Finance*, 3 (6), p.157- 165.
7. Kühl, M. (2007) Co integration in the Foreign Exchange Market and Market Efficiency Since the Introduction of the Euro: Evidence based on Bi- variate Co-integration analysis. *Centre for European Governance and Economic Development Research*.
8. Kumar, A. (2011) Testing for weak form of market efficiency in Indian foreign exchange market . *Selected works* . Li, L. et al. (2010) An Empirical study of the Weak Efficiency of China's Foreign Exchange Market. International Conference on E- Business and E- Government.
9. Li, L. et al. (2010) An Empirical study of the Weak Efficiency of China's ForeignExchangeMarket.*International Conference on E- Business and E- Government*.
10. Noman, A. and Ahmed, M. (2008) Efficiency of the foreign exchange markets in south Asian countries .*American International University-Bangladesh*.
11. Wickremasinghe, G. (2004) Efficiency of foreign exchange markets: A developing country perspective .*Monash University*.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 142
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

AN EMPRICAL ANALYSIS OF FACTORS AND VARIABLES INFLUENCING INTERNET BANKING AMONG BANGALORE CUSTOMERS

VIDYA CHANDRASEKAR
RESEARCH ASSOCIATE
CENTRE FOR RESEARCH - PROJECTS
CHRIST UNIVERSITY
BANGALORE

ABSTRACT

During the past two decades, Information technology has transformed the banking industry and has provided a way for the banks to offer differentiated products and services to its customers. Internet Banking is an innovative service and is the new & prevailing trend among banking customers. Based on the feedback from 200 bank customers of different banks, this paper explores how far various demographic variables have an influence on usage and what factors have motivated customers in adoption of internet banking. The Chi Square test revealed that Age, Occupation, Income and Type of Banks have significant relation to usage of internet banking service, where as Qualification and Gender have no relation to its usage. Factor analysis was performed to extract the factors responsible for the adoption of internet banking. Factors influencing the adoption of internet banking were found to be Ease of use, Perceived risk, Infrastructure complaints, Operational advantage and Personal Limitations.

KEYWORDS

Adoption, Information technology, Internet Banking.

INTRODUCTION

T he progress made in information technologies have changed the banking industry and have provided a way for the banks to offer differentiated products and services to their customers. The advent of technology made the banks which were used to branch based operations for over 200 years, change the nature of financial services offered to its customers. For instance, automated teller machines (ATM) displaced cashier tellers, telephone represented by the call centers replaced the branch banking, the internet replaced mail, credit cards and electronic cash replaced bank transactions.

Earlier, banking techniques required the customer to visit the bank branch where he has his account to perform the basic banking operations like depositing or withdrawing cash, funds transfer or balance enquiry etc. Internet banking enabled the customer to perform these basic banking operations sitting at home or in office with a desktop or a laptop round the clock globally through internet. This is called anytime, anywhere banking where customers can access their account and transact any banking business without any restrictions like banking hours, long queues, geographical distance etc. The development of technology has made time and distance meaningless in banking business.

Internet Banking also called as online banking is the new age banking system. Internet banking uses the internet as the delivery channel to conduct banking activities like transferring funds, paying bills, viewing account statements, paying mortgages and purchasing financial certificates of deposits (Haque et al. 2009). Banks know that the Internet opens up new horizons for them and moves them from local to global frontiers (Mavri & Ioannou, 2006). Banks gain competitive advantage over their rivals by providing electronic banking services as technology induced services reduce cost of operations, removes geographical barrier, provides 24 hr banking, extended hours of business and efficiency in daily banking processes. Without even interacting with the bankers, customers can transact banking activity from any corner of the world. Electronic banking has experienced rapid growth and has transformed the traditional banking practices (Gonzalez et al. 2008).

Internet banking made its debut in UK and USA in 1980s. It was first introduced in India by ICICI bank in mid 1990's. With the globalization of the Indian economy coupled with rapid growth of information and communication technology, Indian banks started a new phase in banking journey. They embraced technology in a big way, with private and foreign banks showing the way. The most significant technological innovation being Internet banking for retail customers, which changed the way, banking was carried on for decades. Internet banking was adopted by banks when Internet was making a slow and steady progress in the country.

The middle and late 90s witnessed a tornado of financial reforms, deregulation and globalization which led to the arrival of private and foreign banks into the banking domain, which was till then dominated by Government controlled public sector banks. These banks entered the industry with state of the art technology right from day one creating competition to the existing Indian banks. In the scenario of severe competition and escalating customer expectations, banks cannot remain lukewarm to IT and yet hope to grow. The key to survival is to provide value added services using state of the art IT. Not to be left behind, public sector banks were also quick to adopt the new technique by computerizing all their branches and adopting Core Banking Systems (CBS).

A combination of regulatory and market forces supported the implementation of technology and automation in the Indian banking industry. As the Central bank in a developing country the Reserve Bank of India (RBI) has adopted development of the banking and financial market as one of its prime objectives. "Institutional development" was the hallmark of this approach from 1950s to 1970s. In the 1980s, the Reserve Bank focused on "improvements in the productivity" of the banking sector. Being convinced that technology is the key for improving productivity and efficiency, the Reserve Bank took several initiatives to popularize usage of technology by banks in India.

Internet banking refers to systems that enable bank customers to get access to their accounts and general information on bank products and services through the use of bank's website, without the intervention or inconvenience of sending letters, faxes, original signatures and telephone confirmations. (Thulani et al.2009). In its simplest form, electronic banking may mean the provision of information about the bank and its products via a page on the internet (Ibrahim et al. 2006). It is the types of services through which bank customers can request information and carry out most retail banking services such as balance reporting, inter account transfers, bill payment, etc via a telecommunication network without leaving their homes or organizations. Daniel (1999) defines electronic banking as the delivery of banks' information and services by banks to customers via different delivery platforms that can be used with different terminal devices such as a personal computer and a mobile phone with browser or desktop software, telephone or digital television. Internet banking provides universal connection from any location worldwide and is accessible from any internet linked computer (Thulani et al., 2009). According to Christopher (2006), Internet banking has become an important tool for the banks to stay in competition and also be profitable.

RELATED STUDIES IN INDIA & ABROAD

In their study on factors influencing rate of adoption of internet bank services by users in Singapore, Gerrand & Cunningham (2003), concluded that the adopters of internet banking perceive the service to be more convenient, less complex and more compatible and suiting them. Sohail & Shanmugham (2004) in their study done in Malaysia indicates that age and education have no impact on adoption whereas accessibility to the internet, awareness of E-banking and customers' resistance to change are the main factors influencing adoption. Gan et al. (2006) conducted a research to examine customer's preference to electronic and non electronic banking in New Zealand. The decision to use electronic banking depends on service quality dimensions, perceived risk factors, user input factors, price factors, product characteristics, individual and demographic factors such as age, gender, education etc. Abdulaziz, A. Hashim, R. & Chaker, M.N. (2008), found that the major Internet Banking concern amongst customers in Qatar was the safety and security of the service. Padachi et al. (2008) indicate that trust, ease of

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   143
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

use, cost of computer, internet accessibility & security concerns are important factors in adoption of internet banking among customers in Mauritius. Eriksson, Kerem & Nilson (2008), while studying the adoption of internet banking in Estonia, concluded that relative advantage & complexity have strong influence, whereas perceived risk and compatibility have weak/negative influence on adoption.

Waleed Al-Ghaith et al (2010) Gender plays a significant role in the adoption of e-service and it is found that women are more likely to adopt than men. Perceived Complexity followed by Privacy and Compatibility have significance influence on adoption. Quality of the Internet and its relative advantage also had a notable affect on usage and adoption (Saudi Arabia). Marchionni & Ritchie (2007) concluded that adopters of new technology are younger, wealthy, usually have a good level of education, and possess more social mobility than those who adopt innovations later. Chen & Wellman (2004) focused on Internet usage in China, Germany, Korea, Italy, Japan, Mexico, UK, and USA and found that men were more likely than women to use the Internet and the rate of adoption was high for young people who understand English and live in urbanized environment.

Gupta (2008) in his study in Jaipur city has identified certain loopholes such as non awareness of the facility, lack of trust, using only few facilities though e-banking provides various services, concern about safety and security. Other suggestions include improve awareness in rural areas, banks to be transparent about charges, installing e banking facility wherever ATMs are installed and setting up a network of all banks through a single network. Prasad. M. A., (2010) tried to identify e banking channels, study their utility and make suggestions for improvement. He recommended that to enhance the utility of channels, banks need to take certain important initiatives like providing access to internet in ATM booths, removing limitations on operations, reducing service charges and providing smart card facility for pay and use internet in any ATM booths. Yahya, S., et al. (2009) in his study concluded that banks have major role in ensuring that more customers adopt Internet Banking. The more facilities they have in terms of website, locations, security and risk, the more will be the adoption rate.

NEED / RATIONALE OF THE STUDY

According to Internet and Mobile Association of India (Sep 2011), there are 112 mn claimed Internet users in India. Youth and Students constitute the major portion of the total users. Their main purpose of internet access was Education and Entertainment. Online Banking was the last in the list of internet access.

According to a survey by Global Management Consultancy, Mckinsey & Co. (2010-11), Only 7% of the account holders in the country are using internet for banking transactions,. Though this is a massive seven fold jump from 2007(when it was just 1%), still it is very low from bank's perspective. The report also states that it is the younger generation customers who prefer internet banking.

Further findings also indicate that where Internet and ATM usage is growing, the same cannot be said about internet banking. Robinson (2000) reported that half of the people who have tried online banking services do not become active users. Highly publicized cases involving major security failures have contributed to the customers' apprehension and lack of adoption of Internet banking.

With India taking giant leaps after globalization, the internet banking also needs to keep pace with it. With a booming economy triggered by the IT sector and sophisticated customers, it becomes imperative for the banks to get a feedback on the features of internet banking. Thus this paper, based on the feedback from 200 bank customers of different banks, explores how far the various demographic variables have an influence on usage and what factors have motivated customers in adoption of internet banking.

OBJECTIVES

1. To find out the encouraging / discouraging factors influencing customers of internet banking
2. To analyze the impact of various demographic factors on the usage of internet banking
3. To find out the difference in usage of internet banking by customers of public and private sector banks

HYPOTHESES

Hypothesis 1: There is significant relation between various demographic variables and usage of internet banking.
Hypothesis 2: There is significant difference between the public and private sector bank customers and usage of internet banking.
Hypothesis 3: There is significant relation between encouraging and discouraging factors on the satisfaction level of customers of internet banking.

RESEARCH METHODOLOGY

The population for the study is the bank customers of Bangalore. Since, Bangalore is considered as the IT capital of the country and also most of the young lot of population working in IT or ITES sector with constant access to computers, it would be ideal to find their perception and usage of internet banking. The sample consisting of 200 bank customers, 54 from State Bank of India, 44 from ICICI, 27 from HDFC, 19 from other private sector banks, and 56 from other public sector banks. A convenience sampling technique was adopted for selecting the respondents. General background of the respondents is given in Table 1

Tool for measuring the variables was developed by the researcher with the help of previous studies. Various features of internet application which encourages and discourages the customers in using internet banking were considered based on earlier studies. Ten encouraging and ten discouraging factors were considered to develop a questionnaire. The questionnaire was developed on a five point likert scale, where 1 represents strongly disagree and 5 represents strongly agree.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 144
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE 1: GENERAL BACKGROUND OF THE RESPONDENTS

Age	Frequency	Percentage
18 -25 years	38	19
26-35 years	76	38
36-45 years	52	26
46-55 years	17	9
Above 55 years	17	9
Gender	**Frequency**	**Percentage**
Male	111	55
Female	89	45
Profession	**Frequency**	**Percentage**
IT industry	54	27
Non IT industry	46	23
Professional	9	5
Businessmen	18	9
Others	73	37
Income	**Frequency**	**Percentage**
< 2 Lakhs	64	32
2 to 5 Lakhs	59	30
>5 Lakhs	77	39
Education	**Frequency**	**Percentage**
PU	4	2
Graduates	108	54
Post Graduates	75	38
Others	13	7
Types of Banks	**Frequency**	**Percentage**
SBI	54	27
ICICI	44	22
HDFC	27	14
Other Public sector banks	56	28
Other Private sector banks	19	10

ANALYSIS AND INFERENCE OF THE STUDY

The reliability of the scale of items was tested with the application of Cronbach's alpha and it was found to be 0.7501

The chi-square is used to test whether two variables are independent or not. In other words, this test is used to test whether one variable has significant influence over the other variable. To check the impact of various demographic variables on the Internet usage and also to find the difference in the perception among customer's of different banks to the usage of Internet banking, Chi square analysis was done.

