INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT

IJRCM

IJRCM

CONTENTS

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

http://ijrcm.org.in/

CALL FOR MANUSCRIPTS

We invite unpublished novel, original, empirical and high quality research work pertaining to recent developments & practices in the areas of Computer Science & Applications; Commerce; Business; Finance; Marketing; Human Resource Management; General Management; Banking; Economics; Tourism Administration & Management; Education; Law; Library & Information Science; Defence & Strategic Studies; Electronic Science; Corporate Governance; Industrial Relations; and emerging paradigms in allied subjects like Accounting; 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; Rural Economics; Co-operation; Demography: Development Planning; Development Studies; Applied Economics; Development Economics; Business Economics; Monetary Policy; Public Policy Economics; Real Estate; Regional Economics; Political Science; Continuing Education; Labour Welfare; Philosophy; Psychology; Sociology; Tax Accounting; Advertising & Promotion Management; Management Information Systems (MIS); Business Law; Public Responsibility & Ethics; Communication; Direct Marketing; E-Commerce; Global Business; Health Care Administration; Labour 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; International Relations; Human Rights & Duties; Public Administration; Population Studies; Purchasing/Materials Management; Retailing; Sales/Selling; Services; Small Business Entrepreneurship; Strategic Management Policy; Technology/Innovation; Tourism & Hospitality; Transportation Distribution; Algorithms; Artificial Intelligence; Compilers & Translation; Computer Aided Design (CAD); Computer Aided Manufacturing; Computer Graphics; Computer Organization & Architecture; Database Structures & Systems; Discrete Structures; Internet; Management Information Systems; Modeling & Simulation; Neural Systems/Neural Networks; Numerical Analysis/Scientific Computing; Object Oriented Programming; Operating Systems; Programming Languages; Robotics; Symbolic & Formal Logic; Web Design and emerging paradigms in allied subjects.

Anybody can submit the **soft copy** of unpublished novel; original; empirical and high quality **research work**/manuscript *anytime* in *M.S. Word format* after preparing the same as per our **GUIDELINES FOR SUBMISSION**; at our email address i.e. infoijrcm@gmail.com or online by clicking the link **online submission** as given on our website (*FOR ONLINE SUBMISSION, CLICK HERE*).

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 mentionthe 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.

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.

PLEASE USE THE FOLLOWING FOR STYLE AND PUNCTUATION IN REFERENCES:

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, Kurukshetra University, 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

INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION & MANAGEMENT   vi

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

http://ijrcm.org.in/

A ROBUST AUDIO STEGANOGRAPHY FOR HIDING ENCRYPTED DATA

R.VALARMATHI.
RESEARCH SCHOLAR
BHARATHIAR UNIVERSITY
COIMBATORE

DR. G.M.KADHAR NAWAZ
DIRECTOR& PROFESSOR
DEPARTMENT OF MCA
SONA COLLEGE OF TECHNOLOGY
SALEM

ABSTRACT

In the current information age, secure data transfer is limited due to its attack made on data communication. So more robust methods are chosen so that they ensure secured data transfer. One of the solutions which came to the rescue is the audio steganography. But existing audio steganographic systems have poor interface, very level implementation, difficult to understand and valid only for certain audio formats with restricted message size. This is one proposed system which is based on audio steganography and cryptography, ensures secure data transfer between the source and destination. This uses most powerful encryption algorithm in the first level of security, which is very complex to break. In the second level it uses a more powerful modified LSB(Least Significant Bit) algorithm to encode the message into audio. It performs bit level manipulation to encode the message. The basic idea behind this paper is to provide a good, efficient method for hiding the data from hackers and sent to the destination in a safe manner.

KEYWORDS
Steganography, LSB, Security, Cryptography.

1. INTRODUCTION

ecurity of information is one of the most important factors of information technology and communication. Security of information often lies in the secrecy of its existence and/or the secrecy of how to decode it. Cryptography techniques often use the worst approach assuming that only one of these two conditions holds. It was created as a technique for securing the secrecy of communication. Various methods have been developed to encrypt and decrypt data in order to keep the message secret[2]. Unfortunately, it is not enough to keep the content of the information/message secret, it may also be necessary to keep the existence of the information secret. The technique used to implement this, is called steganography. Steganography is the science and art of hiding information in another. The definition according to Neil Johnson "Steganography is the art of hiding information in a way that prevent the detection of hidden message". It is a useful tool that allows covert communication amongst acknowledged parties[3]. The word steganography is derived from the Greek words "stegos" meaning cover/hidden/roof and "grafia" meaning writing defining it as "covered writing" and essentially means "to hide in plain sight". In Audio steganography the information is hidden exclusively in Audio files. Hiding messages by masking their existence is nothing new. Before the digital era, simple steganography techniques have been in use for hundreds of years. However, with the emergence of networks and digital technologies and increasing use of communication and files in electronic format, new techniques for information hiding have become possible[4]. Steganography relies on hiding covert message in unsuspected text, protocols, images, and multimedia (audio/video) data which is generally used in secret communication between acknowledged parties. Steganography is a method of encryption that hides data among the bits of a cover file, such as a graphic or an audio file. The technique replaces bits with the secret data[5].

2. LITERATURE REVIEW
This section presents some common methods used in audio steganography[7].
* LSB coding
* Parity coding
* Phase coding
* Spread spectrum
* Echo hiding

LSB CODING
Least significant bit (LSB) coding is the simplest way to embed information in a digital audio file. By substituting the least significant bit of each sampling point with a binary message, LSB coding allows for a large amount of data to be encoded.
In LSB coding, the ideal data transmission rate is 1 kbps per 1 kHZ. In some implementations of LSB coding, however, the two least significant bits of a sample are replaced with two message bits. This increases the amount of data that can be encoded but also increases the amount of resulting noise in the audio file as well. Thus, one should consider the signal content before deciding on the LSB operation to use.

FIG 2.1: LSB CODING
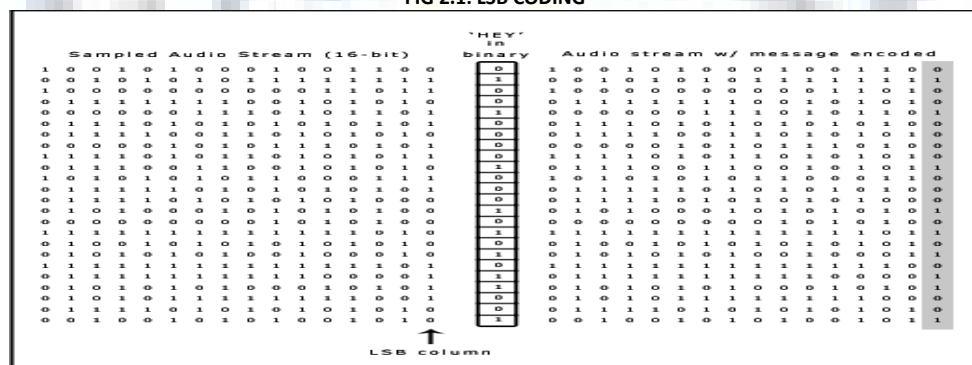
To extract a secret message from an LSB encoded sound file, the receiver needs access to the sequence of sample indices used in the embedding process. Normally, the length of the secret message to be encoded is smaller than the total number of samples in a sound file. One must decide then on how to choose the subset of samples that will contain the secret message and communicate that decision to the receiver. One trivial technique is to start at the beginning of the sound file and perform LSB coding until the message has been completely embedded, leaving the remaining samples unchanged.

A more sophisticated approach is to use a pseudorandom number generator to spread the message over the sound file in a random manner. One popular approach is to use the random interval method, in which a secret key possessed by the sender is used as a seed in a pseudorandom number generator to create a random sequence of sample indices. The receiver also has access to the secret key and knowledge of the pseudorandom number generator, allowing the random sequence of sample indices to be reconstructed. Checks must be put in place, however, to prevent the pseudorandom number generator from generating the same sample index twice. If this happened, a collision would occur where a sample already modified with part of the message is modified again. The problem of collisions can be overcome by keeping track of all the samples that have already been used. Another approach is to calculate the subset of samples via a pseudorandom permutation of the entire set through the use of a secure hash function. This technique insures that the same index is never generated more than once[7].

PARITY CODING

Instead of breaking a signal down into individual samples, the parity coding method breaks a signal down into separate regions of samples and encodes each bit from the secret message in a sample region's parity bit. If the parity bit of a selected region does not match the secret bit to be encoded, the process flips the LSB of one of the samples in the region. Thus, the sender has more of a choice in encoding the secret bit, and the signal can be changed in a more unobtrusive fashion.

The decoding process extracts the secret message by calculating and lining up the parity bits of the regions used in the encoding process. Once again, the sender and receiver can use a shared secret key as a seed in a pseudorandom number generator to produce the same set of sample regions[7].

PHASE CODING

Phase coding addresses the disadvantages of the noise-inducing methods of audio steganography. Phase coding relies on the fact that the phase components of sound are not as perceptible to the human ear as noise is. Rather than introducing perturbations, the technique encodes the message bits as phase shifts in the phase spectrum of a digital signal, achieving an inaudible encoding in terms of signal-to-perceived noise ratio.

FIG. 2.2: PHASE CODING
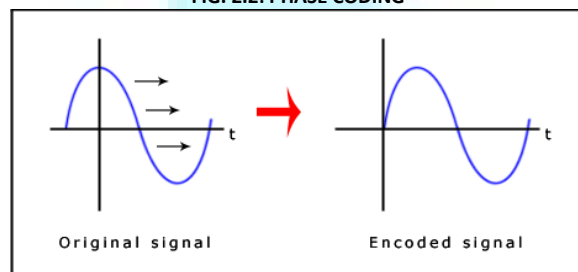
Phase coding is explained in the following procedure:
1. The original sound signal is broken up into smaller segments whose lengths equal the size of the message to be encoded.
2. A Discrete Fourier Transform (DFT) is applied to each segment to create a matrix of the phases and Fourier transform magnitudes.
3. Phase differences between adjacent segments are calculated.
4. Phase shifts between consecutive segments are easily detected. In other words, the absolute phases of the segments can be changed but the relative phase differences between adjacent segments must be preserved. Therefore the secret message is only inserted in the phase vector of the first signal segment as follows:
5. A new phase matrix is created using the new phase of the first segment and the original phase differences.
6. Using the new phase matrix and original magnitude matrix, the sound signal is reconstructed by applying the inverse DFT and then concatenating the sound segments back together.

To extract the secret message from the sound file, the receiver must know the segment length. The receiver can then use the DFT to get the phases and extract the information[7].

SPREAD SPECTRUM

In the context of audio steganography, the basic spread spectrum (SS) method attempts to spread secret information across the audio signal's frequency spectrum as much as possible. This is analogous to a system using an implementation of the LSB coding that randomly spreads the message bits over the entire sound file. However, unlike LSB coding, the SS method spreads the secret message over the sound file's frequency spectrum, using a code that is independent of the actual signal. As a result, the final signal occupies a bandwidth in excess of what is actually required for transmission.

Two versions of SS can be used in audio steganography: the **direct-sequence** and **frequency-hopping schemes**. In direct-sequence SS, the secret message is spread out by a constant called the chip rate and then modulated with a pseudorandom signal. It is then interleaved with the cover-signal. In frequency-hopping SS, the audio file's frequency spectrum is altered so that it hops rapidly between frequencies[7].

ECHO HIDING

In echo hiding, information is embedded in a sound file by introducing an echo into the discrete signal. Like the spread spectrum method, it too provides advantages in that it allows for a high data transmission rate and provides superior robustness when compared to the noise inducing methods.

To hide the data successfully, three parameters of the echo are valid: amplitude, decay rate, and offset (delay time) from the original signal. All three parameters are set below the human hearing threshold so the echo is not easily resolved. In addition, offset is varied to represent the binary message to be encoded. One offset value represents a binary one, and a second offset value represents a binary zero.

If only one echo was produced rom the original signal, only one bit of information could be encoded. Therefore, the original signal is broken down into blocks before the encoding process begins. Once the encoding process is completed, the blocks are concatenated back together to create the final signal[7].

3. IMPORTANCE OF AUDIO STEGANOGRAPHY

In a computer-based audio steganography system, secret messages are embedded in digital sound. The secret message is embedded by slightly altering the binary sequence of a sound file. Existing audio steganography software can embed messages in WAV, AU, and even MP3 sound files[6].

Embedding secret messages in digital sound is usually a more difficult process than embedding messages in other media, such as digital images. In order to conceal secret messages successfully, a variety of methods for embedding information in digital audio have been introduced. These methods range from rather simple algorithms that insert information in the form of signal noise to more powerful methods that exploit sophisticated signal processing techniques to hide information[7].

4. PROPOSED SYSTEM

In the Audio Steganography with cryptography, the process of embedding secret message using Symmetric-Key algorithm[8], DES into the Audio file. The following gives the complete working of the Audio Steganogrpahy. This system contains Sender Side and Receiver Side. Both are connected with Trustcenter.

Both sides the user has to register their name. The system will generate secret key for the user. Using the login name both the users have to enter into their area. The system will generate Quantum Key. Both Sender and Receiver have to use the same quantum key to connect with each other through Trustcenter.

In the sender side, the text which has to be embedded into an audio file is encrypted using Symmetric Key cryptographic algorithm, DES. The cipher text obtained is then embedded using Steganographic algorithm. The resultant audio file contains the secrete message embedded into it. In the receiver side, the embedded audio file is selected to extract the secret message. The secret message is decrypted using DES decryption method.

5. ALGORITHMS AND RESULTS

I. SENDER SIDE ALGORITHM:

Step 1: Select the Text for encoding into Audio File.

Step 2: Encrypt the text using DES Algorithm.

Step 3: Select the Audio file for Encoding.

Step 4: Encode encrypted text into Audio File using modified LSB algorithm.

II. RECEIVER SIDE ALGORITHM

Step 1: Select the Encoded Audio file.

Step 2: Decode the text from Audio File using modified LSB algorithm.

Step 3: Decrypt the text using DES Algorithm.

Step 4: Display the secret text/message to the end user.

FOLLOWING FIGURES GIVES THE RESULTS OF THE ABOVE ALGORITHMS

FIG. 5.1   SENDER MAIN

FIG. 5.2. RECEIVER MAIN

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
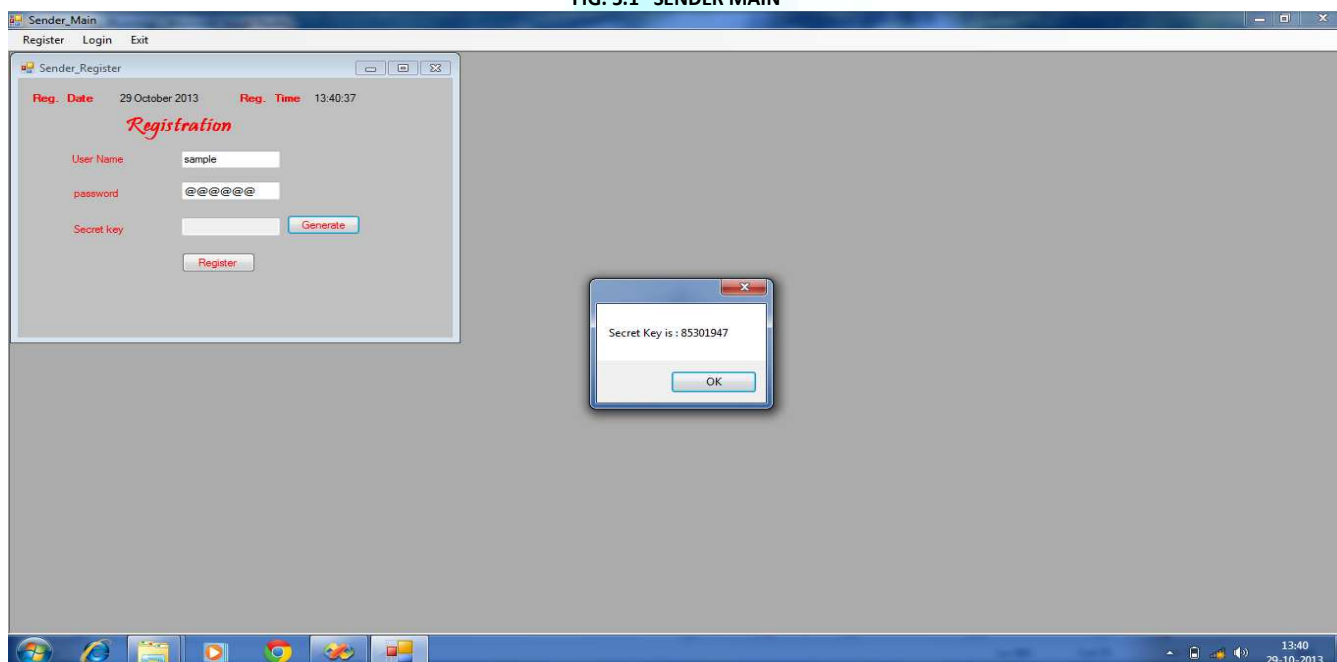
http://ijrcm.org.in/
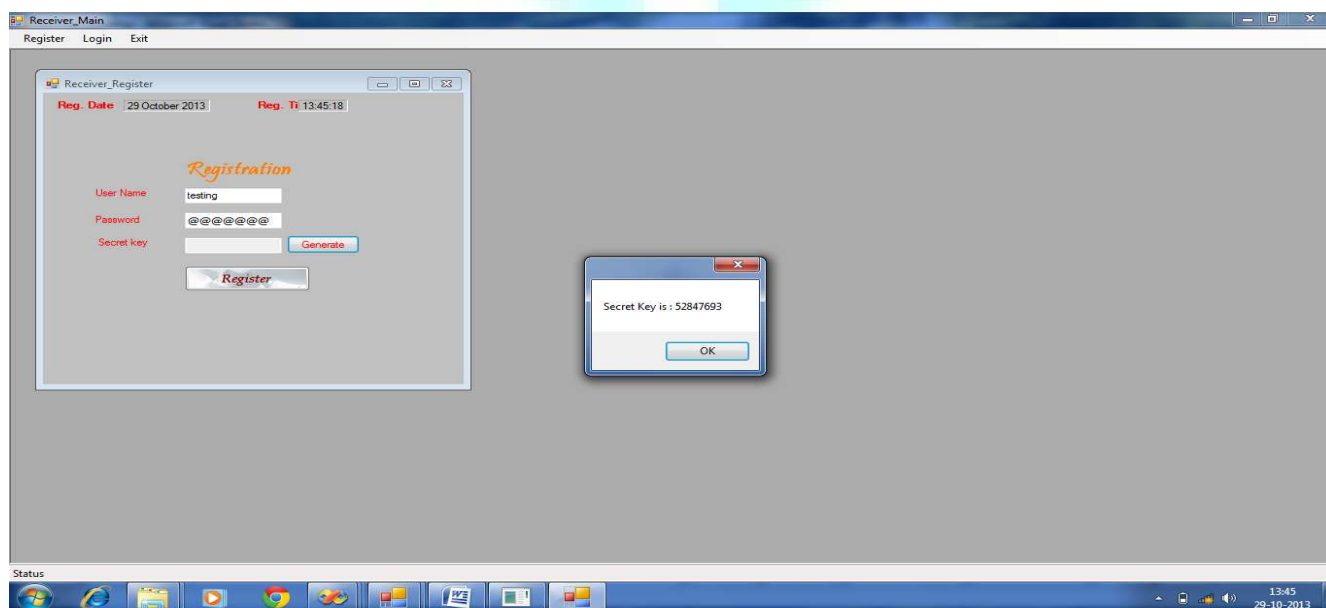
FIG.5.3 SENDER, RECEIVER AND TRUST CENTER
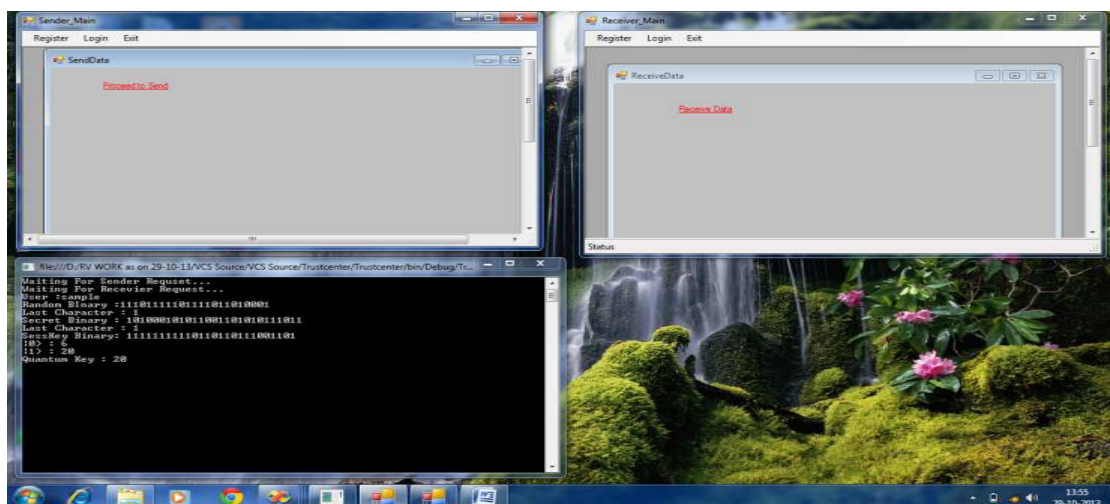
FIG.5.4: SENDING ENCODED FILE TO RECEIVER

FIG.5.5: RECEIVER DECODE/DECRYPT THE TEXT
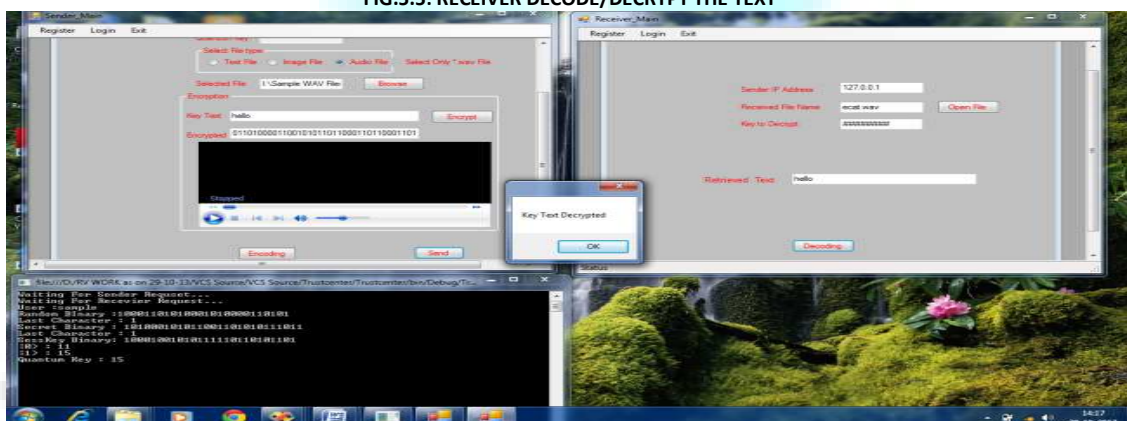
6. CONCLUSION

Audio Steganography with cryptography is to provide a good, efficient method for hiding the data from hackers and sent to the destination in a safe manner. This proposed system will not change the size of the file even after encoding. Encryption and Decryption techniques have been used to make the security system robust.

7. ACKNOWLEDGEMENT

REFERENCES

1.   R Sridevi, Dr. A Damodaram, Dr. Svl.Narasimham, "Efficient Method Of Audio Steganography By Modified LSB Algorithm And Strong Encryption Key With Enhanced", Journal of Theoretical and Applied Information Technology.
2.   Deepak Singla, Rupali Syal /International Journal Of Computational Engineering Research/ ISSN: 2250–3005.Data Security Using LSB & DCT Steganography In Images -Deepak Singla1, Rupali Syal2
3.   An Overview of Steganography for the Computer Forensics Examiner -Gary Kessler Associates,Burlington, Vermont ,February 2004 (updated June 2011)

4. International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-1, Issue-4, September 2011
   Optimum segment length for embedding in the LSB of JPEG images with Minimum MSE,Hamdy A. Morsy, Zaki B. Nossair, Alaa M. Hamdy, Fathy Z. Amer.
5. Secret Communication through Audio,Video and Image for Defence Application, Jun 26,2013.
6. Steganography| ClubHACK Magazine, Mar 8,2010.
7. Methods of Audio Steganography, Internet publication on www.Snotmonkey.com.
8. Padmashree G, Venugopala P S-Audio Stegnography and Cryptography: Using LSB algorithm at 4th and 5th LSB layers.

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

http://ijrcm.org.in/

EXAMINING FACTORS OF CUSTOMER EXPERIENCE AND THEIR MEDIATING ROLE IN RETAIL BANKING SECTOR: AN EMPIRICAL STUDY

MEENAKSHI CHANDOK
ASST. PROFESSOR
DEPARTMENT OF M.B.A.
UTTARANCHAL UNIVERSITY
ARCADIA GRANT

N. L. GUPTA
PRINCIPAL (RETD.)
D. A. V. (PG) COLLEGE
DEHRADUN

ABSTRACT

Banking occupies one of the most important positions in the modern economic world. The retail banking sector is undergoing sweeping changes due to heightened competition and the initiation of modern technology. This study was conducted within the evolving retail banking industry and investigated customer experience as a possible strategic differentiator in this industry. The paper identifies the critical success factors of Customer Experience which have been identified from the literature survey and through expert's opinion and to find their priorities for success in banking organizations. This, in turn, would help in the enhancement of the relationship between the retail banks and their customers, and thus aid the decision makers of the banks to identify the major factors that determine the satisfaction of their customers. Data from 400 survey respondents(100 each from four banks two public and two private sector banks) were collected from tone branches of Garhwal region of Uttarakhand. The findings suggest that the managers in banking organizations must ameliorate these critical factors according to their weights, in order to attain favourable Customer Experience, sustainable Customer Satisfaction and Customer delight.

KEYWORDS

retail banking, customer experience, customer satisfaction, customer motivation, public sector banks, private sector banks.

INTRODUCTION

The banking industry, as is the case with other financial services industries, is facing a rapidly changing market, new technologies, economic uncertainties, fierce competition, and more demanding customers; and the changing environment has presented an unprecedented set of challenges. In India too, the cross border flows and entry of new players and products have forced banks to adjust the product-mix and undertake rapid changes in their processes and operations to remain competitive. Over the years, Indian banks have expanded to cover large geographic and functional area to meet the developmental needs of their customers. They have been managing a world of information about customers – their profiles, location, etc. They have a close relationship with their customers and a good knowledge of their needs, requirements and cash positions. Though this offers them a unique advantage, they also face a fundamental problem. During the period of planned economic development,it was the consumers that reached out to the banks for their needs, i.e. the bank products were bought and not sold. What our banks, especially those in the public sector, lack is the marketing attitude. What is needed is the effort on their part to improve their service image and exploit their large customer information base effectively to communicate product and/or service availability.

Now-a-days. the banking organizations are focusing more on the interaction with their customers. They are trying to provide superior services and endeavouring to satisfy their customers, but to sustain their competitiveness, the banking organizations have to rigorously work on the 'touch points' of the customers (Berry and Carbonc. 2007). These 'touch points' are, the experiences of the customers which arc generated when any type of interaction occurs between the customer and the organization (Gentile *et al.*. 2007: Ravizza. 1977). According to Shaw (2005), "The customer experience is a combination of everything you do. or fail to do for that matter, that underpins any interaction with a customer or potential customer".

Now-a-days. customer experience has become the next battleground for the bar organizations. After commodities, goods and services; experiences act as fourth econ offering for the organizations (Pine and Gilmorc. 1999). In India, there arc many different types of banks and a fierce competition exists among them. So. to compete in the present competitve scenario these banks have to thoroughly work on the experiences of their customer? maintain and sustain the position in the banking industry, delivering positive and enhancing level of customer experience has become the major imperative issue for competitiveness.

REVIEW OF LITERATURE

In 21" century, the service industries are booming worldwide (Hsich *et al.*. 2008). These industries arc basically customer-driven and their growth and survival highly depends upon the services delivered by them (Khan and Mahapatra. 2009). In India, banking is one of the most important and vibrant service sectors. It acts as a core clement for the financial system of the country and plays a vital role in the development of the country's economy (Tripathy. 2011). However, intensifying competition, changing investment environment, altering investor preferences, uprising technology and upcoming new opportunities have compelled the banking institutions to restructure themselves and take up to new practices (Srivastava and Thakur. 2006

They are trying to provide superior services and endeavoring to satisfy their customers, but to sustain their competitiveness, the banking organizations have to rigorously work on the 'touch points' of the customers (Berry and Carbonc. 2007). These 'touch points' are, the experiences of the customers which arc generated when any type of interaction occurs between the customer and the organization (Gentile *et al.*. 2007: Ravizza. 1977). According to Shaw (2005), "The customer experience is a combination of everything you do. or fail to do for that matter, that underpins any interaction with a customer or potential customer".

There is a need to identify the specific dimensions of customer experience. There is a need to focus on the interaction between the factors of customer experience. There is a need to weigh the importance of each factor with respect to customer experience. Walter *et al,* (2010) ,There is a need to investigate the effect of both online and offline factors on customer experience.Yi and Gong, To identify the moderating role (2009) of customer experience in customer social exchange relationships with customer satisfaction.

RETAIL BANKING AND CUSTOMER EXPERIENCE

The first and the foremost challenge for retail banking business is customer retention, to increase the profitability and market share, banks have to pay proper attention in retain their customers. According to the *Mid-term review of at policy. (2004-05)* of Reserve bank of India, though consumer credit segments witness growth in future it is a temporary measure and contains high risk. In case of consumer < comprising credit cards and personal loans, the risk weight has increased from 100 percent to 125 percent. Third challenge which arises in front of retail banks is their high dependency on Information Technology (IT) departments

As mentioned above, the first and the foremost challenge the Indian retail banking sector is facing is, the retention of the customer. According to Gerpott *el al..* (2001). "the phenomenon of customer retention encompasses a degree of fuzziness' since it represents a theoretical construct which cannot be observed directly". It is linked with customer satisfaction and customer loyalty (Homburg and Bruhn. 1998). where customer loyalty is determined by customer satisfaction and acts as a determinant of customer retention (Gerpott *ei al..* 2001). Though each of these three constructs i.e. customer satisfaction, customer loyalty and customer retention is affected by variety of other factors, but in the existing body of literature customer experience has shown a significant effect on customer satisfaction and loyalty as depicted in Table 2.9. According to Meyer and Schwager. (2007), customer satisfaction is the resultant of the good minus the bad experiences the customer avails from any organization. So. if any customer possesses positive experiences from an organization, he/she will be highly satisfied with the products/services delivered by that organization. This in turn makes him/her loyal towards that organization and he/she will remain with that organization on a long lasting basis. This reveals that customer retention is highly associated with customer experience.

The well-known expression of Drucker, (1992) is, "If you can measure it you can manage it".

In 1990s, due to intense competition it was not easy for the companies to survive by exclusively working on the products and services. Therefore, to maintain the competitive edges of the commodity business, companies had to deliberately make efforts for enhancing the total customer experience (Carbone, 1998). At that time, one of the significant concepts regarding customer experience was presented by Pine and Gilmore, (1998; 1999) in the form of 'Experience Economy'. Pine and Gilmore, (1998) characterize experience with two dimensions. First customer participation (based on the gamut of active and passive participation of the customer and second is environmental relationship or connection (based on the spectrum of immersing absorption into an activity). In the range of two dimensions, the experience gets sorted into categories or realms. First is ***entertainment experience;*** in this the customers passively the activity without getting immersed into it (listening to music, watching the T.V.). Second is ***educational experience,*** that engages the minds of the customers, as they actively parth the activity but stay outside for example attending cookery class or taking son-demonstrations. Third dimension is ***esthetic experience;*** in this type of experience, ***cx*** interpret the physical surroundings around them.

OBJECTIVES OF THE STUDY AND RESEARCH METHODOLOGY

Banking system is the backbone of economy. The working of customer's mind is a mystery which is difficult to solve and understanding customer experience is a challenging task. It is seen that customer experience with the product or services leads to his satisfaction or dissatisfaction. With this in mind, Present Research work has been taken up with the objectives to identify the attributes of customer experience & customer satisfaction of retail banking services and analyze the impact of customer experiences on customer satisfaction derived from retail bank services. It was hypothesized that there is no significant relationship between Customer Experience and Customer satisfaction.

To achieve the above state objectives, both Exploratory and Descriptive type of research has been carried out. Two banks of public sector and two from private sector namely , SBI, PNB, HDFC and ICICI were chosen for the proposed study. A well designed questionnaire was administered amongst the customers of these banks located in Garhwal region of Uttarakhand. Of all the four banks under sample and data obtained was processed and analyzed with the help of analytical & statistical tools, besides, the secondary information was collected from most reliable sources which include- Economics survey, RBI Bulletin, IBA Bulletin, www. Rbi.org.in.

To measure the customer experience and their satisfaction, primary data of 400 respondents (100 from each bank) from conveniently selected respondents of these four banks located in garhwal region has been taken.

The quantitative data used to extract the dimensionality of customer experience were collected by means of a structured questionnaire. The paper-based questionnaire contained three parts. The first part, concerned the bank related information from customers and frequency of using different bank automated services. Part 2 included product-class related experiences of the respondents mainly consisting of 50 items on customer experience followed by 3 items on customer satisfaction, which were identified through a comprehensive literature review of customer experience, customer satisfaction, automated service quality, customer trust,customer delight, and customer commitment. Part 3 comprised of demographic data related to customers' gender, education, age, The study's main items were measured using a five-point Likert scale, ranging from 5 – strongly agree to 1 – strongly disagree. The above mentioned items have already been tested and validated .The data collected from the field experiments spanned 9 weeks .Before the actual field experiments, a pilot study with four focus groups consisting 10 respondents each was carried out among the customers of the bank. The purpose of this phase was to uncover the perceptions of consumers towards retail banking. The scale was kept simple to make the selection process easier for the respondents.after collection of data, it as edited, tabulated and processed. Data analysis tools like factor analysis , descriptive statistics, correlation, t-test, ANOVA has been used to analyse the data.

DISCUSSION

Among others, the questionnaire included a segment on customers' profile. This was done because an assortment of demographic and other factors were likely to influence the degree of customer experience on the products and services offered by the bank. Information on demographic features is also useful in formulating the bank's marketing strategy. The demographic profile of the respondents is presented in Table 1.

TABLE 1: DEMOGRAPHIC PROFILE OF THE RESPONDENTS

	Description	Frequency	Percent
		400	**100**
Gender	Male	256	64
	Female	144	36
Marital status	Married	235	58.75
	Unmarried	165	41.25
Age wise classification	Less than 20	16	4
	21-35	170	43
	36-50	131	33
	51-65	46	12
	Above 65	37	9
Educational Qualification	High school & below	3	1
	Diploma	23	6
	Bachelor Degree	119	30
	Master Degree	202	51
	Professional Degree	53	13
Income	Less than 10,000	27	6.8
	10,001-30,000	103	25.8
	30,001-50,000	134	33.5
	50,001 & above	90	22.5
	None	46	11.5

Demographic characteristics of the respondents presented in the above ttable indicates that in the sample 64% were males and 36% females , 59% were married and 41% were unmarried. It is seen that 4% are less than 20 years of age, 43 % are in the age group of 21-35, 33% are in the age group of 36-50, 12 % are of the age group of 51-65 and 9% of the respondents are above 65 years of age, Furthermore, sample is the representation of qualified respondents as out

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

http://ijrcm.org.in/

of the total respondents only 1% are high school and below, 6% are only diploma holders, 30% are graduates and max that is 51% out of total respondents are post graduates and 13% have a professional degree as well which implies that there is high literacy level among the respondents. With regard to employment status6.8% have a monthly income less than 10,000 , 25.8% have income between 10,000-30,000, majority that is 33.5% earn monthly between 30,000-50,000 , 22.5% of them have income above 50,000 while 11.5% 0f the respondents do not earn(may be students or retired persons).