TABLE 2/GRAPH 1 - CHI SQUARE RESULT ON - AGE VS. USAGE OF INTERNET BANKING SERVICES
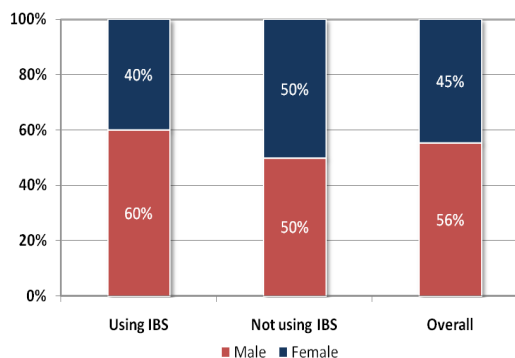
Statistics	
Chi square	20.87
d.f.	4.00
Sig.	.000(*)
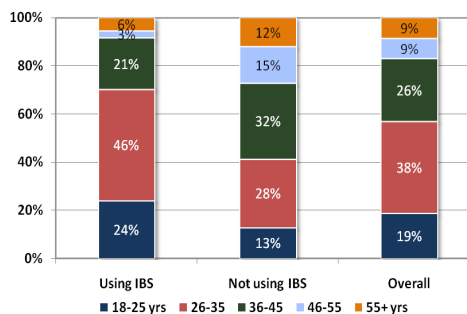
With Chi Square values of 20.87, age was found to be statistically significant at 1% level with internet usage. 70% of the customers in the age group of 18-35 were found using internet banking, with majority of 46% falling in the age category of 26-35 years, which confirms the hypothesis that age has relation to usage of internet banking.

TABLE 3/GRAPH-2 - CHI SQUARE RESULT ON - GENDER VS. USAGE OF INTERNET BANKING SERVICES

Statistics	
Chi square	2.09
d.F	1.00
Sig.	0.15

Contrary to Literature, this study found no relation between gender and usage of internet banking services. With a Chi square value of 2.09, gender was found to be statistically insignificant to internet usage.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   145

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

TABLE 4/GRAPH 3 - CHI SQUARE RESULT ON - OCCUPATION VS. USAGE OF INTERNET BANKING SERVICES

Statistics	
Chi square	52.83
d.F	4.00
Sig.	.000(*)
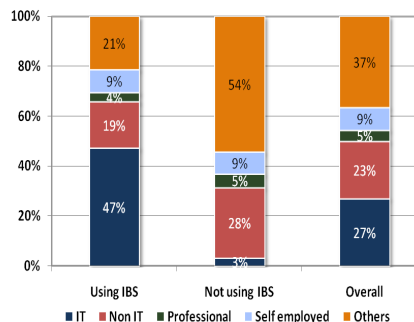
In line with the literature, 47% of the respondents working in IT sector were found to be using and only 3% from IT sector were found not using internet banking. With a chi square value of 52.83, at 1% significant level, occupation was found to be statistically significant to usage of internet banking.

TABLE 5/GRAPH 4 - CHI SQUARE RESULT ON - INCOME VS. USAGE OF INTERNET BANKING SERVICES

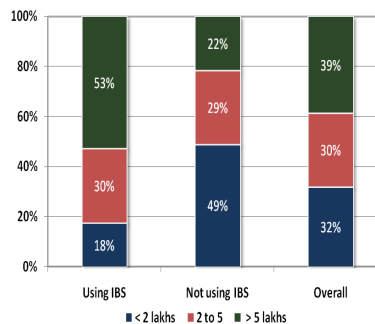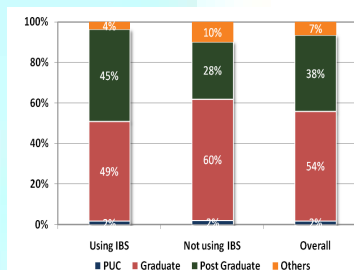| Statistics	
Chi square	27.66
d.F	2.00
Sig.	.000(*)

53% of the respondents drawing more than 5 lac were found to be using and 49% of the respondents drawing less than 2 lac were found not using internet banking services, which is in confirmation to the previous studies, i.e., higher the income, greater is the adoption rate. The chi square value of 27.66 at 1% significant level, statistically also income was found to be significant.

TABLE 6/GRAPH 5 - CHI SQUARE RESULT ON - EDUCATION VS. USAGE OF INTERNET BANKING SERVICES

Statistics	
Chi square	7.78
d.F	3.00
Sig.	.051(a)

Contrary to the literature, this study found no relation between education and internet banking usage. With a chi square value of 7.78 at 1% significant level, education was found to be statistically insignificant.

TABLE 7/GRAPH 6 - CHI SQUARE RESULT ON – TYPES OF BANKS VS. USAGE OF INTERNET BANKING SERVICES

Statistics	
Chi square	49.79
d.F	4.00
Sig.	.000(*)
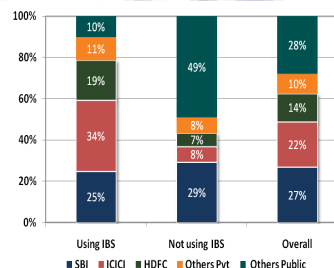
64% of the customers of Private sector banks and 25% of the customers of SBI, were found to be using internet banking. Only 23% of the Private sector banks customers were not using internet banking, with SBI maintaining status quo with 29%. Majority of 49% of customer of public sector banks were found not using internet banking. The chi square result with 49.79 at 1 % sig. level, types of bank was found to be statistically significant to usage of internet banking.

FACTOR ANALYSIS

An exploratory Principal Component Analysis was used to extract the factors. The study considered 20 variables (statements rating varying from 1 to 5) 1 is strongly disagree and 5 is strongly agree and the determined Eigen value greater than 1 was the extracted variables for the factors. The variances extracted by the factors are called the *Eigen Values*. The Table 4 shows the Eigen Values and the 'Total Variance Explained' on the new factors that were successively extracted. The values are expressed as a percentage of the total variance. i.e., Factor 1 for about 25.28 Percentage of the total variance and Factor 2 for about

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 146
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

14.50 Percentage etc. The sum of the Eigen Values is equal to the number of variables which contains the cumulative variance of 67.59%. The 5 factor model explains only 67.59% of the variance in the selected variables. Table 9 provides the results of the factor analysis.

20 variables yielded 5 factors such as:

Factors encouraging customers to use internet banking -   Ease of use
                                                                                 Operational advantage

Factors discouraging customers to use internet banking -   Perceived Risk
                                                                                 Personal Limitations
                                                                                 Infrastructure Complaints

TABLE 8: RESULTS OF FACTOR ANALYSIS

Ease of use		Perceived Risk	Personal Limitations	Infrastructure constraints	Operational Advantage
E2.More reliable	0.84				
E4.Easy to maintain transaction activity	0.80				
E3.Transactions can be done faster	0.78				
E1.More convenient	0.78				
E5.Safety and Security	0.77				
E6.Cost effective	0.70				
E7.Time saving	0.70				
E10.Web site is user friendly	0.60				
D8.Formalities involved in opening IB a/c is more		0.77			
D6.Do not trust internet as a channel for banking		0.74			
D7.Have more hidden costs		0.71			
D5.Do not ensure privacy		0.63			
D9.Prefer face to face banking		0.56			
D1.Lack of Knowledge			0.83		
D2.Lack of Infrastructure			0.80		
D10.Reluctance to change			0.58		
D3.Quality of Internet Banking service is bad				0.76	
D4.Takes time to finalize the transactions				0.63	
E8.Overcomes geographic limitations					0.84
E9.Updated information available online					0.57
Total variance Explained (%) = 67.59	25.28	14.50	11.59	8.77	7.45
Eigen Value	6.53	3.61	1.23	1.12	1.03

IMPLICATIONS – ENCOURAGING FACOTRS

Ease of use: Out of the cumulative variance of 67.59% explained vide factor analysis, 25.28% of variance explained is by the factor ease of use. For successful adoption of internet banking, banks must ensure that the services offered are simple, easy to understand and operate. Mols (2000) suggested that it is crucial for the Internet to be easy to use to increase the adoption rate Internet banking. Customers look for ease in performing banking transactions along with more and update information when adopting internet banking (Geetika et al. 2008). A user friendly website, with sufficient tips and information enables customer's easy navigation within the site for transacting. Well connected web site of different accounts and Web based services have to be more convenient, easier to use, and less expensive than the alternative, to win the loyalty of customers (Cronin,1998).

Operational Advantage: Internet banking provides the greatest advantage to customers by enabling them to access at any time. With banking services available 24*7, the concept of "banking hours" is unheard of these days, as customers can deposit, withdraw, and make purchases from any place and time without bothering to have cash on hand. Thus, a bank's Internet presence transforms it from 'brouchreware' status to 'Internet banking' status once the bank goes through a technology amalgamation effort to facilitate the customer to access information about his or her specific account. The convenience of online banking is helping people gain greater control of their finances and contributing to changing patterns in cash withdrawal and day to day money management (Beer, 2006).

DISCOURAGING FACTORS

Perceived Risk: Security of banking transactions, customers' privacy, etc., which have all along been concerns of both bankers and supervisors have assumed different dimensions given that Internet is a public domain, not subject to control by any single authority or group of users (rbi.org.in). Customer protection and data privacy are areas which assume great significance when banking transactions are carried over a medium as insecure as the Internet. Out of all methods for transactions, consumers trust the branch the most (84%). "Connecting with consumers in a one-on-one manner can drastically influence bank loyalty," said (Gary Edwards, 2010).

The distant and impersonal nature of on-line environment and the implicit uncertainty of using a global open infrastructure for transactions have rendered risk an inevitable element of e-commerce (Pavlou, 2003). The banks also need to be transparent about charges involved in internet banking services. Since human-internet interaction is the main service delivery and communication channel, offering high quality services to satisfy consumers' needs, at lower costs, are potential competitive advantage of e-banking.

Personal Limitations: Though Internet banking is an effective tool; many customers are not using it due to lack of knowledge, poor awareness and lack of facility (Dabholkar, 2000). Consumers would look out for those products which provide the best value for money and they are aware about it. Banks need to make the customers aware of internet banking and take the responsibility of educating them through mass communication, advertisement, personal contacts etc and guide them to use internet banking. Consumers must become aware of the new brand or technology. An important characteristic for any adoption of innovative service or product is creating awareness among the consumers about the service/product (Sathye, 1999).

For nonusers the knowledge on advantage of Internet banking may be poor, because the adoption would require them to purchase a computer and acquire an Internet connection (Kuisma et al., 2007). To address this problem, banks can provide internet access in ATM Kiosks to customers who are unable to invest in a computer for internet banking. Banking kiosks can be opened to provide various banking services on 24x7 basis. These kiosks will be an improved version of present day ATMs and will be in a position to provide all the banking services.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   147
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

Generally, human beings resist change and more so if it is technology based. A sense of satisfaction is experienced if the transactions especially financials are done with a person at the other end rather than a machine. Sathye (1999) emphasized that customers, particularly the senior citizens, prefer personal interaction and that they have technology phobia. Reluctance to change from branch banking to internet banking is yet another drawback which banks needs to overcome.

Infrastructure Constraints: The quality of Internet connectivity to be a reason for greater inclination to online banking among the people involved in banking activity, (Yahya.S., et al. 2009). Any disruption during the course of the transaction leaves the customer in doubt whether the transaction has been completed or not. In such cases, the customer is dissatisfied and would not opt for IB in future. If the time taken to finalize the transaction is also too long, that will also make the customer lose interest in internet banking. The Operational difficulties of using Internet banking must be minimized by the bankers to make it more appealing to the customers.

CONCLUSION

Internet banking has changed both the banking industry as well as banks' services to its customers. It is clearly in the interest of the banks to encourage their customers to use internet banking. User friendly web sites can achieve this. In India banking just like other transactions, continues to be relation based and a need for personal touch and human assurance are needed despite technological growth. So it is particularly necessary that banks have user centered web sites for internet banking.

True benefits for the banks will be when they use this technology to reduce customer service costs and increase sales by maximizing self service. As 21st century banking customers are entrusting their most important assets to cyber space, a stress free and successful experience is essential. User friendly web sites, backed up with demos & presentations, building the trust & confidence of customers regarding the safety & security of transactions, establishing banking kiosks at ATM centre's and improving the quality of internet connections will justify the banks investment made in technology through better usage of internet banking by satisfied customers. Besides providing cost and revenues to banks, it enhances the potential for customer satisfaction and retention. Internet banking is no longer a competitive advantage but a necessity which serves as a powerful tool to the banks to satisfy and retain their customers. Thus providing Internet banking service is increasingly becoming a 'need to have' than a 'nice to have service' (Singhal et al. 2008).

REFERENCES

1. Abdulaziz, A., Hashim, R., & Chaker, M.N. (2008), "Customers' perception of online banking in Qatar", Oxford Business & Economics Conference Program, 22-24.
2. Beer, S. (2006), "Customers' preference on internet banking", survey (Retrieved from http://www.itwire.com/content/view/4570/53).
3. Chen,W., & Wellman,B.(2004)," The Global Digital Divide – within and between countries", IT & Society, 1(7), 39-45
4. Christopher, G. C., Mike, L., Visit & Amy, W. (2006), "A logit analysis of electronic banking in New Zealand", International Journal of Bank Market, 24,360-383.
5. Cronin, M. J. (1998), "Defining net impact: The realignment of banking and finance on the web", in Cronin, M. J. (Ed.) Banking and Finance on the Internet. Chapter 1, John Wiley & Sons, New York, USA, 1-18.
6. Dabholkar, P. A. (2000), "Technology in service delivery: Implication for self service and service support". Handbook of service alternatives and management, Sage, Thousand Oaks, CA. 103-109
7. Daniel, E. (1999),"Provision of electronic banking in the UK and the Republic of Ireland", International Journal of Bank Marketing, 17(2), 72 – 83.
8. Edwards, Gary., (2010), "Empathica study on people bank online, but prefer branch service", The Financial Brand.com
9. Eriksson, K., Kerem, K., & Nilson, D., (2008), "The adoption of commercial innovations in the former central and eastern European markets: The case of internet banking in Estonia", The International Journal of Bank Marketing, 26(3), 5- 14.
10. Gan,C., Clemes, M., Limsombunchai, V., & Weng, A.(2006)," A logic analysis of electronic banking in New Zealand", International Journal of Bank Marketing, 24(6), 360-383.
11. Geetika, Nanada, T., & Upadhyay, A.K., (2008), Internet banking in India: Issues and prospects. The ICFAI Journal of Bank Management, 7(2).
12. Gerrard, P., & Cunningham, J. (2003),"The diffusion of internet banking among Singapore consumers", International Journal of Bank Marketing, 21 (1), 16-28.
13. Gonzalez, M.E., et al (2008),"An alternative approach in service quality. An E-banking case study", Quality Manage, 15,41-48.
14. Gupta, S. (2008),"A study of customer perception to e-banking with special reference to Jaipur city", Professional Banker.
15. Haque, A., et al (2009),"Issues of E-Banking transaction: An empirical investigation on Malaysian customers perception", Journal of Applied Sciences, 9(10), 1870-1879.
16. IAMAI report Sep 2011
17. Ibrahim, E.E., Joseph, M., & Ibeh, K.I.N. (2006),"Customers' perception of electronic service delivery in the UK retail banking sector",International Journal of Bank Marketing, 24(7), 475-493
18. Kuisma,T., Laukkanen, T. & Hiltunen, M. (2007),"Mapping the reasons for resistance to approach",International Journal of Information Management, 27(2), 75-85
19. Marchionni,C., & Ritchie,J. (2007),"Organizational factors that support the implementation of a Nursing best practice guideline", Journal of Nursing Management.16(3),74-266
20. Mavri, M & Ioannou, G. (2006),"Consumers' perspectives on online banking services. International Journal of Consumer Studies", 30(6), 552–560.
21. Mckinsey & co.,"A Global Management company report 2010-11".
22. Mols, N. P. (2000),"The internet and services marketing – the case of Danish retail banking Internet Research", 10(1), 7-18
23. Padachi, K., Rojid, S., & Seetanah, B. (2008). "Analyzing the factors that influence the adoption of internet banking in Mauritius", Proceedings of the 2007 Computer Science and IT Education Conference.
24. Pavlou, P., (2003),"Consumer acceptance of electronic commerce: Integrating trust and risk with the Technology Acceptance Model", International Journal of Electronic Commerce, 7(3), 101-134.
25. Prasad, M. A., & Harish, K.S., (2010),"E-banking channels: A study on user perceptions", Professional Banker, 47-54.
26. Robinson, T., (2000),"Internet banking: still not a perfect marriage", Information week.com, 104-106.
27. Sathye, M., (1999),"Adoption of Internet banking by Australian consumers: an empirical investigation", International Journal of Bank Marketing, 17(7), 324-334.
28. Singhal, D., & Padmanabhan, V., (2008)," A study on customer perception towards internet banking: Identifying major contributing factors", The Journal of Nepalese Business studies, 5(1).
29. Sohail, M, & Shanmugham, B. (2004),"E-banking and customers' preferences in Malaysia: an empirical investigation", Information sciences, Informatics and Computer Science: an International journal, 150 (3-4), 207-217.
30. Thulani, D., Tofara, C., & Langton, R. (2009),"Adoption and use of internet banking in Zimbabwe: An exploratory study", Journal of Internet Banking and Commerce, 14(1).
31. Waleed AL-Ghaith et al (2010),"Factors influencing the adoption & usage of online services in Saudi Arabia", The Electronic Journal on Information System in Developing Countries, 40(1), 1-52.
32. www.rbi.org.in
33. Yahya, S., Harashid, Singh, & Thakur, Rajendra, (2009),"A case study on internet banking in Hyderabad – Issues and Prospects", Professional Banker.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   148
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

EMPLOYEE ATTRITION IN SOFTWARE INDUSTRY

I.NAGA SUMALATHA
RESEARCH SCHOLAR, DEPARTMENT OF BUSINESS ADMINISTRATION, RAYALASEEMA UNIVERSITY, KURNOOL
ASST. PROFESSOR
AUROBINDO COLLEGE OF BUSINESS MANAGEMENT
HYDERABAD

ABSTRACT
Organizations must have the best talent in order to succeed in the hyper competitive and increasingly complex global economy. Organizations need to understand the importance of hiring, developing and retaining talented people. Organizations must mange talent as a critical resource to achieve the best possible results. Focusing on this, it has been observed that professional software employees retention become a challenge for software Industry in India as the attrition rate has been significantly increased in recent years. The main objectives of this paper assessment of Individual and Propel concern for Job Attrition on Software Industry. Primary data were collected from 100 employees from 10 software Industry using questionnaire methods. The results indicate that all factors (Individual and Propel) have contributed in the employees' attrition intentions. However, some facets of individual factor have significantly contributed in attrition intentions

KEYWORDS
Individual factors, Job attrition, Propel factors, Software industry and Hyderabad City.

INTRODUCTION
India has created tremendous opportunities and competition for talented software professionals in other countries in form of global outsourcing. The downside of this increased competition is a rising rate of attrition, particularly in India. Fiscal first-quarter 2011 results filed by Infosys, Wipro and TCS listed attrition rates between 7.6%-17.7percent. Various studies conducted indicate that everyone is contributing to the prevailing attrition. Attrition dos not happen for one or two reasons. The way the industry is projected and speed at which the companies are expanding has a major part in attrition. If we look back, we did not plan for the growth of that industry. The readiness in all aspects will ease the problems to some extent. In our country we start the industry and then develop the infrastructure. All the major software companies have faced these realities. If you look within, the specific reasons for attrition are varied in nature and it is interesting to know why the people change jobs so quickly. Even today, the main reason for changing jobs is for higher salary and better benefits. But in call centers the reasons are many and it is also true that for funny reasons people change jobs. At the same time the attrition cannot be attributed to employees alone. The employees always assess the management values, work culture, work practices and credibility of the organization. The Indian companies do have difficulties in getting the businesses and retain it for a long time. There are always ups and downs in the business. When there is no focus and in the absence of business plans, non-availability of the campaigns makes people too quickly move out of the organization. Working environment is the most important cause of attrition. Employees expect very professional approach and international working environment. They expect very friendly and learning environment. It means bossism; rigid rules and stick approach will not suit the call center. Employees look for freedom, good treatment from the superiors, good encouragement, friendly approach from one and all, and good motivation. No doubt the jobs today bring lots of pressure and stress is high. The employees leave the job if there is too much pressure on performance or any work related pressure. It is quite common that employees are moved from one process to another. They take time to get adjusted with the new campaigns and few employees find it difficult to get adjusted and they leave immediately. Monotony sets in very quickly and this is one of the main reasons for attrition. Youngsters look jobs as being temporary and they quickly change the job once they get in to their own field. The other option is to move to such other process work where there is no pressure of sales and meeting service level agreements (SLA). The employees move out if there are strained relations with the superiors or with the subordinates or any slightest discontent.

REVIEW OF LITERATURE
A detailed survey of the concerned literature has been carried out based on various journals, magazines and internet and presented below-

Ajay Chandra.S[1] explores employee hidden talents and potentials that make higher contributions which surprise their leaders. But all may not willing to put extra efforts for the benefits of organization only some who will love the organization and having willing can show more efforts beyond their duty. Such emotional connection is necessary for strengthening the growth of the organizations. This article provides different practices which help to achieve the higher level of employee engagement which increase the productivity. Organizations first need to ensure that the leaders are energized and motivated. Recruitment policies, work-practices and culture are to be designed to enhance employee engagement. Efforts needed to find the barriers for employee engagement by periodic evaluation.

Ongori, and Amah[2], this literature showed the importance of employee's retention and cot of employees' quitting.

Ammu Aanantharaja T[3]n his study identified the main causes which increase the employee turnover and suggested ways to control attrition. Due to monotonous nature of the job, employees change their jobs frequently hence suggested exit interviews as the best way to control or maintain attrition rate in companies

Karthikeyan J[4] opines that Organization should have a vision and a well defined strategy on hiring for the future and assess whether we have right talent with in to attract and retain the best available talent. He suggested a number of measures for talent management in the modern organizations.

Lawrence Ang and Francis Buttle[5] Focused on the associations between customer retention outcomes and a number of management processes including customer planning, budgeting and accountability. In their research, they found that excellence in customer retention is strongly associated with the presence of a documented complaints-having process.

Mobley's[6] study focused on the relationship between job satisfaction and attrition. Mohammad (2006) worked on the relationship between organization commitment and attrition.

Nr. Aravamudhan[7] opines storytelling as one of the powerful tool to engage the employee. According to his survey, stories can give life to the business messages, the leaders want to convey and engage them deeply in every conceivable manner. The stories can motivate, elevate, inspire, challenge, excite and mould the employees.

Pandit YVL[8] highlights how an Indian HR manager should develop strategies to face the challenge of attracting and retaining talent in a competitive environment. He suggested various measures to provide talent management in the organizations.

S.Murali[9] highlights company's specific policy guidelines available for reemployment and also says that employees are also aware about how to approach the companies in case they are seeking re-employment

Steijn and Voet[10] also showed the relationship between supervisor and employee attitude in their study.

Sylvia Ann Hewlett[11] in his article focused on attracting and retaining well-educated, highly ambitious women in developing economies. He opined that organizations are ready to engage them in work, as they are willing to do the extra work.

Tan and Tiong[12], another study which showed the relationship among work satisfaction, stress, and attrition.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

149

The results of each study were different as each study was carried out in different countries (having different socio-economic and culture), in different setting, for different organizations and used different independent variables. Review of various research studies indicated that employees resign for a variety of reasons, these can be classified into the following:

Demographic Factors: Various studies focus on the demographic factors to see attrition across the age, marital status, gender, number of children, education, experience, employment tenure.

Individual Factors: Individual factors such as health problem, family related issues, children education and social status contributes in attrition intentions. However, very little amount of empirical research work is available on individual related factors. There is another important variable "Job-Hoping" also contributes in attrition intentions. Unrealistic expectation of employee is also an important individual factor which contributes in attrition. Many people keep unrealistic expectations from organization when they join. When these unrealistic expectations are not realized, the worker becomes disappointed and they quit. One of the individual factors which have been missed in many research studies is the inability of employee to follow organizations timings, rules, regulations, and requirement, as a result they resign. Masahudu (2008) has identified another important variables "employers' geographic location" that may determine attrition. The closeness of employees to their families and significant others may be a reason to look elsewhere for opportunities or stay with their current employers. For instance, two families living and working across two time zones may decide to look for opportunities closer to each other.

Propel factors: Propel factors are aspects that Propel the employee towards the exit door. In the literature it is also called controlled factors because these factors are internal and can be controlled by organizations. According to Loquercio (2006) it is relatively rare for people to leave jobs in which they are happy, even when offered higher pay elsewhere. Most staff has a preference for stability. However, some time employees are 'Propelled' due to dissatisfaction in their present jobs to seek alternative employment. On the basis of available literature, Propel factor can be classified as follows Organizational Factors: There are many factors which are attached with an organization and work as Propel factors for employees to quit. Among them which are derived from various studies are: salary, benefits and facilities; size of organization (the number of staff in the organization); location of the organization (small or big city); nature and kind of organization; stability of organization; communication system in organization; management practice and polices; employees' empowerment.