TABLE 2: RESULTS OF THE FACTOR ANALYSIS

Factors and items	Eigen Value	Factor loadings	% of Variance	Cumulative %
RESULTS OF FACTOR ANALYSIS OF 50 ITEMS OF CUSTOMER EXPERIENCE AND ITS 12 ATTRIBUTES				
Conveniance	16.4148		32.8295	32.8295
The location of the bank is at convenient place		0.682		
The operating hours of bank are convenient & sufficient		0.573		
The atm of bank is at convenient locations		0.546		
The statements and letters sent by bank are clear		0.461		
The bank provides you proper information		0.438		
Serviscape	2.62237		12.2447	45.0742
The cleanliness of bank is excellent		0.592		
The exterieror apperance of bank Is visiually appealing		0.629		
The physical layout of equipments and furnishing are comfortable		0.512		
The ambient conditions as temp,ventilation,noise and adour of bank are good		0.602		
The singns,symbols,advertisments,board,pamplets and other artifacts are properly placed		0.625		
Employee Willingness	2.30241		8.60481	53.67901
The employeesof bank are social and friendly		0.625		
The employeesof bank are capable enough to deliver you error free services		0.595		
The employeesof bank delivers prompt services		0.483		
The employeesof bank are willing to solve problem of customers		0.611		
The employeesof bank always help out customers		0.542		
Online functional Elements	2.15031		5.30061	58.97962
You can easily login /logout of bank website		0.557		
The links are problem free, accurate and pages download quickly		0.576		
The functioning of webpages is proper		0.546		
The website of bank posseses up to date and error free information		0.466		
Presence of Other Customers	1.98271		4.96543	63.94505
The presence of other customers in the bank irritates you		0.569		
The presence of other customers in the bank gives you social surrounding		0.621		
The number of customers affects the reputation of bank in your mind		0.602		
The recommendation made by other customers affects you.		0.498		
Online Hedonic Elements	1.91298		3.82595	67.7712
The presentation quality of bank website is high		0.521		
The design elements of bank website are innovative		0.634		
The information architecture of banks website is clear		0.657		
The language of banks website is easily understandable		0.642		
Customisation	1.74443		3.48885	71.25985

The bank offfers a range of credit facilities that meets your specific requirements		0.651		
The bank is capable to alter its products/ services to meet your needs		0.625		
The bank helps you at the time of financial emergencies		0.63		
Core service	1.50356		3.00713	74.26698
The bank is capable to handle complaints		0.658		
The transactions of account are proper and confidential		0.585		
The employess of bank gives you personlised attention		0.578		
The bank provides all types of services		0.636		
Value addition	1.37294		2.74589	77.01287
The bank offers some type of gift as incentives		0.528		
The additional services provided by the bank are valuable for you		0.514		
Your bank provides useful innovative services		0.656		
Speed	1.2925		2.58499	79.59786
You do'nt have to stand in ques for long time		0.553		
Bank gives prompt responses for your querries		0.645		
Bank delivers its promises on time		0.689		
Promotion	1.21797		2.43593	82.03379
The bank promotes its products/services effectively		0.652		
The promotions of the bank are attractive		0.573		
The bank offers its prouduct/services at competitive prices		0.548		
Online aesthetics	1.13332		2.26664	84.30043
The web pages of the bank donot freeze any information given by you		0.623		
The feel secure while transacting through banks website		0.566		
You try to avail self banking services offered by bank willingly		0.536		

The factors derived represent the different elements of customer experiences, which form the underlying factors from the original 50 scale response items given. Referring to the Table 2, Factor 1 having variance 32.8295% represents the elements of the convenient services provided by the bank and is therefore labeled as 'CONVENIENCE'. These elements are the convenient location of banks, convenient operating hours, ATMs at convenient locations, the clear statements sent and proper information provided by banks. Factor 2 with a variance of 5.24475% has all the statements related to the physical appearance of

bank as perceived by the customers and therefore has been termed as 'SERVISCAPE', an abbreviated term for bank personality. The elements were the cleanliness, exterior appearance ,physical layout , ambient conditions, and advertisement visuals, its clear cut objective is to attract its customers and build a brand(image) of the bank. The statements that load into factor 3, having variance 4.60481% all were concerned with the attitude and behavior of the bank employees and thus was abbreviated as 'EMPLOYEE WILLINGNESS'. The elements were the friendliness of employees, error free services provided, employees prompt services, willingness to solve problems ,empathy and helpullness. Factor 4 having variance 4.30061% consisted of the online functions provided by banks and has been named as 'ONLINE FUNCTIONAL ELEMENTS'. The elements factored were, the ease of login/logout, quick downloading of pages, functioning of web pages and updated websites. Factor 5 having variance equal to 3.96543% was a summation of the elements that are related to attitude of customers with other customers present in the bank and was termed 'PRESENCE OF OTHER CUSTOMERS. The elements were irritation on presence of other customers, a feeling of social surrounding, number of customers in building reputation, recommendations made by other customers. Factor 6 with a variance of 3.82595% consisted hedonic elements of website and was termed as "ONLINE HEDONIC ELEMENTS" comprising design of website, information architecture of website and understandable language of website. Factor 7 having variance 3.48885% was related to customized retail services and so abbreviated as "CUSTOMISATION". The elements were range of services to meet specific requirements, capability to alter services as customer needs and financial help by bank at time of emergencies. Factor 8 with a variance of 3.00713% was related to the core retail services provided and hence labeled as "CORESERVICE" consisting capability of banks to handle complaints, transactions proper and confidential, employees personal attention, all types of services provided by banks. Factor 9 having variance 2.74589% consisted of elements of value added services provided by retail banks, added valuable services, useful innovative services provided. Factor 10 with a variance equal to 2.58499% was related to timely and speedy attention hence labeled as "SPEED" contained elements waiting period in ques, prompt response to queries , promises made on time. Factor 11 variance equal to 2.58499% was related to promotional efforts made by bank so termed as "PROMOTION" having elements effective promotion of products/services, attractive promotional schemes, competitive prices .Factor 12 with a variance 2.26664% comprised of elements related to security of online services and termed as "ONLINE AESTHETICS". The elements being web pages do not freeze information, feeling of security while transacting online and willingly use of self banking services.

CONCLUSION

The findings of the research provide the practical inferences of the identified customer experience factors, which may be supportive in formulating the strategies essential for the growth of Indian banking sector. In the long run, these strategies could help the banking organizations to attain competitive advantage through customer loyalty, customer retention and positive word of mouth. It is anticipated that the present research work would be very fruitful for the academicians, practitioners, decision makers, managers and future researchers of this arena.

Regarding the limitations of the study it can be said that the recessionary trends being faced currently might have an influence on the satisfaction levels of the customers of retail banking in India. Secondly, responses have been solicited from customers of retail bank in a developing economy, i.e., India. The experiences of customers in a developing economy may show a discrepancy from those of a developed economy and consequently there is a possibility of cultural predisposition playing a role in the outcome of the study.

To sum up, a major contribution of this study is the provision of an approach for the management of the banks to identify the factors of customer experience and future intentions towards them. The approach has integrated constructs or items beyond the service quality to capture the sphere of influence of factors that drive customer satisfaction. Also, the study has endowed insights and implications for managers in retail banks thus enabling them to improve customer satisfaction and retention rates.

REFERENCES

1. Alda´s-Manzano, J., Lassala-Navarre, C., Ruiz-Mafe, C. and Sanz-Blas, S. (2009), "The role of consumer innovativeness and perceived risk in online banking usage",*International Journal of Bank Marketing,* Vol. 27 No. 1, pp. 53-75
2. Al-Eisa, A.S. and Alhemoud, A. M.(2009), "Using a multiple-attribute approach formeasuring customer satisfaction with retail banking services in Kuwait",*International Journal of Bank Marketing,* Vol. 27 No. 4, pp. 294-314.
3. Berry, L. L., Carbone, L. P. and Haeckel, S. H. (2002), "Managing the total customer experience", *MIT Sloan Management Review,* Vol. 43, No. 3, pp. 85-89.
4. Brakus, J.J., Schmitt, B. H. and Zarantonello, L. (2009), "Brand Experience: What Is It?How Is It Measured? Does It Affect Loyalty?" *Journal of Marketing,* Vol. 73,pp. 52-68.
5. Brauer, H. (2005), "Financial services customer loyalty", *Finance Week*, March:49
6. Bridges, E. and Florsheim, R. (2008), "Hedonic and utilitarian shopping goals: The online experience", *Journal of Business Research,* Vol.61, pp. 309–314.
7. Davies M.A.P. (1994), "Using the AHP in marketing decision-making", *Journal ofMarketing Management*, Vol. 10, pp. 57-73.
8. Dvir, D., Lipovetsky, S. Shenhar, A. and Tishler, A. (1998), "In search of project classification: a nonuniversal approach to project success factors, *Research Policy*,Vol. 27, pp. 915-935.
9. Gentile, C., Spiller, N. and, Noci, G. (2007), "How to Sustain the Customer Experience: An Overview of Experience Components that Co-create Value With the Customer", *European Management Journal* Vol. 25 No. 5, pp. 395–410.
10. Hackel, S. H., Carbone, L.P. and Berry, L.L. (2003), "How to lead the customer experience", *Marketing Management,* (Jan. /Feb.), Vol. 12 No.1, pp. 18-23.
11. Hsieh et al., 2008, "How to diminish the investment systematic risk?" , *African Journal of Business Management* Vol. 5(11), pp. 4561-4572
12. Johnston , R . (1999) Service transaction analysis: Assessing and improving the customer's experience . *Managing Service Quality* 9 (2) : 102 – 109 .
13. Johnston, Robert (1995) The Determinants of Service Quality: Satisfiers and Dissatisfiers. *International Journal of Service Industry Management* 6(5): 53–71.
14. Khan & Mahapatra, (2009), "Service quality evaluation in internet banking: an empirical study in India", *International Journal of Indian Culture and Business Management Volume 2, Number 1/2009*
15. Meyer, C. and Schwager, A. (2007), "Understanding customer experience", *Harvard Business Review*, Vol. 85 No. 2, pp. 116-126.
16. Nagasawa, S. (2008), "Customer experience management: Influencing on human Kansei to management of technology", *The TQM Journal,* Vol. 20 No. 4, pp. 312-323.
17. Parasuraman, A., Zeithaml, V.A Ramanathan, R. And Ganesh, L.S. (1994), "Group preference aggregation methods employed in AHP: An evaluation and an intrinsic process for deriving members' weightages", *European Journal of Operational Research*, Vol. 79, pp. 249–265.
18. Parasuraman, A., Zeithaml, V.A., Berry, L.L.: SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. Journal of Retailing 64, 12–40 (1988)
19. Pine, J. B., II & Gilmore, J. H. (1998), "Welcome to the experience economy", *Harvard Business Review*, Vol. 76 No.4, pp. 97–103.
20. Schmitt, B. (1999). *Experiential Marketing. How to Get Consumers to Sense, Feel, Think, Act, Relate*. Free Press, New York.
21. Shaw , C . and Ivens , J . (2005) *Building Great Customer Experiences* . New York: Macmillan .
22. Srivastava & Thakur (2006), "Performance Appraisal in Public Sector Banks, A Case of the State Bank of India" , Mangalmay *Journal of Management & Technology*, Volume 1, Issue 1.
23. Verhoef, P.C.; Lemon, K.N.; Parasuraman, A.; Roggeveen, A.; Tsiros, M.; Schlesinger, L.A. (2009), "Customer Experience Creation: Determinants, Dynamics and Management Strategies", *Journal of Retailing*, Vol.85, No.1 pp.31-41.
24. Walter, U., Edvardsson, B. and Ostrom, A. (2010), "Drivers of customers' service experiences: a study in the restaurant industry", *Managing Service Quality*, Vol. 20 No. 3, pp. 236-258.

DETERMINING APPROXIMATE FUNCTIONAL DEPENDENCIES USING ASSOCIATION RULE MINING

SIKHA BAGUI
PROFESSOR
DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF WEST FLORIDA
PENSACOLA

ANTON ZAYNAKOV
IT SUPPORT TECHNICIAN
DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF WEST FLORIDA
PENSACOLA

ABSTRACT

In this paper we present a unique way to analyze the support and confidence of association rules to come up with Approximate Functional Dependencies (AFDs). We also discuss how the nature of AFDs determined from association rule mining is different from functional dependencies (FDs) in the relational model.

KEYWORDS

Functional dependencies, approximate functional dependencies, association rule mining, relational databases, apriori algorithm, support, confidence.

1. INTRODUCTION

Association rule mining is used to find relationships between items or itemsets in *market basket* or transactional data representations (Agrawal, et al. 1993). Statistical measures like support and confidence are used to measure the strength of these relationships (Agrawal and Srikant, 1994). In this paper we are trying to determine if these relationships are FD relationships as defined in relational representations.

FDs exist between attributes in a relational representation. In a relational representation, there is a FD between the primary key attribute and other attributes. Association rule mining, however, finds correlations among data contents and works at the instance or attribute-value level rather than the attribute level. In this paper we would like to see if FDs or AFDs can be determined from association rule mining using association rule mining's statistical measures like support and confidence. It would appear that 100 % confidence in association rule mining would translate to FDs, but as we will see in this paper, this is not always true. Hence we use association rule mining to determine AFDs. We will also see that the FDs or AFDs determined from association rule mining have a different nature.

Data in market basket data representations (or in transaction datasets) is in the form represented in (Han and Kamber, 2012), as shown in Figure 1. There is no particular order, format or domain constraint for the items purchased. Transactions can also have duplicate items or *n* number of same items, and the number of items purchased is not fixed or limited.

Using association rule mining, figure 1 would show not only which items are purchased in which transaction but also which items are purchased when other items are purchased. The items in figure 1 are shirt, pen, book, etc. Itemsets are sets of items. Examples of 1-itemsets would be {shirt}, {pen}, {book}; examples of 2-itemsets would be {shirt, pen}, {shirt, book}, {pen, book}; examples of 3-itemsets would be {shirt, pen, book}, and so on. Data in transactional datasets do not follow the principles of database normalization.

FIGURE 1: MARKET BASKET DATA REPRESENTATION

Transaction_ID	Items_Purchased
T100	Shirt, pen
T200	Shirt, book
T300	Pen, book
T400	Shirt, pen, book
T500	Bread, cake, shoes, socks

Data in relational databases, however, is more orderly and structured and follows principles of FDs and database normalization. A relational representation would be made of a finite number of attributes, and the attribute values would have to be within a valid domain. Relations within a relational representation would have a key to identify a unique tuple or row and there would be FDs between the key or keys of the table and the other attributes in that row. There would also be no multi-valued attributes in a relational representation. A formal relational database representation (Elmasri and Navathe (2007), Date (2003), Bagui and Earp, 2012) is very different in format from the representation presented in figure 1. A relational database representation is presented in figure 2.

FIGURE 2: A RELATIONAL DATABASE REPRESENTATION

STUDENT									
STNO	SNAME	MAJOR	CLASS	BDATE	AGE	HIGHSCHOOL	CAMPUSRESIDENT	HRSWORKED	GPA
200	John	ENG	1	1/2/1990	under_25	Highland Park	YES	21_40	2.90
300	Mary	CS	4	7/6/1987	under_25	Pensacola	NO	less_10	3.5

CLASSES						
STNO	CLASSID	SECID	INSTRID	ISBN	TIME	DAYS
200	COP3698	0456	96	2901558609012	12 - 1:15	TR
200	ART2103	9876	70	5693256148965	8:30 - 9:15	MW
300	COP3698	6789	96	2901558609012	5:30 - 8:45	T
300	ART2103	0321	70	5693256148965	11:15 - 12:45	TR

As can be seen from figure 2, relational schemas have fixed columns (attributes) and values within the columns fall within a fixed domain. The data is also of a particular type. Every relational schema has a primary key, and the other attributes in the relation are functionally dependent on the primary key. Hence FDs, the key to relational representations, are determined at the attribute (columnar) level in relational representations. FD means that the value of an attribute is

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

http://ijrcm.org.in/

10

uniquely determined by some other attribute, usually the key, for example, from figure 2, the stno (student number) would determine the sname, major, class, etc.

In this paper we determine a way to use association mining rules to find AFDs in large datasets. Determining AFDs in large datasets using association rule mining will serve the following purposes: (i) it will help in reverse engineering (Alashqur, 2009); Since relational databases are so widely used (Ceri, et al., 2000; Kappel, et al., 2001a; Kappel, et al., 2001b; Shanmugasundaram, et al., 2001), it might be necessary to reverse engineer to a relational database to take advantage of the benefits of relational databases; (ii) it can help in data prediction (Wolf, et al., 2007); (iii) It can help in further analyzing association mining rules.

The rest of the paper is organized as follows: Section 2 presents the relational representation; section 3 defines FDs; section 4 presents association rule mining; section 5 defines AFDs; section 6 discusses related works; section 7 shows how we calculated the AFDs using some real datasets; section 8 presents a discussion of the results; and section 9 presents the conclusions.

2. RELATIONAL REPRESENTATION

A relational schema R, denoted by $R(A_1, A_2, ..., A_n)$, is composed of a relation name, R and a list of attributes $A_1, A_2,...A_n$. Each attribute A_i has a domain made of a set of atomic values. Atomic means that the values are not divisible into components within the framework of R. A relational state, r, is made of n-tuples, where $r = \{t_1, t_2, ..., t_n\}$. Each tuple is an ordered list of values, so $t = <v_1, v_2, ..., v_n>$. Each value v_i is within a specified domain (Elmasri and Navathe, 2007), and must have a value or will be null. Multivalued attributes are not allowed in the relational model and composite attributes are represented by their simple component attributes.

The relational representation is typically made up of more than one relational schema, as shown in figure 2. Figure 2 has two tables or relations, STUDENT and CLASSES. In the STUDENT table, each tuple represents an entity or student and in the CLASSES table each tuple represents an entity or class. The STUDENT table has stno (student number) as the primary key and the CLASSES table has secID as the primary key. In both tables, the rest of the attributes are fully functionally dependent on the primary key. FDs are explained next.

3. FUNCTIONAL DEPENDENCIES (FDs)

FDs can be determined by the semantics of attributes, but they can also be inferred or deduced. FDs are the basis for relational database theory. A FD can be defined as a relationship between two attributes or sets of attributes in a relation. Given a relation R, with n attributes, $A_1, A_2, A_3, ..., A_n$, attribute A_y of R is functionally dependent on attribute A_x of R, $(A_x \rightarrow A_y)$ (we will use "$\rightarrow$" to show FD), if and only if each A_x in R is associated with precisely one A_y in R (in a particular database state). So, any two tuples, t_1 and t_2 in R in the form $t_1[X] = t_2[X]$ must also have $t_1[Y] = t_2[Y]$. That is, the values of the Y component of a tuple in R depends on, or are determined by, the values of the X component of the tuple; or the values of the X component of a tuple functionally determine the values of the Y component (Earp and Bagui, 2012; Elmasri and Navathe, 2007), hence Y is functionally dependent on X.

FDs cannot necessarily be reversed. That is, X → Y in a relation R, does not imply Y → X in a relation R. A functional dependency may also be between two sets of attributes, that is, between composite attributes. In relational databases, FDs hold all the time, which is in 100% of the cases.

4. ASSOCIATION RULES

Association rules are presented in the form $A \Rightarrow B$, where the rule body A (Left Hand Side (LHS)) and the head B (Right Hand Side (RHS)) are subsets of the set of items $I = \{i_1, i_2, ..., i_n\}$ from a set of transactions $D = \{t_1, t_2, ..., t_n\}$, where $t_i (i \in [1,N])$ is a transaction and $t_i \subseteq I$, and A ∩ B = ∅. Every subset of I is called an itemset. If an itemset contains k items, then it is called a k-itemset. The strength of an association rule is measured by a rule's support and confidence.

A rule's support measures the number of times $(A \cup B)$ occurs together in a dataset. That is, the probability, $P(A \cup B)$. (Han and Kamber, 2012).

support$(A \Rightarrow B) = P(A \cup B)$

Confidence is taken to be the conditional probability, $P(B|A)$. (Han and Kamber, 2012). That is, the number of times A and B occur when A occurs.

confidence $(A \Rightarrow B) = P(B|A) = support(A \cup B)/support(A) = support\_count(A \cup B)/support\_count(A)$

Rules with high confidence and strong (reasonably large or high) support are referred to as strong rules (Agrawal, et al.1993; Han and Kamber, 2012; Park, Chen and Yu, 1995; Tan, Steinbach and Kumar, 2006). A rule with very low support may occur simply by chance. Confidence, on the other hand, measures the reliability of an inference rule. So, the higher the confidence, the more likely it is for B to be present in transactions that contains A.

One of the most commonly used algorithms for association rule mining is the Apriori algorithm. Next we explain the Apriori algorithm. The Apriori algorithm can be decomposed into the following two step process (Han and Kamber, 2006):

1. Find all frequent itemsets. An itemset that contains k items is a k-itemset. All frequent itemsets will occur at least as frequently as a pre-determined minimum support count.
2. Generate strong association rules from the frequent itemsets – these rules must satisfy a minimum support and minimum confidence.

The overall performance of mining association rules is determined by the first step.

4.1 ALGORITHM TO MINE ASSOCIATION RULES

The Apriori algorithm finds frequent itemsets using an iterative approach based on candidate generation. Below we present the pseudocode for the Apriori algorithm, as presented in (Han & Kamber, 2006):

L_1 := {frequent 1-itemsets} D;

```
for (k=2; L_{k-1} ≠ ∅ ; k++)
        C_k = apriori_gen(L_{k-1}, min_sup);
        for each transaction t ∈ D { //scan D for counts
                C_t = subset(C_k, t); // get the subsets of t that are candidates
                for each candidate c ∈ C_t
                        c.count++;
}
        L_k = { c ∈ C_k | c.count ≥ min_sup}
}
return L = U_k L_k;


procedure apriori_gen(L_{k-1}; frequent(k-1)-itemsets; min_sup: minimum support threshold)
        for each itemset l_1 ∈ L_{k-1}
                for each itemset l_2 ∈ L_{k-1}
                        if (l_1[1] = l_2[1]) ∧ (l_1[2] = l_2[2]) ∧ ... ∧ (l_1[k-2] = l_2[k-2]) ∧ (l_1[k-1] = l_2[k-1]) then {
                                c = l_1 |X| l_2 ;          // join step: generates candidates
                                if has_infrequent_subset(c, L_{k-1}) then
                                        delete c;  //prune step: remove unfruitful candidate
```

                               else add *c to C_k*;

    }

return C_k;

procedure has_infrequent_subset(c:candidate k-itemset; L_{k-1}: frequent (*k*-1)-itemsets);

                 //use prior knowledge

           for each (*k-1*) − subset *s* of *c*

                if $s \notin L_{k-1}$ then

                        return TRUE;

                return FALSE;

This Apriori algorithm employs an iterative approach known as a level-wise search, where *k*-itemsets are used to explore (*k*+1) − itemsets. First, the set of frequent 1-itemsets is found, denoted by L_1. All these frequent 1-itemsets have to have *support* above a user specified minimum. The frequent 1-itemsets are generated by counting item occurrences and then those that turn out to be frequent after computing their support are used.

L_1 is then used to find L_2, the set of frequent 2-itemsets, which is used to find L_3, and so on until no more frequent *k*-itemsets can be found. The size of the itemsets is incremented by one at each iteration, and the finding of each L_k requires one full scan of the database. This phase stops when there are no frequent itemsets.

The apriori_gen procedure performs two steps – a join and a prune. In the join part, L_{k-1} is joined with L_{k-1} to generate potential candidates. The prune portion employs the Apriori property to remove candidates that have a subset that is not frequent. The test for infrequent subsets is shown in procedure has_infrequent_subset (Han & Kamber, 2006).

5. APPROXIMATE FUNCTIONAL DEPENDENCIES (AFDs)

An AFD will hold most of the time, but not all the time. Though FDs form the basis for database theory, AFDs can also have applications in database design (Bra and Paredaens, 1984) and the discovery of unexpected but meaningful approximate dependencies can also be used in data mining applications (Huhtala, et al., 1999). For example, in an environmental dataset an AFD could point to the causes for air pollution, and these can then be further investigated by domain experts.

We will define an AFD as: Given a relational representation R, attribute Y of R is approximately dependent on attribute X of R if and only if each X in R has associated with it one Y in R in at least (Z − T) cases. Z is the number of tuples or rows in R, and T is the number of tuples that have to be removed for each X in R to have associated with it precisely one Y. We will denote the AFD with a "$\leadsto$".

6. RELATED WORK

AFDs have been studied by a few. Huhtala, et al. (1999) presented the Tane algorithm to determine functional and approximate dependencies from large databases. Tane is based on partitioning sets of rows by their attribute values.

Kivinen and Mannila (1995) discussed several measures to determine the error of dependencies and derived bounds for discovering dependencies with errors.

Ilyas, et al. (2004) developed a system called CORDS to determine statistical correlations and soft FDs. One of the drawbacks of CORDS is that it works with a sample of data, hence we cannot assert with complete certainty if a functional dependency always holds.

Giannella and Robertson (2004) examined how to measure, based on information theory, the degree to which a FD is approximate. Their measure is compared with the other two standard measures, g3 and Tau.

Kalavagattu (2008) measured for AFDs (derived from association rules) and also presented an algorithm for generating AFDs according to measures of confidence and specificity with derivations.

Alashqur (2009) describes the similarities and differences between FDs and association rules and introduces a formal definition of FDs in terms of association rules. But Alashqur (2009) only talks about FDs whose confidence is 100%. We deal with AFDs whose confidence may be less that 100%.

Sanchez et al (2008) provide a methodology to adapt existing association rule mining algorithms to the task of discovering Approximate Dependencies. The adapted algorithms obtain the set of Approximate Dependencies that hold in a relation with accuracy and support greater than user-defined thresholds.

Approximate functional dependencies were also studied as fuzzy functional dependencies by some (Berzal, et al (2005); Sanchez et al. (2003)). Calero, et al. (2003, 2004a, b) introduced a methodology that employed fuzzy approximate dependencies for perform a high-level analysis of data.

Though AFDs have been studied by a few, none of them have studies related to determining AFDs from association rule mining using the statistical measures of support and confidence (where confidence is below 100%) using the approach we took. We present a unique way to analyze the support and confidence of association rules to come up with AFDs.

7. EXPERIMENTAL RESULTS

Our aim in this work is to determine AFDs between attribute-value pairs of association rules in large datasets using 2-item rules. This work can be extended to more than 2-item rules, but we do not consider that scenario in this paper. Our proposed method works for 2-item rules, that is, one attribute-value pair on either side of an association rule.

We tested our ideas using five datasets. We will present details of the work using the first dataset, Colleges, available at **[**ftp://85.158.30.137/lib.stat.cmu.edu/datasets/colleges/aaup.data**]**. This dataset has 1161 rows.

STEP 1

Our first step was to categorize the data to make it ready for association rule mining. We then ran the Apriori algorithm using Weka on the categorized dataset using a minimum support of 0.01 and minimum confidence of 1. The reason for the low minimum support and high confidence numbers was to get all possible 2-item rules so that we could create 2-itemsets out of 2-item rules with 100% confidence.

From this initial run we selected two 2-item rules with 100% confidence:

- Type=IIB 618 ==> NFP=NFPlowest 618
- Average Salary Assistant Proffessors=ASASPlow 415 ==> Number of Associate Professors=NAPlowest 415

The next step was to run Weka's Apriori algorithm using the attributes from the 2-item rules, hence we first ran the Apriori algorithm on the attributes from the first rule and then on the attributes from the second rule.

STEP 2

We ran Weka's Apriori algorithm on the Type and Number of Full Professors attributes (the attributes from the first rule), with the lowest minSupport (0.001) and minConfidence (0.001) settings. We got the following rules:

1. Type=IIB 618 ==> NFP=NFPlowest 618   conf:(1)
2. NFP=NFPhigh 11 ==> Type=I 11   conf:(1)
3. NFP=NFPhighest 9 ==> Type=I 9   conf:(1)
5. Type=IIA 363 ==> NFP=NFPlowest 337   conf:(0.93)
6. NFP=NFPmed 45 ==> Type=I 37   conf:(0.82)
7. NFP=NFPlow 88 ==> Type=I 70   conf:(0.8)
8. NFP=NFPlowest 1008 ==> Type=IIB 618   conf:(0.61)

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

http://ijrcm.org.in/

9. Type=I 180 ==> NFP=NFPlow 70   conf:(0.39)

10. NFP=NFPlowest 1008 ==> Type=IIA 337   conf:(0.33)

11. Type=I 180 ==> NFP=NFPlowest 53   conf:(0.29)

12. Type=I 180 ==> NFP=NFPmed 37   conf:(0.21)

13. NFP=NFPlow 88 ==> Type=IIA 18   conf:(0.2)

14. NFP=NFPmed 45 ==> Type=IIA 8   conf:(0.18)

15. Type=I 180 ==> NFP=NFPhigh 11   conf:(0.06)

16. NFP=NFPlowest 1008 ==> Type=I 53   conf:(0.05)

17. Type=I 180 ==> NFP=NFPhighest 9   conf:(0.05)

18. Type=IIA 363 ==> NFP=NFPlow 18   conf:(0.05)

19. Type=IIA 363 ==> NFP=NFPmed 8   conf:(0.02)

The possible values of Type were Type = IIB, Type = IIA and Type = I. We kept one rule for each value of the Type attribute. The rule with the highest confidence was kept. For example, Type = IIA had 3 rules with confidences of 93%, 5% and 2% respectively. We kept the rule with the 93% confidence and did not use the rest of the rules. For Type = I, since the rule with the highest confidence had a confidence of 39%, we did not use it since we would only keep it if the rule's confidence was above 50% (this confidence is a user-defined confidence and is selected arbitrarily). For Type IIB, since this is a rule with confidence of 100%, we kept this one; so we ended up with the following:

Type = IIB   618 tuples out of 618 were retained

Type = IIA   337 tuples out of 363 were retained   26 tuples were removed

Type = I   0 tuples were retained   180 tuples were removed

This means that, in this dataset, out of 1161 rows, if Type IIB occurs, then this always leads to NFPlowest, since this has 100% confidence, and this happened in 618 cases or 53% of the time. Similarly, when Type IIA occurred, NFPlowest occurred 93% of the time (shown by the confidence) and this happened 29% in the whole dataset (the support). In this study we are trying to get a combined support of at least 80%. Since Type IIB and Type IIA accounted for 82% of the data we will continue with AFD calculation.

We calculated the AFD's as follows:

Step 2.1

Calculate the total number of tuples removed. We based this on confidence of the association rules. If the confidence is below 50%, the rules are removed. Since Type = I had confidence less than 50%, these rules were not used. Also we try to obtain a combined support of at least 80%.

HR = Highest rule from each attribute-value combination with confidence > 50%

Total number of tuples retained = Total_retained

Total_retained% = 955/1161 = 82%

Total_retained = $\sum_{n=1}^{\infty}(HR)$

Total_retained = 618 + 337 = 955

Total number of tuples removed = Total_removed

Total_removed = Dataset size − Total_retained

Total_removed = 1161 − 955 = 206

Step 2.2

Next we calculate the impurity.

Impurity % = (Total_removed /dataset size) * 100

Impurity % = 206/1161 * 100

Impurity = 17.8%

Step 2.3:

The Approximate Functional Dependency (AFD):

AFD = 100 − Impurity%

AFD = 100 − 17.8

AFD = 82.2%

Therefore, we can conclude that dependency (Type → Number of Full Professors) has AFD with the strength=82.2% and that the impurity of this AFD is 17.8% or 206 tuples. This would imply that for the attributes Type and Number of Full Professors, if we know the Type, we can predict the Number of Full Professors with an accuracy of 82.2%

Step 3

Next we will consider the second 2-item rule. The attributes are Average Salary Assistant Professor (ASASP) and Number of Associate Professors (NAP). We ran Weka's Apriori algorithm using these two attributes with the lowest minSupport and minConfidence settings. We got the following rules:

1. ASASP=ASASPlow 415 ==> NAP=NAPlowest 415   conf:(1)

2. NAP=NAPhigh 9 ==> ASASP=ASASPmed 9   conf:(1)

3. NAP=NAPhighest 2 ==> ASASP=ASASPmed 2   conf:(1)

4. NAP=NAPlow 117 ==> ASASP=ASASPmed 106   conf:(0.91)

5. NAP=NAPmed 35 ==> ASASP=ASASPmed 31   conf:(0.89)

6. ASASP=ASASPmed 709 ==> NAP=NAPlowest 561   conf:(0.79)

7. ASASP=ASASPhigh 37 ==> NAP=NAPlowest 22   conf:(0.59)

8. NAP=NAPlowest 998 ==> ASASP=ASASPmed 561   conf:(0.56)

9. NAP=NAPlowest 998 ==> ASASP=ASASPlow 415   conf:(0.42)

10. ASASP=ASASPhigh 37 ==> NAP=NAPlow 11   conf:(0.3)

11. ASASP=ASASPmed 709 ==> NAP=NAPlow 106   conf:(0.15)

12. NAP=NAPmed 35 ==> ASASP=ASASPhigh 4   conf:(0.11)

13. ASASP=ASASPhigh 37 ==> NAP=NAPmed 4   conf:(0.11)

14. NAP=NAPlow 117 ==> ASASP=ASASPhigh 11   conf:(0.09)

15. ASASP=ASASPmed 709 ==> NAP=NAPmed 31   conf:(0.04)

16. NAP=NAPlowest 998 ==> ASASP=ASASPhigh 22   conf:(0.02)

17. ASASP=ASASPmed 709 ==> NAP=NAPhigh 9   conf:(0.01)

18. ASASP=ASASPmed 709 ==> NAP=NAPhighest 2   conf:(0)

The values of Average Salary Assistant Professors were ASASPlow, ASASPmed, and ASASPhigh. Again, keeping one rule for each value of the ASASP attribute (and only the rules with confidence > 50%), we have:

ASASP = ASASPlow   415 tuples out of 415 were retained

ASASP = ASASPmed   561 tuples out of 709 were retained   148 tuples were removed

ASASP = ASASPhigh   22 tuples out of 37 were retained   15 tuples were removed

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

http://ijrcm.org.in/

In this case, ASASPlow accounts for 35.74% of the data (the support) and ASASPmed accounts for 48.32% of the data. ASASPlow and ASASPmed taken together account for 84.06% of the data. ASASPhigh had a very low support of 1.89%, but we kept it since this rule's confidence was 59% (in this study we are keeping rules with confidence > 50%). So, the process is, we first check for the confidence, and if the confidence is above 50%, we keep the rule, even if the support is very low.

Step 3.1:

Total_retained = $\sum_{n=1}^{\infty}(HR)$

Total_retained = 415 + 561 + 22 = 998

Total_retained% = 998/1161 = 85.96%

Total_removed = 1161 − 998 = 163

Step 3.2:

Impurity % = (Total_removed /dataset size) * 100

Impurity% = (163/1161) * 100 = 14%

Step 3.3:

The Approximate Functional Dependency (AFD):

AFD = 100 − Impurity%

AFD = 100 − 14

AFD = 86%

Therefore, we can conclude that dependency Average Salary Assistant Professors → Number of Associate Professors has AFD with the strength 86% and this AFD's impurity = 14% or 163 tuples. This means that if we know the ASASP, we can predict the NAP with an accuracy of 86%.

Using the same steps, we calculated the impurities and AFDs for the other four datasets. Figure 3 presents the 2-item rules extracted from each dataset. These were obtained using the minSupport of 0.01 and minConfidence of 1. Medical data set did not have 2-item rules with 100% confidence; therefore, we had to lower the confidence value to 95%.

FIGURE 3: 2-ITEM RULES

Dataset: Colleges
ftp://85.158.30.137/lib.stat.cmu.edu/datasets/colleges/aaup.data
2-item rules with 100% confidence
•   Type=IIB 618 ==> NFP=NFPlowest 618
•   Average Salary Assistant Proffesors=ASASPlow 415 ==> Number of Associate Professors=NAPlowest 415
Dataset: Forest Fires
http://archive.ics.uci.edu/ml/datasets/Forest+Fires
2-item rules with 100% confidence
•   RH=Rhlow 305 ==> rain=RAINlow 305   conf:(1)
•   temp=TEMPmed 236 ==> rain=RAINlow 236   conf:(1)
•   DMC=DMClow 210 ==> rain=RAINlow 210   conf:(1)
•   DMC=DMClow 210 ==> area=AREAsmallest 210   conf:(1)
•   wind=WINDlow 209 ==> ISI=ISIlow 209   conf:(1)
•   wind=WINDlow 209 ==> rain=RAINlow 209   conf:(1)
•   wind=WINDlow 209 ==> area=AREAsmallest 209   conf:(1)
•   X=Xcentral 207 ==> rain=RAINlow 207   conf:(1)
•   X=Xeast 176 ==> area=AREAsmallest 176   conf:(1)
•   X=Xwest 134 ==> FFMC=FFMChigh 134   conf:(1)
Dataset: Green Vehicle data
https://explore.data.gov/Transportation/Green-Vehicle-Guide-Data-Downloads/9un4-5bz7
2-item rules with 100% confidence
•   Eng Displ=med_Eng_Displ 290 ==> # Cyl=med_cyl 290   conf:(1)
•   # Cyl=high_cyl 234 ==> Eng Displ=large_Eng_Displ 234   conf:(1)
Dataset: Contraceptive Method Choice
http://archive.ics.uci.edu/ml/datasets/Contraceptive+Method+Choice
2-item rules with 100% confidence
•   Number of Children ever born=Ten_to_Thirteen 28 ==> Wife Age=Adult 28   conf:(1)
Dataset: Medical Data set
2-item rules with more than 90% confidence
•   Systolic Pressure=SP_low 4317 ==> Blood Pressure Medication=Bpmed_NO 4314   conf:(0.99)
•   Body Mass Index=BMI_Normal 4405 ==> Blood Pressure Medication=Bpmed_NO 4379   conf:(0.99)
•   Weight=Weight_average 4488 ==> Blood Pressure Medication=Bpmed_NO 4456   conf:(0.99)
•   Current Smoker=CurrentSmoker_NO 3648 ==> Blood Pressure Medication=Bpmed_NO 3617   conf:(0.99)

The 2-item rules presented in figure 3 were used to create 2-itemsets presented in figure 4. Attributes from each 2-item rule create one 2-itemset. Therefore, the number of 2-item rules should correspond to the number of 2-itemsets, but not in all cases. For example, in the Green Vehicle data set, we have two 2-item rules that create only one 2-itemset because the rules use the same pair of attributes.