Attitude Factors: In the literature, attitude is another kind of Propel factor which is mostly attach with employee behavior. Attitude factors are further classified into job satisfaction and job stress. Job Satisfaction is a collection of positive and/or negative feelings that an individual holds towards his or her job. Satisfied employees are less likely to quit. Job satisfaction is further divided into extrinsic factors and intrinsic factors. Extrinsic factors include variables such as job security, physical conditions/working environment, fringe benefits, and pay. Intrinsic factors include variables such as recognition, freedom, position advancement, learning opportunities, nature, and kind of job and social status (workers with a high hierarchical position who link their social position with their job want to retain it). Job stress includes variables such as role ambiguity (e.g. my job responsibilities are not clear to me), role conflict (e.g. to satisfy some people at my job, I have to upset others), work-overload (e.g. it seems to me that I have more work at my job than I can handle) and work-family conflicts (e.g. my work makes me too tired to enjoy family life).

Organizational Commitment: There are many factors which are attached with employee and organization and work as propel factors for employee to quit. Organizations are interested in not only finding high performing employees, but those who will be committed to the organization. Similarly employees are also interested to work in an organization which is committed to pursue their carriers and benefits. Organizational commitment is recognized as a key factor in the employment relationship and it is widely accepted that strengthening employment commitment, reduce attrition (Mohammad, 2006). Johns (1996) defines organizational commitment as "an attitude that reflects the strength of the linkage between an employee and an organization." Ugboro (2006) identified three types of organizational commitment: affective, continuance and normative, detail of which is given below: Affective commitment is employee emotional attachment to the organization. It results from and is induced by an individual and organizational value congruency. It is almost natural for the individual to become emotionally attached to and enjoy continuing membership in the organization. Continuance commitment is willingness of employee to remain in an organization because of individual investment in the form of nontransferable investments such as close working relationships with coworkers, retirement investments and career investments, acquired job skills which are unique to a particular organization, years of employment in a particular organization, involvement in the community in which the employer is located, and other benefits that make it too costly for one to leave and seek employment elsewhere.

HYPOTHESIS OF THE STUDY

H1: There is relationship between individual factors and job attrition intentions
H2: There is relationship between propel factors and job attrition intentions
H3: Individual factors will have significant contribution in attrition intentions

RESEARCH METHODOLOGY

Data Collection: Data were collected from 100 professional software employees from 10 software companies at Hyderabad city , India In questionnaire each statements was measured using a 1-5 Likert Scale with a rating of 1 indicating "Strongly Disagree" and a rating of 5 indicating "Strongly Agree." The questionnaire was divided into 3 Parts. Part A contains questions regarding socio demographic factors of the software employees, Part B Individual factors and Part C propel factors

Sample Size: Total 140 questionnaires were dispersed 10 leading software companies in Hyderabad city. Finally we received 100 questionnaires from respondent, the respondent response ratio 71.24%

Dependent Variable: Attrition intentions, the dependent variable of the study, were assessed using two statements. The statements in the instrument measure the probability of software employee's intention to leave the organization with the following statements: 1) "As soon as I can find a better job, I will quit at this organization"; 2) "I often think about quitting my job". Each statement is represented with 5 points Likert Scale to indicate their intention of leaving the organization in the near or distant future. A higher score indicates a higher intention to leave the organization.

Independent Variables: Individual, pull and Propel factors are the independent variables in the study. Individual and propel factors were measured using five points Likert Scale from strongly disagree to strongly agree. Individual factors were consisted of 12 questions, propel factor 19 questions.

Statistical Methods: Correlation was used to find out the relationship between dependent variable (Attrition Intentions) and independent Variables (Individual and propel). In other words, correlation is used to test hypothesis H1, H2, and H3. Regression analysis was conducted on the data to find out how much Individual and propel variables contribute in attrition intention

RESULT ANALYSIS AND DISCUSSION

Respondents' Profile: Total ten software companies were selected randomly for data collection. Data were collected from 100 software employees using questionnaire method. Out of 100 participants we were classified all social aspect. Details which are given table 1.

Individual Factor: Relationship and contribution in attrition intention (H1 and H3): In order to find out software employees attrition intention, 12 questions (table 2) belonging to their individual life which may intend them to quit job were asked. The descriptive statistics of these questions is given in Table 2: The respondents were slightly agreed to three facets of individual factors i.e. those they are intended to quit job because of family related problems (mean 3.13 & SD .92), they do not like their boss (mean 3.34 & SD 1.08), and their expectation from organization has not been fulfill (mean 3.34 & SD 1.06). However, they were not agreed to the nine facets of individual factors i.e. they are disagreed to quit job because of health problem (mean 2.38 & SD 0.89), social status (mean 2.67 & SD 1.01), because of children education (mean 2.33 & SD 0.84), job is difficult (mean 2.15 & SD 0.79), their relative are changing jobs (mean 2.14 & SD 2.14), because of fun (mean 2.48 and SD 0.98), family living in other area (mean 2.35 & SD 0.88), unable to concentrate other work (mean 2.17 & SD 0.84) and unable to follow organization rules (mean 2.24 & SD 0.88). The overall, employees were slightly disagree to quit job because of individual factors (mean 2.58 & SD 0.73) Pearson correlation to test the hypotheses H1 and H3.The results supported only five facets out of 12. The first facet is that there is statistically positive relationship between attrition intention and health related problem was strongly supported by the results - 0.221 at p<=.0271. Similarly, the other three facets

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   150
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

i.e. family related problem (0.216 at p≤0.031), because of fun (0.023 at p≤0.006) and family living in other area (0.260 at p≤0.009) are strongly supported. The fourth i.e. children education and attrition intentions and shows negative relation and were also strongly supported by the results -0.211 at p≤035. The H1 is accepted and there is strong relationship between individual factors and attrition intention. In order to find out the contribution of each facets of individual factor in attrition intention of employees, coefficient of correlation is calculated in Table 27. Table 27 shows the contribution of each factor in attrition intention. The most significant factors which contribute in attrition intentions are family living in other area (2.75% at p 0.00) and health related problems (2.52% at p 0.001). The other factors which also significantly contribute in attrition intentions are: social status (1.87% at p 0.012), children education (1.58% at p 0.31), fun (1.80% at p 0.013), unable to follow organization rules (1.61% at p 0.030). The overall contribution of individual factors which contribute in attrition intentions is given in Table 2 and shows that 17.5% variations in attrition are associated with individual factors. Thus, the hypothesis H3 is accepted as individual factors have significant contribution in attrition intention of university employees.

Propel Factors

H2 In order to find out software employees attrition intention, 19 questions (table 4) belonging to Propel factors which may intend them to quit job were asked. The descriptive statistics of these questions is given in Table 33. The respondents were slightly agreed to quit present job because of seven Propel factors of present organization: small size organization (mean 3.57 & SD 1.06), social status (mean 3.57 & SD 1.01), working environment (mean 3.61 & SD 1.08), and employees confect (mean 3.51 & SD 1.13), lack of promotion (mean 3.71 & SD 1.06), life-work balance (mean 3.45 & SD 1.04) and no fairness/justice in present organization (mean 3.47 & SD 1.05). However, the employees were not agreed to quit the present job because of twelve Propel factors: less salary (mean 2.29 & SD 0.93), less fringe benefits (mean 2.4o & SD 0.94), no security in present job good (mean 2.65 & SD 0.94), organization location (mean 2.19 & SD 0.83), encouragement (mean 2.16 & SD 0.83), work recognition (mean 2.00 & SD 0.66), freedom (mean 2.47 & SD 0.93), lack of research facilities (mean 2.57 and SD 0.93), more office work (mean 2.21 & SD 0.83), more teaching load (mean 2.38 and SD 0.93), more work (mean 2.41 & SD 0.97) and bad behavior of boss (mean 2.38 & SD 0.94). Overall the employees were slightly disagree to quit job because of Propel factors (mean 2.79 & SD 0.96) Pearson correlation. The results supported only 2 facets out of 19. There is significant negative relationship between attrition intention and lack of motivation (0.221 at p≤0.027). Similarly, significant relationship was found between attrition and more office work (0.187 at p≤0.063). In order to find out the contribution of each facets of Propel factor in attrition intention of employees, coefficient of correlation is calculated in Table 4 and shows the contribution of each facet of Propel factor in attrition intention. However, no variable has significant contribution in attrition intention. The overall contribution of Propel factors which contribute in attrition intentions is given in Table 36. The above table shows that 1.3% variations in attrition are associated with Propel factors. However, hypothesis H3 is not accepted as pull factors are not significantly contributed in the attrition intention

COMPARISON OF INDIVIDUAL AND PROPEL FACTORS IN ATTRITION INTENTION

Each facet of individual and Propel factor is compared in Table 4 to show which facet is significantly contributed more in attrition intentions. Similarly, the overall contribution of individual factor and Propel factor in attrition intention has been shown in the last section of Table 5 from comparison point of view. Most significant facets of individual factors which contributed in attrition intention are difficulty in software work and health problem. The other significant facets of individual factors are children education, unrealistic expectation for organization, living close to family and because of fun (enjoy in changing job). The overall contribution of individual factors in attrition intention is 17.5%. In Propel factor no significant reasons were found due to which employees quit. Similarly, the overall contribution of Propel factors in attrition intention is 1.3% which is not significant.

CONCLUSION

In literature various factors / reasons have been identified for the employee's attrition intentions. These factors of attrition intentions are different from organization to organization to some extent. In this paper all factors were divided into two main factors i.e. Individual and Propel factors in order to find out the contribution of each factor in attrition intention of the software employees in Bangalore city, India This paper concludes that the most significant factor is individual factor (17.5% contribution in attrition intention). The Propel factor also contributed in attrition (1.3%) but not significantly. The most significant reasons in individual factor are difficulty in software heavy work and health problem (employees quit a job because they have health related problem). Other reasons which were found significant are: children education (employees quit jobs because they did not find good education facilities in the area), unrealistic expectation for organization (employees quit job because the organization did not meet their expectation), living close to family (employees quit job because they are away from their family) and because of fun (employees quit job because they enjoy in changing job).In Propel factor no significant reasons were found due to which employees quit. The overall conclusion is that individual factors are the more significant in attrition intention in software industry employees in Bangalore city, India. Therefore the organization may take into consideration the individual problems of their employees to reduce attrition of their good employees.

REFERENCES

1. Ajay Chandra.S, HR Manager (May 2008), ENGAGE EMPLOYEES STO RETAIN THEM, HRM Review.
2. Amah, O.E. (2008); Job Satisfaction and Attrition Intention Relationship: THE MODERATING EFFECT OF JOB ROLE CENTRALITY AND LIFE STIAFACTION, Human Resources Institute & Curtin University of Technology, Singapore.
3. Ammu Aanantharaja (Nov 2009), CAUSES OF ATTRITION IN BPO COMPANIES, Vol VIII No.II. HRM Review.
4. Karthikeyan J (May 2007), TALENT MANAGEMENT STRATEGIES, NHRD journal, Hyderabad, p23-26.
5. Lawrence Ang and Francis Buttle (VOL.40 No. ½, 2006), CUSTOMER RETENTION MANAGEMENT PROCESSES, European journal of marketing..
6. Mobley and William. H. (1977); INTERMEDIATE LINKAGES IN THE RELATIONSHIP BETWEEN JOB SATISFACTION AND EMPLOYEE ATTRITION, Journal of Applied Psychology, Vol 62(2), April 1977, 237-p 240.
7. Nr. Aravamudhan (dec.2009), STORYTELLING, HRM review.
8. Pandit YVL (May 2007), TALENT RETENTION STRATETGIES IN AN COMPETITIVE ENVIRONMENT, NHRD journal, Hyderabad, P27-29.
9. S.Murali (July 2010), RE-EMPLOYMENT OR REHIRING, HRM review.
10. Steijn, B. and Voet, J (2009); SUPERVISORS IN THE DUTCH PUBLIC SECTOR AND THEIR IMPACT ON EMPLOYEES, EGPA Annual Conference, Malta, September 2-5 2009.
11. Sylvia Ann Hewlett (May 2010), THE BATTLE FOR FEMALE TALENT IN EMERGING MARKETS, HBR south Asia.
12. Tan, J., Tan, V and Tiong, T.N. (2006); WORK ATTITUDE, LOYALTY AND EMPLOYEE ATTRITION, Singapore Institute of Management, National University of Singapore.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 151
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLES

TABLE 1: RESPONDENT PROFILE

VARIABLE	CATEGORY	PERCENTAGE
Age (in years)		
25-33	15	15.0
34-40	80	80.0
Above	41	5 5.0
Total experience (in years)		
1-3	21	21.0
4-7	44	44.0
8-10	24	24.0
11 & above	12	12.0
Tenure in current organization (in years)		
1-3	58	58.0
4-6	33	33.0
7 & above	9	9.0
No. of Children		
No children	34	34.0
1	22	22.0
2	33	33.0
3 and Above	11	11.0
Gender		
Male	68	68.0
Female	32	32.0
Marital Status		
Married	79	79.0
Unmarried	21	21.0
Level of Education		
UG	31	31.0
PG	60	60.0
Above PG Like MS/PhD	09	9.0
Present Position/Scale		
Top Level	51	51.0
Middle Level	19	19.0
Lower Level	30	30.0

TABLE 2: DESCRIPTIVE STATISTICS - MEAN, SD, COEFFICIENTS OF CORRELATION AND BETA (INDIVIDUAL FACTORS)

Variable	Mean	SD	Coefficients of Correlation – Individual Factors			
			Standardized Coefficients		t	Sig
			Std. Error	Beta		
(Constant)	-	-	0.533	-	1.200	0.232
Health Problem	2.380	0.897	0.060	0.252	3.426	0.001
Social Status	2.670	1.016	0.053	0.187	2.547	0.012
Children education	2.330	0.842	0.063	0.158	2.180	0.031
Difficult Job	2.150	0.796	0.066	0.084	1.170	0.244
Relative are changing job	2.140	0.817	0.065	0.027	0.367	0.714
Because of fun	2.480	0.990	0.052	0.180	2.525	0.013
Do not like boss individuality	3.430	1.085	0.052	0.025	0.320	0.749
Expectation not fulfill	3.340	1.037	0.049	0.097	1.397	0.164
Family living in other area	2.350	0.880	0.058	0.275	3.916	0.000
Unable to personal work	2.170	0.841	0.064	0.093	1.263	0.208
Unable to follow organization rules	2.240	0.877	0.061	0.161	2.190	0.030
Attrition Intention	***30.81***	***11.006***	***Dependent Variable***			

TABLE 3: REGRESSION SUMMARIES OF INDIVIDUAL FACTORS

R	R Square	Adjusted R Square	Std. Error of Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
0.524	0.275	0.175	0.66173	0.275	2.746	12	87	0.003

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 152
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

TABLE 4: DESCRIPTIVE STATISTICS - MEAN, SD, COEFFICIENTS OF CORRELATION AND BETA (PROPEL FACTORS)

Variable	Mean	SD	Coefficients of Correlation – Propel Factors			
			Standardized Coefficients		t	Sig
			Std. Error	Beta		
(Constant)	-	-	1.127	-	2.002	0.049
Less salary	2.290	0.935	0.098	0.201	1.605	0.112
Less fringe benefits	2.400	0.943	0.086	0.116	1.049	0.297
No job security	2.650	0.946	0.086	0.073	0.653	0.516
Small size of organization	3.570	1.066	0.084	0.194	1.571	0.120
Organization location	2.190	0.837	0.101	0.022	0.188	0.851
Social status	3.570	1.018	0.083	0.125	1.076	0.285
Working environment	3.610	1.082	0.078	0.039	0.332	0.741
Lack of motivation	2.160	0.837	0.101	0.185	1.598	0.114
Employees conflict	3.510	1.133	0.072	0.023	0.210	0.835
Lack of recognition work	2.000	0.667	0.125	0.014	0.127	0.899
Lack of freedom	2.470	0.937	0.092	0.035	0.297	0.767
Lack of career advancement	3.710	1.067	0.079	0.042	0.367	0.715
Lack of QIP	2.570	0.935	0.100	0.084	0.659	0.512
More office work load	2.210	0.833	0.098	0.148	1.329	0.188
Heavy work	2.380	0.930	0.090	0.130	1.129	0.262
Too tired to enjoy family life	2.410	0.975	0.090	0.050	0.415	0.679
Not enough time for family	3.450	1.048	0.082	0.050	0.423	0.673
Bad behavior of boss	2.380	0.940	0.092	0.193	1.628	0.108
No fairness	3.470	1.058	0.081	0.102	0.868	0.388
Attrition Intention	*41.29*	*14.116*	*Dependent Variable*			

TABLE 5: REGRESSION SUMMARY OF PROPEL FACTORS

R	R Square	Adjusted R Square	Std. Error of Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
0.450	0.202	0.013	0.72382	0.202	1.066	19	80	0.400

TABLE 6: COMPARISON OF PERSONAL AND PROPEL FACTORS IN ATTRITION INTENTION

R^2	0.275	0.202
Adj. R^2	0.175	0.013
Sig F Change	0.003	0.400

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 153
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

IMPORTANCE OF XBRL: AN OVERVIEW

B.RAMESH
RESEARCH SCHOLAR
SCHOOL OF MANAGEMENT STUDIES
UNIVERSITY OF HYDERABAD
HYDERABAD

ABSTRACT

This paper explains the importance and overview of XBRL.XBRL stands for Extensible Business Reporting Language. It is an open normal, and creature developed by XBRL International, a non-profit organization. XBRL is a innovatory idea in the world of business and financial information and will have a far accomplishment impact diagonally the intact financial reporting. The Institute of Chartered Accounts of India (ICAI) is spearheading the XBRL inventiveness in the country and India is at the present a conditional authority of XBRL globally. It makes the data understandable, with the lend a hand of two documents taxonomy and instance document. XBRL is speedily being adopted global as a de facto financial and business reporting standard. It facilitates junction of accounting standards by the facility to bring into line financial concepts among public taxonomies. XBRL provides a business reporting structure. Business reports cover a extensive spectrum from regulatory acquiescence to business intelligence

KEYWORDS
XBRL, business reporting language.

INTRODUCTION
XBRL It is the language for electronic communication of business and financial in sequence between business and in excess of Internet. It is an open technology standard, free from any license fees, software agonistic and accounting structure neutral. As a language, it does not be going to to amend any of the Generally Accepted Accounting Principles (GAAP) but to present them in a suitable format which facilitates further analysis and relationship of data. It can be used for converting both financial in order and data such as financial statements and non-financial information and data such as Sustainability Reports, Regulatory Reports, and Loan Applications etc. in XBRL format. XBRL is composed of specifications about how to structure business and financial data and a common framework for structure and identification business and financial information. XML (EXtensible Mark-up Language) provides the structure for the data.

MEANING OF XBRL
XBRL stands for extensible Business Reporting Language. It is an open normal, and creature developed by XBRL International, a non-profit organization. XBRL is a innovatory idea in the world of business and financial information and will have a far accomplishment impact diagonally the intact financial reporting sequence. International approval of XBRL as the information standard for business and financial reporting has gathered significant pace in past two years with regulators in US, Japan, European Union, China and now in India successfully implementing XBRL based coverage systems. XBRL means bar-coding business information with tags. The business information no longer remains a block of text but each information element is tagged which makes it computer-readable. Traditional business reporting is done in various formats viz. printed financials, spreadsheets, PDF documents, html and so on. All these are human readable and can be interpret by human beings or by systems with human involvement.

REVIEW OF LITERATURE
XBRL is speedily attractive a worldwide standard designed for the exchange of business information. The most important explanation is that incredible reminiscent of XBRL requirements to continue living in the age of the computer and the Internet, united with a long-lasting shift away from paper-based to e-based business models. XBRL is an XML language. It is significant to comprehend why XML exists in arrange to recognize why XBRL exists in addition to why XBRL is considered necessary. XBRL is an XML-based language for electronic communication of financial and other business data. in sequence is no longer treated as a building block of textbook, other than each data thing is tagged with information as regards a variety of attributes: company name, financial period, etc. XBRL-tagged data can be understand writing and processed by any software that is XML-enabled and thus can be transferred without difficulty between computers. Inexpensive software is easy to get to to connect a label to the data so it is ready to be understood writing and analyzed.

OBJECTIVES OF THE STUDY
1. To study the history of XBRL
2. To study the importance of XBRL
3. To study the methodology of XBRL
4. To study the benefit of XBRL in Business
5. To study the applications of XBRL.

HISTORYOF XBRL
XBRL had its early development in April 1998 at what time the author of this book conceived of the thought of by means of XML to articulate financial statements and examination schedules subsequent to understanding a book on XML in April 1998. From that point, the AICPA (American Institute of Certified Public Accountants) was approached to organize the preface of what was to become XBRL to the world. The AICPA and Knight, Vale & Gregory, a CPA firm (now part of RSM McGladrey), funded an initial first of its kind of XBRL. The AICPA funded a business plan, several successive prototypes called XFRML (Extensible Financial Reporting Markup Language) and starting the XBRL global consortium. flush earlier than the first XBRL conglomerate meeting, the AICPA guidance determined to pursue dealing reporting as a broader possibility which was to take account of financial reporting, to a certain extent than restraining the possibility to no more than financial reporting.

XBRL IN INDIA
The Institute of Chartered Accounts of India (ICAI) is spearheading the XBRL inventiveness in the country and India is at the present a conditional authority of XBRL worldwide. Members of XBRL India are Reserve Bank of India (RBI), Insurance Regulatory and Development Authority (IRDA), Securities and Exchange Board of India (SEBI), Ministry of Corporate Affairs (MCA), stock exchanges like Bombay Stock Exchange Limited (BSE) and National Stock Exchange of India Limited (NSE) and a few private companies. The ICAI has developed the taxonomy based on Indian GAAP for universal reason financial statements for manufacturing and services sector and banking sector. Both the taxonomies are credited by XBRL worldwide. The taxonomy for NBFC is underneath growth. In arrange to improve the quality and reusability of data and to put together the flexibility to without difficulty provide somewhere to stay opportunity authoritarian data needs, the financial authority of India, RBI, was keen to put into operation the bring into play of XBRL services in their reporting structure.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   154
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

IRIS' XBRL enabled workflow explanation, IRIS file, was implement as the solution for the necessities of the RBI in October 2008, for the capital adequacy returns. All the programmed commercial banks which fall under the purview of Basel II use this display place. Returns for fortnightly liquidity position, foreign exchange balances, Form X, and the annual financial statements are in pipeline The Securities Exchange Board of India (SEBI) has mandated the top 100 companies listed on the two major exchanges viz. the Bombay Stock Exchange and the National Stock Exchange, to file their disclosures through XBRL-based Compiling. In addition to the mandated companies, many companies are filing of your own accord their financial in XBRL.

SCOPE OF XBRL

XBRL India is a Company registered under Section 25 of the Companies Act, 1956, integrated for managing the affairs of Indian Jurisdiction of XBRL International. The Ministry of Corporate Affairs has adopted the new way of reporting by issuing General Circular 9 dated 31st March, 2011. The Ministry of Corporate Affairs, in supersession of its earlier circular No. 9/2011 dated 31.03.2011, has mandate for following companies to file Balance sheet and Profit and loss Account along with Directors' and Auditors' Report for the year 2010·11 onwards by using XBRL taxonomy:

(i) All companies listed in India and their Indian subsidiaries;
(ii) All companies having a paid up capital of Rs. 5 crore and above
(iii) All companies having a turnover of Rs. 100 crore and above.

However banking companies, non banking financial companies, insurance companies, power companies are exempted from XBRL filing till further order.
There is no speculate that the XBRL data ordinary is surroundings its foothold around the world since XBRL address the predicament of data reliability, suitability and reusability.

THE METHODOLIGY OF XBRL

In its place of treating financial information as a building block of text, XBRL provides a unique, predefined electronic data tags to information elements identifying the information's content and structure and creation it straight away reusable by computer systems, interactive and bright. Tags give data identity and context which can be understood by a range of software applications. It allows data to interface with data bases, financial reporting systems and spreadsheets. Once the data is tagged, it can be used anytime. XBRL treats financial information as static text – as in standard page or printed document – XBRL provides identifying tag for each take apart item of data be it arithmetical or textual. These tags are bar coded to be recognized singly and used for reporting purposes. XBRL tags are definite and maintained in taxonomies which include meta-data (data about data). The Taxonomies are the beginning for tagging financial and business reporting in sequence in XBRL. Taxonomy is electronic categorization of tags which defines a choice of business reporting concepts. This taxonomy contains detail for each concept together with labels, definitions, accounting balance i.e. (debit and credit) arrangement and summation information.