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

http://ijrcm.org.in/

FIGURE 4: 2-ITEMSETS GENERATED

Dataset: Colleges ftp://85.158.30.137/lib.stat.cmu.edu/datasets/colleges/aaup.data **2-itemsets extracted**
• Type, Number of Full Professors • Average Salary Assistant Professors, Number of Associate Professors
Dataset: Forest Fires http://archive.ics.uci.edu/ml/datasets/Forest+Fires **2-itemsets extracted**
• RH, Rain • Temp, Rain • DMC, Rain • DMC, Area • Wind, ISI • Wind, Rain • Wind, Area • X, Area • X, Rain • X, FFMC
Dataset: Green Vehicle data https://explore.data.gov/Transportation/Green-Vehicle-Guide-Data-Downloads/9un4-5bz7 **2-itemsets extracted**
• Eng Displ, # Cyl
Dataset: Contraceptive Method Choice http://archive.ics.uci.edu/ml/datasets/Contraceptive+Method+Choice **2-itemsets extracted**
• Number of Children ever born, Wife Age
Dataset: Medical Data set **2-itemsets extracted**
• Current Smoker, Blood Pressure Medication • Body Mass Index, Blood Pressure Medication • Systolic Pressure, Blood Pressure Medication • Weight, Blood Pressure Medication

Figure 5 shows the resulting AFDs, the value and percentage of impurity, and the AFD's strength.

FIGURE 5: RESULTING AFDS OF THE EXPERIMENTAL DATASETS

Dataset: Colleges
ftp://85.158.30.137/lib.stat.cmu.edu/datasets/colleges/aaup.data

Size	AFDs	Impurity (Tuples)	Impurity (Perc.)	AFD strength (Perc.)
1161	Type ⤳ Number of Full Professors	206	17.8 %	82.2 %
1161	Average Salary Assistant Professor ⤳ Number of Associate Professors	163	14 %	86 %

Dataset: Forest Fires
http://archive.ics.uci.edu/ml/datasets/Forest+Fires

Size	AFDs	Impurity (Tuples)	Impurity (Perc.)	AFD strength (Perc.)
517	Wind ⤳ Area	3	0.5 %	99.5 %
517	RH ⤳ Rain	1	0.2 %	99.8 %
517	Temperature ⤳ Rain	1	0.2 %	99.8 %
517	DMC ⤳ Rain	1	0.2 %	99.8 %
517	DMC ⤳ Area	3	0.6 %	99.4 %
517	Wind ⤳ ISI	10	1.9 %	98.1 %
517	Wind ⤳ Rain	1	0.2 %	99.8 %
517	X ⤳ Area	3	0.6 %	99.4 %
517	X ⤳ Rain	1	0.2 %	99.8 %
517	X ⤳ FFMC	7	1.4 %	98.6 %

Dataset: Green Vehicle Data
https://explore.data.gov/Transportation/Green-Vehicle-Guide-Data-Downloads/9un4-5bz7

Size	AFDs	Impurity (Tuples)	Impurity (Perc.)	AFD strength (Perc.)
840	Number of Cylinders ⤳ Engine Displacement	41	5 %	95 %

Dataset: Contraceptive Method Choice
http://archive.ics.uci.edu/ml/datasets/Contraceptive+Method+Choice

Size	AFDs	Impurity (Tuples)	Impurity (Perc.)	AFD strength (Perc.)
1473	Wife Age ⤳ Number of Children Ever Born	620	42 %	58 %

Dataset: Medical data set

Size	Relation	Impurity (Tuples)	Impurity (Perc.)	AFD strength (Perc.)
5945	Current Smoker → Blood Pressure Medication	44	0.7 %	99.3 %
5945	Body Mass Index → Blood Pressure Medication	44	0.7 %	99.3 %
5945	Systolic Pressure → Blood Pressure Medication	44	0.7 %	99.3 %
5945	Weight → Blood Pressure Medication	44	0.7 %	99.3 %

8. DISCUSSION OF THE RESULTS

In the first dataset, Colleges, there were two AFDs with relatively high strengths, 82.2% and 86% respectively.

In the second dataset, Forest Fires, there were quite a few AFDs with relatively high strengths. In fact, all of these strengths were over 99%, with just one at 98%, therefore most of these AFDs hold most of the time. Figure 6 visualizes the AFDs in the Forest fires data set. The attributes on the left would be the LHS of an association rule and the attributes on the right would be the RHS of the rule.

FIGURE 6: AFDS DETERMINED FROM ASSOCIATION RULE MINING
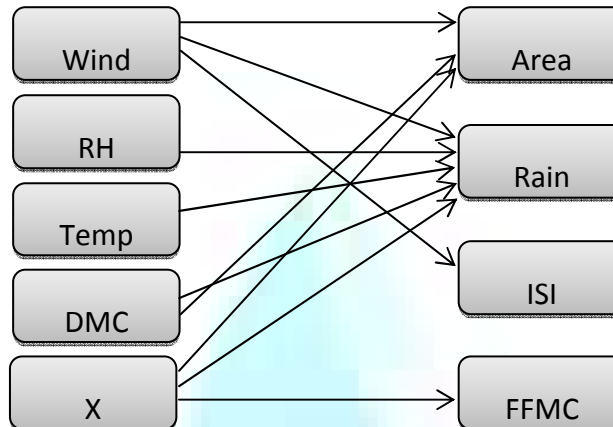
From this mapping we can see that AFDs determined from association rule mining would take a different nature. In FDs in relational database theory, a RHS cannot be mapped by more than one LHS. That is, a set of attributes in a row (RHS) is dependent on one key value (LHS), as shown in figure 7. This same set of attributes could not be dependent on more than one key value. From figure 7, sname, major, class, bdate, age, and GPA would be dependent on the student number (stno).

We can see from figure 6 that this is clearly not the case. Area, Rain, ISI, FFMC (the RHS) can be defined by more than one LHS. Hence, in AFDs determined from association rule mining, one LHS can map to more than one RHS. And, one RHS side can be mapped from more than one LHS. So, the nature of the AFDs determined from association rule mining is different from the definition of FDs used in relational database theory.

FIGURE 7: FDS IN A RELATIONAL REPRESENTATION
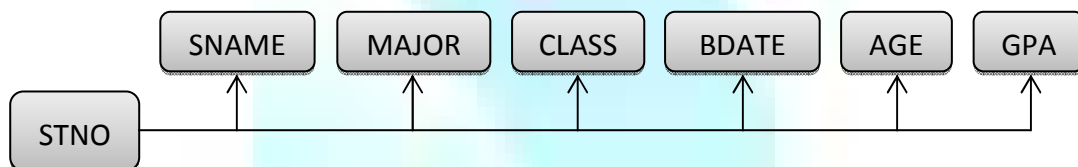
The third dataset also had an AFD with high strength (95%). Just as in the other datasets, there are many AFDs in this dataset too, however, we cannot discover them using our criteria (filtering only the rules with 100% confidence). If we lower the confidence threshold for association rule mining, we should be able to create much more 2-itemsets out of the rules with the confidence >50% and support >80%. In the fourth dataset, however, we found only one AFD with the strength 58%. So, this AFD would happen only about 58% of the time. In the last dataset, the Medical dataset, however, there were some really high AFDs.

9. CONCLUSION

From this study we can conclude that 100% confidence obtained from association rule mining does not necessarily mean a FD. To determine AFDs, in addition to the rules with 100% confidence, we have to determine what percentage of the data (the support) the rules with or close to 100% confidence cover. The higher the support (the closer the combined total of the support of the rules selected is to 100%) and the higher the confidence of the rules (and the closer this is to 100%), the higher strength of the AFD.

REFERENCES

1. Agrawal, R. and Srikant, R. 1994. Fast algorithms for mining association rules in large databases. *Proceedings of the 20th VLDB Conference*, p. 487-499.
2. Agrawal, R., Imielinski, T. and Swami, A. (1993). Mining association rules between sets of items in large databases. *ACM SIGMOD Conference*, ACM Press, 207-216.
3. Alashqur, A. (2009). Expressing Database Functional Dependencies in Terms of Association Rules. *European Journal of Scientific Research,* 32(2), 260-267.
4. Bagui S., & Earp, R. (2012) *Database Design Using Entity-Relationship Diagrams*, 2nd edition, Francis and Taylor, Boca Raton, FL.
5. Berzal, F., Blanco, I., Sánchez, D., Serrano, J., Vila, M.A. (2005) A Definition For Fuzzy Approximate Dependencies. *Fuzzy Set Syst*. 149, 105–129.
6. Bra, P. D. and Paredaens, J. (1984). Horizontal Decompositions for Handling Exceptions to Functional Dependencies. In Gallaire, H., Minker, J. and Nicolas, J. –M. (eds), *Advances in Database Theory*, 2, 123-141.
7. Calero, J., Delgado, G., Sánchez-Marañón, M., Sánchez, D., Serrano, J., Vila, M.A. (2003). Helping User To Discover Association Rules. A case In Soil Color As Aggregation Of Other Soil Properties. *Proceedings of the 5th International Conference On Enterprise Information Systems, ICEIS'03*, 533–540.
8. Calero, J., Delgado, G., Sánchez-Marañón, M., Sánchez, D., Vila, M.A., Serrano, J. (2004a). An Experience In Management Of Imprecise Soil Databases By Means Of Fuzzy Association Rules and Fuzzy Approximate Dependencies. *Proceedings of the 6th International Conference On Enterprise Information Systems, ICEIS'04,* 138–146.
9. Calero, J., Delgado, G., Serrano, J., Sánchez, D., Vila, M.A. (2004b). Fuzzy Approximate Dependencies Over Imprecise Domains. An Example In Soil Data Management. *Proceedings of the IADIS International Conference On Applied Computing 2004,* 396–403.
10. Ceri, S., Fraternali, P., and Paraboschi, S. (2000) 'XML: Current Developments and Future Challenges for the Database Community', *Proceedings of the 7th International Conference on Extending Database Technology (EDBT),* Springer, LNCS 1777, Konstanz, March 2000.
11. Date, C. 2003. *An Introduction to Database Systems.* Addison Wesley.
12. Elmasri R. & Navathe, S. B. (2007) *Fundamentals of Database Systems*, Fifth Edition, Pearson Education, Boston, MA.
13. Giannella, C. and Robertson, E. (2004). On approximation measures for functional dependencies. *Inf. Syst.,* 29(6), 483-507.
14. Han, J. and Kamber, M. (2012). *Data Mining: Concepts and Techniques.* Morgan Kaufmann Publishers, USA.

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

http://ijrcm.org.in/

15. Huhtala, Y., Karkkainen, J., Porkka, P., and Toivonen, H., (1999). Tane: An Efficient Algorithm for Discovering Functional and Approximate Dependencies. *The Computer Journal*, 42(2), 100-111.

16. Ilyas, I. F., Markl, V., Haas, P., Brown, P. and Aboulnaga, A. (2004). Cords: automatic discovery of correlations and soft functional dependencies. *SIGMOD 2004: Proceedings of the 2004 ACM SIGMOD International Conference of Management of data,* New York, NY, USA, 647-658.

17. Kalavagattu, A. K. (2008). *Mining Approximate Functional Dependencies as Condensed Representations of Association Rules,* Master's Thesis, Arizona State University.

18. Kappel, G., Kapsammer, E., and Retschitzegger, W. (2001a) 'Architectural Issues for Integrating XML and Relational Database Systems – The X-Ray Approach', *Proceedings of the Workshop on XML Technologies and Software Engineering,* Toronto.

19. Kappel, G., Kapsammer, E., and Retschitzegger, W. (2001b) 'XML and Relational Database Systems – A Comparison of Concepts', *Proceedings of the 2nd International Conference on Internet Computing (IC),* CSREA Press, Las Vegas, USA.

20. Kivinen, J. and Mannila, H. (1995). Approximate dependency inference from relations. *Theor. Comp. Sci.*, 149, 129-149.

21. Park, J. S., Chen, M. –S., and Yu, P.S. 1995. An effective hash based algorithm for mining association rules. *Proceedings of the 1995 ACM SIGMOD Conference*, ACM Press, 175-186.

22. Sanchez, D., Jose, M. S., Blanco, I., Maria, J. M-B., Vial, M-A. (2008). Using Association Rules to Mine for Strong Approximate Dependencies. *Data Mining and Knowledge Discovery*, 16, 313-348.

23. Sánchez, D., Serrano, J., Vila, M., Aranda, V., Calero, J., Delgado, G. (2003). Using Data Mining Techniques To Analyze Correspondences Between User and Scientific Knowledge In An Agricultural Environment. In Piattini, M., Filipe, J., Braz, J. (eds) *Enterprise Information Systems IV*. Kluwer Academic Publishers, Hingham, MA, USA, 75–89.

24. Shanmugasundaram, J., Shekita, E., Barr, R., Carey, M., Lindsay, B., Pirahesh, H., and Reinwald, B. (2001). 'Efficiently publishing relational data as XML document', *VLDB Journal*, Vol. 19, No. 2-3, 133-154.

25. Tan, P-N, SteinBach, M., and Kumar, V. 2006. *Introduction to Data Mining*, Addison Wesley.

26. Wolf, G., Khatri, H., Chen, Y., and Kambhampati (2007). Quic: A System for Handling Imprecision and Incompleteness in Autonomous Databases (demo), *CIDR*, 263-268.

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

http://ijrcm.org.in/

ATTRITION TRENDS IN INDIA: ISSUES & IMPLICATIONS

M. NAGABHASKAR
ASST. PROFESSOR
SCHOOL OF MANAGEMENT STUDIES
VIGNAN UNIVERSITY
VADLAMUDI

DR. P. SRINIVASAREDDY
PROFESSOR
SCHOOL OF MANAGEMENT STUDIES
VIGNAN UNIVERSITY
VADLAMUDI

M RAMU
ASST. PROFESSOR
SCHOOL OF MANAGEMENT STUDIES
VIGNAN UNIVERSITY
VADLAMUDI

ABSTRACT

The biggest challenge facing the corporate houses these days is not attracting the prospective employee but retaining the talent. Attrition has been a never-ending problem for every organization especially the developing countries like India due to either lack of appreciation or lack of proper job sculpting. It not only affects the morale of other employees but also on the financial position of the organization. As it becomes very necessary for the HR managers to understand the factors that prompt employees to quit an organization, firms are adopting many retention strategies to combat the attrition problem. This paper examines the faces of attrition within the global organization of today; and attempts to offer some insight that may alleviate future problems. In this paper an attempt has been made by authors to suggest suitable measures for controlling attrition. Lastly the authors have handled positive aspects of attrition.

KEYWORDS
Attrition, retention, globalization, job sculpting.

INTRODUCTION

Attrition simply means "A reduction in the number of employees through retirement, resignation or death."Attrition can be conceptualized in many forms; the two prominent forms of attrition for the constraints of this Endeavour are attrition due to employees leaving and employee retiring from an organization.

Attrition has always been a sensitive issue with IT firms. Despite offering the highest salaries across all business segments, the industry has been plagued with attrition across the board, particularly in the past few years. This ever-growing wage inflation and attrition rates have put financial pressures on firms.

For a generation used to constantly seeing and adapting to change, "getting bored" will happen quickly and easily. Jobs will be increasingly treated like projects and assignments that workers would like to complete and move on. And they would want to have the option of multiple employment contracts - full-time jobs, consultancy, and project-based jobs to retainer ships. Companies will have to either cater to these needs or lose them to competition. Perhaps reasons why many `Best Employers' like Satyam are institutionalizing the job change. Satyam has a "global rotation plan" where every 18-24 months, employees can actively seek a job change.

Hiring young IT majors are now also turning towards youth from the interior regions of the country to get more loyal employees coming from rural parts. As a part of its experiment, Wipro technologies have recently gone to Chindwara in Madhya Pradesh to train students. As part of its four-months 'finishing school' programme, Wipro Technologies is eyeing students who are either graduates or even those who have passed the 12th standard. The company is not just hiring candidates from the rural areas but also making them expertise in the field. Wipro has also hired science graduates instead of engineers. It has hired 300 science graduates, who will undergo the training to acquire necessary IT skills.

ATTRITION SCENARIO IN INDIA

Almost all the sectors in India are facing attrition, but the reasons and effects are unique to each sector. The BPO sector has highest attrition rate i.e. 50%. The aviation sector, pulsating with the early of numerous private players, has thrown up irresistible opportunities, fueling attrition to46%. In case of Service sector highest attrition levels are seen in sales. One reason for this is the fact that companies in the FMCG sector are themselves hiring more salespeople. Another reason is that insurance and telecommunications sectors are also hiring people. At PepsiCo India, according to Pavan Bhatia, executive director, human resources of the company, the proportion of people hired in sales to total hires increased from 20% in 2006 to 70% in 2007**.**

Leading business chambers of commerce and industries, Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce and Industry (FICCI), Associated Chambers of Commerce and Industry of India (Assocham) and Indian Merchants' Chamber (IMC) also facing a major problem of attrition. The attrition rate among these organisations ranges between 6% to well over 35%. Sources at these organisation said that though they revise salary and remuneration by at least 25 to 30% annually, it seems it was quite inadequate compared to the market trend. CII, which has a total employee strength of around

550 across India, has the attrition rate of 5 to 6%. FICCI, which has almost equal strength of employees, the attrition is almost upto 20%. FICCI sources informed, "Apart from lucrative salary package, staffers take the advantage of command in various subjects and sectors.

At FICCI, recently a staffer, who was drawing Rs 15 lakh annually, got a package of Rs 1.50 crore, while another had been lured by an industry in the entertainment sector for a similar package. More than six employees of the middle level have been hired by Reliance." In case of IMC, the attrition is almost 25% of its total employee strength of 80. At FICCI, recently a staffer, who was drawing Rs 15 lakh annually, got a package of Rs 1.50 crore, while another had been lured by an industry in the entertainment sector for a similar package. More than six employees of the middle level have been hired by Reliance." In case of IMC, the attrition is almost 25% of its total employee strength of 80.

DRIVERS OF ATTRITION

It is not easy to find out, who contributes and who has the control on the attrition of employees. Various studies/survey conducted indicates that everyone is contributing to the prevailing attrition. Attrition does 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 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 odd reasons people change jobs. At the same time the attrition cannot be attributed to employees alone. Organizations must develop its own sensing device to know whether it is the internal or external factor that is causing the attrition.

❖   Individual / Personal reasons
❖   Organizational matters
❖   Other factors

INDIVIDUAL / PERSONAL REASONS

The personal reasons are many and only few are visible to us. The foremost personal reasons are getting married or falling in love or change of place. The next important personal reason is going for higher education. Health is another aspect, which contributes for attrition. Employees do get affected with health problems like sleep disturbances, indigestion, headache, throat infection and gynecological dysfunction for lady employees. Employees who have allergic problems and unable to cope with the AC hall etc will tend to get various other health problems and loose interest to work. Youngsters look jobs as being temporary and they quickly change the job once they get in to their own field.

ORGANIZATIONAL MATTERS

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 to quickly move out of the organization.

Moving from one job to another for higher salary, better positions and better benefits are the most important driver for attrition. The salary offered from MNC companies & IT firms in Bangalore, Delhi, Pune and Mumbai have gone up very high and it is highly impossible for Indian companies to meet the expectation of the employees. The employees expect salary re The employees move out if there are strained relations with the superiors or with the subordinates or any slightest discontent.

OTHER FACTORS

Working environment is the most important cause of attrition. Employees expect very professional approach and working environment of international standard. They expect very friendly and learning environment. Employees look for freedom, good treatment from the superiors, good encouragement, friendly approach from one and all, and motivation. If they won't get such environment they will leave the job. vision once in 4-6 months and if not, they move to other organizations.

POUCHING

The demand for trained and competent manpower is very high. Poaching has become very common. The big companies target employees of small companies. The employees with 4-6 months experience have very good confidence and dare to walk out and get a better job in a week's time. Most of the organizations have employee referral schemes and this makes people to spread message and refer the known candidates from the previous companies and earn too.

CONTROLLING ATTRITION: SUITABLE MEASURES

Employee attrition rate can be never being entirely eradicated. It can only be influenced to keep it in control. How a company can best retain its staff in a competitive environment is the topmost challenge of HR professionals. When employees leave, it is usually due to either lack of appreciation or due to an inability of nurturing employees according to their skills. Following are some strategies to combat the attrition problem.

1.   Exit Interview
2.   Mentoring
3.   Strengthening the recruitment process
4.   Strategic compensation package
5.   Fun & Laughter at workplace
6.   Free or Subsidized lunch/ Dinner
7.   Treating Employees like Customers.
8.   Transportation facilities
9.   Involvement of Employees in Decision Making Process
10.   Employees Advocate
11.   Making the organisation very transparent.
12.   Recreation, Healthcare, gym facilities, etc.
13.   Employee stock ownership plan.
14.   Bring your buddy scheme.

1. Exit Interviews

Exit interview has always been a reliable as well as cost-effective retention tool. A well-designed exit interview provides a valuable feedback about the employees' perceptions and experiences. Results obtained from these exit interviews help the HR managers to take initiatives in order to retain a loyal and motivated workforce.

2. Mentoring

The Mentor plays a very vital role of handholding in the initial stages of an enterprise. He is the guardian angel to whom an entrepreneur can turn when in distress.(Gavane

2007) The Mentor provides business guidance and shares his experience and skills with the entrepreneur. The Mentor through counselling will come to know the problems of employees, which may lead to attrition in future.

3. Strengthening the recruitment process.

Hiring the people that are a good "fit" with the culture of the organization meaning that their values, principles, and goals clearly match those of the company and then training as necessary will go a long way toward ensuring employee loyalty and retention.

4. Strategic compensation package

The firms should develop an overall strategic compensation package that includes not only base and variable pay scales, but long-term incentive compensation, bonus and gain-sharing plans, benefit plans to address the health and welfare issues of the employees, and non-cash rewards and perks as well. To be competitive in today's labour market, most companies find it necessary to offer a standard benefit package, including health, dental, and life insurance, vacation and leave policies, and investment and retirement plans. But what more could be done that would be cost effective toward creating an employee-oriented work environment?

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

http://ijrcm.org.in/

Creativity in compensation and benefits can make quite a difference to the welfare of the employee. A company should assess overall employee needs when addressing retention issues.

5. Fun & Laughter at workplace

Fun filled workplaces results in excellent performance of the employees. This element of fun and laughter at the workplace makes a significant and positive change in the employee's attitude and behaviour on the company's bottom-line. Happy employees are the most productive workers who break workplace monotony and make it really a perfect place to work as they pass on their exuberant mood to their colleagues and managers too. This serves a source of motivation to everyone in the office.

6. Free or Subsidized lunch/ Dinner

If the organisation is far away from city, many employees find it difficult to arrange lunch for them especially, the bachelors. If free or subsidized lunch/ dinner are made available by organisation the chances of leaving may dimmer.

7. Treating Employees like Customers

Companies should have similar approach to employees and Customer. If the company strives to retain their employees in the same way they try to retain their customer the attrition problem is out of question. The companies should maintain the good flow of communication with regular meetings and daily updating employee about company's current position and events.

8. Transportation facilities

Due to shortage of space to setup offices, corporate houses are setting their offices far away from the city place; many times the employees feel inconvenience to manage the conveyance from home to office. Keeping the same problem in view many organisations are providing to & fro transportation facilities to their employee either on sharing basis or part of benefits.

9. Involvement of Employees in Decision Making Process

Employees like to be a part of an organisation where their voices are heard and opinions really matters. The greater an employee's involvement in decision making process better is the organisations ability to retain its talent.

10. Employees Advocate

Handling employee's grievances is very critical issue, effective grievance handling is very essential in any organisation. One of the main reasons why employees leave companies is because of problems with their managers. An HR professional can be termed an employee's advocate and a bridge between top management and employees at all levels. There is a huge gap between HR professionals and employees in terms of understanding challenges and delivering requirements. HR has not really understood the problems associated with employees' careers and jobs. The company's overall plans and strategies also depend on HR professionals as they voice employees' problems and requirements The HR department should have genuine interest in the employees' welfare...it is responsible for making sure that their expectations are met.

11. Making the organization very transparent

Employees feel more comfortable working in a highly transparent organisation where much of the details regarding its functioning, development and performance are freely available to the employees.

12. Recreation, Healthcare, gym facilities, etc.

To have healthy atmosphere at the workplace, many organizations are providing different facilities like gym, yoga/mediation, healthcare facilities etc.

13. Employee stock ownership plan (ESOP)

ESOP i.e. Employee stock ownership plan is a kind of reward scheme that enable employees to acquire the status and benefit of ownership in their company without investing their money. It creates the direct link between employee productivity and employee benefits. ESOPs also encourage employees to develop a sense of ownership and commitment. They provide increased financial incentives, create a sense of ownership, and help to build teamwork.

14. Bring your buddy scheme

Bring your buddy scheme is the recent strategy now a days the HR managers are adopting. If we refer the McClelland's theory of motivation the need for affiliation is one of the factors influencing behaviour of an employee, which can in turn to be the motive for leaving the organisation, considering this psychology; most of the IT companies have started hiring the buddies/friends of the existing employees. Here companies are getting double benefit of getting an employee as well as retention of existing employees.

COST OF ATTRITION

Employee attrition is a costly dilemma for all organizations. In today's taxing business climate, managing company's competent and skilled human capital is vital for success.

The extent of the impact of attrition on an organisation cannot be fully understood if there is no attempt to quantify the costs. The more complex approaches to costing turnover give a more accurate and higher estimate of the costs. When a competent employee is to be replaced an organization incurs a variety of costs including those related to recruiting, selection, training and suboptimal performance while learning the job.

Companies usually turn to increasing the compensation for employees to retain them. This however is no longer helpful in solving the problem as the skilled work force has many opportunities which masses of them give predilection to. Employee attrition costs 12 to 18 months' salary for each leaving manager or professional.

The UK Chartered Institute of Personnel and Development (CIPD) suggests that because of the difficulties involved in estimating and quantifying some of the indirect costs many organisations prefer to take a 'not less than' approach in attempting to cost turnover.

According to the CIPD the major turnover costs are:

- ❖ Administration of the resignation (including exit interviews
- ❖ Recruitment costs (including advertising)
- ❖ Selection costs
- ❖ Costs of cover (temporary employees or overtime) during the vacancy period
- ❖ Administration of recruitment and selection process
- ❖ Induction training for new employees.

SOME POSITIVE ASPECTS OF ATTRITION

If all employees stay in the same organization for a very long time, most of them will be at the top of their pay scale which will result in excessive manpower costs.

- ❖ When certain employees leave, whose continuation of service would have negatively impacted productivity and profitability of the company, the company is benefited.
- ❖ New employees bring new ideas, approaches, abilities & attitudes which can keep the organization from becoming stagnant.
- ❖ Desirable attrition also includes termination of employees with whom the organization does not want to continue a relationship. It benefits the organization in the following ways:
  - ➤ It removes bottleneck in the progress of the company
  - ➤ It creates space for the entry of new talents
  - ➤ It assists in evolving high performance terms
- ❖ Acquisition of new knowledge
- ❖ Reduced conflict situations from controversial employees who leave.

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

http://ijrcm.org.in/

CONCLUSION

In the current scenario where every organization wants to be at its competitive best, high attrition rate can really act as a threat to success. Attrition is a very serious challenge Especially to rapidly growing organizations. Before it explodes, the organizations should seriously workout strategies to reduce the turnover so that the organizations should not suffer. Organizations planning for the future should be giving close attention to why attrition is occurring in the present.

Attrition is not bad always if it happens in a controlled manner. Some attrition is always desirable and necessary for organizational growth and development. The only concern is how organizations differentiate "good attrition" from "bad attrition"

REFERENCES

1. Attrition Management (2008) taken from http://www.fractalanalytics.com/industries/financial-services/attrition- management.html
2. Aubrey C. Daniels (2003), How to Prevent Employee Turnover taken from www.amazon.com
3. Buck J.M., Watson J.L. (2002) "Retaining Staff Employees: The Relationship between Human Resources Management Strategies and Organizational Commitment". Innovative Higher Education, Vol. 26, No. 3 pp175-193
4. Chartered Institute of Personnel and Development (2004), Fact sheet on employee turnover and retention.

A LITERATURE REVIEW ON THE ROLE OF MASS MEDIA IN RURAL DEVELOPMENT

DR. A. KUMUDHA
ASSOCIATE PROFESSOR (BUSINESS ADMINISTRATION)
PSGR KRISHNAMMAL COLLEGE FOR WOMEN
COIMBATORE

THILAGA.S
RESEARCH SCHOLAR (BUSINESS ADMINISTRATION)
PSGR KRISHNAMMAL COLLEGE FOR WOMEN
COIMBATORE

ABSTRACT

With the development of new communication technologies, the power of mass media has gained greater importance. The media is pivotal in defining what we think, how we look and our social place and issues in the society. Mass media has been significantly influencing the social, cultural, economic, spiritual, political and religious aspects of society as well as personal level thinking, feeling and acting. Media disseminates information and had created the need for revolution in contemporary society. Mass media plays both positive and negative role in the society. In this article an extensive review of literature has been carried on to analyse and to get a good understanding on the role of mass media in rural development. Literature review has been done from various books, journals, published papers etc. These studies have been reviewed and presented in the following manner. Literature review has been collected from both within India and outside India.

KEYWORDS
Communication, Media, Radio, Rural development, TV.

INTRODUCTION

Communication is a process of sharing meaning and experience between people (Okunna, 1999, p.72). It is an activity or process that entails mutual partaking or exchange of ideas, information, feelings, emotions and reactions (Unoh, 1991 cited in Okoro and Agbo, 2003). Communication is a critical factor for any momentous growth to take place in the society. This explains why Asemah and et al. (2013, p.18) had rightly brought out that information is pivotal to all forms of human activity no matter the field, be it medicine, agriculture, tourism or engineering. Radio, TV or any other forms of media is an necessary medium of communication for achieving development in the rural areas, as issues of development are taken to audience in the form of various programmes and individuals are exposed to happenings in and around their society, either through listening or watching to these programmes. Thus, this paper focuses on the reviews which have examined the role of media in various forms and led to the rural development.

REVIEW OF LITERATURE

The following were the major efforts at research in the subject, which have been referred for the research purpose.

1. Abdulwahab Olanrewaju Issa (2000) emphasized on the usefulness of information and above all, the need for it to be adequately and widely disseminated to all segments of the society. He also discusses on the role of the popular mass-media of information dissemination such as the Radio, Television and Newspaper and has critically examined against the backdrop of the peculiarities that constitute the lots of the rural persons. With this he also brings out the specific role of librarianship as an information profession that could greatly complement those of the other mass-media in the task of proper and adequate dissemination of appropriately needed information to this undeniably indispensable but often neglected segment of our society. It is concluded in the paper that the combined efforts on the parts of these information professionals that the hope to rise above the challenges of information dissemination to these rural dwellers actually lies.

2. Arokoyo (2003) has conducted his study in Nigeria which revealed that although video, radio, and television are the major sources of information for the farmers of this country, in the case of establishing the foundations, it is also possible to use other developed equipment. In Nigeria, the print media have a specific situation in agriculture transferring as well. Television is acknowledged as the most important medium for communicating with the rural populations of developing countries (FAO, 2001).

3. Chinyere Stella Okunna (1992) discusses how communication has become widely accepted all over the developing world as an effective tool for rural development and tries to find out what communication media are used by rural women in Nigeria as sources of development information. He evaluates that this faith in the power of development communication often appears to be misplaced, as development fails to measure up to larger expectations even after huge resources have been invested in development communication. Many of the failures of development communication projects arise from the application of improper development paradigms and communication strategies which overemphasize the mass media as channels of communication in the development process.

4. Clever Maputseni (2006) brings out the importance of media in influencing the development. The research is based on a case study of the radio programme sponsored by an NGO, which is broadcast on national radio, to study the extent of its usefulness for the growth of marginalized farm communities in Zimbabwe. The research findings indicate that radio remains a popular medium with communities and development actors that still see it to be useful in spreading of development messages.

5. Kirk Johnson (2001) has analyzed the role of television in rural life, and the influence it has had on various social, economic and political processes that have been revolutionizing the India villages in recent years. Taking data from two villages in Maharashtra, he discusses the unique characteristics of television that make it an important agent of cultural change by analyzes various social processes that include consumerism, urban modelling, restructuring of human relationships, linguistic hegemony, migration and the emergence of an information underclass. He concluded with a discussion of social change at both the structural as well as psychological levels.

6. Laverack and Dap (2003) has discussed about the use of information by the rural elites of Vietnam. In order to access information, a great percentage of rural elites of Vietnam use single-page publications, posters and radio, and obtaining the necessary information through these media has been accompanied with a great success.

7. Leo O. N. Edegoh and et al. (2013) has discussed about the potential role of radio to inform, educate and entertain its audience, its capacity to break illiteracy barriers as well as its power to penetrate into the remote areas of the rural communities in Nigeria. They have found that a good number of rural women listen to radio and that programmes that interest them most are health related and agricultural programmes. The study recommends the utilisation of radio by government and its agencies for disseminating messages intended for rural people.

8. W.W Manoj Pushpa Kumara Jinadasa (2011), in his paper has brought out that traditional folk-media is a good wealth in effective communication. He also discusses about some key aspects such as the closeness to rural life, credibility, utilization of familiar signs and symbols, community participation, collective

presentation, utilization of past experience, plot and the subjects from their own life and the minimum media literacy for folk-media which are related to the communication for rural community development in Srilanka. In this article he points out that communicating a message through entertainment was the practices of this model for which Folk songs, ritual performances, drumming and all other folk communication were used creatively. Finally he has analysed the effect or the influence of the communication using two methods as the live observation analysis and later impact analysis.

9. Mudasiru Olalere Yusuf and et al. emphasized in their study the perception of rural women on the impact of mass media on their social, economic, and political development. The data collected, using a researcher-developed interview guide from 144 rural women belonging to Kwara State, Nigeria, were analysed using percentages, means, and chi-square statistics. Findings revealed that the most of the women in the rural areas had access to the media and agreed that these were effective in their social, economic and political development. No significant difference was established between the literate and the illiterate and between farmers and traders who are rural women in their perception of the effect of mass media on their development.

10. Muhammad Irfan and et al. (2006) in their study based out of Lahore district of Pakistan points out the role of mass media in the dissemination of agricultural technologies among farmers. Here the agricultural production is comparatively lower than that of many other countries of the world. Even within the country there is a big gap between average and potential yields of various agricultural crops which clearly indicates that the available technologies, if adopted by farmers according to the recommendations, can enhance agricultural production considerably. Therefore, there is a dire need to apply science and technology in the field of agriculture and to achieve this objective; the extension agencies are disseminating new technologies through different means including mass media. A random sampling technique was used for selecting sample with a total sample size of 120 respondents. A vast majority of the respondents did not listen / watch agricultural radio/TV broadcasts frequently or occasionally. With regard to effectiveness, the respondents ranked TV, radio and print media as 1st, 2nd and 3rd, respectively.

11. Dr Nabi Bux Jumani (2009) discusses in his paper the role of information media with specific reference to rural development to bring about a change in the quality of the life of rural people in Pakistan. The utility of radio as a media of information transfer for assisting in rural development has been established worldwide and there are several ways in which the technology of communication media can be used to further the education. The important use of broadcast media is their contribution to the educational system; in both formal and non-formal education and also has brought out how effectively a radio could be used in rural development.

12. Omolade Obukohwo Sanni (2013) examined the influence of broadcast economic programmes in rural communities in terms of economic knowledge, training and management using a survey method among Ijede community in Ikorodu local Government area, Lagos state and Ikereku community in Akinyele local government area, Oyo state, Nigeria. The study was based in development media theory, uses and gratification theory and agenda setting theory. The study finds that respondents get enlightened through information disseminated in the economic programmes aired by radio and television thereby improving their standard of living, economic standard and development in their communities and concludes that informative attributes of broadcast economic programmes improve their awareness in terms of economic knowledge, training and management.

13. Osakue Stevenson Omoera (2010) examined the effectiveness of the broadcast media, specifically radio and television in creating and disseminating family planning information on matters of number and spacing of children in rural Nigeria, using Ebelle community in Igueben Local Government Area of Edo State as a study case using a survey questionnaire method. The study revealed that radio and television, through certain programmes, have helped in the dissemination of relevant information on family planning in rural settings just as they have purportedly done in urban centres in Nigeria. Hence, the paper recommended that the broadcast media should be massively deployed to disseminate significant messages on issues such as contraceptive alternatives, distended family size, female genital mutilation, "area boys" cultism in the streets, sexually transmitted infections, malnutrition, among others, that have the potentials of destroying family hood. Eventually, the redress of these challenges would redound to the cohesion and progress of the average rural family in Nigeria.

14. Osunkunle, Oluyinka O aims to evaluate the role of community radios in bringing about development in the rural areas of Limpopo Province in South Africa by a case study method and analyse the contributions of "Radio Turf" station and some other radio stations by evaluating their programming and communication strategies towards ensuring development in their communities. To have a clear understanding of the activities and impact of Radio Turf, he has used theoretical analysis and focus groups interviews to tackle identified research problems and has also evaluated the station's programmes and its impact on the communities.

15. Dr. D. Puthira Prathap and Dr. K. A. Ponnusamy (2006) in their study experimentally examines the effectiveness of mass media viz., radio, television, print and internet in influencing the symbolic adoption behaviour of rural women on rabbit farming technologies with a sample of 144 rural women belonging to self-help groups of Coimbatore district in Tamil Nadu, India. Their results indicated that all the four mass media formats were effective enough in persuading the respondents to mentally adopt the technologies. It was also found that there existed significant differences in the effectiveness of the four channels in 'recommended breeds' and 'feeding' technologies and the radio-exposed group had differed significantly from the other three groups in terms of symbolic adoption and have identified radio as the most effective and better medium.

16. Rao RL, Krishnamurthy B and Ganesamoorthi S. (2003) discusses on the impact of media on the position of women in society and their development. Communication in rural areas in a country like India is a necessary and vital process and paves way for modernization and social change. Studies have found that nearly 40 per cent of farm women either read newspaper or have them read by someone else. In an agricultural country like India, having differing development themes for rural women, the best approach for those who want to reach the rural women would be to use a blend of the print, broadcast and multimedia approach to gain the advantages.

17. Saad Ullah Khan (2010), discusses on the role of community radio which has proved to be one of the best medium of communication at the grass-root level as it can easily cover a wider range of area as well as diversified audience in a vast country like India. Indian government is spending million of rupees in the name of rural development, but still it's not getting the desired results as one of the foremost reasons is the communication gap between government devised policies and common masses as people largely remain ignorant regarding them for which a firm communication policy will prove crucial. According to this policy, local community media should be promoted in order to enhance community development, at least at grass root level.

18. Shweta Upadhyay and et al. (2011) in their study investigated media utilization, preferences and prospect for use in nutrition education service delivery in three villages of Uttarakhand State. A total of 223 women respondents in the age group of 18-45 years were selected using a random sampling technique and used Questionnaires/interview schedules. Media possession data showed that the TV was most commonly possessed and used media whereas print media was found to be less popular compared to electronic media. They have also brought out that effectiveness for information dissemination was the major reasons for TV usage/ preference. The study also revealed that media preferences in descending order were: television, radio, poster, calendar, lecture, audiocassettes, booklets, charts and newspaper. Finally it was recommended that development agencies should take advantage of women's preferences to ensure best possible effect of various food and nutrition related extension programmes.

19. Stephen Ocheni and Basil C. Nwankwo (2012) critically evaluates that news for reporters focus more on the negative things and give least attention to any good news about the rural communities in Nigeria which has resulted in the increase of rural poverty and has not effectively exposed the appalling conditions under which the rural dwellers live in. The study finally concluded by observing that the trend should be reversed immediately and that the news reporters in Nigeria should show more devotion in the coverage of events in the rural areas so as to make the government know and understand the plights of the rural dwellers for effective public policy-making to reduce the present level of rural poverty and reverse the current rise in rural-urban migration in the country.

20. Vandana Kumari (2011) conducted her study in the Mirzapur village with a sample of 60 respondents. Her study was based on a household survey using a schedule and personal interview and adopted purposive sampling method to find the "Impact of television programmes on rural women". Thus from the study it was concluded that rural women are an important part of our country. Because of their busy schedule they have no time to watch television and therefore it does not impact on the life of rural masses especially the women.

CONCLUSION

With the pervasiveness of mass media, human beings do not live in information vacuum; rather, they are part of the complex communicational network which influences their views and interactions with the world (Serban, 2004). With this it is clear that mass media plays a pivotal role in rural development. Although there is enough research literature on the role of mass media on rural development, most of the studies have been done to study the role of information dissemination which has created both a positive and a negative impact on the society. The present study makes an attempt to investigate the upper-handed role of mass media on rural development.

REFERENCES

1. Abdulwahab Olanrewaju Issa (2000), "Information dissemination to the rural persons in Nigeria: a librarian's perspective" Department of Library and Information Science, Federal Polytechnic, Offa.
2. Arokoyo, T. (2003), "ICT's for agriculture extension transformation. Proceeding of ICT's – transforming agriculture extension? CTA's observatory on ICT's", 6th consultative Expert Meeting. Wageningen, 23 – 25 September.
3. Asemah, E. S., Anum, V. and Edegoh, L. O. N. (2013), "Radio as a tool for rural development in Nigeria- Prospects and challenges", International Journal of Arts and Humanities. Vol. 2 (1). pp.17-35
4. Chinyere Stella Okunna (1992) "Sources of Development Information among Rural Women in Nigeria: A Case Study", Africa Media Review, Vol. 6 No. 3 1992, African Council for Communication Education
5. Clever Maputseni (2006) "Using Radio for Advocacy and Communication of Issues Affecting Farm Communities in Zimbabwe", Unpublished thesis, June 2006
6. Dr. D. Puthira Prathap and Dr. K. A. Ponnusamy (2006) "Mass Media and Symbolic Adoption Behavior of Rural Women" Studies in Media & Information Literacy Education, Volume 6, Issue 4 ,November 2006, 1–10 ,University of Toronto Press. DOI: 10.3138/sim.6.4.002
7. Dr. Nabi Bux Jumani (2009), "Study on Role of Radio for rural education in Pakistan", Turkish Online Journal of Distance Education-TOJDE October 2009, ISSN:1302-6488, Vol.10, No.4, Article-11.
8. Kirk Johnson (2001) "Media and social change: the modernizing influences of television in rural India", Media,Culture and Society, 23.
9. Laverack, G. and Dap, D.H. (2003), "Transforming information, education and communication in Vietnam Health Education"; 103(6): 363 – 369.
10. Leo O. N. Edegoh, Ezekiel S. Asemah, Angela N. Nwammuo(2013), "Radio Listening Habit of Rural Women in Idemili South Local Government Area of Anambra State, Nigeria" IOSR Journal Of Humanities And Social Science (IOSR-JHSS) Volume 15, Issue 5 (Sep. - Oct. 2013), pp. 21-26 e-ISSN: 2279-0837, p-ISSN: 2279-0845
11. Mohammad Reza Nazari , "Impact of television on rural development" Department of Media Studies, Faculty of Art and Social Sciences, University Malaya, Malaysia Islamic Republic of Iran Broadcasting (IRIB) East Asia Center, Kuala Lumpur, Malaysia, http://eprints.um.edu.my/3342/1/IMPACT_OF_TELEVISION _ON_RURAL.pdf
12. Mudasiru Olalere Yusuf, Florence Olutunu Daramola and Alice Arinlade Jekayinfa "Non-formal education: perception of rural Women on the impact of mass media on their social, economic, and political Development", Unpublished.
13. Muhammad Irfan, Sher Muhammad1, Ghazanfar Ali Khan and Muhammad Asif (2006) "Role of Mass Media in the Dissemination of Agricultural Technologies among Farmers" International Journal Of Agriculture & Biology, 1560–8530/2006/08–3–417–419 , http://www.fspublishers.org
14. Okoro, N. and Agbo, B. (2003), "Writing for the media society. Nsukka: Prize Publishers
15. Okunna, C. S. (1999), "Introduction to mass communication (2nd ed.)", Enugu: New Generation Books.
16. Omolade Obukohwo Sanni (2013) "Influence of Broadcast economic programmes on rural community development in Lagos and Oyo states, Nigeria" International Journal of Education and Research, ISSN 2201-6333, Vol. 1 No. 4 April 2013.
17. Osakue Stevenson Omoera(2010) "Broadcast Media in Family Planning Matters in Rural Nigeria:The Ebelle Scenario" J Communication, 1(2): 77-85 (2010)
18. Osunkunle, Oluyinka O "Using radio as a tool for rural development in Limpopo Province of South Africa: An evaluation of case studies", Ejournalist.com.au, 8(2), pp.43-64.
19. Rao RL, Krishnamurthy B and Ganesamoorthi S. (2003) "Impact of Mass Media Communication on the Development of Rural Women", Citation: International Conference on Communication for Development in the Information Age: Extending the Benefits of Technology for All. 07-09 January 2003
20. Saad Ullah Khan (2010) "Role of community radio in rural Development" Aligarh Muslim University, Aligarh 202002, U.P., India, Unpublished, http://www.caluniv.ac.in/Global%20mdia%20journal/ student_research-june-2010/s%20u%20khan%20-amu.pdf
21. Serban, L. (2004). Influence of mass media on Ohioans' knowledge, attitudes and behaviours regarding physical activities and health. M.Sc. thesis submitted to the faculty of the College of Communication of Ohio University. Retrieved September 13 , 2008 from http://www.ohiolink.edu/etd/send-pdf.cgi/Serban%20Liliana.pdf?acc_num=ohiou1103231890
22. Shweta Upadhyay, A. R. Kumar, R. S. Raghuvanshi and B.B. Singh (2011) "Media accessibility, Utilization and Preference for Food and Nutritional Information by Rural Women of India" J Communication, 2 (1): 33-40 (2011)
23. Stephen Ocheni and Basil C. Nwankwo (2012) "The Role of Mass Media in Rural Information System in Nigeria", Vol. 3, No. 3, 2012, pp. 10-14, ISSN 1923-0176 DOI:10.3968/j.sss.1923018420120303.1935
24. Vandana Kumari (2011) "Impact of television on rural women: A study of Mirzapur village. District (Kurukshetra)" International Referred Research Journal, May, 2011, ISSN-0975-3486, and Rni: Rajbil 2009/30097, Vol-II,Issue- 20
25. W.W Manoj Pushpa Kumara Jinadasa(2011),"Community Development Programmes and Folk-Media: A Communication model for Sri Lankan Rural Society" Global Media Journal – Indian Edition/ISSN 2249-5835 Winter Issue / December 2011 Vol. 2/No.2.

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

http://ijrcm.org.in/

STUDY OF MOTIVATIONAL PARAMETERS OF FTAS (FOREIGN TOURIST ARRIVALS) FOR MEDICAL TOURISM IN INDIA

KAUSHAL DESAI
ASST. PROFESSOR
S. S. AGRAWAL INSTITUTE OF MANAGEMENT & TECHNOLOGY
NAVSARI

VISHVESH PATEL
ASST. PROFESSOR
S. S. AGRAWAL INSTITUTE OF MANAGEMENT & TECHNOLOGY
NAVSARI

PARAG MORE
ASST. PROFESSOR
S. S. AGRAWAL INSTITUTE OF MANAGEMENT & TECHNOLOGY
NAVSARI

ABSTRACT

This research paper analysed the major motivational parameters for foreign tourists to visit India. There are various motivational parameters like beach tourism, heritage tourism, medical tourism etc. attract lots of tourists from all over the world to India but this literature is mainly focused on the medical tourism as one of the major motivational parameters for the foreign tourist to visit India. Literature also mention, with the help of secondary data, the various reasons like cheap medical services, speedy medical procedures, government support to medical tourists, simple visa procedure for foreign medical tourists, world class health care, specialised and educated doctors, Ayurveda therapy, yoga's etc. which helps INDIA to become the global destination for medical tourism.

KEYWORDS
Foreign Tourist, Medical Tourism, Medical Tourist.

INTRODUCTION

Motivation is the act of stimulating for someone or oneself to get the desired course of action. Travel motivation is the psychological construct which holds a multidimensional underlying structure. People are travelling to various places to meet different needs. Travellers may hold different sets of motivations when travelling to different destinations, for different occasions and with different companions. Individual travel motivators are influenced by their culture, background and previous experiences. It is believed that all the travellers are different. They all must identify as the different segment. All the tourists have different attitudes, perceptions and motivations. Motivations have an important influence on travel decisions. There are two types of travel motivators.

- Intrinsic motivators.
- Extrinsic motivators.

The intrinsic travel motivators recognise that each individual has unique personal needs and wants that stimulate them to pursue travel. Some of them needs are associated with to satisfy their personal needs. For example: - becoming a tourist for self improvement as to achieve a state of happiness. It may also help boost one's ego because of the personal confidence building that travel can encourage. One the other hand extrinsic motivation approach views the broader conditioning factors that shape individual attitudes, preferences and perceptions. There are lots of various travel motivators which encourage individual to travel domestic as well as international. These travel motivators are as under:

- A desire to escape from routine environment.
- The hunt of relaxation and healing functions.
- Prestige.
- The escalation of family bonds.
- Social interactions.
- Educational opportunities.
- Wish fulfilment.
- Shopping etc.

MOTIVES TO TRAVEL TO INDIA

India has for so long been the sightseer's paradise. India offers three oceans, five thousand years of history and external sun. The Arabian Sea, the Indian Ocean and the Bay of Bengal evade multitude of magic names, the Malabar Coast, the coast of Coromandalam, Kerala, Mahabalipuram and Konark. Cape Comorian or kanniyakumari where all the seas join beneath the world's most incredible sunset. The entire coastline is stretched thousand kms. is laced with the rich history of ancient cultures, palace, temples, villages and great cities. India is the mixture all 5 A's which consist of Attraction, Accommodation, Accessibility, Amenities and Activities which attracts hundreds of foreign tourist as well as domestic tourists. According to provisional statistics 6.29 million foreign tourists arrived in India in 2011, an increase of 8.9% from 5.78 million in 2010. This ranks India as the 38th country in the world in terms of foreign tourist arrivals.

LITERATURE REVIEW

A number of tourist approaches have been posited for understanding tourist motivations. Some researchers believe that tourist has multiple motivations while some believes that tourists have a single motivation at one particular point of time while they travel. This literature describes about the motivational functions of Foreign Tourists to visit India and how medical tourism is one of the major motivations for Foreign Tourists to visit India.

DATA

All the data about foreign tourists arrival, top 10 source country, top 10 state/U.T. of India where most foreign tourists visit, and about month wise foreign tourist arrivals are collected from the govt of India's website i.e. is Secondary data.

TABLE 1: FOREIGN TOURIST ARRIVAL IN INDIA (FTAs) IN INDIA [1997-2012]		
FOREIGN TOURIST ARRIVAL (FTAS) DURING THE YEARS 1997-2012		
Year	**Foreign Tourist Arrivals (in million)**	**Percentage (%) Change over the Previous Year**
1997	2.37	3.8
1998	2.36	-0.7
1999	2.48	5.2
2000	2.65	6.7
2001	2.54	-4.2
2002	2.38	-6
2003	2.73	14.3
2004	3.46	26.8
2005	3.92	13.3
2006	4.45	13.5
2007	5.08	14.3
2008	5.28	4
2009	5.17	-2.2
2010	5.78	11.8
2011	6.29	8.9
2012 (Jan-June)	3.24	7.4

Source: http://tourism.gov.in/writereaddata/CMSPagePicture/file/marketresearch/INDIATOURISMSTATICS(ENGLISH).pdf

TABLE 2: MONTH WISE FOREIGN TOURISTS ARRIVALS (FTAs) IN INDIA 2010-2012					
MONTH-WISE FOREIGN TOURIST ARRIVALS IN INDIA, 2010-2012					
Month	**Foreign Tourist Arrivals (FTAs) in India**				
	2010	**2011**	**2012**	**Percentage (%) Change**	
				2011/2010	**2012/2011**
January	568719	623885	681282	9.70	9.20
February	552152	635527	677472	15.10	6.60
March	512152	550051	622658	7.40	13.20
April	371956	437792	452239	17.70	3.30
May	332087	355333	371678	7.00	4.60
June	384642	412336	432128	7.20	4.80
July	466715	513853		10.10	
August	422173	444548		5.30	
September	369821	401995		8.70	
October	507093	562873		11.00	
November	608178	636762		4.70	
December	680004	715364		5.20	
Total	5775692	6290319	3237457	8.90	
Subtotal (Jan-June)	2721708	3014924	3237457	10.80	7.40

Source: http://tourism.gov.in/writereaddata/CMSPagePicture/file/marketresearch/INDIATOURISMSTATICS(ENGLISH).pdf

Foreign tourists mostly prefer to visit India in the months between October to march because of the pleasant weather and less tourist arrivals between March to September because of the hot and humid weather.

TABLE 3: TOP 10 SOURCE COUNTRIES FOR FOREIGN TOURISTS ARRIVALS (FTAS) IN INDIA IN 2011			
TOP 10 SOURCE COUNTRIES FOR FOREIGN TOURISTS ARRIVALS (FTAs) IN INDIA IN 2011			
Sr. No.	**Source Country**	**FTAs (in million)**	**Percentage (%) Share**
1	USA	1.004	15.97
2	UK	0.791	12.57
3	Bangladesh	0.399	6.34
4	Sri Lanka	0.305	4.85
5	Canada	0.255	4.05
6	Germany	0.253	4.02
7	France	0.237	3.76
8	Malaysia	0.218	3.46
9	Japan	0.189	3.01
10	Australia	0.186	2.96
	Total of Top 10 Countries	3.837	60.98
	Others	2.453	39.02
	All Countries	6.29	100

Source: http://tourism.gov.in/writereaddata/CMSPagePicture/file/marketresearch/INDIATOURISMSTATICS(ENGLISH).pdf

TABLE 4: SHARE OF TOP 10 STATES/ U.T.'S OF INDIA IN NUMBER OF FOREIGN TOURITS VISIT TO INDIA IN 2011

Rank	State/UT	Domestic Tourist Visits in 2011	
		Number	Percentage Share (%)
1	Maharashtra	4815421	24.70
2	Tamil Nadu	3373870	17.30
3	Delhi	2159925	11.10
4	Uttar Pradesh	1887095	9.70
5	Rajasthan	1351974	6.90
6	West Bengal	1213270	6.20
7	Bihar	972487	5.00
8	Kerala	732985	3.80
9	Karnataka	574005	2.90
10	Himachal Pradesh	484518	2.50
	Total of top 10 states	17565550	90.10
	Others	1929329	9.90
	Total	19494879	100.00

Note: The header inside the table reads "SHARE OF TOP 10 STATES/U.TS OF INDIA IN NUMBER OF DOMESTIC TOURIST VISIT IN 2011"

Source: http://tourism.gov.in/writereaddata/CMSPagePicture/file/marketresearch/INDIATOURISMSTATICS(ENGLISH).pdf

CONCEPT MAP
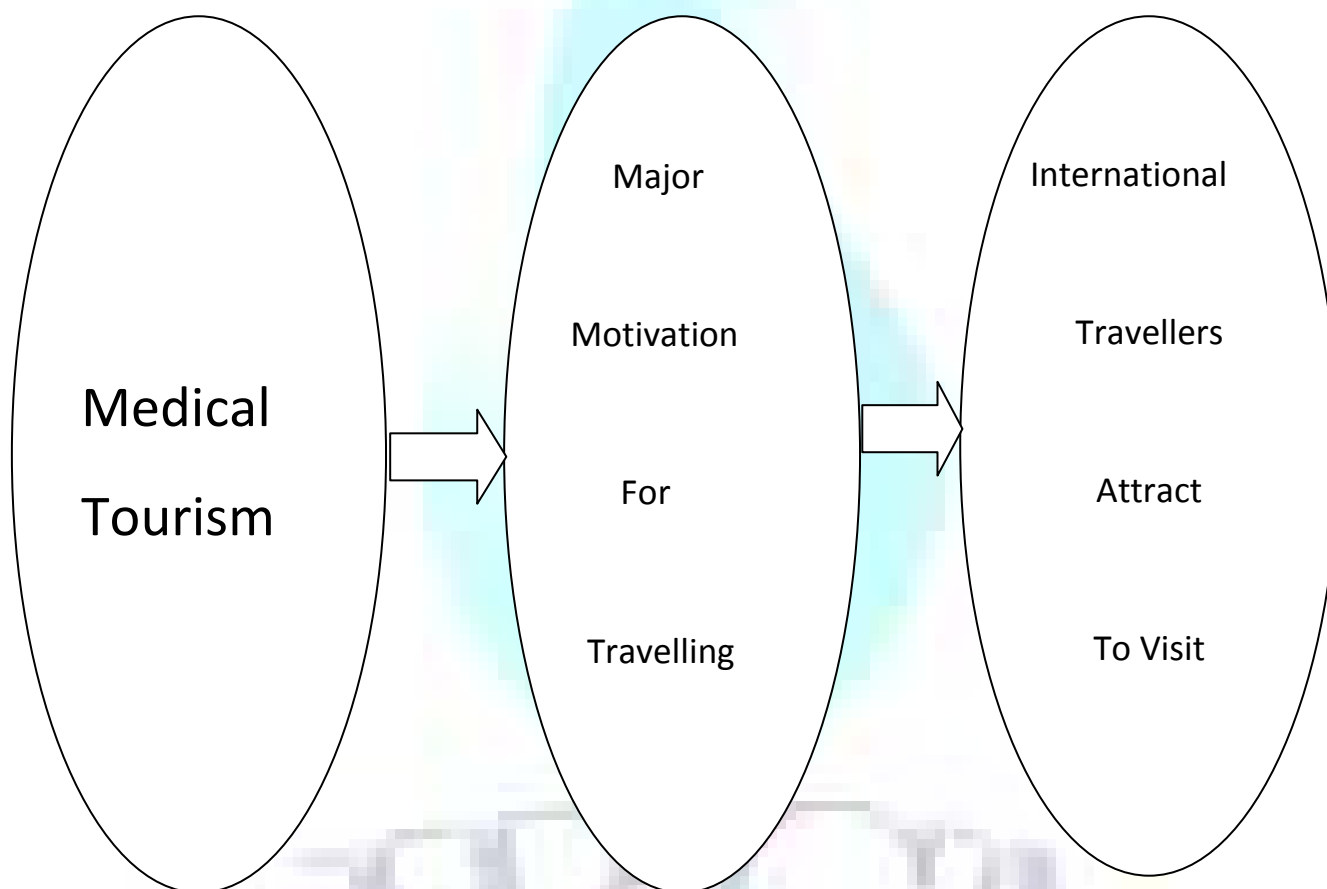
All the circles are interrelated like the first two circles shows that medical tourism is one of the major motivations to travel to India and last two circles shows that because of this motive Foreign Tourists are mainly attracted to travel India.

OBJECTIVES
1. To study the various motivational factors which attracts the foreign tourist to India
2. To study parameters which make India an important medical tourism destination

REASERCH DESIGN
This research is designed to measure various motives of Foreign Tourists to visit India. Data are collected from the government website, various journal articles and books. Research method is quantitative because literature includes people counts, surveys etc. The research design into two parts, part 1 described about the motives for Foreign Tourists to visit India in general and 2nd part is more focused on medical tourism as the major motivational function for Foreign Tourists to visit India.

LIMITATIONS
The main limitation of this literature is that, it does not include personal interviews of international tourist who visit India.

DATA ANALYSIS & FINDINGS

PART 1
India attracts mostly tourists who are male and unmarried between 30 to 50 years. The largest proportions of tourists are from North America, Western Europe, Australia and Middle East. The western Europeans and North American tourist contribute over 54%. The average stay of tourists in India is six times longer than

its neighbouring countries. The average stay of international tourist in India is 28 days. There are 58 destinations which are mostly patronized by international tourists with the TajMahal of Agra and Delhi amongst the cities as the prime destinations [know India: news letter of India tourism, 1989]. The foreigners also visit to Goa, Rajasthan, and Kerala etc... In search of exotic beaches, ancient forts and palaces as well as rich heritage and culture, deserts. India is famous for the "TajMahal" – the symbol of love, which is considered as the one of the Seven Wonders of the World. 92% of the foreigners who visiting to India belongs to non packaged category, while remaining 8% use packages and stay for relatively shorter period 14 days. The non packaged category tourists arranged their own lodging and boarding facilities. Mostly 40-45% foreign tourist visits India for pleasure purpose, 20-25% tourist visit to India for business purpose and 10-15% travellers visit their friends and relatives.

India is a vast country with a large variety of tourist attractions which is yet to make its presence felt on the world tourism map. India always appeared to a class of international tourists for its oriental charm and mystery and this class visited India to know it. India is the destination which having enough charisma for every type of tourists. Like most developing countries India's major tourism generating markets are distant. Most travellers came from North America and Western Europe. Most travellers visit India between October to march because of the pleasant weather and less number of tourist arrivals between April to September because of hot and humid weather. International tourist arrivals in India have increased gradually in the last 15 years. India is a land of spectacular landscapes, enchanting coastlines, colourful seasons, wildlife paradise, aesthetic and exquisite traditions of architecture and land of rich music and dances. There are other motives like medical tourism, beach tourism, scenic tourism, heritage train tourism, heritage hotel tourism, shopping tourism etc.

PART 2

Nowadays medical tourism also becomes the major motivational factor for the foreign tourist to visit India. Medical tourism is the term refers to people who travel to other countries for health care and relaxation. Medical tourism in the western countries is so much costly and so much time consuming, but in the case of India it is cheaper and less time consuming. Nowadays India has become the hot medical tourism destination in the world. Medical tourism is becoming the most niche products in today's world scenario. India is referred as the global centre for the tourism. It offers everything from alternative Ayurvedic therapy to coronary bypass. India has also upgraded technology, absorbed western medical protocols, emphasised low cost and prompt attention. The Indian medical industry is growing by leaps and bounds. India is also referred as the contender for the top global medical tourism destination. The Indian medical tourism sector provides health care to 1, 00,000 to 1, 50,000 patients a year. The tourist arrivals in India for medical surgeries are increasing at the rate of 25%. Medical tourism is likely to increase even faster in future. There were almost 5, 00,000 medical tourists visit India [Indian express, www.Expresstravelandtourism.com]. India also offers holistic medical services with yoga, meditation, Ayurveda, allopathy etc. Foreign tourists also attract so much because of those diverse specialised services. The Indian government also educates and encouraged the travel agents to publicise certain specialised hospitals and medical treatment centres for promoting tourism.

There are several factors which encouraged the international tourists to visit India for medical tourism. The factors are as under.

1. COST OF SURGERIES

Medical procedure in India is much cheaper than the western countries. So that it attracts so many Foreign Tourists to visit India for medical surgeries. Lots of international patients come to India for cardiac surgery, dental treatment or hip replacement operations. The cost these operations are less than half of amount than their home country without any compromising in health care facilities. For example: - A small child of the united states with the hole in his heart was faced with a bill around $70,000, but the operation carried out in India at cost of $4400.

PROCEDURE	U.S.A	INDIA
CORONARY BYPASS	$1,76,000	$10,000
SPINAL FUSION	$90,000	$5500
ANGIOPLASTY	$82,000	$11,000
KNEE REPLACEMENT	$58,000	$8500
MASTECTOMY	$43,000	$7500

SOURCE:http://www.surgicalpatientsafety.facts.org/news/medical tourism.html

2. THE QUEUE

One of the tempting reasons to visit India for a medical procedure is that the patients need not to spend months or even a year waiting turn for treatment and compromise on your health. Waiting list for non-essential surgery such as knee-reconstruction may be as long as 18 months in the U.K. but in India whole procedure can be done in under a week and patients sent home after 10 days. The treatment begins in India even as soon as the day after you arrive in India. Indian hospitals provide immediate attention to medical tourists or have a minimal waiting period. So the international tourists need not to spend more time in hospitals and they can enjoy the rich Indian heritage as well as culture.

3. HIGH QUALITY OF HEALTH CARE

There are lots highly trained doctors and other health care professional in different specialists in India. These professionals provide world class Medicare facilities to the patients. The doctors of Indian hospitals are mostly trained abroad, in the U.K. and U.S.A. so that they are mostly aware about the international standards of medical procedures, so that an international traveller get benefitted and feels like they are in their home environment. Many doctors are also members of international professional organisation.

4. PERSONALISED HEALTH CARE FACILITIES

In India all guests referred as the God. In terms of medical tourism the entire international tourist group refereed as the most important segment. Indian hospitals provide superior nursing care to the patients. Senior consultants also provide personalized attention towards patients than hospitals in the west. So the international patients feel like home away from home. One patient from USA named Mrs. Nilonfer Rozario recommends that the nursing staffs are kind, efficient, and affectionate.

5. TECHNOLOGICAL SOPHISTICATION

Indian hospitals provide world class facilities and high quality Medicare. There are lots Indian hospitals e.g. Apollo Hospitals in Chennai, breach candy hospitals in Bombay are well equipped with modern technologies.

6. GOVERNMENT SUPPORT

Government of India has identified the tremendous potential of the medical tourism industry. Government also encourage hospitals to offer world class treatments by offering tax breaks and other incentives. There are lots of insurance companies which provide lots of benefits to foreign tourists. E.g.:- Canadian patients now get 75% of their expenses reimbursed after treatment in India. In the present span of time Government of India offers medical visas to avoid any travel delays. Government of India is always ready to help Foreign Tourists in several ways, so that travellers never feel any inconvenience.

7. EASE OF COMMUNICATION

Sometimes language becomes the major barrier in communication for travellers while they visit internationally. But in India's case English is widely spoken in all major cities in India. All the doctors and other health care staff in corporate hospitals speak English. So that it is so much convenient for international patients to communicate about their health care problems with doctors and health care staff.

8. AVAILIBILITY OF DRUGS

The pharmaceutical industry in India is one of the largest in the world and India exports drugs to several countries. Most medications are available at a comparatively lower cost than in western countries.

9. A COMBINATION OF MODERN AND TRADITIONAL MEDICINE

India offers both modern as well as traditional medical treatments in a high class manner. Indian hospitals also provide the best treatments in modern medicine for some of the most complex medical procedures in relatively lower prices than western countries with no compromising in services. Indian doctors also specialise in cardiology, orthopaedic surgery, cancer therapy, dental surgery etc...These hospitals also provide rejuvenation and holistic treatments in alternative

medicine such as Ayurveda, Homeopathy, meditation and yoga. Kerala [southern state of India] is so much popular for the Ayurvedic therapy. There are lots of resorts who provide Ayurvedic therapy as well as Vedic astrology.

For example: - Nirmalayam Ayurvedic retreat in Kerala attracts lots of international tourists and tourist enjoys the Ayurvedic treatment and scenic beauty together in god's own country.

10.   EXEPERIENCE INDIA

Medical tourism in India is all about combining medical procedures with a luxury vacation to experience the beauty and rich cultural heritage of India. This is possible when the international patient came to India for minor surgery and if the doctor allows than the tourists visit to sun kissed beaches, beautiful hill stations, heritage monuments etc... There are lots of travel agencies who provide special packages for medical tourists. It includes medical treatments and sightseeing.

CONCLUSION

Lastly we would like to conclude that India is the mixture of culture, heritage, scenic beauty, palace hotels etc...India is always referred as the incredible India. India can easily attract lots of foreign tourists from all over the world. India has lots of things to offer. India has a rich heritage culture, wellness of spa, amazing hill stations, ancient temples etc. But nowadays medical tourism is becoming the most prime motivation for international traveller to visit India. Medical tourism sector is a growing source of foreign exchange as well as prestige and goodwill outside the country. Indian consulates and missions abroad face a growing number of inquiries about "M"- medical visas. Government also improve airport infrastructure to smooth the arrival and departure of the guest. There are lots of factors like cheap medical services, speedy medical procedures, govt. support to medical tourists, simple visa procedure for foreign medical tourists, world class health care, specialised and educated doctors, Ayurvedic therapy, yoga's etc. will mainly motivates foreign medical tourists to visit India and experience medical treatments and rich cultural heritage of India.

REFERANCES

1.   Ahmed, Z. 1992, Marketing India as a tourist destination in North America—challenges and opportunities, in international journal of hospitality management, Vol. 11, issue 2, Elsevier, U.K., p.p. 89-98.
2.   Chaudhary, M. 1996, India tourism: a paradoxical product, in journal of tourism management, vol. 17, issue 8, Elsevier, U.K., p.p. 616-619.
3.   Chaudhary, M. 2000, India's image as a tourist destination – a perspective of foreign tourist, in journal of tourism management, Vol. 21, issue 3, Elsevier, U.K., p.p. 293-297.
4.   Connell, J. 2006, medical tourism: sea, sun, sand and surgery, in journal of tourism management, Vol. 27, issue 6, Elsevier, Australia, p.p. 1093-1100.
5.   Mani, R. 2006, India: what makes it an attractive medical tourism destination? , in tourism destination in medical tourism: A Bangalore perspective, chillibreeze publication, India, p.p. 1-7.
6.   Martin, D., Woodside, A. 2008, travel motivations: a critical review of concept's development, in tourism management: analysis, behaviour and strategy, CABI, U.K., p.p. 14-20.
7.   Mudur, G. 2004, hospitals in India woo foreign tourist, in British medical journal, Vol. 328, issue 5 June 2004, New Delhi, p. 1338.
8.   Page, S. 2009, demand: why do people engage in tourism, in tourism management: managing for change, Elsevier, U.S.A., p.p. 81-104.
9.   Raguraman, K. 1998, troubled passage to India, in journal of tourism management, Vol. 19, issue 3, Elsevier, U.K., p.p. 533-543.
10. Seth, R. 2005, sun, sand and coast of India, in tourism in India: an overview [2nd edition], India, p.p. 87-94.

STUDY LINUX POWER – BY DESIGN AND IMPLEMENTATION OF COMMANDS AS QUERIES FOR READING DATA

MANPREET SINGH SANDHU
RESEARCH SCHOLAR
MEWAR UNIVERSITY
CHITTORGARH

DR. SAURABH SRIVASTAVA
ASST. PROFESSOR
DEPARMENT OF MATH & COMPUTER APPLICATION
BUNDELKHAND UNIVERSITY
JHANSI

ABSTRACT

In today's scenario data is growing and people need it for personal and professional use. This data reporting helps understand consumer behavior, help build business plans and also other MIS reports for various other reasons. All this is required and with minimal cost. Costing or cost effectiveness, productivity, efficiency all are need of the hour in today's world – both personally and professionally.[1] It can cost up to $40,000 to keep a large proprietary database on your own computer network or servers and to process it with your own software, according to former Sun Microsystems engineer Jignesh Shah (see his former colleague, fellow Sun, and now Oracle engineer, Allan Packer's blog post[2] All working professionals are involved in one type or the other type of report making activity from the raw data, and for this there are many reporting tools and databases in the market by some of the major giants. Obviously there is a lot of license cost one have to bear to use the branded reporting tools plus the training cost to get the work force get trained on the specific tool.[2] It has been observed that people who are into reporting believe in famous and favorite tools rather than fabulous efficient tools or techniques. The idea is to bring into picture the alternative, efficient, accurate, possible cost effective reporting methodology – for many normal, to above average reporting floors, professionals. In this paper, focus is on the demostration of unix and unix based system commands for extraction of data like SQL commands to do the same.

KEYWORDS

Data extraction linux, GNU Tools, Linux, Query Text Data, Text data extraction.

INTRODUCTION

As it is clear that data plays a very vital and important role in our personal and professional life, and its use in the form of report / reporting is essential and beneficial thing, now the focus is on what is the grey problematic area and solution for the same.

PROBLEM STATEMENT

Report making - how?
Cost in terms of money and time?
General-layman's Solution:
Buy a tool from market and start using it, adjust yourself and your needs with the tools capability.
Of course one needs to pay the cost for the tool and training cost as well.

SUGGESTED SOLUTION

Look around for alternative/s.
Minimize the cost in term of money and time.
The suggested solution sounds great but the big question is how?

WHAT IS A DATABASE?

Here we have few solutions to choose from. Many corporate houses already started this trend to use tools like Microsoft excel for reporting, filtration, pivoting, data projection etc.

Not only tools like MS-Excel is easy to learn, but also number of professionals who have knowledge of the same are available easily everywhere, it is cost effective, accurate, and powerful both speed and analytical capability wise. New versions for this kind of tool(s)/software's introduced new features which make them more flexible, versatile and powerful/useful in practical sense.

Almost in every office where there is need for reporting and are using computers one can find use of excel or similar types of tools/software's. This is single handed strong statement / proof of market and scope of small, powerful tools.

Telecom, banking and other industries use data in csv or text format to answer many questions, reporting and/or for data analysis. In this, they need to clean, transform data before doing analysis. Alternate to this, linux / unix commands can be use effectively for data filter and data extraction just like data SQL queries.

A database is combination of data + base that is collection of data at one base central place which is related to a particular topic or purpose. A database management system (DBMS) is a application software / system that manages information /data. It is used to help in organize data according to a required subject or topic.[3][4]

Many Corporate managers and management people possess strong spreadsheet skills, but database designing is different from spreadsheet designing, the rules are entirely different.

- Spreadsheet design have different viewpoint and carries very few rules, so comparatively spreadsheets are easy to create. But not all spreadsheets are clear and most of them lack data integrity. When spreadsheet designs have no clarity or logic, then it is difficult to modify data and formulas, and that leads to erroneous situation.
- Database is more formal and has rules or standards to follow. Errors are less likely to occur with a properly designed database, and it is feasible to extract data for obtaining reports etc.

A TIMELINE OF DATABASE HISTORY[5]

Ancient Times: Manual systems to store data for reference purpose is not new, in the ancient times, starting from old human civilizations till just before the start of computer systems come into lime-light, man has used one or the other means to store data for variety of purposes.

Year 1960s: Computerized database started in the year 1960s.

Year 1970: E.F. Codd introduced and propose the use of a relational database model, which has changed the way people thought about databases.

Year 1976: ERD a new database model was proposed.

Year 1980s: SQL - Structured Query Language, became the standard language for databases and querying.

Year 1990s(starting): New client tools for application development were released, Examples Oracle Developer (D2K), PowerBuilder, VB, etc.

Year 1990s(Mid): Starting of Internet era led to growth of the database industry. Users began to use client-server database systems architecture to access computer systems that contained legacy data.

Year 1990s(Late): Huge investment in online businesses resulted in a rise in demand for Internet database connectors like JSP, ASP CF-tags, Dream Weaver, Java Beans, and Oracle Developer. The use of open source solution to the Internet also been introduced.

Year 2000s: Era of new age - new interactive applications were developed for PDAs, and hand-held devices, and consolidation of vendors. There are few leading database companies in the world are Microsoft, IBM, SAP, and Oracle.

USE A DATABASE IF…

- If the amount of data would become unmanageable and real time scenario exists.
- When real time database is required and you want to maintain records for ongoing usage.
- There are chances of many changes in the existing data.
- Many and complicated reports are based on the information, which is highly scattered.

WHY DO YOU NEED A DATABASE?[6]

Need of Databases can be tested using below mentioned questions which help analysis and understand need for databases usage

1. You find entering the same values of information into multiple spreadsheets / reports / documents?
2. When making changes results in other document to get changed manually?
3. Data is large and becoming larger and unmanageable.
4. When tracking related information in several spreadsheets – such as separate sheets for sales for different departments?
5. When viewing some specific data but in-0turn you need to open the entire set of data records? Or do you have a difficulty to filter specific data with some other details?