XBRL PROCESS

XBRL is the one of the latest electronic financial reporting it start with physical data enter into the excel format then it should be tag by training staff then audited by the xbrl experts (those who are expert in dealing with xbrl) then should go for the creation of instance document after this then should go the validation of instance document after that data should enter into the uploading into MCA portal finally certified by the practsioning professionals.xbrl mainly done the physical financial information convert in to electronic form.once data converted into electronic form then there is chances for the transparency and every can acces the report then they will get the necessary information with low time and minimization of cost.
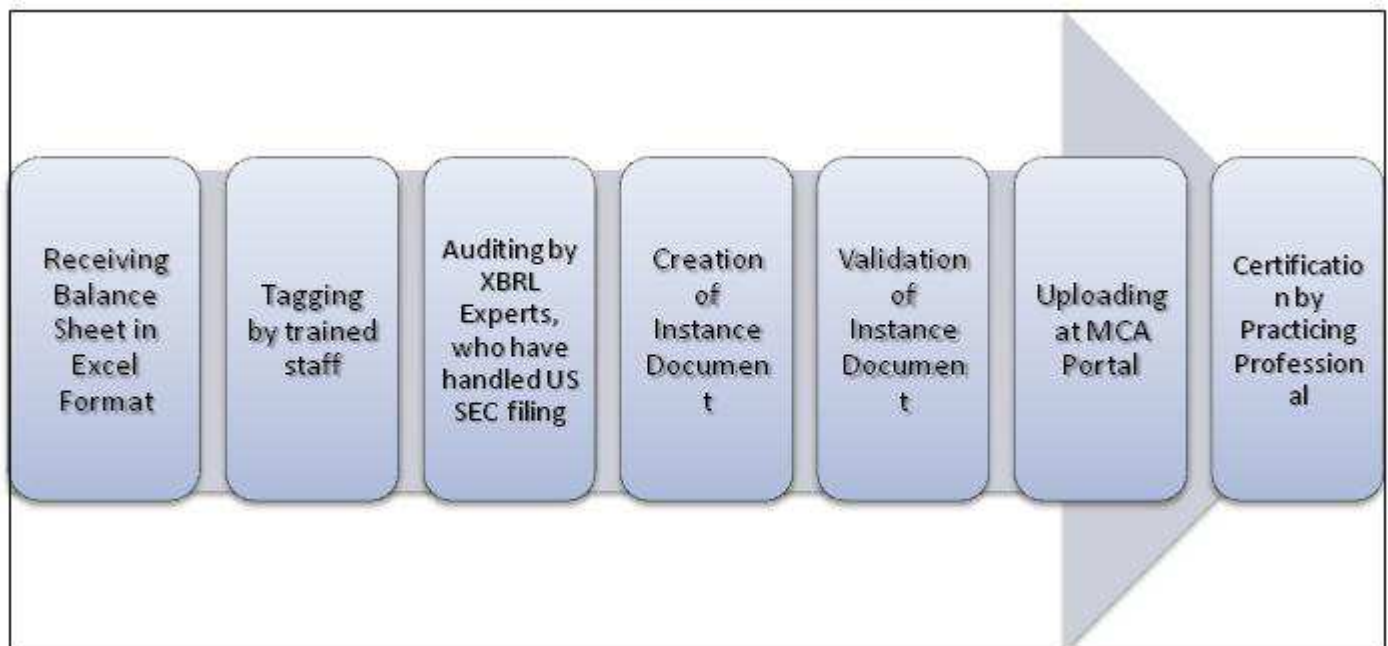
Source: takshilalearning.com

HOW DOES XBRL WORK

XBRL makes the data understandable, with the lend a hand of two documents **Taxonomy and instance document. Taxonomy** defines the elements and their relationships based on the regulatory necessities. by means of the taxonomy prearranged by the regulators, companies need to map their reports, and generate a valid XBRL instance document. The process of mapping means matching the concepts as reported by the company to the corresponding element in the taxonomy. In addition to assigning XBRL tag from taxonomy, information like unit of measurement, period of data, scale of reporting etc., needs to be included in the instance document.

1. TAXONOMIES
2. ELEMENTS
3. EXTENSTION TAXONOMIES
4. INSTANCE DOCUMENTS

1. TAXONOMIES: Taxonomy can be referred at the same time as electronic dictionary of the reporting concepts. Taxonomy consists of all the data definitions, the basic XBRL properties and the interrelationships amongst the concepts. It includes terms such as net income, EPS, cash, etc. Each term has specific attributes that help define it including label and definition and potentially references. Taxonomies may represent hundreds or even thousands of individual trade reporting

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   155
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

concepts, mathematical and definitional relationships among them, along with text labels in several languages, references to authoritative literature, and in sequence about how to exhibit each concept to a client.

2. ELEMENTS: An element is a business concept (such as Assets, Liabilities, Income, Expenditure….) presented to a computer in a system that it could learn its main characteristics. To attain this, definitions of elements that come into display in schemas are constructed according to a precise set of rules

3. EXTENSION TAXONOMIES: The national taxonomies, like Indian GAAP, IFRS Taxonomy, US-GAAP taxonomy etc define elements and the relationships between them according to particular legislation or standards. However, if companies need to include in their business reports additional concepts (usually related to the area of their activity or the reporting purpose), XBRL, as its name indicates, allows for such extensions.

One can create taxonomy extensions by:

➢ Adding one's own data elements
➢ Creating one's own relationships
➢ Or both

There are several rules to be followed while extending taxonomy, the most important being the extensions should be as per the base taxonomy style and architecture. Taxonomy is extended to accommodate items/relationship specific to the owner of the information.

4. INSTANCE DOCUMENTS: An XBRL instance document is a business report in an electronic format formed according to the rules of XBRL. It contains essentials that are defined by the elements in the taxonomy it refers to together with their values and an explanation of the context in which they are placed.

## XBRL EXTENSION TAXONOMY AND INSTANCE DOCUMENT CREATION PROCESS
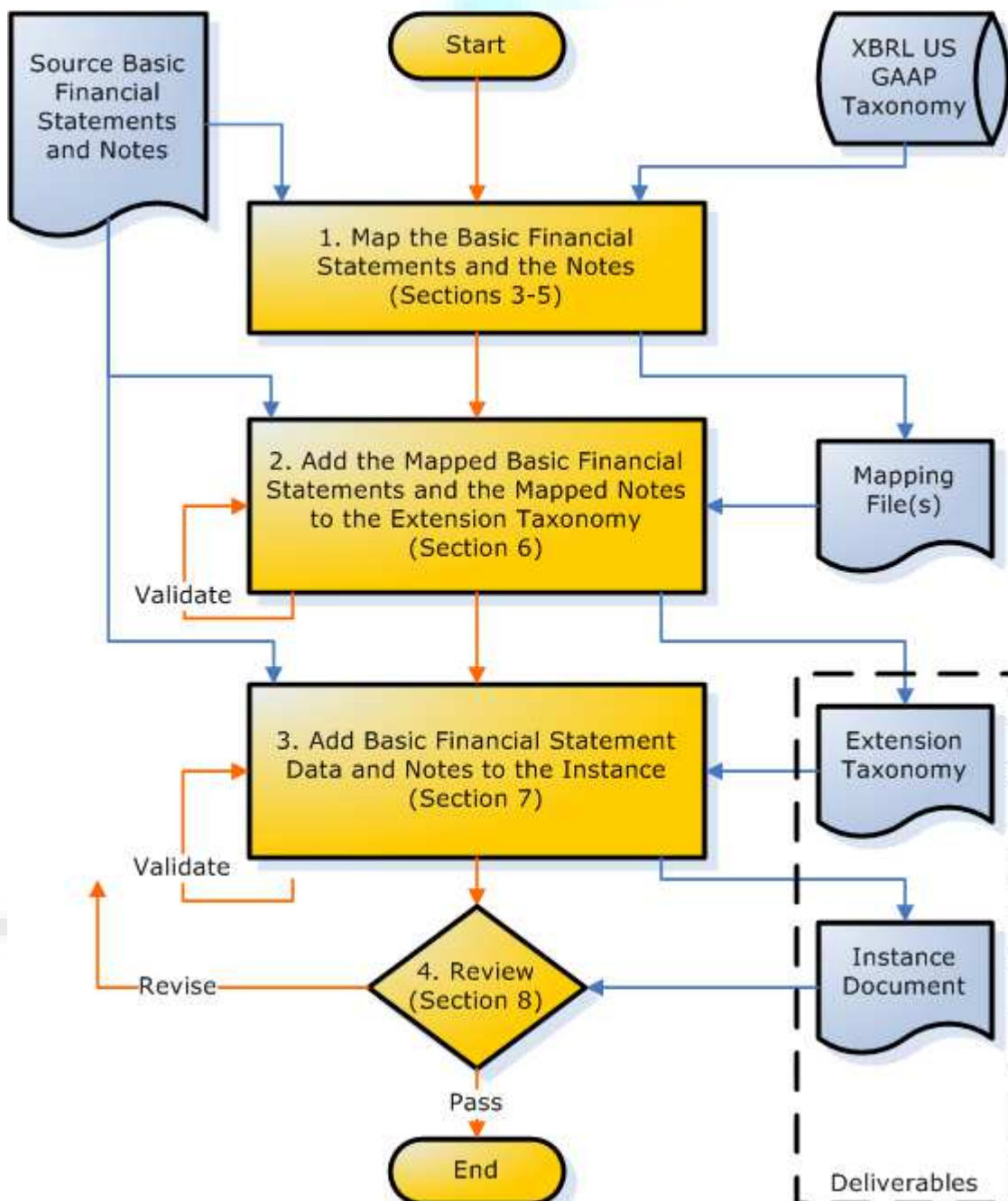
Source: xbrl.us.

BENEFITS OF XBRL IN BUSINESS: XBRL provides a come within reach of to put mutually and bring together data and then merely complete study using automated equipment. Governments, regulators, stock exchanges and financial in succession companies will convey into play XBRL to collect data. Also, accountants, company managers, financial analysts, investors and creditors will put advance and make use of data via XBRL. In addition together, the in progression technology industry will be concerned with creating XBRL-enabled software. Companies possibly will use XBRL on the inside for a numeral of purposes, together with bring in sequence information, consolidation processes and workforce routine records. It is reliable, efficient, cost effective, computer

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 156
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

readable, requiring no data entry again and all over again which is the most time strong, expensive and unreliable. Data once changed in the XBRL format can be easily processed through Computers.The design at the back XBRL, EXtensible Business Reporting Language, is easy. as an alternative of treating financial information as a building block of text as in a standard internet page or a printed document it provides an identifying tag for every person item of data. This is computer readable.

1. More consistent
2. Better investigation
3. Well again quality of in sequence and decision-making.
4. Cost reduction
5. Quicker
6. Enhanced business reporting and analysis.
7. Avoids re-entry of data.
8. More truthful managing of information,
9. Internet standing by for communication and direct use by all stake holders
10. Avoids time-consuming manual comparison,

XBRL INPUT DATA AND BENEFICIARIES
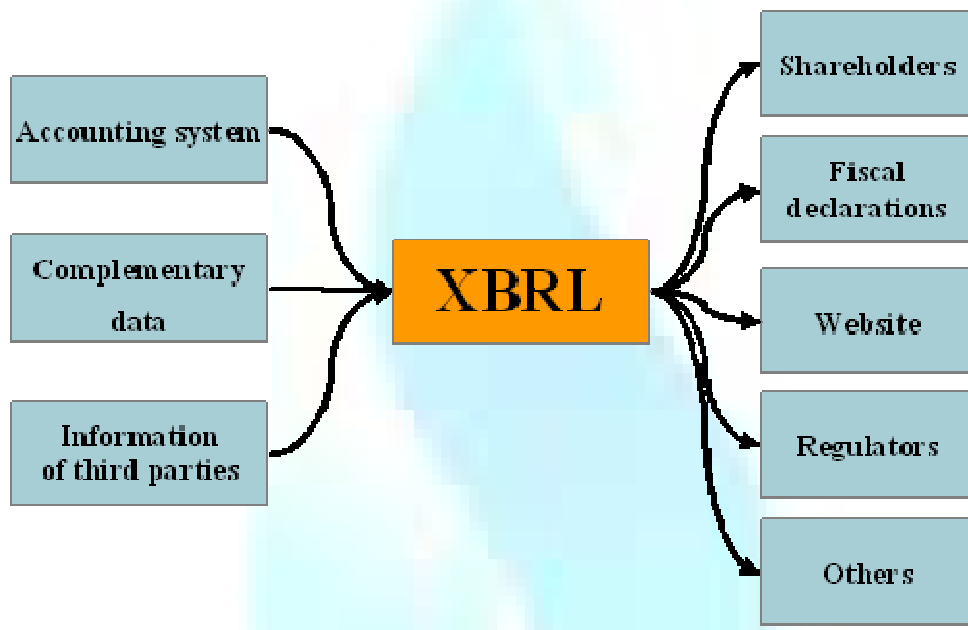
Source: www.xbrl.org.