FEATURES OF OPERATING SYSTEMS[7]

Every operating system differs from each other in some features while there are some features which are common in all operating systems. *Few features are listed below:*

- **Software and hardware management:** Component management and software management is the important job of OS.
- **Consistent API:** Application Program Interface (API) allows different applications that run on a computer to work on other computers as well. But there base OS should be same.
- **Execution of programs:** Programs running in the computer are completely dependent on the operating system. The multitasking and multithreading features of the operating system are dependent upon the type of program execution feature of O.S.
- **Interruptions:** Interruption may happen at any time while using the computers. This is famously referred to as event driven programming in windows which allow and handle many numbers of interrupts/Events.
- **Managing memory:** The operating system provides the memory for the programs that are executed at any moment.
- **Networking:** Interconnection of computers to share resources is the new era computing and the operating system is the one which plays an important role to make it possible.
- **Security:** Security is the important feature in any operating system. Any new age operating system should be well capable to takes care of all security issues.

THE POWER OF UNIX / LINUX[8]

Linux / UNIX based operating systems are in and gained a lot of popularity for various reasons. The main difference between linux and unix lies in the fact that Linux falls under general public license and is available freely, but on the other hand, UNIX is the copyrighted name. Mostly it is same. The Linux kernel being Open Source can be modified when required.

The major advantages of Linux / UNIX are as following

- Stability
  - Linux or UNIX operating systems are much more stable than the others.
- Free software
  - Linux kernel is available free of cost and most of the applications are also available freely. Although many application in unix is also free but UNIX is copyrights.
- Portable - Runs on any hardware
  - Linux can run on any machine. In that very sense is portable and it has minimum hardware requirements.
- Security
  - Till date no virus threats have been reported that has affected the Linux or the UNIX kernel.
- Open source software
  - Linux and UNIX are open source software whose code is available to all the users worldwide and you may choose to debug any problem that you may find out or add any module that is necessary to suit your specific needs.
- Portability
  - Websites that you design on a UNIX or a Linux based platform can easily be hosted on other operating systems servers as well but the reverse is not always true.

FIG. 1
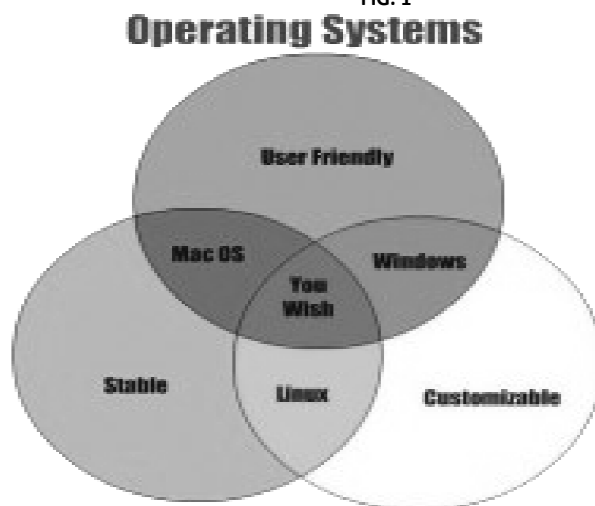
BACKGROUND

This trend was started by many people. One of such personality is Larry Wall. Larry is known for PERL, a famous language for reporting and automation based on unix. He developed perl interpreter and language while working for Unisys.

As unix was the platform in Larry's era and he designed and developed PERL for reporting, it gained popularity for the same reason we have discussed above i.e. low cost, automated, accurate, efficient data extraction tool language for reporting.

This language i.e. PERL is dynamic language released in the year 1987 by Larry Wall for reporting and some people call it as "Practical Extraction Reporting Language".

PERL is still programming solution with tedeous syntax and learning curve. Not everyone is interested to go with it.

UNIX/LINUX COMMAND POWER

Unix and linux is treated as consisted, powerful operating system, most of its commands are external utilties. The real power of unix/linux comes with its commands, pipes and filters.

Unix and unix based systems like linux has a philosophy that everything is file and on file basic operations like reading and writing are supported. A file in unix or unix based systems can be named position based (location based) recordable media or can be in memory that is virtual media based file. In that sense unix and unix based systems classify file as standard or regular files, directory files, or special files based on types.

Redirection feature also play a vital role and is one of the undisputed important feature of unix and related systems, in which reading and writing of data stream is possible.

One of the example is as follows:

$ ls –l | sort > new_ls.txt

Text data files can be treated as data table store and in that way linux commands, pipes and filters can used in combination to extract data in the desired fashion. Apart from the commands, filters and pipes other features like support of wild-card and regular expressions also play a vital role for text pattern matching and hence data fetching.

DATA DEALING MEANS SQL AND DATABASE SERVER??

As we know any data driven reporting means a lot of activities which are generally database related activities like selection, projection, joining of data, summarization of data, filter based data, concatenation of data to produce pseudo columns, etc.

SQL queries are the perfect answer to this kind of problems, where these activities are accomplished with minimum efforts as SQL is meant to do these things. The big fuss is money and resource cost and training cost.

If one can perform the same type of stuff done and accomplished by SQL without the use of database server, then we can get rid of resource requirement plus resource cost and special learning curve of SQL.

This is something which can be accomplished through linux/unix commands, one can achieve almost all things / can perform all things that can be done using database queries for lower to middle level data driven floors or offices.

Almost, 60% offices fall in this category, which are not doing reporting on the global or volume data all time.

As linux is free and used as operating System its knowledge and learning is not a big issue, same applies to its availability and cost, one cannot raise eye-brows on the security, performance and stability of linux/unix, which makes it further a number one choice.

The only thing is to focus on attitude to use it like a tool or rather say query tool to query and report data. Its efficiency and performance is unquestionable.

METHODOLOGY

How commands can act as SQL queries?

All the people who interact with data have to deal with retrieval of data which can be done using select command of any database SQL language, it is so common and important in day to activities, this can be achieved in linux using cat command.

So the comparable commands are as follows:

SQL:	select * from tablename;
Linux:	cat filename

All people at all time don't need all columns or fields in the output, so the database SQL command for the above requirement can fulfilled using the following commands in SQL and linux;

Assumption:	assuming there are 5 fields but user wants to retrieve only first 2.
SQL:	select col1, col2 from tablename;
Linux:	cut–d " " f1,f2 filename

Common scenario in SQL is to count the total number to rows in a table, this can be accomplished using the following commands;

SQL:	select count(*) from tablename;
Linux:	wc –l filename

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

http://ijrcm.org.in/

Data appears in the result as it is available in the original order, but Sorting data can change the order, to achieve this we can use various forms of the linux command like;

SQL:	select col1, col2 from tablename order by col1;
Linux:	sort filename

For reverse order use

SQL:	select col1, col2 from tablename order by col1 desc;
Linux:	sort –r filename

Let see a table with utilities and intended work done on data files:[9]

UTILTIY	MEANING / WORKING
cat	To display contents of file
cut	Extract desired columns, or data
head	Extraction of few top lines from text file
less	Display specified lines from file
join	Fields from first and second file on the basis of some common value
more	Similar to less
ls	List files in directory
nl	Adds file number to a file
od	Demo files
paste	Merge lines of files
pr	Breaks files to pages
sed / awk	Special utilities for data extraction and manipulation
grep	Filter lines on the basis of criteria
sort	Sorting of data
uniq	Non redundant data
wc	Counting of words, lines and characters from file or data

Above commands of unix and unix based systems along with pipes and filters can do all things that SQL commands can on tables in there respective systems. Pipes of unix and related systems act as or can be used as subqueries.
Redirectional operators can cause new table formation equivalent. Inner and outer joins are also possible with the help of join command (different operator like –a –v -1 etc)

LIMITATION OF WORK/SOLUTION

Although, the unix and unix based commands are well capable of doing data extraction as been done using SQL but in no way it is an attempt to replace the same. This is not possible because of multiple resons like

- Concurrency control
- Multi-langual support
- ACID properties implementation
- Volumn of data handling
- Backup and restore
- Recovery mechanism
- Replication
- Performance (to some extent – in cases), etc

Unix and unix based systems can't comment on performance factor, otherwise accuracy is fine, feasibility is also questionable for non unix based professionals.

CONCLUSION

It is clear that data stores, data-marts, reports, analyais, etc are day to day activities and is integral part of job for anyone. The cost, complexity to perform the job plays vital role for the profitability of the organisation. Altough, there are so much of advancement and research devleopment going on on modern day databases's but at the same time it is also a fact that tools and techniques like unix and unix based commands, Excel, etc can do the job in fantastic manner. It not only make job simple, and cost effective but proves that these kind of belief on old and existing technologies can prove fantastic, fabulous with more awareness it will for sure become famous as well.

REFERENCES

1. http://www.axial.net/blog/costs-of-your-database/
2. https://blogs.oracle.com/jkshah/entry/cost_of_proprietary_database
3. Jeffrey Ullman 1997: First course in database systems, Prentice-Hall Inc., Simon & Schuster, Page 1, ISBN 0-13-861337-0.
4. Beynon-Davies P. (2004). Database Systems 3rd Edition. Palgrave, Basingstoke, UK. ISBN 1-4039-1601-2
5. http://quickbase.intuit.com/articles/timeline-of-database-history
6. http://www.cdis-now.com/uploads/media/WhyDoYouNeedaDatabase.pdf
7. Ritchie, Dennis. "Unix Manual, first edition". Lucent Technologies. Retrieved 22 November 2012.
8. http://www.tutorialspoint.com/operating_system/os_linux.htm
9. http://linux.about.com/od/commands/l/blcmds.htm

FURTHER SUGGESTED READING

- http://en.wikipedia.org/wiki/Comparison_of_database_tools
- http://en.wikipedia.org/wiki/List_of_relational_database_management_systems
- http://en.wikipedia.org/wiki/Database
- http://abacus.bates.edu/wmarchive/INTRO_papers.html
- http://comjnl.oxfordjournals.org/content/35/4/322.full.pdf
- http://www.linux.org/
- http://www.thegeekstuff.com/2010/11/50-linux-commands/
- http://en.wikipedia.org/wiki/Operating_system

STUDYING THE RELATIONSHIP BETWEEN ISSUING ACCEPTABLE AUDITING REPORT AND AUDITOR'S CHARACTERISTICS IN ELECTRICITY DISTRIBUTION COMPANIES IN IRAN

SEYYED SAMANEH SALEHI
RESEARCH SCHOLAR
ACCOUNTING DEPARTMENT
SCIENCE & RESERCH BRANCH
ISLAMIC AZAD UNIVERSITY
GIULAN

MOHAMMAD MOHSEN NOURBAKHSH
ASST. PROFESSOR
MANAGEMENT DEPARTMENT
ISLAMIC AZAD UNIVERSITY
RASHT

ABSTRACT

In this research the relationship between issuing acceptable reports of auditing with a characteristics of auditors' in electricity distribution companies in Iran (depending on the base company of Tavanir) was investigated. To do so, active companies in electricity distribution industry were studied for the period between 2008 and 2012. Independent variables of this research included: 1- auditing firm type, 2- tenure of an audit, 3- auditing cost, 4- auditor's job experiences, and 5- auditor's rank. The dependent variable for this research was acceptable auditing report. Our statistical sample included 34 companies from among those electricity distributing companies and the data gathered to study the research hypotheses were analyzed by Eviews software and analyzed in the form of logistic regression. Results of investigations showed that none of corporate governance system elements have had a meaningful relationship with acceptable auditing report.

KEYWORDS

corporate governance system, acceptable auditing reports**.**

INTRODUCTION

ithout any doubts auditing is an assuring process about reliability and relatedness of information in financial statements. The existence of controversy between the benefits of stockholders and managers renders a specific importance to an audit to remove this controversy. Auditing, as an efficient mechanism, assures the stockholders that whether managers have acted to the benefit of stockholders' or not. Thus, the use of auditing is to assure stockholders and other beneficiaries who have contracts with the company (Walker, 2003). Since reports of auditors are considered as useful information in the process of making decisions by financial statements' users, the goal of this research is first to recognize and investigate effective factors in issuing acceptable auditing reports in electricity distributing firms during a 5 years time period and then to devise and suggest a pattern to identify it. The importance of this research is due to the fact that it tries to show experimentally to formal auditors' assembly, financial analysts, investors, and other users of accounting information that managers in business units permanently try to show their performance to be positive through the receipt of acceptable auditing reports. Electricity industry is a dynamic and effective one due to its fundamental role and its relations with all factors affecting economic growth. Due to the broad spread of electricity energy we can consider it as one of the main factors setting the backgrounds for economic development in the country. Electricity industry is divided into three main parts of: production, distribution, and transfer and each of them is important in its own place. Regarding accounting approaches electricity companies need audited financial statements to collect their claims in time because they have a key role in optimal energy use and are among some limited resources and the audited financial statements of these companies are left to users (especially contractors) who get the responsibility of administrative equipments of electricity in planning and to absorb their trust. Also this issue is fundamentally important due to the future plans to cede stocks of electricity distributing companies. Also different strategies have been posed in financial literature to reduce agency problem and one of the most important issues in this regard is firm's corporate governance system. Firm's corporate governance system is the process of supervising and controlling firm's management to get confidence about the convergence of their performances with stockholders' benefits and the most important elements related to it are: stockholders and their ownership type, members of board of directors and its composition, and … .

RESEARCH LITERATURE

RESEARCH CARRIED OYT IN IRAN

Alavi-e-Tabari & et al (2009) found out in studying about the quality of auditing and earning prediction that those companies that are audited by specialized auditors have shown a higher earning prediction precision and less earning prediction deviation. Also the results of their research showed that size of auditing entity has a reverse relationship with earning prediction.

Vahidi & et al (2009) found out in their studies about withdrawals of internal and independent auditors and the efficiency of alarm signs in discovering fraudulent financial reporting that there is not a main difference between withdrawal of internal and independent auditors. Also they showed that experience amount and job rank are effective in withdrawals of internal auditors regarding the efficiency of alarms. However, these two variables were not effective regarding independent auditors.

Bahman Banimahd (2012) showed in his research that the probability of issuing an acceptable auditing report varies affected by: ownership change, auditing privatization, opinion expression phenomenon, changing audit from one private auditing entity into another private auditing entity, and firm size, respectively. From among the variables mentioned above, all variables except firm size audited by an auditor have a direct relationship with the probability of issuing an independent acceptable auditing report.

FOREIGEN RESEARCHES

Chen & et al (2010) found out in a study in China that by merging a Chinese auditing company with one of big auditing entities (Ernest Wiong's institution) 30 employers out of 46 employers of this Chinese auditing entity changed their auditor and selected smaller auditing entities as their auditors. They showed that the incentive of 30 companies in changing auditors was to receive acceptable auditing report against low quality of auditing. Based on the results gained competition in auditing can reduce auditing quality.

Fafatas (2010) studied audit's conservatism after bankruptcy of auditing entities in his research. He found out that after the rule Sarbenz-Axely was approved, the conservatism of auditors after bankruptcy of some auditing entitles has increased. His research findings approved that using conservative accounting approaches has increased among the employers of these entities and in other words, auditors have enforced the use of these approaches for their employers.

Mohammad Saleh & Esmaeel (2011) studied about the role of auditing quality and corporate governance approaches to reduce earning management in initial stock offering in Malaysian Stock Exchange. They used firm size to measure auditing quality and used auditing committee and board of directors to measure corporate governance. Jones' adjusted model (1995) was a base for earning management identification. Results of their studies showed that auditing quality index based on firm size does not have a meaningful relationship with earning management for initial stock offering. On the other hand, independence of auditing committee and total managers not in charge have a positive relationship with earning management in Malaysian companies and this shows the effectiveness of elements in corporate governance.

RESEARCHE GOALS

The main goal of this research is to study the relationship between issuing acceptable auditing report and characteristics of auditors in electricity distribution companies in Iran (depending on base professional company of Tavanir) through hypotheses utilized in the research. Also the ideal goal of this research is to step forwards to reduce information asymmetry and try to present transparent, related, and reliable information for the users on the part of suppliers to let investors and creditors to be able to analyze financial reports of companies in a more conscious way in order to make decisions. In this way they can analyze financial statements that have had acceptable auditing reports with a broader outlook (regarding the consideration of independent research variables here) and make more appropriate decisions.

RESEARCHES METHODOLOGY

The present research is post incidental regarding time which deals with financial data of the company in the past and studies hypotheses. Also it is applied regarding the nature of its goal and the results gained could be used directly in decision makings by the users. Research data are of aggregate data and in order to discover the relationship between two variables we have used a correlation method by using logistic regression model. Information in this research include data gained from financial reports and data and information about electricity distributing companies which have been estimated based on research models to devise a base for testing hypotheses. Raw data needed about companies in order to study research hypotheses were collected directly and face to face through studying financial statements of electricity distributing companies and after comparing and removing lack of frequent harmonies and transferring into Excel broadsheet were transmitted into Eviews7 software for final analysis.

The statistical population for this research includes all electricity distributing companies during the time period between 2008 and 2012. Of course, the following limitations were observed in order to collect data through the statistical society to form our research sample:

1- Financial information needed and audited financial statements of firms should be complete and accessible.
2- Auditing report of companies should be acceptable or conditioned. We should have chosen two report types from among four ones as: acceptable, conditioned, lack of opinion expression, and rejection. This was due to the selection of binary logistic regression model to analyze data.

Regarding the limitations above, our research sample entailed 34 electricity distributing companies (depending on base professional company of Tavanir).

RESEARCHES HYPOTHESIS

H1: There is a meaningful relationship between auditing firm type and acceptable auditing reports.
H2: There is a meaningful relationship between tenure of an audit and acceptable auditing reports.
H3: There is a meaningful relationship between auditing cost and acceptable auditing reports.
H4: There is a meaningful relationship between auditor's job experiences and acceptable auditing reports.
H5: There is a meaningful relationship between auditor's rank and acceptable auditing reports.

INDEPENDENT VARIABLE

Independent variables in this research include: 1- auditing firm type (audit organization or auditing entities), 2- tenure of an audit, 3- auditing cost, 4- auditor's job experiences, and 5- auditor's rank. The methods to calculate each of these variables are described below:

1- **Auditing firm type:** if auditing has been carried out by audit organization number 1 will be attributed, and if not 0 will be attributed.
2- **Tenure of an audit:** if auditor has changed compared to the previous year, number 1 will be attributed and if not 0 will be attributed.
3- **Auditing cost:** here the logarithm of sum of auditing costs during audit period will be used.
4- **Auditor's job experiences:** if auditor has had auditing experiences in firms under investigations, number 1 will be attributed and if not 0 will be attributed.
5- **Auditor's rank:** auditor's rank will be measured in the form of (A, A+, B, B+). This ranking will be carried out according to the marks determined by formal auditors' association in Iran. This means that if a company is put in groups A, and A+, number 1 will be attributed to it and if the auditing company is put in group B, and B+, 0 will be attributed to it.

DEPENDENT RESEARCH VARIABLE

The dependent research variable here is acceptable auditing report. This variable is a virtual variable which was shown with 1 or 0. 1 represented acceptable auditing report while 0 was considered to show conditioned auditing report.

RESEARCHE FINDINGS

In this part and in order to enter information analysis stage, the descriptive statistics of data including central indexes, dispersion indexes, and deviation from symmetry and also Jarque-Bera test which approve normal distribution of leftovers were calculated and results were represented in table 1.

TESTING DEPENDENT VARIABLE ' NORMALITY

Since normality of data distribution was one of the presuppositions in regression model, first normality of the distribution of research variables was investigated and Jarque-Bera's test was utilized to do so. In order to test normality of dependent variable we also used a test. If the probability of statistics was less than %5 (prob. < 0.05), H_0 claiming that error sentence and dependent variable is normal will be rejected. Based on calculations estimated by Eviews7 software represented in table 1, all probabilities are equal to 0. Thus, null hypothesis is rejected and it was found that the distribution of data in variables were not normal. To normalize the dependent variable we use Johnson's transformation in Minitab software and the transformation function of dependent variables has been presented in figure (1). As it can be seen in figure (1), the probability of statistics of initial data was less than 0.005 (prob. < 0.05) and this showed that dependent variable was not normal. By normalizing data using Minitab software the probability of statistics increased to 0.864 for UAR variable. Thus, in this case H_0 regarding the normality of error sentence and dependent variable is approved.

DIAGRAM 1 - TEST NORMALIZE JOHNSON TRANSFORMATION FOR THE DEPENDENT VARIABLE UAR
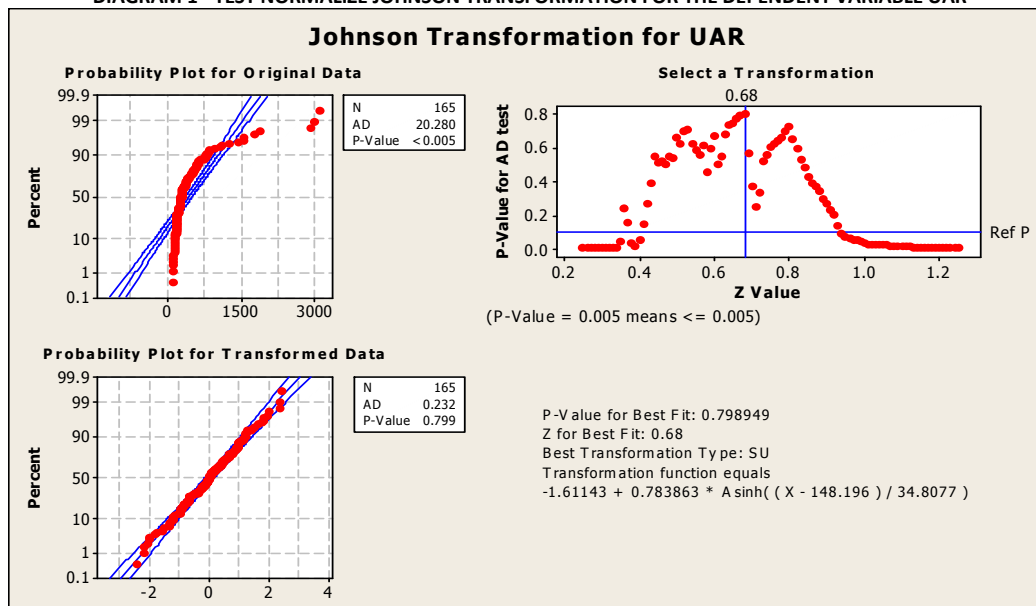
Then we will try to describe tests carried out by Eviews software version 7.01.

CHOW TEST OR TEST OF STRUCTURAL CHANGES RELATED TO HYPOTHESES

In order to test research hypotheses first time fixed effects model was estimated and then to study about the meaningfulness difference we used structural changes test. This test is hypothesized in the following way to investigate about the existence of fixed effects:

H_0: lack of existence of fixed effects ---- pooled model
H_1: existence of fixed effects ---- fixed effects model

TABLE (1): RESULTS OF CHOW TEST RELATED TO RESEARCH HYPOTHESES

Results of Chow				
Assumptions	**Cross-sections**	**Statistics**	**Degrees of freedom**	**P-VALUE**
first hypothesis	F-statistic	0.725484	(32,131)	0.8537
	Kai-do	26.920338	32	0.7215
second hypothesis	F-statistic	0.717776	(32,131)	0.8617
	Kai-do	26.656211	32	0.7339
third hypothesis	F-statistic	0.702322	(32,131)	0.8770
	Kai-do	26.125397	32	0.7580
fourth hypothesis	F-statistic	0.719739	(32,131)	0.8597
	Kai-do	26.723535	32	0.7308
fifth hypothesis	F-statistic	0.692012	(32,131)	0.8867
	Kai-do	25.770338	32	0.7737

As it can be seen, regarding the meaningfulness level gained in the hypothesis, latitudes from base are rejected. In this stage pooled model is selected as the preferred model for these hypotheses. The statistical method used in this research was binary logistic regression and we also used Logit method.

First hypothesis: There is a meaningful relationship between auditing firm type (audit organization or auditing entities) and acceptable auditing report.

$UAR = \beta_0 + \beta_1 CA$

TABLE (2): RESULTS OF ESTIMATION GAINED FROM TESTING THE HYPOTHESIS USING LOGIT METHOD

Variables	Coefficient	Criterion deviation	t statistics	Meaningfulness
Fixed number	-0.075035	0.158225	-1.474230	0.6353
Firm's audits	0.480500	0.926482	0.518629	0.6040
McFadden identification coefficient	0.001202	Average of dependent variable		0.484848
Criterion deviation of dependent variable	0.501292	Standard error of regression		0.502410
Akikeh index	1.407952	The amount of residuals		41.14375
Shwarts index	1.445600	Likelihood of interruption		-114.1561
Hannan-Queen index	1.423235	Deviation		228.3122
Limited deviation	228.5870	Limited likelihood of interruption		-114.2935
LR statistics	0.274870	Average likelihood of interruption		-0.691855
LR statistics probability	0.600084			

Coefficients of regression model in figure 4-6 shows that in Logit method there is a positive relationship between auditing firm type (audit organization or auditing entities) and acceptable auditing report. This is not meaningful statistically and regarding McFadden identification coefficient (0.001), this relationship is weak. Also likelihood of interruption statistics shows that model is not meaningful on the whole. The positive relationship between these two variables showed that auditing firm type (audit organization or auditing entities) affects acceptable auditing report but the weakness of this relationship showed that there are numerous factors other than auditing firm type which affect acceptable auditing report.

Second hypothesis: There is a meaningful relationship between tenure of an audit and acceptable auditing report.

$UAR = \beta_0 + \beta_1 AT$

TABLE (3): RESULTS OF ESTIMATION GAINED FROM TESTING THE HYPOTHESIS USING LOGIT METHOD

Variables	Coefficient	Criterion deviation	t statistics	Meaningfulness
Fixed number	-0.043485	0.208564	-0.208498	0.8348
Tenure of an audit	-0.038753	0.313665	-0.123549	0.9017
McFadden identification coefficient	0.000067	Average of dependent variable		0.484848
Criterion deviation of dependent variable	0.501292	Standard error of regression		0.502804
Akikeh index	1.409526	The amount of residuals		41.20831
Shwarts index	1.447174	Likelihood of interruption		-114.2859
Hannan-Queen index	1.424808	Deviation		228.5718
Limited deviation	228.5870	Limited likelihood of interruption		-114.2935
LR statistics	0.015266	Average likelihood of interruption		-0.692642
LR statistics probability	0.901668			

Coefficients of regression model in figure 4-7 shows that in Logit method there is a negative relationship between tenure of an audit and acceptable auditing report. This is not meaningful statistically and regarding McFadden identification coefficient (0.00006), this relationship is very weak. Also likelihood of interruption statistics shows that model is not meaningful on the whole. The negative relationship between these two variables showed that tenure of an audit affects acceptable auditing report but the weakness of this relationship showed that there are numerous factors other than tenure of an audit which affect acceptable auditing report.

Third hypothesis: There is a meaningful relationship between auditing cost and acceptable auditing report.

UAR = $\beta_0 + \beta_1 AF$

TABLE (4): RESULTS OF ESTIMATION GAINED FROM TESTING THE HYPOTHESIS USING LOGIT METHOD

Variables	Coefficient	Criterion deviation	t statistics	Meaningfulness
Fixed number	0.032508	0.216210	0.150354	0.8805
Auditing cost	-0.000214	0.000347	-0.617261	0.5371
McFadden identification coefficient	0.001710	Average of dependent variable		0.484848
Criterion deviation of dependent variable	0.501292	Standard error of regression		0.500030
Akikeh index	1.407249	The amount of residuals		40.75487
Shwarts index	1.444897	Likelihood of interruption		-113.3762
Hannan-Queen index	1.422531	Deviation		226.7523
Limited deviation	228.5870	Limited likelihood of interruption		-114.2935
LR statistics	0.390971	Average likelihood of interruption		-0.687128
LR statistics probability	0.531789			

Coefficients of regression model in figure 4-9, shows that in Logit method there is a negative relationship between auditing cost and acceptable auditing report. This is not meaningful statistically and regarding McFadden identification coefficient (0.001), this relationship is very weak. Also likelihood of interruption statistics shows that model is not meaningful on the whole. The negative relationship between these two variables showed that auditing cost affects acceptable auditing report but the weakness of this relationship showed that there are numerous factors other than auditing cost which affect acceptable auditing report.

Fourth hypothesis: There is a meaningful relationship between auditor's job experiences and acceptable auditing report.

UAR = $\beta_0 + \beta_1 EA$

TABLE (5): RESULTS OF ESTIMATION GAINED FROM TESTING THE HYPOTHESIS USING LOGIT METHOD

Variables	Coefficient	Criterion deviation	t statistics	Meaningfulness
Fixed number	0.129212	0.254531	0.507647	0.6117
Auditor's job experiences	-0.304416	0.322366	-0.944319	0.3450
McFadden identification coefficient	0.003911	Average of dependent variable		0.484848
Criterion deviation of dependent variable	0.501292	Standard error of regression		0.500030
Akikeh index	1.404199	The amount of residuals		40.75487
Shwarts index	1.441847	Likelihood of interruption		-113.3762
Hannan-Queen index	1.419482	Deviation		226.7523
Limited deviation	228.5870	Limited likelihood of interruption		-114.2935
LR statistics	0.894117	Average likelihood of interruption		-0.687128
LR statistics probability	0.344364			

Coefficients of regression model in figure 4-10, shows that in Logit method there is a negative relationship between auditor's job experiences and acceptable auditing report. This is not meaningful statistically and regarding McFadden identification coefficient (0.003). Also likelihood of interruption statistics shows that model is meaningful on the whole. The negative relationship between these two variables showed that auditor's job experiences affect acceptable auditing report but the weakness of this relationship showed that there are numerous factors other than auditor's job experiences which affect acceptable auditing report.

Fifth hypothesis: There is a meaningful relationship between auditor's rank and acceptable auditing report.

UAR = $\beta_0 + \beta_1 RA$

TABLE (6): RESULTS OF ESTIMATION GAINED FROM TESTING THE HYPOTHESIS USING LOGIT METHOD

Variables	Coefficient	Criterion deviation	t statistics	Meaningfulness
Fixed number	0.202199	0.361776	0.558908	0.5762
Auditor's rank	-0.109090	0.135668	-0.804096	0.4213
McFadden identification coefficient	0.002844	Average of dependent variable		0.484848
Criterion deviation of dependent variable	0.501292	Standard error of regression		0.500030
Akikeh index	1.405679	The amount of residuals		40.75487
Shwarts index	1.443327	Likelihood of interruption		-113.3762
Hannan-Queen index	1.420961	Deviation		226.7523
Limited deviation	228.5870	Limited likelihood of interruption		-114.2935
LR statistics	0.650017	Average likelihood of interruption		-0.687128
LR statistics probability	0.420107			

Coefficients of regression model in figure 4-11, shows that in Logit method there is a negative relationship between auditor's rank and acceptable auditing report. This is not meaningful statistically and regarding McFadden identification coefficient (0.002). Also likelihood of interruption statistics shows that model is meaningful on the whole. The negative relationship between these two variables showed that auditor's rank affects acceptable auditing report but the weakness of this relationship showed that there are numerous factors other than auditor's rank which affect acceptable auditing report.

RESEARCHE LIMITATIONS

Like most developing countries, one of the limitations in the present research was lack of a complete access to financial statements through different ways while the information should be completely accessible for the users. The most important limitation was due to corporate governance information collection where there is a need to have access to articles of association but there hasn't been an appropriate strategy to present corporate governance information in notes accompanying financial statements and companies did not present the information precisely or repetitively every year

SUGGESTIONS FOR FUTURE RESEARCHES

1- Doing the research in another range such as Tehran Stock Exchange
2- Using other corporate governance indexes such as indexes G and E
3- Since there hasn't been any similar Iranian research found, carrying out similar researches during different time ranges , in isolated industries or each of corporate governance indexes (E and G) can describe this relationship better.
4- Using other elements of corporate governance (ownership of institutional stockholders, external stockholders with higher than %5 ownership, the percentage of independence of board of directors, …) and studying their relationship with acceptable auditing reports

RESEARCHE RESULTS

- Results gained from first hypothesis showed that there is not a meaningful relationship between auditing firm type (audit organization or auditing entities) and acceptable auditing report. In this way the amount of dependence of the dependent and independent variables were (0.001202) and this showed dependence amount and the strength of being affected by both of these variables on each other.
- Results gained from first hypothesis showed that there is not a meaningful relationship between tenure of an audit and acceptable auditing report. In this way the amount of dependence of the dependent and independent variables were (0.000067) and this showed dependence amount and the strength of being affected by both of these variables on each other.
- Results gained from first hypothesis showed that there is not a meaningful relationship between auditing cost and acceptable auditing report. In this way the amount of dependence of the dependent and independent variables were (0.001710) and this showed dependence amount and the strength of being affected by both of these variables on each other.
- Results gained from first hypothesis showed that there is not a meaningful relationship between auditor's job experiences and acceptable auditing report. In this way the amount of dependence of the dependent and independent variables were (0.003911) and this showed dependence amount and the strength of being affected by both of these variables on each other.
- Results gained from first hypothesis showed that there is not a meaningful relationship between auditor's rank and acceptable auditing report. In this way the amount of dependence of the dependent and independent variables were (0.002844) and this showed dependence amount and the strength of being affected by both of these variables on each other.

REFERENCES

1. Alavi-e-Tabari, A., et al. (2009), "Study found that firms that audit quality and earnings forecast by industry experts Hsabrsydr auditors of companies listed on Iran".
2. Banimahd, b. (2012), "Investigate the report issued by independent auditors acceptable to the Board accepted the characteristics enhancing the Tehran Stock Exchange".
3. Chen, M., et al. (2010), "The relationship between the incorporation of large auditing firms to audit Chinese companies".
4. Fafatas, S,. (2010), "Auditor conservatism following audit failures Managerial", Auditing Journal . Vol. 25, Iss. 7; pg. 639.
5. Mohammad Saleh, E., Esmaeel, A. (2011) , "Review of audit quality and corporate governance practices to mitigate earnings management in the initial offering of shares in the Malaysian stock".
6. Vahidi, M., et al. (2009), "Removal of internal auditors and independent study on the effectiveness of financial reporting wrongful detect warning signs of the listed companies in Iran".

MEDITATION: A KEY TO OVERCOME STRESS

JYOTI VIJ
ASST. PROFESSOR
DEPARTMENT OF COMPUTER SCIENCE
BABA MASTNATH UNIVERSITY
ASTHAL BOHAR, ROHTAK

KAVITA VIJ
ASST. PROFESSOR
DEPARTMENT OF MANAGEMENT & COMMERCE
BABA MASTNATH UNIVERSITY
ASTHAL BOHAR, ROHTAK

VINOD VIJ
ALUMNI
SHRI BABA MAST NATH INSTITUTE OF MANAGEMENT STUDIES AND RESEARCH
ASTHAL BOHAR, ROHTAK

ABSTRACT

Meditation is considered a type of mind-body complementary medicine. The purpose of this study was to evaluate the effectiveness of a meditation-based stress reduction. Regular practice of this technique appears to reduce trait anxiety and to develop qualities associated with self actualization, such as inner peace, satisfaction, and creativity. Meditations have tremendous benefits for stress management and overall health. There is no single relaxation technique that is best for everyone. Stress is harmful when it becomes overwhelming and interrupts the healthy state of equilibrium that your nervous system needs to remain in balance. Meditation can give you a sense of calm, peace and balance that benefits both your emotional well-being and your overall health. These days, meditation is commonly used for relaxation and stress reduction. Meditation is considered a type of mind-body complementary medicine Different styles of meditation have been reported in the experimental literature.

KEYWORDS
Stress, stressors, meditation

INTRODUCTION TO STRESS

Stress is a dynamic condition in which a person is faced constraint and strains. Stress is an discomfort of an individual. Stress in the workplace is a common occurrence that is dealt with in many ways, some positive and some negative; healthy ways to deal with stressors increases work satisfaction, decreases health problems, benefits relationships, and improves a person's outlook on life. stress is the no one problem for working people, many of whom are juggling work, home and the care of children and often times aging parents. It is no surprise that stress has increased. Stress creates the **"Fight or Flight"**

Stress is a part of everyday life and cannot be avoided completely. The way we cope with stress in the workplace affects our co-workers, employers, employees, our home life, our social life, and ourselves; it is important to raise awareness of this issue to benefit the aforementioned. It is also imperative for employers to take an active role in decreasing work related stress, hence increasing worker satisfaction, improving business, and promoting a positive work environment. Stress is a silent killer.

According to Hans Selye first introduced the term stress into life science. The term stress is derived from the Latin word "Stringer" which means to be drawn tight. Stress is a complex, dynamic process of interaction between a person and his or her life.

Recent study suggests that stress is killing young people at a faster rate than drugs or guns. They are suffering from heart attacks long life before the age of 50 along with strokes, diabetes, lindy disease and high blood pressure.

> It isn't event that determines whether we're stressed or not it is our reaction to them.

CAUSES AND EFFECTS OF STRESS

One of the main causes of employee stress is change. Change can come in many forms: changes in the industry, changes in the organization, strategies, organizational restructuring, policy changes, changes in responsibilities, and the addition of new equipment or technology. some other causes in stress are due to heavy work load, economic climate, changing male/female dynamics, role perception, life changes etc.

GENERAL CAUSES	SPECIFIC CAUSES
Organizational problems like : heavy work load, Dissatisfaction with the job	Isolation from colleagues support
Conflicts with neighbors' & friends	Role conflict
Changing male/female dynamics	Fighting unnecessary battles
Job uncertainty and insecurity	Inability to finish a job
Poor relation with co- workers	Lack of promotion
TASK RELATED CAUSES	**PHYSICAL CAUSES**
Long hours, excessive over time, rotating shift	Uncomfortable work area
Insufficient training	Mental and physical disorder
Difficult client or subordinate	Drug addiction
The responsibilities of the job	High blood pressure
High job demand	Digestion

Stress effects metabolism, increases heart beats and breathing rates, headache, anxiety, nervousness, irritation, cancer, blood vessels, speculation. Stress also effects working conditions, lighting, inadequate equipment, and an uncomfortable work station. Physically demanding work, and shift work are all sources of workplace stress. Stress causes loss of productivity, loss of efficiency, increased employee absenteeism, and many other problems. Stress comes from several aspects of an employee's life: the workplace, social factors, and personal factors.

ABOUT MEDITATION

The term meditation refers to a broad variety of practices that includes techniques designed to promote relaxation, build internal energy or life force and develop compassion, love, patience, generosity and forgiveness. Meditation often involves an internal effort to self-regulate the mind in some way.
 Meditation is often used to clear the mind and ease many health issues, such as high blood pressure, depression, and anxiety. It may be done sitting, or in an active way – for instance, Buddhist monks involve awareness in their day-to-day activities as a form of mind-training. Meditation may involve generating an emotional state for the purpose of analyzing that state – such as anger, hatred, etc. – or cultivating particular mental response to various phenomena, such as compassion.
The term "meditation" can refer to the state itself, as well as to practices or techniques employed to cultivate the state. Meditation may also involve repeating a mantra and closing the eyes. The mantra is chosen based on its suitability to the individual mediator.
Meditation has a calming effect and directs awareness inward until pure awareness is achieved, described as "being awake inside without being aware of anything except awareness itself."In brief, there are dozens of specific styles of meditation practice, and many different types of activity commonly referred to as meditative practices.

MEDITATION AND STRESS

If stress has you anxious, tense and worried, consider trying meditation. Spending even a few minutes in meditation can restore your calm and inner peace. Anyone can practice meditation. It's simple and inexpensive, and it doesn't require any special equipment. And you can practice meditation wherever you are — whether you're out for a walk, riding the bus, waiting at the doctor's office or even in the middle of a difficult business meeting. Meditation originally was meant to help deepen understanding of the sacred and mystical forces of life. These days, meditation is commonly used for relaxation and stress reduction.
Meditation is considered a type of mind-body complementary medicine. Meditation produces a deep state of relaxation and a tranquil mind. During meditation, you focus your attention and eliminate the stream of jumbled thoughts that may be crowding your mind and causing stress. This process results in enhanced physical and emotional well-being.
Stress is of course unavoidable, and the point of stress reduction and stress management programs is not to eliminate stress from our lives entirely. Life is always going to be full of challenges, and a life without some turmoil is not only impossible but is also undesirable. Many stress therapists, of course, recognize that regular meditation and relaxation can be of significant help in reducing stress to manageable and healthy levels, and relaxation and meditation exercises are now widely taught. Many therapists and psychiatrists are taking up meditation themselves, not only so that they can teach it more effectively to others but in order to deal with the very stressful demands of their own jobs, which can result in burnout. People often think of meditation as being nothing more than relaxation, and there is a famous book on meditation and health entitled "The Relaxation Response."
Meditation, however, not only involves relaxation (the cessation of unnecessary effort) but promotes mindfulness, which helps the stress-sufferer to recognize unhelpful patterns of thought that give rise to the stress response, and also involves the active cultivation of positive mental states such as loving-kindness, compassion, patience, and energy. The mindfulness meditation was a simple, but eye-opening experience. The idea behind meditation is to consciously relax your body and focus your thoughts on one thing for a sustained period. This occupies your mind, diverting it from the problems that are causing you stress. It gives your body time to relax and recuperate, and to clear away stress hormones that may have built up.

PURPOSE

The purpose of this paper is to look at stress in the workplace and its effects on family, medical and work effectiveness and how to overcome the effects of stress with meditation. By looking at a few studies, this paper will show the relevance between stress and meditation from the job and depression and issues in the family, issues with health problems and low job performance.

BENEFITS OF MEDITATION

The benefits of meditation are manifold because it can reverse your stress response, thereby shielding you from the effects of chronic stress. When practicing meditation, your heart rate and breathing slow down, your blood pressure normalizes, you use oxygen more efficiently, and you sweat less. Your adrenal glands produce less cortical, your mind ages at a slower rate, and your immune function improves. Your mind also clears and your creativity increases.
People who meditate regularly find it easier to give up life-damaging habits like smoking, drinking and drugs. Meditation research is still new, but promising. Meditation can give you a sense of calm, peace and balance that benefits both your emotional well-being and your overall health. And these benefits don't end when your meditation session ends. Meditation can help carry you more calmly through your day and can even improve certain medical conditions.

HOW MEDITATION WORKS

Meditation involves sitting in a relaxed position and clearing your mind. You may focus on a sound, like "ooommm," or on your own breathing, or on nothing at all. It's necessary to have at least 5 to 20 distraction-free minutes to spend. (Longer meditation sessions bring greater benefits, but sometimes starting slowly can help you maintain the practice long-term.) It's helpful to have silence and privacy, but more practiced meditators can practice meditation anywhere. Many practitioners of meditation attach a spiritual component to it, but it can also be a secular exercise.

HOW TO REMOVE STRESS WITH MEDITATION

ONE OF THE MAJOR ROLES TO REMOVE STRESS WITH MEDITATION IS PHYSICAL ACTIVITY
EXERCISE REGULARLY: Exercise, at least 30 minutes, three times per Week like aerobics
FOCUSING ON AN OBJECT: you completely focus attention on examination of an object. Look at it in immense detail for the entire meditation.
FOCUS ON A SOUND: people like to focus on sounds they make. The classic example is the Sanskrit word "Om", meaning "perfection". Whether or not this is practical depends on your lifestyle.
WITH IMAGINATION: This can be a very refreshing and pleasant way of meditating.
SOME OTHER WAYS TO REMOVE STRESS
Fragrance of flowers, Entertainment, Always think positives, Reduce work load, By spending time on hilly areas, Eat healthy food, Providing counseling , Get enough sleep, Encourage good Time management, Adopt a healthy lifestyle, Goal setting & jobs designing, Know your limits, Role management , A good social support system, And the last TO MAINTAIN A SENSE OF HUMOR.

LITERATURE REVIEW

Research suggests that workers under the age of 30 feel stress because most of these workers are entering their first career related job and must excel. Workers between the ages of 31 and 40 have job related stress due to job dissatisfaction and lack of feedback and lack of promotion.
Some of the key research on meditation was carrier out by Dr. Herbert Benson of Harvard University. In a series of experiments into various popular meditation techniques, Dr. Benson established that these techniques had a very real effect on reducing stress and controlling the fight-or-flight response. Direct effects

included slowed heartbeat and breathing, reduced oxygen consumption and The idea behind meditation is to consciously relax your body and focus your thoughts on one thing for a sustained period. This occupies your mind, diverting it from the problems that are causing you stress. It gives your body time to relax and recuperate, and to clear away stress hormones that may have built up.

Dr. Gaurav Bissa, Dr. Amit Sharmain26 in their paper talks about managing stress as per Meditation. The idea behind meditation is to consciously relax your body and focus your thoughts on one thing for a sustained period. This occupies your mind, diverting it from the problems that are causing you stress and gives your body a time to relax and recuperate, and to clear away stress hormones. Meditation is a useful and practical relaxation technique Selye (1975) and McGrath (1976) also suggest an inverted-U relationship between stress and performance. It is responsibility of the organization to introduce the Yoga, Meditation and soothing humor for the stress management at workplace Solo-Passive/Group-Passive: - Television, Movies, Shows &Theatre, Listening to music, Concepts, opera, Sporting events, Vacations.

"A healthy way to handle Work place stress through Yoga, Meditation and Soothing Humor" Revati C. Deshpande International Journal of Environmental Sciences Volume 2 No.4, 2012 2147

Stress can be defined as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. Job stress can lead to poor health and even injury (Sauter et al) this research focuses on use of Yoga, Meditation and soothing humor as stress management techniques for a stress free organization.

Kulkarni GK (2006) in an article Burnout published in Indian Journal of Occupational and Environmental Medicine 2006 said that rapid change of the modern working life is associated with increasing demands of learning new skills, need to adopt to new types of work, pressure of higher productivity and quality of work, time pressure and hectic jobs are increasing stress among the workforce. Further he added that privatization and globalization has ignited mergers, acquisitions, and precarious employment has critically affected the domestic industry. Stress that an employee encounters affects the productivity of organization (Bhattacharjee, 2009).

Keeley and Harcourt (2001) in their study on —Occupational Stress: A Study of the New Zealand and Reserve Bank Revealed that stress is caused by heavy work demands in the job itself, which the unskilled employee with little control over how the work is done, cannot adapt to or modify

A wide range of studies have found that modifiable health risks (i.e., stress) can be improved through workplace sponsored preventative medicine and health promotion programs (Smith, 2005).

Workplace stress does not have the same effect on all individuals. There are a range of personal, social, and environmental moderators within each of us that influence our susceptibility and coping abilities in relation to the stressors we experience. Personality differences, gender differences, age, and social support all seem to be important factors in determining how well individuals cope with workplace stress (Wichert, 2002

RESEARCH MEHODOLOGY

SAMPLE SIZE

Sample sizes of 100 respondents were selected for this study.

DATA COLLECTION

Data will be collected from both primary and secondary sources of information.

PRIMARY SOURCE

All necessary information about the study has been collected from personal contact and discussion by using of Questionnaire method.

Type of data	: Primary
Data collection method	: Questionnaire

SECONDARY SOURCES

Data has been collected from both internal and external sources such as personal records, web links etc.

Data analysis tool	: Pie chart

DATA ANALYSIS AND FINDING

The Following table describes the demographic profile of the respondents which consists of gender, age and level of education. From a total of 100 completed questionnaires received. According to our analysis of the demographic characteristics of the respondents we can say that, 25% of the respondents are between the ages of 20 and 29. 40% of the respondents are between the ages of 30 and 39.15% of the respondents are between the ages of 40-49, 12% of the respondents are between the ages of 50 and 59 Then the remaining 8% is higher than the 60 years old. Within the respondents 55% are female and remaining 45% is male.

	Stress	Percentage
Gender		
Male	45	45%
Female	55	55%
Age		
20-29	25	25%
30-39	40	40%
40-49	15	15%
50-59	12	12%
60-69	8	8%

	Almost always	Most of the time	Some of the time	Almost never	Never	Total
20-29	2	6	8	6	3	25
30-39	1	19	11	5	4	40
40-49	3	8	3	1	-	15
50-59	2	7	3	-	-	12
60-69	5	3	-	-	-	8
total	13	43	25	12	7	100

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

http://ijrcm.org.in/
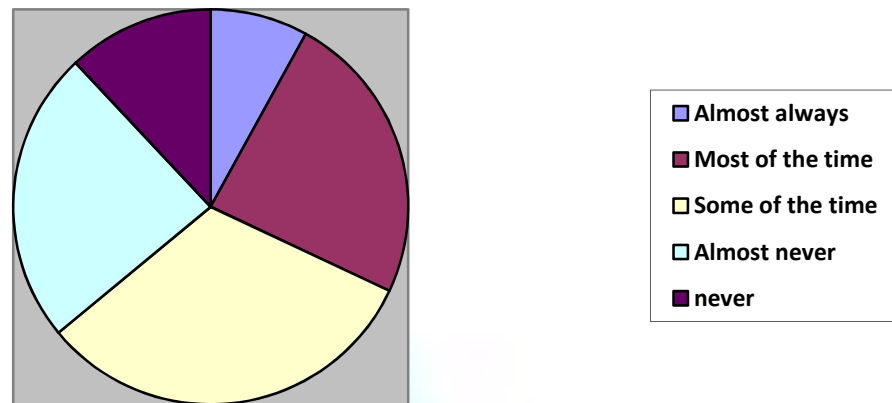
This table shows the increase in the age will lead to the stress level because of the cause of the stress for e.g. Physical cause, task related cause, etc.

Age group 20-30 very rare feels stress at any time of the day. This category are stressed only for their ambition, education completion and setting up life objective.

But group age 30-40 feels stress most of the time and same the age group 40-50 and 50-60 because of their work related stress and non performance of the personal cause,

But age group 60-70 feels stress almost always because of their age, physical inability of work.

Recommendation of meditation can be given on the basis of data collected. Age over 30 respondents is more prone to the disease related with increase in stress level. As a person increases his age, will lead to stress and involved disease, can recommend to the meditation effectively in every age group.

	Almost always	Most of the time	Some of the time	Almost never	Never	total
20-29	1	3	5	2	1	12
30-39	1	12	7	4	2	26
40-49	1	7	2	1	-	11
50-59	1	5	2	-	-	8
60-69	3	2	-	-	-	5
total	7	29	16	7	3	62
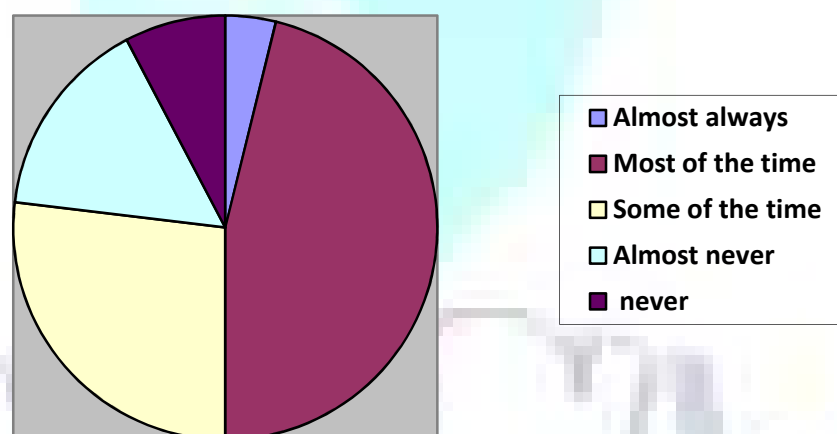
The above chart shows the percentage of removing stress among people with meditation according to their age level.

COMPARISON BETWEEN STRESS AND MEDITATION

	20-29	30-39	40-49	50-59	60-69
Stress before meditation	25%	40%	15%	12%	8%
Remove stress after meditation	14%	24%	11%	8%	5%
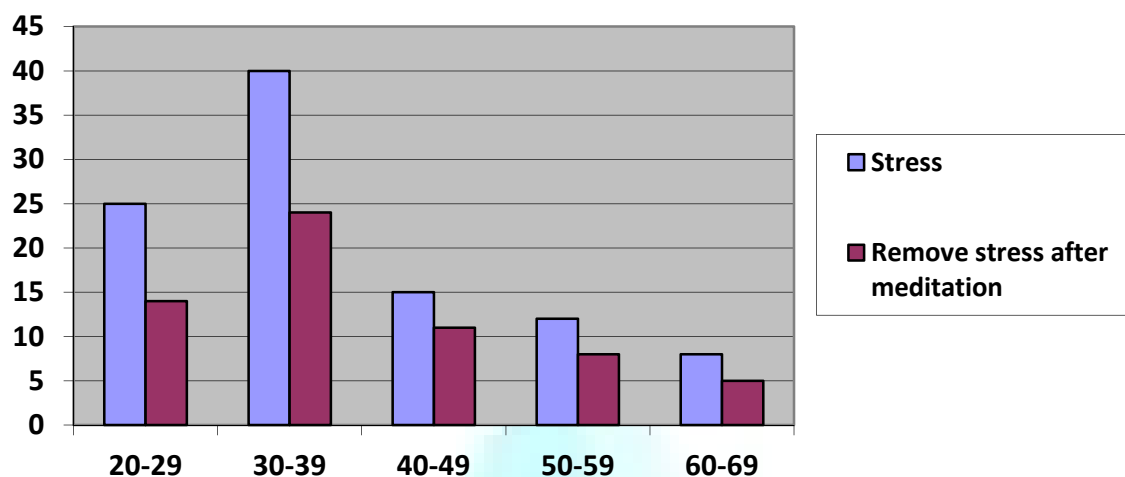
CONCLUSION

Effective tools for dealing with stress will decrease stress, improve the physical and emotional/mental health of workers, increase worker productivity, improve worker satisfaction, and decrease interpersonal problems as a whole. Meditation, however, not only involves relaxation but promotes mindfulness, which helps the stress-sufferer to recognize unhelpful patterns of thought that give rise to the stress. It gives your body time to relax and recuperate, and to clear away stress hormones that may have built up. Meditation is a useful and practical relaxation technique. To use it, sit in a comfortable place, close your eyes, relax your body, and focus your concentration on something for a period of time.

This research is done in the area of Yoga, Meditation and Soothing humor with an intention to find their positive effect on the employees who were suffering from workplace stress. The strong evidences of the positive effect of Yoga, Meditation and Soothing humor gives this research a clearer approach to these interventions which result in a major reduction of workplace stress.

From the study it can be suggested that organization can implement even some new innovative practices for Stress Reduction activities like Fun Friday, Team Building, Team Outing, Yoga & Meditation, Social Dance, and Healing through Music, Themed Events, Annual Days Festival Celebration Award Ceremonies, Important Corporate Events, Annual Days, or any occasion that requires a professional touch to ensure things go just the way you planned.

REFERENCES

1. Beehr, T. A., Jex, S. M., Stacy, B. A., & Murray, M. A. (2000). Work stressors and coworker support as predictors of individual stress and job performance. *Journal of Organizational Behavior, 21*(4), 391–405
2. Bhattacharjee, M., (2009), A Study on Stress Management in NEEPCO, Shillong , Project Submitted to the department of Business Administration, Assam University, Silchar.
3. Clark, (2002), Stress in the Workplace: A General Overview of the Causes, the Effects, and the Solutions, Melanie Bickford, Canadian Mental Health Association Newfoundland and Labrador Division August 2005
4. Cox, T., Griffiths, A., & Rial-González, E. (2000). *Research on Work-related Stress*. Luxembourg: European Agency for Safety and Health at Work.
5. Fresco A, Norfolk A. Patients put at risk as stress rises in nursing. The Times. London: Friday, 12 May 2000:5L.
6. Gyllensten, K., & Palmer, S. (2005b). The relationship between coaching and workplace stress: A correlational study. *International Journal of Health Promotion and Education, 43*(3), 97–103.
7. *Journal of Psychosomatic Research,* 51 (2001) 697– 704.
8. Keeley,K and Harcourt, M., (2001), Occupational Stress: A Study of the New Zealand and Reserve Bank, Research and Practice in Human Resource Management, 9(2), pp 109-118.
9. Kulkarni GK., (2006), in an article Burnout published in Indian Journal of Occupational and Environmental Medicine 2006 [cited 2008 Feb 28];10:3-4 K. Chandraiah, S.C. Agrawal, P. Marimuthu And N. Manoharan - Occupational Stress and Job Satisfaction Among Managers published in Indian Journal of Occupational and Environmental Medicine,7(2), May-August 2003
10. Managing Stress with Tancheon Breathing Meditation Gracia Del Rosario, PhD Namseoul University, Cheonan City, South Korea
11. Managing Work Place Stress through Meditation; Dr. Gaurav Bissa, Dr. Amit Sharma, International Research Journal ISSN-0974-2832, I(16)
12. Mishra, M. and Sinha, R. K., (2001), Effect of Yogic Practices on Depression and Anxiety. Journal of Project Psychology and Mental Health. 8, pp 23-27.
13. Moen, F., & Allgood, E. (2009). Coaching and the effect on self-efficacy. *Organization Development Journal, 27*(4).
14. Revati C. Deshpande Assistant Professor, S.V. Institute of Management, Gujarat Technological University doi:10.6088/ijes.00202030097
15. Revati C. Deshpande International Journal of Environmental Sciences Volume 2 No.4, 2012 "A healthy way to handle Work place stress through Yoga, Meditation and Soothing Humor" Tennant C (2001).Work-related stress and depressive disorders,
16. Selye, H. (1975): Stress without Distress, JP Lippicott Company, New York "A healthy way to handle Work place stress through Yoga, Meditation and Soothing Humor" Revati C. Deshpande International Journal of Environmental Sciences Volume 2 No.4, 2012 2153.
17. Shimazu, A., Shimazu, M., & Odara, T. (2005). Divergent effects of active coping on psychological distress in the context of the job demands-control-support model: The roles of job control and social support. *International Journal of Behavioral Medicine, 12*(3), 192–198.
18. Smith, S. (2005). *Expanded wellness program helps businesses control costs*. RetrievedJuly 7, 2005 from http://www.occupationalhazards.com/ articles/13684
19. Stressed out at work: New research aimed at identifying management practices that leadto, or exacerbate depression in the workplace. (2005, April 16). *The Edmonton Sun*, 80.
20. Townsend NW (2002), *the package deal: Marriage, work and fatherhood inmen's lives*, Temple University Press, Philadelphia.
21. Van Vegchel, N., De Jonge, J., & Landsbergis, P. A. (2005). Occupational stress in (inter)action: The interplay between job demands and job resources. *Journal of Organizational Behavior, 26*(5), 535–560.
22. Williams, C. (2003). *Sources of workplace stress*. Perspectives, June 2003.

NON-DISCLOSURE PRACTICES OF INTEREST RATE AND COMPOUNDING FREQUENCY IN SINKING FUND PROPOSALS BY THE BANKS OPERATING IN BANGLADESH: A SERIOUS PITFALL FOR INVESTORS

ABU SYEED MUHAMMED ABDULLAH
SR. LECTURER
DEPARTMENT OF BUSINESS ADMINISTRATION
SYLHET INTERNATIONAL UNIVERSITY
SHAMIMABAD, SYLHET, BANGLADESH

ABSTRACT

Economic development essentially depends on the ultimate savings by people and the resulting investment by the proper utilization of such savings. Undoubtedly, banks and financial institutions operating in an economy play the significant role to persuade people for savings. By means of creating fixed deposit, different sinking fund provision and other types of funds, banks normally extend their hands to play this important role. This study mainly focuses only on Sinking Fund offerings of banks and attempts to find out the disclosure level of information regarding interest rate and compounding frequency required for better decision by the investor. At the same time, this study reveals the possible pitfalls due to non disclosure of such vital information. To depict a meaningful result, the analysis rests on the sample size of 20 commercial banks of different categories and the analysis greatly bases on different data only available from those selected sample size. Finally, the study finds that non-disclosing of interest rate and compounding frequency are more common in sinking fund offerings by banks and discrepancy in investors' return eventually may prevail due to the unavailability of such vital information. Finally, the study extends some recommendations to overcome the underlying pitfall for the betterment of the investors.

KEYWORDS

Sinking Fund, Compounding Frequency, Interest Rate, Information Disclosure, Discrepancy in Return.

1. INTRODUCTION

By means of Sinking Fund provisions offered by banks and financial institutions operating in Bangladesh, not only people from different income level can save part of their income but also investors and analysts can take the right decisions for their required project(s). The compounding rate used into the normal future value annuity formula for the calculation of return has been the benchmark in appraising any project or investment. Investors have the option of investing into a new project, creating a new business venture, expanding the existing operations, and so forth. Among all the alternative options, every investor must seek the opportunity cost i.e. the benefit forgone from the next best alternative from his or her new investment. Even, the fixed-income level people considers the most beneficial sector from where they can earn more from their savings either through part-time business or making long-term deposits into the bank. Opportunity cost considerations help people choose the best investment alternative. However, this is the compounding rate or discounting rate primarily provides the ground for analyzing the choices. The information of such interest rate is very much essential for the calculation. But, it is a matter of surprising fact that a large number of banks operating in Bangladesh do not provide such types of actual interest rate through brochures, website or other promotional materials. Wonders reach to the peak, when no information regarding the compounding frequency is found from the documents of such financial institutions. Undoubtedly, compounding rate (i.e. interest rate) and compounding frequency is mandatory for calculating the total returns from this type of sinking fund. Hence, real analysis becomes not possible and so the comparison becomes then more cumbersome for most of the savers as well as investors and due to the unavailability of that information people even receive less return from many of the financial institutions. The study mainly focuses to find out of such impediments and tries to measure the discrepancy between the maturity values banks operating in Bangladesh really provides to the people and the maturity value that should come from the calculations.

2. RATIONAL OF THE STUDY

In Wikipedia, a clear statement is found in a page[1] about the disclosure of interest rate and compounding time. The page tells "In order to define an interest rate fully, and enable one to compare it with other interest rates, the interest rate *and* the compounding frequency must be disclosed. Since most people prefer to think of rates as a yearly percentage, many governments require financial institutions to disclose the equivalent yearly compounded interest rate on deposits or advances."

The most important matter in that case is that "The effect of compounding depends on the frequency[2] with which interest is compounded and the periodic interest rate which is applied. Therefore, in order to define accurately the amount to be paid under a legal contract with interest, the frequency of compounding (yearly, half-yearly, quarterly, monthly, daily, etc.) *and* the interest rate must be specified."

Actually, in case of any Sinking Fund Provision, utilization of sinking fund rate (i.e. interest rate compounding) can direct an investor to compare the internal rate of return from any new business initiatives. Because there is also the question of opportunity cost in that the depository party lost other possibilities of using the deposited money into the sinking fund. Economically, the interest rate is the cost of capital and is subject to the laws of supply and demand of the money supply. Investment appraisal tools such as IRR, NPV etc. require the use of interest rate. The analyst can compare the return from alternative choices (i.e. Return on Equity of alternative choices-ROE) with the rate provided by the banks. For example, if a bank provides 12% interest rate and IRR from a possible suitable project is 14%, then it becomes easier for the investor that he or she should not invest into the sinking fund rather invest into the new project as here IRR > the opportunity cost of capital i.e. here the next best benefit forgone is 12% from the bank. At the same time, people from different walks of life normally do not familiar with the many financial calculations. A large number of banks do not disclose the required information very much essential for decision. This non-disclosure of essential data may even influence people investing into wrong project or business. To find out whether different banks disclose those vital information as well provide returns to the people in accordance with the returns the basic financial management theories or formulas indicate, this study has been attempted.

3. LITERATURE REVIEW

A lot of literature describes the interest rate and its impact on the economy. Adam Smith, Jeremy Smith, Jeremy Bentham and Mirabeau firstly provided the formal studies of interest rates and their impact on society during the birth of classic economic thought. The following literature helped in articulating the facts addressed through out the paper.

Wicksell, Knut (1898), a Swedish economist, in his *Interest and Prices* discussed an ample idea of economic crises based upon a distinction between natural and nominal interest rates. The discussion provides the profound basic regarding interest rate.

---

[1]http://en.wikipedia.org/wiki/Compound_interest.
[2]http://advancedwealthbuilders.com/Compound_Interest.html

Fisher, Irving in the early 20th century, provided the most important breakthrough in analysis of interest rates from the economic view point by distinguishing nominal interest from real interest. Several ideas concerning the impact of interest rates have emerged from then.

Schall, Lawrence D; Haley, Charles W; in "Fundamentals of Financial Management"- 6th Edition, McGraw-Hill 1991, page-84-86 presented the detailed regarding the compounding procedure of the equal amounts deposited through out the stipulated period of time. Here, it is mentioned that the annuity compound amount factor (F/A, i, n) is the value at the end of n periods resulting from an investment of $ 1 per period for n periods at a rate of i percent per period and the future value F of an annuity of A dollars per year is, $F = A(F/A_{i,n})$

Graham, John; Smart, Scott B. in "Introduction to Corporate Finance"-3rd Edition (2011) at page – 82 provided the basic formula as FV (Annuity Due) $= PMT \times \frac{(1+r)^{n}-1}{r} \times (1+r)$, where PMT is the periodic installment amount, r is the interest rate an n is the number of periods.

Horne, James C. Van; Jr., John M. Wachowicz; in "Fundamentals of Financial Management"-11th Edition, Pearson Education, 2001; at Page 60, mention that the future value of an annuity due at i percent for n periods (FVAD$_n$) as

$$FVAD_n = R\big[\big[(1+i)^n - 1\big]/i\big](1+i) = R\big(FVIFA_{i,n}\big)(1+i)$$

; where FVIFA $_{i, n}$ is the future value interest factor annuity and R is the annuity for finding out the future value of an annuity due i.e. FVAD$_n$.

Gitman, Lawrence J. in "Principles of Managerial Finance"-10th Edition, Pearson Education, 2007, pages 162 – 169 discussed so elaborately about the future value calculation of an ordinary annuity as well as annuity due. For an ordinary annuity, the formula given is that $FVA_n = PMT \times \big(FVIF_{i,n}\big)$, where PMT is the amount to be deposited to the end of each year and $FVIF_{i,n}$ is the appropriate future value interest factor for a one-dollar ordinary annuity compounded at i percent for n years. To find the future value of an annuity due i.e. when cash flow occurs at the start of the period, they just multiplied the ordinary annuity factor by only (1+i) and therefore the formula becomes $FVIF_{i,n}(Annuity\ due) = PMT \times \big(FVIF_{i,n}\big) \times (1+i)$.

Kieso, Donald E; Weygandt, Jerry J; Warfield, Terry D; in "Intermediate Accounting" -10th Edition, John Wiley & Sons, Inc. (2001) deliberates the idea concerning the future value of ordinary annuity and future value of annuity due (P:288-290) as well as the idea of future value of a deferred annuity (P: 294). They express future value of an ordinary annuity = R (FVF-OA $_{n, i}$) and future value of an annuity due, FV-AD = R (FVF-OA $_{n, i}$) × (1+i); Where R= Annuity or Periodic Amount, FVF-OA $_{n, i}$ = future value of an ordinary annuity factor for n periods at i interest. Future value of a deferred annuity also comes through the proper time adjusted uses of future value of an ordinary annuity i.e. R (FVF-OA $_{n, i}$). At the same time, the necessity of cautiously uses of compounding frequency required for such calculations also came in all of the above literatures.

Khan, Dr. A R in his book "Bank Management : A Fund Emphasis" published by Decent Book House, 135, Islamia Market, Nilkhet, Dhaka-1205, discussed different banking regulatory arrangements conducted as well as supervised by Bangladesh Bank-the central bank of Bangladesh. But the addressing of disclosures need pertaining interest rate and at the same time compounding frequency required for sinking fund scheme were absent fully.

Rose, Peter S.; and Hudgins, Sylvia C. in their "Bank Management & Financial Services" -6th Edition, McGraw Hill, 2005 provided all of the necessary description and analysis for managing the activities and to keep safe the fund of any bank. In that book, any thorough overview the regarding the disclosures of the interest rate and compounding frequency are not addressed.

Whigham, David (1998) in his "Quantitative Business Methods Using Excel" provides a detail analysis regarding the calculation of sinking fund accumulation. Here, he shows that how future accumulation can vary for different interest rate along with different compounding frequency. He also shows the fact that what discrepancy may occur if effective interest rate is not utilized when an installment for a sinking fund and compounding frequency does not follow the same frequency.

It is likely that different conventions may be used from country to country. One example can be sited regarding the regulation of such types in Canada that tells under the Disclosure of Interest (Banks) Regulations (SOR/92-321) under the sub heading of Disclosure in Respect of Deposit Accounts as (1) Subject to subsection (1.1), a bank shall disclose to a person who requests the bank to open a deposit account the rate of interest applicable to the deposit account and how the amount of interest to be paid is to be calculated.

A different scenario is found in case of regulations provided by Bangladesh Bank. A guide-line of 55 pages containing 22 instructions provided by Bangladesh Bank based on BRPD Circular No. 01 dated February 19, 1997 and BRPD Circular No. 01 dated January 10, 2004, entitled as "Prudential Regulations for Banks: Selected Issues" tells under the heading of 'Interest Rates on Deposit and Lending" that banks are now free to fix their rates of interest on their deposits of different types after withdrawal of restriction about the floor rate of interest in 1997 and banks are also free to fix their rates of interest on lending except for export sector, which has been fixed at 7%per annum with effect from January 10, 2004. At present, banks can differentiate interest rate up to 3% considering comparative risk elements involved among borrowers in same lending category. With progressive deregulation of interest rates, banks have been advised to announce the mid-rate of the limit (if any) for different sectors and the banks may change interest 1.5% more or less than the announced mid-rate on the basis of the comparative credit risk. By the by, no instructions and regulations regarding the disclosures of interest rate and the frequency level of compounding at which banks pay the interest to the depositor have totally been mentioned.

4. OBJECTIVES

The main objective of the study is to find out the disclosure of very important information such as interest rate provided to the different deposit scheme (i.e. Sinking Fund) along with the frequency of compounding bank apply for calculating the future sum of accumulated money and to compare whether any discrepancy prevails between the total returns provided by the banks for a given time period in accordance with the brochures, other documents etc and the total returns comes from the calculation of the basic financial management formulas. However, the other objectives are also as follows:

1- To find out the reason behind any discrepancy found from the calculation.
2- To find out the ways to overcome such discrepancies.

5. METHODOLOGY

The study is analytical in nature. Most of the data are taken from secondary sources. Among 52 commercial banks, 20 banks have been taken as sample. Printing materials, website of particulars banks, brochures and advertising materials have been analyzed in this study. Mainly different Deposit Scheme Plan in the name of Monthly Savings Scheme, Deposit Pension Plan, and Deposit Savings Scheme etc. of the sample banks are taken into consideration. Data of Millionaire Scheme as well as Billionaire Scheme of different sample banks are also viewed for getting insight into the topic. Mainly, most of the data presented and analyzed in that paper are from respective publicly available brochures of different banks. Besides, for analysis purpose, some undisclosed data were collected from the bank officials. The study presents some facts through descriptive statistics using percentages for analyzing how many banks are providing interest rate information as well as compounding frequency level information. Besides, to find out discrepancy level, the study used some manual calculations found through the basic compounding formula used in Financial Management. Spread Sheet was used for all calculation. The resulting facts then are presented through tabular presentations and findings are sorted out from those presentations.

6. DISCUSSION

6.1 BASIC IDEA

The necessity of sinking fund calculation for comparing the investment proposal is worth mentioning. The basic formula for any deposit scheme belongs to the basic sinking fund provision formula written in every financial management. The formula is as follows: ---

$$FVA = Installment \times FVIFA_{i/m,mn}$$

Where, FVA= Future Value of Annuity

i = Interest Rate (or Compounding Rate)

$FVIFA_{i/m,mn}$ = Future Value Interest Factor of Annuity for nth Period compounded in m times at i Interest rate and it is calculated as follows:-

$$FVIFA_{i/m,mn} = \frac{1}{\frac{i}{m}} \left\{ \left(1 + \frac{i}{m}\right)^{mn} - 1 \right\}$$

This widely used formula is the basic for all types of calculation of Sinking Fund. An investor can save an equal amount each period specified by bank and can collect the sum-total with interest earned after the specified period. Equal installment is hereby treated as annuity in the finance literature. Whenever, any saver makes any deposit scheme, almost all of the banks require a first installment at the time of opening such DPS plan. So, the initial formula needs some extension due to the very fast installments and the formula is to be:

$$FVA = Installment \times FVIFA_{i/m,mn} \left(1 + \frac{i}{m}\right)$$

The essential elements for utilizing the formula is that investor must know the installment amounts the bank requires to deposit, the value of i (i.e. interest rate), and the time in a year the bank provides interest to the account i.e. compounding frequency. Besides, if an investor wishes to accumulate a certain sum of money to create his own customized scheme through a given period of time at a specific rate, then the investor can find out the installment amount for this specific accumulation and make his own scheme.

The difficulty arose when banks compounded in different time period but takes the installment on monthly basis. To overcome such issues banks use an average amount from the entire installment collected within a compounding time period and then apply the formula for calculating the value of money. A more important aspect is that when installment and compounding frequency does not occur at the same frequency, effective interest rate must be used in the calculation.[3]

The essence of the discussion is that maximum banks do not disclose the important elements such as how much interest they provide for a specific savings scheme and surprisingly almost all of the banks do not mention how many times they provide interest to the savers. The lack of those elements seriously impedes the personal calculation by investors they could do for comparing with other alternatives and taking a better decision. The unavailability of such information extremely not only halts the better choice but also persuades in some cases to choose the erroneous investment. The succeeding part of the paper articulate ins and out regarding the matter and the pitfall of such practices.

6.2 DEPOSIT SCHEME

The discussion mainly relies on the following types of accounts banks are normally offering to people throughout the country. The study discusses under the three main headings:

- Deposit Scheme for Different level of Accumulation.
- Deposit Scheme for Millionaire
- Deposit Scheme for Kotipoti (Billionaire).

The purposes of all the schemes are the same that is to accumulate a certain sum of money for some equal payments. These types of accumulation are found in different names in different banks such as--Monthly Saving Deposit Scheme (MSDS), Deposit Plus Scheme, Monthly Savings Scheme, Monthly Savings Scheme, Education Saving Scheme (EDS), Smart Savers Scheme, Shanchay Prokolpo, Millionaire Scheme, and Kutipoti Scheme, etc.

7. ANALYSIS

This part of the paper first presents the different interest rate offered by different banks for the aforementioned scheme separately.

7.1 DISCLOSER OF INTEREST RATE

Only a few banks tell the interest rate for various levels of offerings of deposit scheme. Others conceal the rate which has been exposed through descriptive statistics throughout this paper. For various monthly deposit schemes, the disclosure percentage of interest rate scenario is presented below:

TABLE 1: INTEREST RATE DISCLOSING FOR SINKING FUND[a]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Interest Rate Mentioned	2	100.0	100.0	100.0

[a] Identity = Nationalized Bank

Source: Brochures of Nationalized Bank

Among four nationalized commercial banks two banks were taken into consideration regarding whether they mention interest rate in their brochures and it is found that all of them disclose the interest rate i.e. the investor can get the full disclosure of interest rate information from the nationalized commercial banks. As a result, any analysis for the investor creating sinking fund through nationalized commercial banks while they consider such rate as opportunity cost of capital becomes some what meaningful.