The advantage with XBRL is the accounting system, complementary data and information of third parties, through xbrl can send the different parties , the beneficiaries with XBRL are shareholders, website, regulators, bankers, other financial institutions and others.

IMPORTANCE OF XBRL

XBRL is speedily being adopted global as a de facto financial and business reporting standard. XBRL facilitates junction of accounting standards by the facility to bring into line financial concepts among public taxonomies. Stock Exchanges, Supervisory and Regulatory bodies transversely sphere is looking forward for XBRL adoption.

1.Accurate and Quality Data – XBRL validates the data based on the regulations and relations defined in the middle of the figures essentials, which results in obtaining sparkling and suitable.

2. Automation – by means of XBRL, the intelligence of thoughtful and interpreting the data is transferred to the system and this facilitates automation in data processing and management. By using XBRL, companies and other producers of financial data and business information can computerize the processes of data compilation.

3. Reduce cost of ownership of data – The XBRL information is interoperable and accordingly shaped once can be used by multiple agencies seamlessly. In addition to as a result of interoperability the in general cost of creating data and meeting the compliance requirements is reduced dramatically. Moreover, XBRL is a open and crowned heads free normal.

4. Efficient Business processing a lot of of the information necessities of the different agencies is comparable and companies enclose to suggest the same manifold times. At the same time as the data is interoperable, the redundant information elements can be done away with and thus reducing the reporting burden on top of enterprises The XBRL data carries along with it, the supplementary attributes and facts, which makes the data easy to understand. Along with thus the data remains no longer dependent on any purpose or platform for interpretation and processing. The XBRL data can be easily integrated into any system As XBRL cuts down the time spent on less efficient process like rekeying and re-arranging data, the complete business process now becomes more competent and prolific. XBRL will streamline the preparation of business and financial reports for internal and external decision making.

5. Consumer oriented reporting - customers can work together and share the methodical concepts and are no longer needy on the reporting concepts embedded in exact software. And clients can now enthusiastically intend and share their own business information. All the information is recognized with a exceptional XBRL tag and this makes locating the data from a enormous information storage area or from a large report very easy and quick. Since associated in sequence is linked retrieving information is done in no time.

6. Real-time data for the reason that of computerization and conception of truthful and official data, the dispensation of data becomes much quicker and so does its propagation.

7. Help full to Analyst community: The occasion necessary for investigation is relatively soaring for the reason that the data is first rekeyed, validated and arranged according to the needs. Since all these actions are no longer necessary in XBRL based support and hence the forecaster cover time to focal point on top of small companies .XBRL, being a common ordinary, facilitates association connecting companies across world.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 157
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

8. Transparent Data: XBRL facilitates in good health and quicker right to use to information; clearness in the in one piece information deliver succession is greater than before.

APPLICATIONS OF XBRL

XBRL provides a business reporting structure. Business reports cover a extensive spectrum from regulatory acquiescence to business intelligence. XBRL applications be capable of endow with worth at a lot of different points in the reporting chain. By standardizing the method business information flows in this chain, you can open up a number of possibilities for by means of canned applications for concerto, analysis, presentation, and whichever additional function of with the purpose of information.

- IFRS translation – XBRL data set is exceptionally acquiescent to be processed by means of business set of laws that be capable of be built interested in the taxonomy. IFRS accomplishment with XBRL Standards creates an XBRL cover on the to be had inheritance systems.
- Trade Operations - XBRL brings effectiveness in Intra period reporting for in-house assessments and monetary modeling.
- Risk Assessments – XBRL automates the process of inputting data in various models and thereby facilitates the process of determination of risk.
- Investing & Lending – Helps allocating resources to assorted investment avenues in addition to brings about competence in provided that data to banks and other authorities.
- Mergers & Acquisitions – XBRL facilitates easier replace of in sequence connecting two organizations. It is reliable based on a jurisdictional permitted taxonomy.
- Investor Relations – Making consequent information accessible to the clients of information and providing reports in XBRL through the industrial relations portal thereby making the consumption of financial information simpler.
- Financial Reporting – XBRL is a mandate for various regulatory filing in India, US, UK and   a lot of additional.   XBRL enables reporting in whichever taxonomy like Indian GAAP, IFRS, US GAAP & UK GAAP, thus satisfying the regulatory reporting requirement of companies falling under any jurisdiction.
- Regulatory Reporting Frameworks - Those organizations who supervise authoritarian compliance and thus collect large amounts of reported data, -- like national banks -- need a scalable XBRL solution for viewing and analyzing thousands of complex financial report submissions each quarter.
- In-house Reporting - To prop up the corporate reporting procedure, enterprises be able to lengthen their Oracle database systems with the ability to export in XBRL. This information can then be fully validated against the standard business rules and the recipient's reporting guidelines.

LIMITATIONS OF XBRL

XBRL is not suitable designed for everything. Understanding wherever XBRL is not useful Helps understand what it is helpful for.
XBRL is currently not perfectly suited for:
1. Documents which require a content model,
2. Low-level transactions such at the same time as sales invoices and procure orders; However, XBRL provides some transaction level exchange features,
3. Presentation of information,
4. It is worldwide solutions, better proprietary solutions can be fashioned which have better Characteristics, but no better global solution can be established upon.

CONCLUSION

Most of the countries have renowned the want designed for convergence of accounting standards and are stirring towards its accomplishment at the identical time as others are more in their come up to of financial reporting XBRL. XBRL is planned unambiguously in the direction of maintain business reporting along with as a result, it's improved functionality connected with XBRL is recent. This study has emphasized the opportunities for organizations to adapt, integrate and overview of XBRL on the inside in view of the fact that this brings the nearly everyone advantage and reduces the risks and impacts highlighted. a lot of organizations send their data to outside providers of XBRL-the outsourced approach. at the same time as the outsourced scenario is one of the faster strategies in the short term, this come near will not permit organizations to influence the benefits of integrating it into the wider inside reporting processes of the organizations.

REFERENCES

1. "XBRL for Indian CA"written by XBRL community in India. Peter Mayne,(2008) "Reporting language XBRL looks as thoughit is in the right place at the right time "Balance Sheet,Vol 10,iss 3
2. .Goodhand. M., and Hamscher, W., (2004), "Financial Reporting Instance Standards 1.0", XBRL International (Internal Working Draft).
3. .Needles, Belverd E. and Marian Powers, Financial Accounting, Houghton Mifflin Company (NY) 2004.
4. Chandran, M.P. (2010) "XBRL: Enterprise Financial Reporting System" (http://www.boloji.com/business/032.html)
5. CIMA (n.d.) "Business Briefing: Standard Business Reporting" http://www.cimaglobal.com/Documents/ImportedDocuments/Business_Briefing_SBR.pdf)
6. Coffin, Z. (2001) "The Top Ten Effects of XBRL: The Future of Internet Reporting" (http://circa.europa.eu/)
7. Hamscher, W., (2004), "Financial Reporting Taxonomies Architecture 1.0", XBR International (Internal Working Draft).
8. Sayther Cunningham,(2005) " XBRL : A Multitalented tool XBRL can save time and money and facilitate information analysis,"article "Journal of Accountancy,Vol.199
9. takshilalearning.com.
10. www.bseindia.com.
11. www.hitachiconsulting.com/xbrl/case_studies.cfm?id=case_studies.
12. www.icai.org.
13. www.isaca.org.
14. www.mca.gov.in.
15. www.nseindia.com
16. www.rbi.org.in
17. www.sebi.gov.in
18. www.xbrl.org.
19. www.xbrl.us.
20. XBRL International, www.xbrl.org.
21. XBRL US, http://xbrl.us/Pages/default.aspx.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 158
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

AN ANALYSIS OF ANEKA (CLOUD COMPUTING TOOL)

AANHA GOYAL
M. TECH. STUDENT
COMPUTER SCIENCE
JAYOTI VIDHYAPEETH WOMENS UNIVERSITY
JAIPUR

ANSHIKA BANSAL
B. TECH. STUDENT
JAYOTI VIDHYAPEETH WOMENS UNIVERSITY
JAIPUR

ABSTRACT

Aneka is a platform for deploying Clouds developing applications on top of it. It provides a runtime environment and a set of APIs that allow developers to build .NET applications that leverage their computation on either public or private clouds. Aneka is the ability of supporting multiple programming models that are ways of expressing the execution logic of applications by using specific abstractions. Aneka is an Application Platform-as-a-Service (PaaS) for Cloud Computing. which offers a runtime environment and a set of APIs that enable developers to build customized applications by using multiple programming models such as Task Programming, Thread Programming and Map Reduce Programming, Aneka provides a number of services that allow users to control, auto-scale, reserve, monitor and bill users for the resources used by their applications. Aneka is its support for provisioning resources on different public Cloud providers such as Amazon EC2, Windows Azure and Go Grid.

KEYWORDS

Aneka, Paas (Platform-as-a-service);.Net Frame work; API(Application program interface); Cloud, Anatomy.

I.   INTRODUCTION

Aneka is a platform for deploying Clouds developing applications on top of it. It provides a runtime environment and a set of APIs(Application Program Interface) that allow developers to build .NET applications that leverage their computation on either public or private clouds. ***Aneka*** allows servers and desktop PCs to be linked together to form a very powerful computing infrastructure. Aneka is a workload distribution and management platform that accelerates applications in Microsoft .NET framework environments. It simplifies the development of distributed applications by providing: a collection of different ways for expressing the logic of distributed applications, a solid infrastructure that takes care of the distributed execution of applications, and a set of advanced features such as the ability to reserve and price computation nodes and to integrate with existing cloud infrastructures such as Amazon EC2. Some of the key advantages of Aneka over other GRID or Cluster based workload distribution solutions include:

- rapid deployment tools and framework,
- ability to harness multiple virtual and/or physical machines for accelerating application
- result provisioning based on QoS/SLA
- support of multiple programming and application environments
- simultaneous support of multiple run-time environments
- built on-top of Microsoft .NET framework

A. PUBLIC CLOUDS

A public cloud encompasses the traditional concept of cloud computing, having the opportunity to use computing resources from anywhere in the world. The clouds can be used in a so-called pay-per-use manner.

B. PRIVATE CLOUDS

Private clouds are normally data centers that are used in a private network and can therefore restrict the unwanted public to access the data that is used by the company.

II.   ARCHITECTURE

Aneka is a platform and a framework for developing distributed applications on the Cloud. It harnesses the spare CPU cycles of a heterogeneous network of desktop PCs and servers or data centers on demand. Aneka provides developers with a rich set of APIs for transparently exploiting such resources and expressing the business logic of applications by using the preferred programming abstractions. System administrators can leverage on a collection of tools to monitor and control the deployed infrastructure. This can be a public cloud available to anyone through the Internet, or a private cloud constituted by a set of nodes with restricted access. Aneka is a .NET-based application development Platform-as– a-Service (PaaS), which offers a runtime environment and a set of APIs that enable developers to build customized applications by using multiple programming models
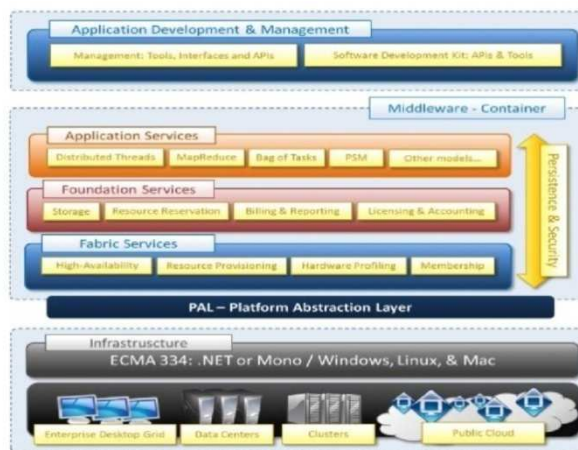
A.   OVERVIEW

The Aneka based computing cloud is a collection of physical and virtualized resources connected through a network, which could be the Internet or a private intranet. Each of these resources hosts an instance of the Aneka Container representing the runtime environment in which the distributed applications are executed. The container provides the basic management features of the single node and leverages all the other operations on the services that it is hosting. In particular we can identify fabric, foundation, and execution services.