TABLE 2: INTEREST RATE[b]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Interest Rate Not Mentioned	12	80.0	80.0	80.0
	Interest Rate Mentioned	3	20.0	20.0	100.0
	Total	15	100.0	100.0	

[b] Identity = Private Commercial Bank

Source: Brochures of Banks

Browsing over of 15 private commercial banks' documentation such as brochures, website reveals that only three private commercial banks disclosed the interest rate of deposit savings scheme but remaining 12 among 15 i.e. 80% of the 100% selected sample did not disclose this vital information pertaining interest rate they consider in their proposal. This forces the investor into more confusion and even they may get lower return in comparison with the calculation found through the manual formula.

TABLE 3: INTEREST RATE [c]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Interest Rate Not Mentioned	1	33.3	33.3	33.3
	Interest Rate Mentioned	2	66.7	66.7	100.0
	Total	3	100.0	100.0	

[c] Identity = Islamic Bank

Source: Brochures of Banks

---

[3] Whigham, David; Quantitative Business Methods Using Excel, Oxford University Press, 1998, P: 194

The table tells that 66.7% Islamic Banks of sample taken clearly disclose the interest rate for various deposit schemes. Islamic banking must disclose the profit sharing ratio and hence the disclosure of estimated profit rate (i.e. estimated interest rate) should be publicly available automatically. So, this scenario can conclude that although disclosing the interest rate is vital, conventional private commercial banks are more prone not to disclose the interest rate in case of monthly deposit scheme.

7.2 DISCLOSER OF FREQUENCY OF COMPOUNDING

The most important fact is that all the banks did not disclose the compounding time period. Without the information of such kind, an analyst must be bamboozled in his or her analysis. The table below shows how compounding frequency can affect the effective interest rate:

TABLE 4: INTEREST RATE MOVEMENT WITH COMPOUNDING FREQUENCY

INTEREST RATE APPLICABLE FOR DIFFERENT COMPOUNDING PERIOD					
		Effective Yearly Rate* for Compounding by			
Name of the Banks	Interest Rate (%)	Monthly (%)	Quarterly (%)	Semiannually (%)	Annually (%)
Agrani Bank Ltd.	9% [†]	-	-	-	-
Sonali Bank	8% [†]	8.30%	8.24%	8.16%	8.00%
Bank Asia Ltd.	11.83% [††]	12.49%	12.37%	12.18%	11.83%
Dhaka Bank	11.83% [††]	12.49%	12.37%	12.18%	11.83%
Dutch Bangla Bank	10.5% ††	11.02%	10.92%	10.78%	10.50%
IFIC Bank Ltd	-	-	-	-	-
Jamuna Bank Ltd.	12.49% [††]	13.23%	13.09%	12.88%	12.49%
Mercentile Bank Ltd.	11.83% [††]	12.49%	12.37%	12.18%	11.83%
Mutual Trust Bank	-	-	-	-	-
National Bank Ltd.	11.08% [††]	11.66%	11.55%	11.39%	11.08%
Premier Bank Ltd.	8.55% [††]	8.89%	8.83%	8.73%	8.55%
Prime Bank Ltd.	-	-	-	-	-
Southeast Bank Ltd	9.5% [††]	9.92%	9.84%	9.73%	9.50%
Trust Bank Ltd.	11.5% [††]	12.13%	12.01%	11.83%	11.50%
AB Bank	12.25% [†]	12.96%	12.82%	12.63%	12.25%
City Bank	10% [†]	10.47%	10.38%	10.25%	10.00%
Pubali Bank	12% [†]	12.68%	12.55%	12.36%	12.00%
Shahjalal Islami Bank Ltd.	12.75% [†]	13.52%	13.37%	13.16%	12.75%
Al-Arafah Islami Bank Ltd.	-	-	-	-	-

Source: (i) † Brochures of Respective Banks (ii) ††Calculated through the interest rate function given in Microsoft Excel (iii) *Effective rate through Spread Sheet

Table 4 depicts that at different compounding frequency level, effective interest rate changes. Different interest rates generate different maturity value discussed in the return comparison part of this section. So, an investor without the information of compounding frequency level can easily make wrong decision. For example, from the above table it can be said that in case of Mercentile Bank the annual rate is 11.83% and if the bank provides actually interest on quarterly basis, then effective interest rate the investor will earn from his investment is 12.37%. But the investor should have been earned 12.49 % effective interest because the investor provides monthly installment and utilizes monthly compounding frequency required to use in the basic sinking fund formula. Clearly, in that case an investor receives less income. Whatever, an investor even receiving fewer amounts from the sinking fund scheme can not claim to the authority. Bank officials orally give the information regarding compounding time period, though written documents in that case is very fruitful. This is the main pitfall created by all banks to bind the investor within a limit so that any investor or analyst can not challenge the banks later. In this study among 20 banks including Islamic bank and nationalized bank, no banks were found that they have provided the compounding time i.e. compounding frequencies in their information sources.

7.3 RETURN COMPARISON

Although interest rate and compounding time period are not found for many banks, the final maturity value and corresponding monthly installment have been used to find out the annual return. The function provided in Microsoft Excel i.e. ƒ Rate(Number of Period, Periodic Equal Payment, Present Value, Future Value, Type, Guess)[4] has been utilized in that purpose. The probable compounding period has been considered as monthly, quarterly, semi-annually and even yearly though annual interest payment is rare. The original calculation uses the formula given in discussion section and therefore the total return based on different compounding frequency is easily found manually. However, the following part of the paper addresses prospective maturity value for different compounding frequency level and at the same time compares those values with the original amount paid by different banks to verify any sort of discrepancies inherent to the offerings of banks.

7.3.1 IMPACT OF INTEREST RATE AND COMPOUNDING ON DIFFERENT DEPOSIT SCHEME

Most of the banks offer a wide range of deposit scheme ranging from one year to 10 years deposit scheme. For simplification, the data concerning for 10 year period for only Tk. 1000 monthly deposit for a future accumulated sum of money have been analyzed. The other periods with other amount are identical with the same analysis i.e. the interpretation will be the same as the undergoing interpretation of the analysis is.

The following tables compare different maturity values paid by different banks for different compounding frequencies for a monthly deposit of Tk. 1000 for the mentioned maturity period. At the same time, discrepancy column of tables determine whether the investor could get more or less if this compounding level along with the interest rate is used. The calculation in table 5 is based on different compounding frequency.

---

[4]Whigham, David; Quantitative Business Methods Using Excel, Oxford University Press, 1998, P: 194

TABLE 5: MATURITY VALUE FOR DIFFERENT COMPOUNDING FREQUENCY

	Yearly Interest Rate	RETURN COMPARISON THROUGH MATURITY VALUE CALCULATION BY				
		Monthly Compounding	Quarterly Compounding	Semiannually Compounding	Annually Compounding	Actual Amount Paid by Bank*
Name of the Banks		TK.	TK.	TK.	TK.	TK.
Agrani Bank Ltd.	9%	-				-
Sonali Bank	8%	184165.68	183622.03	182837.40	181371.76	181371
Bank Asia Ltd.	11.83%	230001.53	228454.04	226253.69	222245.20	230000
Dhaka Bank	11.83%	230001.53	228454.04	226253.69	222245.20	230000
Dutch Bangla Bank	10.50%	212659.44	211547.66	209958.26	207036.48	212659
IFIC Bank Ltd	-	-	-	-	-	-
Jamuna Bank Ltd.	12.49%	239238.00	237431.91	234871.02	230227.17	239250
Mercentile Bank Ltd.	11.83%	230001.53	228454.04	226253.69	222245.20	230000
Mutual Trust Bank	-					-
National Bank LTd.	11.08%	220020.77	218732.11	216894.12	213528.51	220000
Premier Bank Ltd.	8.55%	190011.89	189367.16	188438.52	186709.78	190000
Prime Bank Ltd.	-	-	-	-	-	-
Trust Bank Ltd.	11.5%	225544.18	224114.95	222079.98	218364.32	224115
AB Bank	12.25%	235828.69	234120.16	231695.12	227290.20	231695
City Bank	10%	206552.02	205577.79	204182.27	201608.42	205568
Pubali Bank	12%	232339.08	230727.85	228438.52	224272.83	224273
Shahjalal Islami Bank Ltd.	12.75%	242998.23	241081.72	238367.28	233454.03	233000
Al-Arafah Islami Bank Ltd.	-	-	-	-	-	-

Source: Manual Calculation through Spread Sheet

The table 5 tells that among 14 banks whose maturity value from the brochures were available, only 7 banks compounded the installment monthly, 2 banks compounded quarterly, 1 bank semiannually and 4 banks annually. Due to these different compounding frequencies applied by different banks, the return also varies and therefore discrepancies prevail. Table 6depicts such discrepancy for different compounding frequency levels that may occur through a bank. For example, Bank Asia receives installment and provides interest on monthly basis. The calculated value from the basic sinking fund formula by an investor and the maturity value offered by bank become same and therefore an investor will not get any fewer amounts from his investment i.e. no discrepancy will follow. But if Bank Asia would have utilized quarterly or semi—annual compounding, then an investor would have been received 0.66% or 1.66% fewer returns from his or her savings from the sinking fund. In the same manner, table 6 shows that the banks that use monthly compounding frequency, investors face no discrepancies from their savings. In addition, an investor will receive 0.63% less return form his savings in Trust Bank Ltd. because this bank uses quarterly compounding instead of monthly compounding. Generally, a few banks uses monthly compounding, rather they use other compounding frequency whereas they are taking installment on monthly basis. If such practices are prevailing, it indicates that banks are providing fewer amounts from the accumulated fund. So, there is a deep pitfall for investors that could only be overcome through proper disclosures of interest rate and its respective compounding frequency.

TABLE 6: DISCREPANCY IN MATURITY VALUE OF TK. 1000 MONTHLY INSTALLMENT FOR DIFFERENT COMPOUNDING FREQUENCY

	Interest Rate	DISCREPANCY* IN MATURITY VALUE FOR DIFFERENT COMPOUNDING FREQUENCY BY DIFFERENT BANKS				
Name of the Banks		Compounding Frequency	Monthly Compounding	Quarterly Compounding	Semiannually Compounding	Annually Compounding
	(%)	(%)	(%)	(%)	(%)	(%)
Agrani Bank Ltd.	9% [†]	-	-			
Sonali Bank	8% [†]	Annually	-1.52%	-1.23%	-0.80%	0.00%
Bank Asia Ltd.	11.83% [‡]	Monthly	0.00%	0.68%	1.66%	3.49%
Dhaka Bank	11.83% [‡]	Monthly	0.00%	0.68%	1.66%	3.49%
Dutch Bangla Bank	10.5% [‡]	Monthly	0.00%	0.53%	1.29%	2.72%
IFIC Bank Ltd	-	-	-	-	-	-
Jamuna Bank Ltd.	12.49% [‡]	Monthly	0.00%	0.77%	1.86%	3.92%
Mercentile Bank Ltd.	11.83% [‡]	Monthly	0.00%	0.68%	1.66%	3.49%
Mutual Trust Bank	-	-	-	-	-	-
National Bank LTd.	11.08% [‡]	Monthly	0.00%	0.58%	1.43%	3.03%
Premier Bank Ltd.	8.55% [‡]	Monthly	0.00%	0.33%	0.83%	1.76%
Prime Bank Ltd.	-	-	-	-	-	-
Southeast Bank Ltd	9.5% [‡]	Annually	-1.01%	-0.81%	-0.53%	-0.02%
Trust Bank Ltd.	11.5% [‡]	Quarterly	-0.63%	0.00%	0.92%	2.63%
AB Bank	12.25% [‡]	Semiannually	-1.75%	-1.04%	0.00%	1.94%
City Bank	10% [†]	Quarterly	-0.48%	0.00%	0.68%	1.96%
Pubali Bank	12% [†]	Annually	-3.47%	-2.80%	-1.82%	0.00%
Shahjalal Islami Bank Ltd.	12.75% [†]	Annually	-4.11%	-3.35%	-2.25%	-0.19%
Al-Arafah Islami Bank Ltd.	-	-	-	-	-	-

Source: (i) [†]Brochures of Respective Banks (ii) [‡]Calculated through the interest rate function given in Microsoft Excel (iii) * Manual Calculation through Spread Sheet by Using Data Found form Brochures

7.3.2 IMPACT OF INTEREST RATE AND COMPOUNDING ON DIFFERENT MILLIONAIRE SCHEME:
The same mechanism has been used in case of millionaire scheme. In millionaire scheme's documents, no bank provided the information of interest rate and compounding time. However, through the in-depth analysis of the brochures and other documents such as website, available printed materials, the following information concerning millionaire scheme of only six banks among the sample twenty banks were originated which have been presented below through different tables: ---

TABLE 7: INTEREST RATE WITH DIFFERENT COMPOUNDING FREQUENCY.\

Name of Banks	Monthly Installment	Effective Rate for Monthly Compounding	Effective Rate for Quarterly Compounding	Effective Rate for Semiannual Compounding	Effective Rate for Annual Compounding
IFIC Bank Ltd	4850	10.44%	10.35%	10.22%	9.97%
Jamuna Bank Ltd.	4400	12.27%	12.15%	11.97%	11.63%
National Bank LTd.	4550	11.64%	11.53%	11.37%	11.06%
Prime Bank Ltd.	4570	11.56%	11.45%	11.29%	10.99%
Trust Bank Ltd.	4935	10.11%	10.03%	9.90%	9.67%
Al-Arafah Islami Bank Ltd.	4500	11.85%	11.73%	11.57%	11.25%

Source: Manual Calculation through Spread Sheet using the data found on Brochures

TABLE 8: DISCREPANCY IN MATURITY VALUE FOR DIFFERENT COMPOUNDING FREQUENCY

	Interest Rate	Monthly Installment	Compounding Frequency	Monthly	Quarterly	Semiannually	Annually
Name of Banks	(%)	Tk.	Time	(%)	Tk.	Tk.	(%)
IFIC Bank Ltd	9.97%	4850	Monthly	0.00%	0.47%	1.15%	2.43%
Jamuna Bank Ltd.	11.63%	4400	Monthly	0.00%	0.65%	1.59%	3.36%
National Bank LTd.	11.06%	4550	Monthly	0.00%	0.59%	1.44%	3.03%
Prime Bank Ltd.	10.99%	4570	Monthly	0.00%	0.56%	1.40%	2.97%
Trust Bank Ltd.	9.67%	4935	Monthly	0.00%	0.44%	1.08%	2.28%
Al-Arafah Islami Bank Ltd.	11.25%	4500	Monthly	0.00%	0.60%	1.48%	3.13%

Source: Manual Calculation through Spread Sheet using the data found on Brochures

Above tables depict different effective interest rate for different compounding frequencies (table 7) and the possible discrepancies (table 8) if the same compounding frequency with the frequency of installment a bank does not apply. Here it is found that under the consideration of underlying interest rate calculated (due to the unavailability of interest rate through banks' documents) through spread sheet, an investor may receives less return from the sinking fund. For example, in table 8, an investor investing into Jamuna Bank Ltd. would receive 0.65% to 3.36% fewer returns if Jamuna Bank did not use monthly compounding. Besides, surprisingly it is noticeable that for Tk. 1 million Jamuna Bank demands Tk. 4400 monthly installment for 10 years whereas Trust Bank demands Tk. 4935 monthly installment for the same period i.e. Tk. 535 more installment per month for the same level of return. This fact (depicted in table-9) under the heading of range undoubtedly proves that by not providing necessary information pertaining the interest rate and its' compounding nature etc. banks keep more options at their hand. So, eventually only the disclosures of such information can give the real picture of accumulation.

TABLE 9: DISCREPANCY IN INSTALLMENT

	N	Range	Minimum	Maximum
Installment	6	535.00	4400.00	4935.00
Valid N (list-wise)	6			

Source: Brochures of respective banks

7.3.3 IMPACT ON DIFFERENT KOTIPOTI (BILLIONAIRE) SCHEME:

Kotipoti scheme offered by various banks also does not provide interest rate information and its corresponding compounding frequency that are very much crucial for the calculative decision. The following table depicts again the effective earnings rate in the kotipoti scheme for different compounding frequencies:

TABLE 10: INTEREST RATE WITH DIFFERENT COMPOUNDING FREQUENCY

Name of the Banks	Interest Rate	Monthly Installment*	Effective Rate for Monthly Compounding	Effective Rate for Quarterly Compounding	Effective Rate for Semi-annual Compounding	Effective Rate for Annual Compounding
	(%)	TK.	(%)	(%)	(%)	(%)
Jamuna Bank Ltd.	11.63%	44010	12.26%	12.14%	11.96%	11.63%
Mutual Trust Bank	11.95%	43175	12.62%	12.49%	12.30%	11.95%
Trust Bank Ltd.	11.56%*	44510	12.19%	12.07%	11.89%	11.56%
Al-Arafah Islami Bank Ltd.	11.10%	45400	11.68%	11.57%	11.41%	11.10%

Source: Manual Calculation through Spread Sheet using the data found on Brochures

Here, it is again found that non-disclosures of related important facts fell the investor completely in vague situations and might provide them lower returns. For example, by creating Kotipoti Scheme in Mutual Trust Bank Ltd., an investor actually earns 12.62% (found from table 10), if the bank applies monthly compounding on the installment amount but this investor's earnings will be only 11.63% in case of annual compounding on the installment amount by the bank. From table 11, an investor investing into Trust Bank Ltd. receives up-to 0.74% less amount because this bank compounds the received amount of Kotipoti Scheme quarterly basis instead of monthly basis.

TABLE 11: DISCREPANCY IN MATURITY VALUE FOR DIFFERENT COMPOUNDING FREQUENCY

Name of the Banks	Interest Rate	Monthly Installment	Compounding Frequency	Monthly	Quarterly	Semi Annually	Annually
	(%)	Tk.	Time	(%)	(%)	(%)	(%)
Jamuna Bank Ltd.	11.63%	44010	Monthly	0.00%	0.62%	1.57%	3.34%
Mutual Trust Bank	11.95%	43175	Monthly	0.00%	0.68%	1.68%	3.55%
Trust Bank Ltd.	11.56%*	44510	Quarterly	-0.74%	0.00%	0.82%	2.56%
Al-Arafah Islami Bank Ltd.	11.10%	45400	Monthly	0.00%	0.58%	1.44%	3.04%

Source: Manual Calculation through Spread Sheet using the data found on Brochures

Moreover, by means of such non-disclosure, different banks may even demand higher amount of installment for the Kotipoti Scheme i.e. give lower interest to the investor. For example, the amount ranging from Tk. 43175 to Tk. Tk. 45400 are received as installment by various banks and in return every bank provides Tk. 1 crore after 10 years.

TABLE 12: DISCREPANCY IN INSTALLMENT

	N	Range	Minimum	Maximum
Installment	4	2225.00	43175.00	45400.00
Valid N (list-wise)	4			

Source: Brochures of respective banks

This indicates that an investor can deposit Tk. 43175 in Mutual Trust Bank and can accumulate Tk. 1 crore after 10 years. At the same time this investor by not depositing Tk. 45400 in Al-Arafah Islami Bank Ltd. to accumulate Tk. 1 crore can save Tk. 2225 per month. If this investor creates another sinking fund even with Tk. 2000 monthly installment from this Tk. 2225, he or she can accumulate a hand some amount of extra money after the same maturity of 10 years that are presented in the following table:

TABLE 13: MATURITY VALUE FOR TK. 2000 MONTHLY INSTALLMENT FOR 10 YEARS

Name of Banks	Installment Amount	Maturity	Maturity Value
Dutch Bangla Bank Ltd.	2000	10 years	425318
Trust Bank Ltd.	2000	10 Years	448230
Jamuna Bank Ltd.	2000	10 Years	478550
National Bank Ltd.	2000	10 Years	440000
Bank Asia Ltd.	2000	10 Years	460000
Dhaka Bank Ltd.	2000	10 Years	460000

Source: Brochures of respective banks

How large the concealing fact it is? The underlying fact is that through choosing of banks rightly for the Kotipoti Scheme, an investor can accumulate Tk.1 crore as well as extra amount of more than Tk. 4 lakhs from the savings of installment. However, in many cases, for an investor it is not possible to detect the facts prevailing among various banks' offerings. This is only the interest rate and compounding frequency that can direct the investor to detect the facts and choose the right offer.

8. FINDINGS

Most of the banks do not disclose the interest rate used for compounding purpose in sinking fund proposal. Besides, no banks were prone to outlay the time period i.e. the compounding frequency they use for compounding purposes. This information is very much vital for any investor to analyze his or her investment decision in sinking fund that is worthy to mention. In addition, for a same level of return, the installment requirements differ immensely among banks. Due to this pitfall dominant in the banking sector of Bangladesh, banks also have the tendency to pay less amount of future accumulated sum of money to the investor who otherwise, if the information pertaining to the interest rate offered as well as actual compounding frequency would have been obtainable to them, could have overwhelmed the loss they are bound to bear now. As a result, sinking fund investor could plan their savings more efficiently. Not but not least, such type of information handiness would allow them to set their opportunity cost (or minimum required return standard) more prudently in analyzing the return of the other alternatives and thereby escaping from any pitfall manipulating them now and then in case of alternative investment evaluation.

9. RECOMMENDATIONS

[9.1] Bangladesh Bank as the bankers' of all banks in Bangladesh should concentrate on regulating the disclosure of all vital information by banks to all prospective sinking fund customers.

[9.2] All of the banks should provide information of interest rate for all types of deposit savings scheme.

[9.3] Disclosure of compounding frequency must be publicly available through written documents to be fair in paying the accumulated money from the savings scheme. It is the compounding frequency through the disclosure of which the prevailing and prospective discrepancy can be eliminated to the large extent.

[9.4] Hidden facts, containing different rate for different tenures, different slab for availing the accumulated sum of money from the sinking fund, practiced by each and every bank should clearly and elaborately be written so that any investor straightforwardly can take those facts into his or her consideration.

[9.5] In case of customized savings such as millionaire scheme, billionaire scheme, and monthly benefit scheme, central bank should closely monitor the disclosures of pertaining documentations to eliminate any obstacles making serious impact on investors of those types of schemes.

[9.6] Almost all banks create sinking funds in a customized format. Attention should be given on the creation of other types of sinking funds on the need basis of the customers.

10. CONCLUDING REMARKS

As far as disclosures of interest rate and compounding frequency are concerned, banks operating in our country can not undermine the needs of the disclosures of vital information that this study has brought into the focus. For the sustainable economy, the need for ethical banking practices is obligatory. Disclosure of all the requirements in case of receiving the interest from the loan creation, but at the same time no-disclosure of the facts inherent in different sinking fund provision can not be the good practices. Hence, proper disclosures practices of interest rate offering as well as compounding frequency including other hidden facts relating to the proposal of any saving scheme are earnestly expected. Finally, the establishment of better customer-bank relationship practices indispensible for long-run success both for customers and banks must grow by proper practices of the guidelines recommended in this paper.

11. REFERENCES

1. Gitman, Lawrence J., (2007), "*Principles of Managerial Finance*", 10th Edition, Pearson Education, Pp: 150-190; 264-291
2. Graham, John., Smart, Scott B., (2011), "*Introduction to Corporate Finance*",3rd Edition, P-82.
3. Horne, James C. Van., Jr, John M. Wachowicz, (2001), "*Fundamentals of Financial Management*", 11th Edition, Pearson Education Asia, Pp: 38-57
4. Hudson, Michael., (2000), "*The mathematical economics of compound interest: a 4,000-year overview*", Journal of Economic Studies, Vol. 27 Iss: 4/5, MCB UP Ltd, Pp.344 – 363
5. Khan, Dr. A. R., "*Bank Management: A Fund Emphasis*", (2008), 1st Edition, Decent Book House, Dhaka-1205, Pp: 274-287
6. Kieso, Donald E., Weygandt, Jerry J., Warfield, Terry D., (2001), "*Intermediate Accounting*", 10th Edition, John Wiley & Sons, Inc., Pp:288-294.
7. Rose, Peter S., Hudgins, Sylvia C., (2005), "*Bank Management & Financial Services*", 6th Edition, McGraw-Hill, Pp: 389-415.
8. Whigham, David., "*Quantitative Business Methods Using Excel*", (1998), Oxford University Press, Pp: 170-199

WEBSITES
9. Brochure related to Deposit Schemes of Different Banks.
10. http://advancedwealthbuilders.com/Compound_Interest.html
11. http://en.wikipedia.org/wiki/Compound_interest.
12. http://math.ucsd.edu/~wgarner/math4c/textbook/chapter4/compoundinterest.htm

MEASUREMENT OF STATE CAPITAL FORMATION IN INDIAN AGRICULTURE: ISSUES AND FUTURE PERSPECTIVE

NITI PANDEYA
SENIOR RESEARCH SCHOLAR
DEPARTMENT OF ECONOMICS
PANJAB UNIVERSITY
CHANDIGARH

ABSTRACT

Measurement of capital formation in Indian agriculture has always been a controversial affair. What to be included as agricultural capital formation remains a question which has failed to find any consensus among researchers. The problem remains much severe in case of measurement of state level capital formation. The paper presents the major issues/controversies in measurement of public and private capital formation in Indian agriculture at state level along with the differential approaches followed by the centre and states which hinder the comparative analysis of agricultural term investments. It also throws light on the various attempts by institutions or individual researchers with their respective modifications and conceptualization and overtime efforts to estimate state capital formation in agriculture. The paper contributes to the existing literature by highlighting the problems of the existing methods adopted by different states to estimate capital formation in Indian agriculture along with suggesting future pathways for building a sound data base of the same at the state level.

KEYWORDS
capital formation, private investment, public investment.

INTRODUCTION

Capital formation is of paramount importance for assessing the growth potential of any sector including agriculture. Large scale investments in agriculture can not only provide a structural break to the sector, but also lift it up from stagnation. Thus, investment in agriculture i. e. increasing the levels and the quality of investment in agriculture is central to achieving the goals of a smooth economic development, catalysing structural change and increasing food security (FAO, 2011).Though the major focus of researchers has been the declining capital formation in Indian agriculture, another common concern has emerged regarding the methodology to be followed for estimating capital formation in agriculture. The coverage of the existing estimation methods and series based exclusively on direct agricultural expenditure have been repeatedly questioned. The government of India has time and again appointed committees to review the status of capital expenditure estimates and provide suggestions for improvement in the same. In addition to comments about the coverage issue of capital formation in agriculture , the other estimation inadequacies such as lack of direct capital formation estimates at state level , non- availability of state wise series on annual basis with respect to private capital formation , lack of separate estimates of private corporate capital formation in agriculture , improving the quality of capital formation estimates in occasional surveys , enhanced efforts on the part of states to generate estimates and greater comprehensiveness has been suggested to facilitate the analysis of capital formation in agriculture .

OBJECTIVES
Major objectives of this study are -
1. To identify the major issues in measurement of capital formation in Indian agriculture at state level.
2. To provide an insight into the overtime evolution of methodologies regarding estimation of state level capital formation in agriculture.

STATE LEVEL CAPITAL FORMATION IN INDIA: STATUS OF ESTIMATION PROCEDURES AND ISSUES
Estimates of state capital formation acquire extreme importance for a country like India where regional inequalities are significant and lop-sided development of the states have been a cause of concern for the policy – makers. Capital formation reflects the growth performance of the states and its estimation can help a long way in formulation of policies for regional development. In spite of being of extreme importance, measurement of capital formation in agriculture, particularly at state level suffers from a number of limitations. Not only the overall capital formation estimates are unavailable for most of the states, decomposition with respect to share of public, private corporate and household sector is also not readily available on state wise basis. The public sector estimates of capital formation in agriculture are not available directly. Rather state wise capital outlay is available in the form of annual report of "Combined Finance and Revenue Accounts of Union and State Governments", published by Comptroller General of India (CAG), which is used as a proxy variable for estimation of capital formation in agriculture. Private corporate sector is viewed to have a marginal contribution in agriculture and its estimates are not prepared on state wise basis. Moreover, household capital formation, which accounts for a major contribution in private agricultural investments, is also estimated and furnished on a decennial basis in the form of All India Debt and Investment Survey (AIDIS), which is conducted by NSSO. As such, the status of state estimation of agricultural capital formation remains far from satisfaction.

As for the institutional role in assessment/estimation of agricultural capital formation , even though annual estimates of capital formation have been provided by CSO since 1950s, the state of regional estimates in this regard remained unsatisfactory till 1980s. It was only in the subsequent decade that some of the states started estimation of capital formation broadly using the methods adopted and utilizing the training provided by CSO in this regard. At this stage , it would be of order to highlight the differences between the methodologies adopted at the central and state level and the inherent problems arising out of these differences. Though the state level estimates are prepared on the guidelines provided by CSO, there exist several differences exist between the approaches used at the state and national level.

TABLE 1: CAPITAL FORMATION IN AGRICULTURE: A COMPARISON OF CENTRAL AND STATE LEVEL APPROACH

Approach	Central level (CSO)	State level (State Directorates)
Estimation	At the central level, the Gross Capital Formation (GCF) estimates are provided. The estimation of change in stock and net fixed capital formation is also provided.	The estimates of Gross Fixed Capital Formation (GFCF), rather than GCF are provided due to open boundaries of the states.
Components of public sector	The estimation by CSO includes irrigation projects and plantations in the forestry sector. It does not include the components such as soil and water conservation, animal husbandry, etc. These are included separately under the statement of "Economic and purpose classification of government expenditure".	The state estimation includes administrative expenditure of state governments into consideration while calculating capital formation in agriculture.
Private sector	At the national level, the estimates of private sector are available, although the break-up for private corporate sector and household sector are not available.	Very few states provide estimate of private sector due to scarcity of data. The estimation of private corporate sector poses more difficulty due to data constraints.
Household sector estimation	The household sector estimates are provided for two categories - construction and machinery and equipment.	The states use benchmark estimates and move them according to different indicators for extrapolation. There is no uniformity of indicators among the states also.

PROBLEMS RELATED TO USAGE OF AVAILABLE STATE LEVEL DATA FOR ANALYSIS

As mentioned earlier, states have been preparing estimates of capital formation in agriculture since 1990s. However, some problems which restrict the use of state level estimates for analysis of capital formation for agricultural sector can be listed as:

1. The state level data on GFCF for agriculture and all other sectors is available in a discontinuous manner. Most of the states provide GFCF data since 1990s whereas others provide it since the last 10 years. Moreover, trial estimates are not released by the states.
2. The state level estimates do not have a scope of comparability since the very definition of agriculture is different for different states. Some states include crop sector and livestock sector in agriculture whereas others also include forestry and fishing. Animal husbandry is also included by some states into the agricultural sector.
3. The coverage regarding public sector is also differs across states. Some of the states are including local bodies and other autonomous bodies while others are just including DCUs and NDCUs in the public sector.
4. As for the private sector, separate estimates are not prepared by the states for private corporate and household sector.
5. The indicators which are used for moving the benchmark estimates are also different for different states, thus leaving little scope for comparison.

RECENT GOVERNMENT EFFORTS FOR UPDATING CAPITAL FORMATION ESTIMATION AT STATE LEVEL

✓ **National Statistical Commission (2001)** also made recommendations regarding capital formation which may be summed up as –
- The Perpetual Inventory Method of preparing the estimates of Consumption of Fixed Capital may be reviewed periodically for assumptions made regarding the average life of various assets.
- All States should compile estimates of total capital formation.
- Public sector information in respect of local bodies should be improved. States need to make arrangements for consolidation of statistics from the annual statements of receipt and expenditure in respect of their local bodies.
- The State Directorate of Economics and Statistics should start compiling the estimates of Gross Fixed Capital Formation (GFCF), on the basis of the guidelines provided by the Central Statistical Organisation (CSO) from time to time. Once the States start compiling the GFCF estimates, a database on this could be developed, which in the long run, would be used for compiling the estimates of capital stock and CFC. State DESs should examine the guidelines in consultation with CSO for the compilation of capital formation, capital stock and CFC.

✓ **The high level committee on savings and investment** constituted by government of India in 2009 also explored the existing issues and estimation procedures for capital formation and savings at the state level. While proposing estimation methods for state level capital formation in all sectors, the committee contended that a number of issues and problems exist with respect to state level estimation of capital formation in various sectors. The main problems highlighted in the committees report were –

1. Most of the States compile GFCF for only public sector and the compilation is done by industry of use. The State wise data on public sector as available from the Gross Block of public enterprises survey is used for the same. The main problem is getting the data on private investments made in the States. Since a large fraction of investment is by private sector also, it becomes paramount necessity to estimate private capital formation in all sectors in states.
2. The private sector estimation is hindered by scarcity of data. As such, more frequent surveys related to enterprises / households could be a solution to this problem.
3. Even for the public sector, the estimates of various states do not seem to be comparable as some states are including local bodies and autonomous bodies whereas others are excluding local bodies while defining the public sector in their estimation procedure.

✓ The latest analysis of state level estimates came in the form of 19th Conference of Central and State Statistical Organisation (COCSSO) in 2012, which throws light on the present status and issues relating to capital formation estimates at all-India and state level. The main points highlighted in the conference were –

1. Although capital formation can be estimated by commodity flow approach, flow of funds approach and expenditure approach, the same at the state level can be calculated by the expenditure approach only as the other two methods require data on imports and exports of capital goods across the state boundaries and net inflow of resources from outside the state, which are not available at state level.
2. Estimates of GFCF can be prepared by the states, since calculation of GCF estimates require estimation of change in stock, which is not possible due to open boundaries of states.
3. Most of the states are calculating GFCF of the public sector, whereas estimates of fixed capital formation of private corporate sector and household sector are not available due to paucity of data.
4. All-India debt and investment survey data is used by some states for calculating household sector capital formation. This practise is also not problem free as the investment estimates reported in AIDIS are underestimates. It is just a fraction of what is reported in the national accounts statistics.

The manner in which PRIVATE capital expenditure in various sectors can be calculated at the state level was also discussed. As for the agricultural sector, it was suggested that -

1. State wise private /household sector estimates for fixed capital formation in farm-business can be obtained from the decennial survey of NSSO called all-India Debt and Investment Survey. The estimated for the subsequent years could be extrapolated using suitable indicators such as area irrigated under wells, sale of tractors etc. In case of use of quantum indices, suitable indexes can be applied to convert the estimates into current prices.
2. The decennial surveys and the enterprise surveys should be conducted more often so as to reduce the data non- availability of private sector at the state level.
3. Use of all-India capital output ratio in the private sector can be made to estimate private sector capital formation at the state level.
4. Improvement in the quality of capital formation estimates in the enterprise surveys and enlargement of sample size were also recommended.

INDIVIDUAL RESEARCH ATTEMPTS TO ESTIMATE STATE LEVEL SERIES FOR CAPITAL FORMATION IN AGRICULTURE

Recognizing the numerous problems related to accounting of agricultural capital formation at state level, several attempts have been made by various researchers to address the issues relating to estimation of capital formation in various sectors of the economy.

Rajeswari et. Al. (2009) focus on the state wise estimation of private capital formation over the period of 1999-00 to 2005-06 in different industrial sectors as defined in NAS. The study uses all-India estimates of private corporate sector as well as the data available in various surveys conducted by NSSO. As for the private capital formation in agricultural sector, benchmark estimates of 2002-03 have been obtained from the AIDIS report (NSSO 59th round) for estimation of state wise capital formation in agriculture. The estimates of private corporate sector at all-India level have been distributed among states using the indicator "Gross value added in agricultural industry". The addition of capital formation in private corporate sector and household sector have been added and moved according to state wise gross value added in agricultural industry.

Mallick (2008) proposes a methodology of compiling state level estimates by moving away from the state level accounts and allocating national level GCF among states .Two methods have been suggested to allocate the national level estimates among state: first method involves the use of state wise total government capital expenditure and the second method includes making use of state wise GSDP estimates. The second method implies an assumption that rate of capital formation depends on the rate of development and as such, GSDP can be an indicator of development level of states and individual sectors. It was found that the second method of estimation was more accurate and showed high correlation with the estimates given by state level directorates.

Estimation of capital formation in agriculture: Future pathways – in paucity of the direct estimation of capital formation in agriculture at state level with a uniform methodology across states, some other methods, which involve the existing available indicators such as GDP, etc. can be used to estimate agricultural capital formation. The estimates can broadly be arrived at depending on the availability of data.

- The whole state economy may be grouped into specified user industries on the same lines as done for the gross domestic product (GDP). Thereafter the GFCF estimates for each agricultural sector may be attempted depending upon the GDP contribution of agriculture .This method may appear to be an easy task but it involves its own intricacies and limitations.
- The bench mark estimates for capital formation in agriculture can be worked out reasonably/satisfactorily every few years and the estimates for intervening years can be worked out by moving the bench mark estimates by means of appropriate indicators of physical output and prices (e.g. livestock products, unregistered manufacturing construction, trade etc.)
- The national totals of capital formation in agriculture can be allocated among the states by use of some meaningful indicators such as value added in agriculture , share of agriculture in total state domestic product , etc.

CONCLUSION

Even though the importance of capital formation in Indian agriculture remains of utmost importance, its estimation processes and data availability suffer from a number of problems. Whereas the public sector estimates are available in the form of "Capital outlay" rather than "Capital formation" in agriculture at state level, the problem becomes severe for private sector. In the absence of any comparable methodology for private sector at the state level, it becomes an onerous task to compare the long term investments trends across states. Moreover, estimation for private corporate sector, whose contribution precisely relates to agriculture by making term investments in plantation sector, is also not satisfactory. The projection of household capital formation estimates, which are based on benchmark estimates are also found to be either under or overestimations. As such, there is a pressing need for a much stronger database for capital formation in endian agriculture. Not only a uniform methodology be adopted across states but bifurcated estimates should also be prepared for capital formation in agriculture with respect to public, private corporate and household sector.