Additional services such as persistence and security are transversal to the entire stack of services that are hosted by the Container. At the application level, a set of different components and tools are provided to:

- Simplify the development of applications (SDK)
- Porting existing applications to the Cloud;
- and Monitoring and managing the Aneka Cloud.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   159

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

FIG.1: OVERVIEW OF ANEKA

An Aneka based Cloud is constituted by a set of interconnected resources that are dynamically modified according to the user needs by using resource virtualization or by harnessing the spare CPU cycles of desktop machines. If the deployment identifies a private Cloud all the resources are in house, for example within the enterprise. This deployment is extended by adding publicly available resources on demand or by interacting with other Aneka public clouds providing computing resources connected over the Internet. The heart of this infrastructure is the Aneka Container which represents the basic deployment unit of Aneka based clouds. Some of the most characteristic features of the Cloud Computing model are:

- flexibility,
- elasticity (scaling up or down on demand)
- Pay as per usage.

The architecture and the implementation of the Container play a key role in supporting these three features: the Aneka cloud is flexible because the collection of services available on the container can be customized and deployed according to the specific needs of the application. It is also elastic because it is possible to increase on demand the number of nodes that are part of the Aneka Cloud according to the user needs. The integration of virtual resources into the Aneka Cloud does not introduce specific challenges: once the virtual resource is acquired by Aneka it is only necessary to have an administrative account and a network access to it and deploy the Container on it as it happens for any other physical node. Moreover, because of the Container being the interface to hosting node it is easy to monitor, meter, and charge any distributed application that runs on the Aneka Cloud.

FIG.2: ARCHITECTURE OF ANEKA
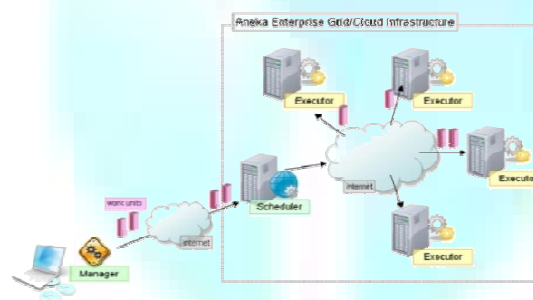
B.   ANATOMY OF THE ANEKA CONTAINER

The Container represents the basic deployment unit of Aneka based Clouds. The network of containers defining the middleware of Aneka constitutes the runtime environment hosting the execution of distributed applications. Aneka strongly relies on a Service Oriented Architecture and the Container is a lightweight component providing basic node management features. All the other operations that are required by the middleware are implemented as services. Such as

- Fabric Services
- Foundation Services
- Execution Services
- Transversal Services

C.   FABRIC SERVICES

It defines the lowest level of the software stack representing the Aneka Container. They provide access to the resource provisioning subsystem and to the hardware of the hosting machine. Resource provisioning services are in charge of dynamically providing new nodes on demand by relying on virtualization technologies, while hardware profile services provide a platform independent interface for collecting performance information and querying the properties of the host operating system and hardware. These services rely on the Platform Abstraction Layer (PAL) that allows the Container to be completely independent from the hosting machine and the operating system and the whole framework to be portable over different platforms

D.   FOUNDATION SERVICES

It represents the core of the Aneka middleware on top of which Container customization takes place. Foundation services constitute the pillars of the Aneka middleware and are mostly concerned with providing runtime support for execution services and applications. The core of Aneka addresses different issues:

- Directory and Membership;
- Resource reservation;
- Storage management;
- Licensing, accounting, and pricing;

D.1. Directory and Membership

It is responsible for setting up and maintaining the information about the nodes and the services constituting the Aneka Cloud. These services include Membership Catalogue, Heartbeat Service, and Discovery Service.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT 160
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

D.2. Resource Reservation

Resource reservation identifies the ability of reserving a set of nodes and using them for executing a specific application. The ability of reserving compute resources two different components has been implemented: Reservation Service and Allocation Manager.

D.3. Storage management

The availability of disk space, or more generally storage, is a fundamental feature for any distributed system implementation. Applications normally require files to perform their tasks, whether they are data files, configuration files, or simply executable files.

D.4. Licensing, Accounting, and Pricing

The Licensing Service provides the very basic resource controlling feature that protects the system from misuse. It restricts the number of resources that can be used for a certain deployment. The Accounting and Pricing Services, available in the next release of Aneka, are more directly related with billing the user for using the Cloud.

2.5. Execution Services

Execution services identify the set of services that are directly involved in the execution of distributed applications in the Aneka Cloud.

III. APPLICATION DEVELOPMENT

Aneka is a platform for developing applications that leverage Clouds for their execution. It then provides a runtime infrastructure for creating public and private Clouds and a set of abstractions and APIs through which developers can design and implement their applications. More specifically Aneka provides developers with a set of APIs for representing the Cloud application and controlling their execution, and a set of Programming Models that are used to define the logic of the distributed application itself. These components are part of the Aneka Software Development Kit.

A. THE ANEKA SDK

The Aneka Software Development Kit contains the base class libraries that allow developers to program applications for Aneka Clouds. the SDK contains a collection of class libraries constituting the Aneka Application Model, and their specific implementations for the supported programming models. The Aneka Application Model defines the properties and the requirements for distributed applications that are hosted in Aneka Clouds. Differently from other middleware implementations Aneka does not support single task execution, but any unit of user code is executed within the context of a distributed application. An application in Aneka is constituted by a collection of execution units whose nature depends on the specific programming model used. An application is the unit of deployment in Aneka and configuration and security operates at application level. Execution units constitute the logic of the applications. The way in which units are scheduled and executed is specific to the programming model they belong to. By using this generic model, the framework provides a set of services that work across all programming model supported: storage, persistence, file management, monitoring, accounting, and security.

B. PROGRAMMING MODELS

A programming model represents a way for expressing a distributed application within Aneka. It defines the abstractions used by the user to model their application and the execution logic of these applications as a whole in the Aneka Cloud. Every application that is executed in the Aneka Cloud is expressed in terms of a specific programming model. The current release of Aneka includes three different programming models ready to use for developing applications. These are: Task Programming Model, Thread Programming Model, and Map Reduce Programming Model.

B.1. TASK PROGRAMMING MODEL

The Task Programming Model provides developers with the ability of expressing bag of tasks applications. By using the Task Model the user can create a distributed application and submit a collection of tasks to Aneka. The submission can be either static or dynamic. The scheduling and execution services will manage the execution of these tasks according to the available resources in the Aneka network. Developers can use predefined tasks that cover the basic functionalities available from the OS shell or define new tasks by programming their logic. With tasks being independent from each other, this programming model does not enforce any execution order or sequencing but these operations have to be completely managed by the developer on the client application if needed. The task programming model is the most straightforward programming model available with Aneka and can be used as a base on top of which other models can be implemented. For example the parameter sweeping APIs used by the Design Explorer rely on the Task Model APIs to create and submit the tasks that are generated for each of the combinations of parameters that need to be explored. More complex models such as workflows can take advantage of this simple and thin implementation for distributing the execution of tasks.

B.2. THREAD PROGRAMMING MODEL

The Thread Programming Model allows quickly porting multi-threaded applications into a distributed environment. Developers familiar with threading API exposed by the .NET framework or Java can easily take advantage of the set of compute resources available with Aneka in order to improve the performance of their applications. The Thread Model provides as fundamental component for building distributed applications the concept of distributed thread. A distributed thread exposes the same APIs of a thread in the .NET framework but is executed remotely. Developers familiar with the multi-threaded applications can create, start, join, and stop threads in the same way in which these operations are performed on local threads. Aneka will take care of distributing and coordinating the execution of these threads.

B.3. MAP REDUCE PROGRAMMING MODEL

The Map Reduce Programming Model is an implementation of Map Reduce as proposed by Google, for .NET and integrated with Aneka. Map Reduce is originated by two functions from the functional language: map and reduce. The map function processes a key/value pair to generate a set of intermediate key/value pairs, and the reduce function merges all intermediate values associated with the same intermediate key. This model is particular useful for data intensive applications. The Map Reduce Programming Model provides a set of client APIs that allow developers to specify their map and reduce functions, to locate the input data, and whether to collect the results if required. Map Reduce is good example for the flexibility of the architecture of Aneka in supporting different programming abstractions supported by the infrastructure.

IV. CLOUD MAINTENANCE AND MONITORING

Aneka provides a platform on top of which it is possible to develop applications for the Cloud. The Software Development Kit addresses all the needs from a development point of view but it is just a part of the feature set required by a Cloud Computing platform. Essential in this case is the support for monitoring, managing, maintaining, and setting up computing clouds. These operations are exposed by the management API and the Platform Abstraction Layer on top of which all the management tools and interfaces have been designed. Of a particular interest are the Management Studio and the web management interfaces. The Management Studio is an important tool for system administrators. It is a comprehensive environment that allows them to manage every aspect of Aneka Clouds from an easy to use graphical user interface. Since Clouds are constituted of hundreds and even thousands of machines both physical and virtual, it is not possible to reach and setup each single machine by hand. Having a tool that allows remote and global management is then a basic requirement. Briefly, the set of operations that can be performed through the Management Studio are the: -Quick setup of computing clouds;-Remote installation and configuration of nodes;-Remote control of containers; -System load monitoring and tuning. Besides the remote control features, which dramatically simplify the management of the Cloud, it is important to notice the support for viewing the aggregate dynamic statistics of Aneka Clouds. This helps administrators to tune the overall performance of the Cloud. It is also possible to probe each single node and collect the single performance statistics: the CPU and memory load information is collected from each container and by inspecting the container configuration it is possible to identify bottlenecks in the Cloud. As the entire framework, the Management Studio has been designed to be extensible: it is possible to add new features and new services by implementing management plug ins that are loaded into the environment and get access to the Cloud.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   161

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in

V. CONCLUSIONS AND FUTURE DIRECTIONS

Aneka is an implementation of the Platform as a Service approach, which focuses on providing a set of APIs that can be used to design and implement applications for the Cloud. The framework is based on an extensible and service oriented architecture that simplifies the deployment of clouds and their maintenance and provides a customizable environment that supports different design patterns for distributed applications. Aneka Container which is the minimum unit of deployment for Aneka Clouds and also the runtime environment for distributed applications. The container hosts a collection of services that perform all the operations required to create an execution environment for applications. A programming model is a specific way of expressing the execution logic of distributed applications. It provides some familiar abstractions that developers can use to define the execution flow of applications and its component. The development team is now working on providing full support for the elastic scaling of Aneka Clouds by relying on virtualized resources

VI. REFERENCES

1. C. Jin, R. Buyya, MapReduce programming model for .NET-based distributed computing, Proc. 15th European Conference on Parallel Processing (Euro-Par 2009), (2009)
2. J.S. Miller, S. Ragsdale, The Common Language Infrastructure Annotated Standard, Addison Wesley, 2004.
3. L. Vaquero, L. Rodero-Marino, J. Caceres, M. Lindner, A break in the clouds: towards a cloud definition, SIGCOMM Computer Communication Review, 39 (2009) 137–150.
4. R. Buyya, S. Venugopal, The Grid bus Toolkit for service oriented grid and Utility Computing: An overview and status report, Proc. of the First IEEE International Workshop on Grid Economics and Business Models (GECON 2004), (2004), 19–36.

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   162
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

REQUEST FOR FEEDBACK

Dear Readers

At the very outset, International Journal of Research in Computer Application and Management (IJRCM) acknowledges & appreciates your efforts in showing interest in our present issue under your kind perusal.

I would like to request you to supply your critical comments and suggestions about the material published in this issue as well as on the journal as a whole, on our E-mail **infoijrcm@gmail.com** for further improvements in the interest of research.

If you have any queries please feel free to contact us on our E-mail **infoijrcm@gmail.com**.

I am sure that your feedback and deliberations would make future issues better – a result of our joint effort.

Looking forward an appropriate consideration.

With sincere regards

Thanking you profoundly

Academically yours

Sd/-

Co-ordinator

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   163
A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories
www.ijrcm.org.in

ABOUT THE JOURNAL

In this age of Commerce, Economics, Computer, I.T. & Management and cut throat competition, a group of intellectuals felt the need to have some platform, where young and budding managers and academicians could express their views and discuss the problems among their peers. This journal was conceived with this noble intention in view. This journal has been introduced to give an opportunity for expressing refined and innovative ideas in this field. It is our humble endeavour to provide a springboard to the upcoming specialists and give a chance to know about the latest in the sphere of research and knowledge. We have taken a small step and we hope that with the active co-operation of like-minded scholars, we shall be able to serve the society with our humble efforts.

Our Other Journals

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   II

A Monthly Double-Blind Peer Reviewed (Refereed/Juried) Open Access International e-Journal - Included in the International Serial Directories

www.ijrcm.org.in