REFERENCES

1. Government of India (2001) Report of the National Statistical Commission, Ministry of Statistics and Programme Implementation, New Delhi.
2. Government of India (2009) Report of the high level committee on estimataion of saving and investment, Ministry of statistics and programme implementation, New Delhi.
3. Mallick, jagannath (2008), "Private Investment in India: Data and Measurement Issues at the State Level", The Journal of Income and Wealth, Vol. 30, No. 2, pp 44-63.
4. Rajeswari T., Ray Anindita Sinha, Sahoo Harihar (2009), "Estimation of Capital Formation At State Level" The Journal of Income and Wealth, Vol. 31 , No. 1, pp 27-33.

EFFECTIVENESS OF HARYANA FISCAL RESPONSIBILITY AND BUDGET MANAGEMENT ACT IN FISCAL CONSOLIDATION OF THE STATE

DEEPAK VATS
RESEARCH SCHOLAR
PANJAB UNIVERSITY
CHANDIGARH

ABSTRACT
Government of India had enacted Fiscal Responsibility and Budget Management Act, 2003 to consolidate the fiscal position of the country. This suit was followed by all the state governments also. The present study attempts to evaluate the effectiveness of fiscal responsibility legislation in Haryana. It examines the fiscal situation of the State that necessitates the adoption of fiscal rules for the State. The study aims at analysing the key fiscal parameters of the State to examine the fiscal health of the State and finding out the role of Haryana Fiscal Responsibility and Budget Management Act in the fiscal consolidation process of the State. To analyse the effectiveness of the Act, the study period of 15 years (1997-98 to 2011-12) has been divided into two sub-periods of pre and post HFRBM Act period. Accordingly, an attempt has been made to evaluate the impact of the Act in improving the fiscal indicators of the State.

KEYWORDS
Deficits, Fiscal Policy Rules, Fiscal Responsibility.

INTRODUCTION
Fiscal performance of national and sub-national governments, both in developed and developing economies is an important measure to assess the macro-economic stability. With increasing trend of decentralization all over the world sub-national governments have gained more powers regarding raising revenues, disbursement of resources and the capacity to incur debt. This autonomy in many cases has resulted in the unsustainable fiscal situation, the burden of which ultimately falls on the central government eventually affecting the national fiscal health. As Liu and Webb (2011) observed, "When SNGs follow unsustainable fiscal policy, it can jeopardize the services they manage (but for which the central government may have ultimate political responsibility), the safety of the financial system, the country's international creditworthiness, and overall macroeconomic stability. Too often the central government then gets dragged in to provide bailouts, which can disrupt its own fiscal sustainability and reward the populist fiscal tactics of the recipient SNGs." Furthermore, sub-national governments have less incentive than the central governments to be concerned with macroeconomic impact of their policies because they do no bear the full cost of their actions (Vulovic, 2010).

In a Globalized world and with the introduction of New Economic Policy in India, states have been given more responsibility in the development of the basic infrastructure, providing better environment for investors apart from providing good quality basic necessities for the well-being of the residents. This has increased the sub-national expenditure to manifold which in some cases has resulted in huge debt accumulation & unsustainable fiscal situations. Adopting the target based fiscal rules in the form of Fiscal Responsibility Legislations (FRLs) is one of the effective solutions to avoid this problem.

Fiscal rules are considered as, "a permanent (or long lasting) constraint on fiscal policy, expressed in terms of a summary indicator of fiscal performance, such as the government budget deficit, borrowing, debt or a major component thereof" (Koptis and Symansky, 1998). Teresa Ter-Minassian (2007) identified that fiscal rules are typically enshrined in constitutional or legal provisions and are intended to influence policy design and anchor economic agents' expectations about a government's commitment to fiscal discipline over a relatively long horizon. At the same time, they also aim at enhancing accountability of policy makers, creating incentives for them to adhere to prudent policies. It is expected that these fiscal rules will deter the unsustainable and imprudent fiscal behaviour of the sub-national governments. These fiscal rules impose restriction on the policymakers to rationalise the spending behaviour and enhance the revenue raising capacity of the state to meet the increasing expenditure and to retain the debt at sustainable levels. Foremny (2011) indicated the introduction of the Maastricht Treaty and the Stability and Growth Pact as the cornerstone in the interest of such rules, which restrict governments in the way how they should keep their books in balance. The best way to make these rules effective is to introduce them in the form of legislations.

Fiscal rules are key to improve the performance at the sub-national level in decentralized governments particularly in a federal nation like India where share of sub-national expenditure is large enough to affect the overall macroeconomic performance. Indian Fiscal situation was very grave in the late 1990s and "there had hardly been any reduction in the central government fiscal deficit. On the contrary there has been a steady increase in the revenue deficits and a sharp reduction in the share of capital expenditures indicating significant deterioration in the quality of fiscal imbalance" (Rao and Amarnath, 2000). Finances of the Sub-national governments were also under huge stress because of increasing responsibilities of states under the New Economic Policy environment, recommendations of the Fifth Pay Commissions resulted in increasing wage bill and growing debt and interest burden.

Under such a situation, introduction of fiscal rules in the form of Acts in India both at national and sub-national level has given a new momentum to the process of fiscal consolidation. Government of India (GOI) had enacted the Fiscal Responsibility and Budget Management Act (FRBAM) in 2003 after which almost all the state government followed suit and enacted FRLs at sub-national level. Karnataka (2002) was the first state enacting the FRBM Act followed by Kerala (2003), Tamil Nadu (2003) and all other state governments. Government of Haryana enacted the Haryana Fiscal Responsibility and Budget Management Act (HFRBMA) in 2005. In the present paper an attempt has been made to analyse the effectiveness of sub-national fiscal rules in improving the fiscal consolidation process of Haryana state.

REVIEW OF LITERATURE
Since last one and half decade the importance of fiscal rules has increased tremendously and both developed and developing countries are adopting fiscal rules as a policy measure for consolidating fiscal situation at national and subnational level. Keeping this in view some important studies have been reviewed to analyse the effectiveness and importance of fiscal responsibility legislations.

Lahiri (2000) found that all state governments in India were under fiscal stress because of increasing interest burdens from debt contracted in the past, and increasing wage bills. By analysing the data for the period 1970-1995, it asserted that there were signs of the states catching up with the centre in terms of fiscal deficit. Therefore, it was imperative to effect a fiscal correction and safeguard developmental expenditure at the state level. While the 'hard' budget constraint at the state level will continue to provide some safeguard at the state level, such a safeguard can be bolstered by a Fiscal Responsibility Act at the central level. Author suggests that it may be useful for states also to enact fiscal responsibility acts to have a medium-term framework for containing debt and interest payments, and to impose ceilings on guarantees.

Koptis (2001) in his paper assessed the potential usefulness of fiscal policy rules for India, in the light of rapidly growing international experience in this area. Author highlighted that India's public deficit bias and indebtedness cannot be sustained much longer, especially with stepped-up external liberalisation. So the author strongly advocated for the adoption of fiscal responsibility legislation that involves: a high degree of transparency; well-designed fiscal policy rules at the national and subnational levels of government; short-run contingency measures and a multiyear macro-budgetary process and an institutional framework for implementation of rules. To ensure the success of fiscal rules, their implementation needs to be preceded by a determined outreach campaign, broad legislative consensus, and an adequate convergence path, all of which are beginning to be tackled in the context of the bill. Apart from this, the introduction of fiscal rules

must be accompanied by an overarching structural reform effort covering intergovernmental fiscal relations, public sector employment, subsidies, and the financial system

Rangarajan and Srivastava (2005) observed that high level of fiscal deficit relative to GDP not only increased debt-GDP ratio, but also adversely affected savings and investment, and consequently growth of the economy. The FRBMA specified the target for achieving a fiscal deficit to GDP ratio of 3% and eliminating revenue deficit by FY 2008-09 at the central level. Here, the authors pointed out that the states' borrowings and debt contributed significantly to the overall fiscal deficit and debt relative to GDP, and had important macro consequence; therefore, it was important that the centre's FRBMA was to be complemented by state level fiscal responsibility legislations.

Bagchi (2006) asserted that with the implementation of FRBMA in most of the states, the focus of the states limited to deficit reduction only which unfavourably affected the public spending on social services in several states and caused reduction in public sector expenditure. Although there are effective opinions against inflexible targets but abandoning the discipline underlying fiscal responsibility legislation is questionable.

Ter-Minassian (2007) analysed different aspects of fiscal rules and concluded that fiscal rules cannot be a conduit to fiscal discipline if political commitment is lacking; nor can they cure poorly designed structures of intergovernmental fiscal relations. Fiscal rules, also, are not the only solution to improving the incentive structure faced by local politicians. However, under certain situations, these rules can offer a valuable policy framework.

Simone and Topalova (2009) in their paper analysed the fiscal performance at the central and subnational government levels since the implementation of Fiscal Responsibility and Budget Management Act (FRBMA) and the state Fiscal Responsibility Legislations (FRLs) provided a preliminary assessment of the impact of fiscal rules on fiscal discipline in India. The headline indicators showed that there is improvement in fiscal position but it is reduced when broader fiscal indicators for the same period are considered. The fiscal consolidation at the state level was achieved on the back of growing own revenues and higher resource transfers from the central government. Authors suggested some measures to improve the FRLs like, defining subnational debt targets that are consistent with national debt reduction objectives, continue to increase the transparency of fiscal policy, to focus medium-term fiscal policy on debt sustainability, prevent excessive use of escape clauses and frequent deviations from targets.

Kumar and Soumya (2010) in their paper traced out that the impact of the current global crisis on India has been significant in terms of fiscal imbalances and the lower GDP growth rate. This has sharply reversed the steady fiscal improvement over the past five years since 2003-04 and weakened public finances considerably. After the introduction of the FRBM Act, public debt steadily declined until 2008–2009. The concern now is that the high fiscal deficits of the past two years may suggest a long-term reversal of this trend. These trends also point to one of the main deficiencies in the FRBM Act, namely the failure to set a cap on public debt. The study pointed out a key challenge that involves balancing between public interventions and maintaining market confidence in the sustainability of public finances. This would involve focusing policy attention on removing some of the structural bottlenecks on raising the potential GDP growth rate.

Sucharita and Sethi (2011) in their paper analysed the role of FRBMA in restoring fiscal balance in India through a quantitative analysis. The study found out the major factor behind rising fiscal imbalance in India and to examine whether there is an electoral motive towards high fiscal deficit to GDP ratio. Ordinary Least Square (OLS) method was employed to examine the impact of FRBMA on fiscal deficit in India using the data for the period 1980-81 to 2008-09. After the implementation of the FRBM Act central government's major fiscal deficit indicators showed a declining trend. The improvement at central level was due to slight improvement in revenue receipts and mainly due to expenditure cut but there was a heavy deterioration in the capital expenditure which according to Fiscal Policy Rules (FPRs) should also take care of, as it was a major indicator of growth and priority should be given for increasing this expenditure rather than cutting it off in the fiscal consolidation process. The empirical results showed that FRBMA does not have a significant effect on the gross fiscal deficit to GDP ratio whereas GDP growth rate has a significant negative effect on the gross fiscal deficit to GDP ratio. The paper suggested that FRBM Act in India need to be accompanied by an overarching structural reform effort covering inter-governmental fiscal relations, public sector employment, subsidies, and the financial system and for achieving transparency, clarity in institutional arrangements in fiscal reporting and in accounting should be enhanced

Haseen and Kirmani (2012) asserted that the aim of central government is to decrease the burden of debt and correct fiscal and revenue deficit at both tier of government within targeted period assigned by FRBM Act. The fiscal position of Indian states worsened, before FRBM Act, fiscal deficit and revenue deficit continuously rose and after the implementation of FRBM Act, government introduced a number of policy actions to correct fiscal situation at state level. States show encouraging sign towards fiscal situation and improve their fiscal and revenue deficit. According to the study the adoption of FRBMA is effective to improve the fiscal health of the state governments in India.

IMPORTANCE OF THE STUDY
Fiscal consolidation has become a major challenge for all levels of government because of increasing public expenditure without any commensurate rise in the resources of the revenue. This unhealthy fiscal situation has shrunk the fiscal space of the governments to develop socio-economic indicators. Therefore, adoption of fiscal responsibility legislations has acted as a deterrent to curb the wasteful expenditure and to raise revenue through tax and non-tax sources and keep the books in balance. In India all the states have implemented the fiscal responsibility legislations as a measure of consolidating the fiscal health of the state. In this line, present study will analyse the effectiveness of Haryana Fiscal Responsibility and Budget Management Act (HFRBMA), 2005 in consolidating the fiscal position of the State.

OBJECTIVES OF THE STUDY
The present study has the following objectives:
1.   To analyse the need for Fiscal Responsibility Legislation in Haryana.
2.   To analyse the effectiveness of Haryana Fiscal Responsibility and Budget Management Act.
3.   To evaluate the performance of key fiscal parameters in Pre-HFRBMA and Post-HFRBMA period.

PROFILE OF HARYANA
The present state of Haryana, as a separate unit of Indian union, came into existence on November 1, 1966 as a result of bifurcation of state of Punjab. The geographical area of Haryana is spread over 44212 sq. k.m. with a population around 25.35 million. The State has seen considerable economic growth in the past decade and the compound annual growth rate of its Gross State Domestic Product (GSDP) for the period 2001-02 to 2010-11 has been 16.42 per cent. During this period, its population grew by 19.90 from 2.11 crore in 2001 to 2.54 crore in 2011. Due to its higher GSDP growth rate and low population, the per capita income growth in Haryana fared better than that of other General Category States in the current decade. Since its inception, Haryana has been an agriculture dominant State but the structural changes that have taken place during last four and half decades has changed the scenario and share of primary sector has reduced to nearly 16 per cent in total GSDP of the State. The relative share of agriculture and allied activities has fallen from 60.7 per cent in 1969-70 to 16.30 per cent in 2011-12. During the same period, the relative share of industry and service sector has registered a higher contribution of 29.1 per cent and 54.6 per cent respectively, compared to 17.1 per cent and 21.7 per cent in 1969-70.

NEED FOR FISCAL RESPONSIBILITY LEGISLATION IN HARYANA
Fiscal indicators of the state government were in healthier position by the end of the 1980s. This healthy fiscal situation has started showing signs of deterioration by the second half of the 1990s. Fiscal deficit remained very high and in 1998-99 it reached to 5.13 per cent of the GSDP of the state. A major part of fiscal deficit was constituted by the revenue deficit which indicated that most of the government expenditure was made to finance the current needs and only a smaller proportion was devoted to the capital projects. The expenditure of the state had experienced a steep surge after the implementation of the recommendations of the Fifth Pay Commission. Fiscal deficit of the state had almost doubled and outstanding liabilities also became very high. Table 1 indicates

that the liabilities of the state government (outstanding debt and contingent liabilities) reached to a very high level i.e. from 29.80 per cent in 1997-98 to 43.48 per cent in 2002-03.

TABLE 1: HARYANA: FISCAL INDICATORS IN PRE-HFRBMA PERIOD (Rs. Crores)

Year	Gross Fiscal Deficit (GFD)	Revenue Deficit (RD)	Outstanding Liabilities*/GSDP	Interest Payment as Per Cent to	
				Revenue Receipts (RR)	Revenue Expenditure (RE)
1997-98	1128 (2.98)	719 (1.90)	11261 (29.80)	13.90	12.39
1998-99	2240 (5.13)	1540 (3.53)	14227 (32.60)	18.20	14.20
1999-00	2133 (4.36)	1185 (2.42)	18126 (37.06)	23.53	19.52
2000-01	2265 (4.11)	608 (1.10)	22859 (41.52)	22.70	20.78
2001-02	2740 (4.52)	1056 (1.74)	26332 (43.48)	21.37	18.76
2002-03	1471 (2.10)	685 (0.98)	27638 (39.51)	22.48	20.83
2003-04	2933 (3.56)	274 (0.33)	28357 (34.39)	21.47	20.89
2004-05	1206 (1.29)	258 (0.28)	29149 (31.07)	20.05	19.59

* It includes outstanding debt and outstanding Guarantees; Notes: 1.Figure in parenthesis is per cent to GSDP 2.Figures are rounded-off.
Source: RBI Handbook of Statistics on State Finances; RBI State Finances: A Study of Budgets; Statistical Abstract of Haryana, various issues

With increasing debt burden interest payments also started mounting and more than 20% of the revenue receipts were spent to pay the interest on the outstanding loans of the State. In their study Rangarajan and Prasad (2012) categorized the states as High Debt Stressed whose Debt/GSDP ratio lies between 30% - 50% and ratio of interest payment to revenue receipt is between 15% - 25%. Keeping this in view it can clearly be stated that Haryana can be categorised as the Debt stressed state and the fiscal situation of the state needed some concrete action. However the situation had started improving from 2003-04 but by that time Finance Commission of India had become more cautious about the fiscal consolidation process of the states.

Apart from it Finance Commission of India has also changed its formula for Tax devolution and other grants. Eleventh Finance Commission proposed the index of fiscal discipline with a view to providing an incentive for better fiscal management. Under its new criteria for devolution a weightage of 7.5% was given to the index of fiscal discipline with a view to providing an incentive for better fiscal management. Report of the Twelfth Finance Commission also emphasised on the fiscal discipline of the sates and stated that, "Debt Relief often underwrites lack of fiscal discipline of the past……so it is clear that any debt relief will have to be linked to a desired path of fiscal adjustment including targets for revenue and fiscal deficit." Thus the relief under the Debt Consolidation and Relief Facility (DCRF) provided by the 12th Finance Commission was attached to the implementation of the Fiscal Responsibility and Budget Management Act. Twelfth Finance Commission stated that, "Only those states can avail this facility which has implemented the FRBMA for their respective states. We recommend that each state should enact fiscal responsibility legislation. This has been stipulated as a precondition for availing the debt-relief scheme as recommended by us. This legislation should, at a minimum, provide for

(a) eliminating revenue deficit by 2008-09;
(b) reducing fiscal deficit to 3 per cent of GSDP or its equivalent defined as ratio of interest payment to revenue receipts;
(c) bringing out annual reduction targets of revenue and fiscal deficits;
(d) bringing out annual statement giving prospects for the state economy and related fiscal strategy;
(e) bringing out special statements along with the budget giving in detail number of employees in government, public sector, and aided institutions and related salaries."

This situation made it imperative for the government to take some suitable steps to maintain the fiscal health of the state which can prevent the further deterioration in the state finances. Thus, the Reports of the Finance Commission, apart from the fiscal situation of the state, prepared the ground for the enactment and implementation of the Haryana Fiscal Responsibility and Budget Management Act, 2005.

Further, in this line the Thirteenth Finance Commission recommended a fiscal roadmap for the states and stated that, "we recommend that the states' enactment/amendment of their FRLs incorporating the above targets should be conditionality for release of all state-specific grants." Keeping these recommendations in view, HFRBM Act, 2005 amended the targets for the deficit indicators as well as for debt levels and state guarantees.

HARYANA FISCAL RESPONSIBILITY AND BUDGET MANAGEMENT ACT, 2005

The Act stated that the Haryana Fiscal Responsibility and Budget Management Act, 2005 (HFRBMA, 2005) is "An Act to provide for the responsibility of the State Government to ensure prudence in fiscal management and fiscal stability by progressive elimination of Revenue Deficit, reduction in Fiscal Deficit, prudent Debt management consistent with fiscal sustainability, greater transparency in fiscal operations of the government and conduct of fiscal policy in a medium term framework and for matters connected therewith". The HFRBMA, 2005 has been amended four times

TABLE 2 HARYANA: HFRBM ACT AND ITS AMENDMENTS

Parameters → HFRBM Act and Amendments ↓	Fiscal Deficit	Revenue Deficit	Debt (including Outstanding Guarantees)
HFRBM Act, 2005	To reduce the fiscal deficit from 2005-06 to bring it down to 3% by the year 2009-10.	To reduce the revenue deficit from 2005-06 to bring it down to 0%of GSDP by the year 2008-09 and surplus thereafter.	To bring the ratio of debt GSDP down to 28 per cent within a period of five years from 2005-06 to 2009-10
HFRBM (Amendment) Act, 2006	To reduce the fiscal deficit from 2005-06 to bring it down to 3% by the year ending March 2009.	Unchanged	Unchanged
HFRBM (Amendment) Act, 2009	The annual reduction in fiscal deficit shall be 3.5% of GSDP for the years ending March 2009 and March 2010.	Condition for elimination of revenue deficit for the financial year 2008-09 and 2009-10 shall remain relaxed.	Unchanged
HFRBM (Amendment) Act, 2010	The annual reduction in fiscal deficit shall be 3.5% of GSDP for the year ending March 2009 and 4% for the year ending March 2010.	Unchanged	Unchanged
HFRBM Act (Amendment) Act, 2011 Targets	Achieve fiscal deficit 3 per cent of GSDP from 2010-11 and maintain the same till 2014-15.	Attain zero revenue deficit by 2011-2012 and maintain till 2014-15.	Outstanding debt as percentage of GSDP shall be 22.4 per cent (2010-11), 22.6 per cent (2011-12), 22.7 per cent (2012-13), 22.8 per cent (2013-14) and 22.9 per cent (2014-15).

FISCAL HEALTH OF THE STATE DURING THE STUDY PERIOD

Implementation of the HFRBM Act, 2005 was considered as a deterrent to the imprudent fiscal behaviour of the state government which would bring books of the state in balance. The government had also showed its commitment towards the implementation of the Act and the fiscal health of the state improved significantly. It can be seen in the Fig. 1 that 3 years following the implementation of the Act has shown great improvement in terms of fiscal deficit and debt indicators.

FIG.1 HARYANA: FISCAL INDICATORS AS PER CENT TO GSDP
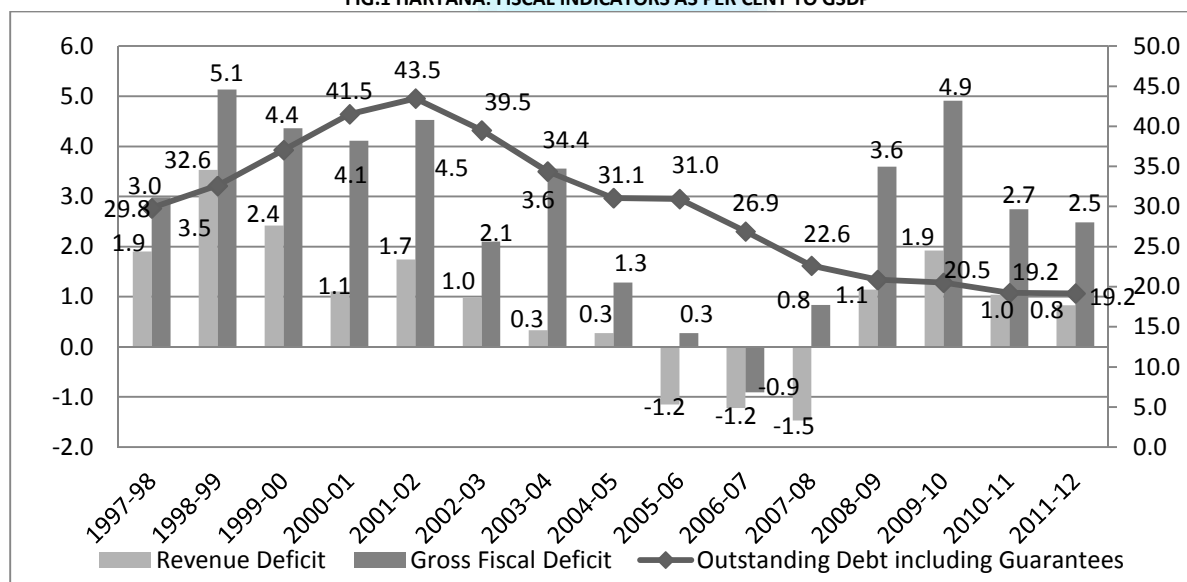
Source: RBI Handbook of Statistics on State Finances; RBI State Finances: A Study of Budgets

After the implementation of the act the revenue deficit had eliminated altogether and fiscal deficit become very low. Target of generating revenue surplus was also achieved before the stipulated time. Soon this good fiscal situation started showing signs of deterioration and both the revenue and fiscal accounts once again pass on to deficits. It was because the macroeconomic slowdown and implementation of the recommendations of the Sixth Pay Commission negatively impacted the fiscal health of the state. Government of Haryana amended the HFRBMA in 2009 and again in 2010 to relax the targets but even then the target of fiscal deficit could not be achieved. The situation came within control in 2010-11 and government succeeded in keeping the fiscal deficit within the limits prescribed in the Act but the elimination of revenue deficit could not take place as yet.

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

http://ijrcm.org.in/

TABLE 3 HARYANA: FISCAL INDICATORS IN POST-HFRBMA PERIOD *(Rs. Crores)*

Year	Gross Fiscal Deficit (GFD)	Revenue Deficit (RD)	Outstanding Liabilities*/GSDP	Interest Payment as Per Cent to	
				Revenue Receipts (RR)	Revenue Expenditure (RE)
2005-06	286 (0.27)	-1213 (-1.15)	32623 (30.95)	15.16	16.61
2006-07	-1179 (-0.91)	-1590 (-1.22)	35012 (26.90)	12.62	13.84
2007-08	1264 (0.83)	-2224 (-1.47)	34313 (22.63)	11.88	13.39
2008-09	6558 (3.59)	2082 (1.14)	38070 (20.86)	12.68	11.39
2009-10	10900 (4.91)	4260 (1.92)	45556 (20.52)	13.04	10.84
2010-11	7260 (2.75)	2750 (1.04)	50828 (19.24)	12.98	11.72
2011-12	7153 (2.48)	1457 (0.83)	59308 (19.17)	11.95	11.10

* It includes outstanding debt and outstanding Guarantees; Notes: 1.Figure in parenthesis is per cent to GSDP 2.Figures are rounded-off.

Source: RBI Handbook of Statistics on State Finances; RBI State Finances: A Study of Budgets; Statistical Abstract of Haryana, various issues

As far as the total outstanding liabilities of the State are concerned, it continuously declined in the post-HFRBMA period and debt to GSDP ratio dropped from 31.1% in 2004-05 to 19.2% in 2011-12. This has resulted in reducing the burden of interest payments. Ratio of interest payments to revenue receipts declined from around 20% in Pre-HFRBMA period to 15.16% in 2005-06 and further 11.95% by the end of 2011-12. Similarly, interest payments as per cent to revenue expenditure also fell from 19.59% in 2004-05 to 11.20% in 2011-12. This sharp decline in debt and debt service payments push the economy out of the debt stressed situation.

QUALITY OF DEFICITS

The ratio of Revenue Deficit and Primary Deficit to Fiscal Deficit would indicate the quality of deficit. Since fiscal deficit represents the aggregate of all the borrowings, the revenue deficit as a percentage of fiscal deficit would indicate the extent to which the borrowings of the Government are being used to finance revenue expenditure. Thus, higher the ratio the worse-off is the state because that would indicate that the debt burden is increasing without adding to the repayment capacity of the State. Table 4 shows that the ratio of revenue deficit to fiscal deficit was quite high in1998-99 and1999-00 and declined steeply to 26.84 per cent in 2000-01. This ratio has started increasing again and reached to 46.57 per cent in 2002-03 before declining sharply to 9.34 per cent in 2003-04. This implies that a large part of the borrowings was going to finance the current expenditure needs of the State.

TABLE 4 HARYANA: QUALITY OF DEFICITS

Pre-FRBMA Period							
Year	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
RD/GFD	68.75	55.56	26.84	38.54	46.57	9.34	21.39
PD/GFD	55.49	36.33	34.13	40.69	-32.29	27.96	-85.32
Post-FRBMA Period							
Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
RD/GFD	-424.13	134.86	-175.95	31.75	39.08	37.88	33.33
PD/GFD	-634.27	292.11	-85.60	64.33	67.43	54.27	43.49

However the situation improved greatly in post-FRBMA period and from 2005-06 to 2007-08 there were revenue surplus and ratio of revenue deficit to fiscal deficit was negative. In 2006-07 both revenue deficits and fiscal deficits were negative, due to which revenue deficit to fiscal ratio became 134.86 per cent. This three year period showed a significant improvement in the key fiscal indicators of the State government. This impressive progress soon disappeared and the ratio again reached to a high level in 2008-09 and became 31.75 per cent in 2008-09. Since 2008-09, this ratio remained more than 30 per cent and fluctuated between 31.77 per cent to 39.08 per cent.

CONCLUSION

Comparison of the key fiscal parameters during pre and post-FRBMA periods indicates that the implementation of the Act has benefitted the State in terms of improved performance and fiscal consolidation of the State. The State had also benefitted from various schemes like Debt Swap Schemes (DSS) and Debt Consolidaion and Relief Facility (DCRF) which were linked to the implementation of the Act and improved performance of the fiscal indicators. These schemes and incentives have helped the State in mitigating its burden of debt and interest payments. Although during the period of macroeconomic slowdown combined with increased burden of salaries and pensions because of the implementation of the recommendations of the Sixth Pay Commission, the performance of fiscal indicators worsened but State has come out of this deteriorated fiscal situation very soon.

The debt/GSDP ratio indicates that State can afford a larger debt as prescribed by the fiscal consolidation roadmap of the Thirteenth Finance Commission and these funds can be better utilized for the creation of large infrastructural base for the economic and social development. The quality of existing infrastructure of health, education and other social service can be greatly improved with this available fiscal space because social indicators of the State are not very good.

REFERENCES

1. Bagchi. Amaresh, Bajaj, J.L. and Byrd, William A. (2006), "India's Fiscal Management Post-Liberalisation: Impact on the Social Sector and Federal Fiscal Relations", Economic and Political Weekly, Vol. 41, No. 39, pp. 4117-4121
2. Foremy, D. (2011). "Vertical Aspects of Sub-National Deficits: the Impact of Fiscal Rules and Tax Autonomy in European Countries". Munich: MPRA Paper No.32998.
3. Kopits, G. and Symansky S. (1998). "Fiscal Policy Rules," Occasional Paper No. 162,   International Monetary Fund, Washington, D.C.
4. Kumar, R. & Soumya, A. (2010), "Fiscal Policy Issues for India after the Global Financial Crisis (2008–2010)", (Working Paper No. 249), Asian Development Bank Institute (ADBI).
5. Lahiri, A. (2000), "Subnational Public Finance in India" Economic and Political Weekly, Vol. 35, No.18, pp. 1539-49.
6. Liu, L., and Steven W. (2011). "Laws for Fiscal Responsibility for Subnational Discipline: International Experience." Policy Research Working Paper No. 5587, World Bank, Washington, DC.

7. Rangarajan C. and Prasad A. (2012). "Managing State Debt and Ensuring Solvency: The Indian Experience", Policy Research Working Paper No. 6039, Economic Policy and Debt Department, The World Bank.

8. Rangarajan, C and Srivastava, D.K (2005), "Fiscal Deficits and Government Debt: Implication for Growth and Stabilisation", Economic and Political Weekly, Vol-40, No-27, pp. 2919-2934.

9. Rao, Govinda M. and Amarnath, H.K. (2000), "Fiscal Correction: Illusion and Reality", Economic and Political Weekly, Vol. 35 (32), Pp. 2806-2809.

10. Simone, A. S. and Topalova, P. (2009), "India's Experience with Fiscal Rules: An Evaluation and The Way Forward" (Working Paper No. 175), Asia and Pacific Department, International Monetary Fund.

11. Sucharita, S., and Sethi, N. (2011), "Fiscal discipline in India." Romanian Journal of Fiscal Policy (RJFP) 2, No.1, pp.1-23.

12. Ter-Minassian, T. (2007). "Fiscal Rules for Subnational Governments: Can They Promote Fiscal Discipline?", OECD Journal on Budgeting , Vol. 6 (3), pp. 1-11

13. Vulovic, V. (2011). "Sub-National Borrowing, Is It Really a Danger?", Economics Dissertations. Paper 77. Georgia State University.

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

http://ijrcm.org.in/

TRENDS AND PATTERNS OF FDI: A COMPARATIVE ANALYSIS OF INDIA AND CHINA

RENU BALA
RESEARCH SCHOLAR
CHAUDHARY DEVILAL UNIVERSITY
SIRSA

ABSTRACT

FDI is the process whereby residents of one country (the home country) acquire ownership of assets for the purpose of controlling the production, distribution and other activities of a firm in another country (the host country. According to the BPM5, FDI is the category of international investment that reflects the objective of obtaining a lasting interest by a resident entity in one economy in an enterprise resident in another economy. The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence by the investor on the management of the enterprise. The present study analyzes the inflow and outflow of funds in India and China. The data is obtains from various reports of IMF, RBI, economic journals of China and India. The obtained data is compiled and T test is used to obtain the results. After compilation it can be said that a substantial amount of money has been invited in both the countries and there is a significant difference in the amount and patterns of investment of funds

KEYWORDS

Internationalization, Investment, Investigate, International Mutual Fund.

INTRODUCTION

Most of the present day underdeveloped countries of the world have set out a planned programme for accelerating the pace of their economic development. In a country planning for industrialization and aiming to achieve a target rate of growth, there is a need for resources. The resources can be mobilized through domestic as well as foreign sources. So far as, the domestic sources are concerned, they may not be sufficient to acquire the fixed rate of growth. Generally domestic savings are less than the required amount of investment. Also the very process of industrialization calls for import of capital goods which can not be locally produced. Hence comes the need for foreign sources. They not only supplement the domestic savings but also provide the recipient country with extra foreign exchange to buy imports essential for filling the saving investment gap and foreign exchange gap. The means of getting foreign resources available to a developing country are mainly three:

1. Through export of goods and services
2. External aid
3. Foreign investment

Export of goods and services do contribute to foreign resources but they can meet only a small part of the total demand for foreign resources. External Aid from foreign governments and international institutions, by increasing the rate of home savings and removing the foreign gap allows the utilization of previously under utilized resources and capacity. But generally the aid is tied and distorts the allocation of resources. So its use has been on the decline.

REVIEW OF LITERATURE

Meyer (2003) discussed the relation between institutions in emerging markets and the entry strategies chosen by foreign direct investors. The merits of alternative strategies from investors' perspective as well as the impact on the host economy are investigated. For this purpose, FDI strategies are investigated and compared in four important emerging markets India, Egypt, South Africa and Vietnam. **Singh (2005)** defined that the Concept of Foreign Direct Investment is now a part of India's economic future but the term remains vague to many, despite the profound effects on the economy. Despite the extensive studies on FDI, there has been little illumination forthcoming and it remains a contentious topic. The paper explores the uneven beginnings of FDI, in India and examines the developments (economic and political) relating to the trends in two sectors: Industry and Infrastructure and sub sector Telecom, to illustrate that. **Denisia (2010)** defined the main trends in FDI theory and highlight how these theories were developed, the motivations that led to the need for new approaches to enrich economic theory of FDI. Although several researchers have tried to explain the phenomenon of FDI, we cannot say there is a generally accepted theory, every new evidence adding some new elements and criticism to the previous ones. **Rao and Dhar (2011)** explained the divergence from the earlier trend. At the outset, the paper dwells on the ambiguities surrounding the definition and the non-adherence of international norms in measuring the FDI inflows. The study finds that portfolio investors and round tripping investments have been important contributors to India's reported FDI inflows thus blurring the distinction between direct and portfolio investors on one hand and foreign and domestic investors on the other. These observations acquire added significance in the context of the substantial fall in the inflows seen during 2010-11.In most countries, particularly those that have faced chronic current account deficits, obtaining stable long term FDI flows was preferred over volatile portfolio investments. This distinction between long term FDI and the volatile portfolio investments has now been removed in the accepted official definition of FDI. **Devajit (2012)** defined that Foreign direct investment (FDI) as a strategic component of investment is needed by India for achieving the economic reforms and maintains the pace of growth and development of the economy. The paces of FDI inflows in India initially were low due to regulatory policy framework but there is a sharp rise in investment flows from 2005 towards because of the new policy has broadened. The study tries to find out how FDI seen as an important economic catalyst of Indian economic growth by stimulating domestic investment, increasing human capital formation and by facilitating the technology transfers. The main purpose of the study is to investigate the impact of FDI on economic growth in India.

RESEARCH METHODOLOGY

The objective of this research is to study the inflows and outflows of Foreign Direct Investment in India and China and also to study the contribution in GDP of India and China. In this study secondary data has been used and data collected through various reports such as IMF report and RBI report from the time period of 1990 to 2012 and to analyse the data T test have been applied.

STATEMENT OF THE PROBLEM

In the present scenario FDI is a necessity, no nation can survive in such a tough economic environment without FDI.FDI has served up as a source of income and revenue to nations, FDI has brought lots of jobs. So this research emphasizes on various aspects of flow of money in and out of the countries that is India and China.

OBJECTIVES

The present study is conducted to achieve the following objectives:

1. To study the inflows of Foreign Direct Investment in India and China.
2. To study the outflows of Foreign Direct Investment in India and China.
3. To study the contribution in GDP of India and China.

RESEARCH HYPOTHESIS

H_{01}: There is no significant difference between the FDI inflow of India and China.

SOURCE OF DATA PLAN AND SAMPLE PLAN

The study is based on the data collection from the primary sources. The secondary data was collected through various report.

DATA ANLYSIS

1. **COMPARISON OF INDIA AND CHINA**

TABLE 1: TOTAL INFLOWS OF FOREIGN DIRECT INVESTMENT (in US billion $)

Sr. No	Year	India		China	
		Inflow	Trend	Inflow	Trend
1	1991	73537638	100.00	4366000000	100.00
2	1992	276512439	376.01	11156000000	255.52
3	1993	550370025	748.42	27515000000	630.21
4	1994	973271469	1323.50	33787000000	773.87
5	1995	2143628110	2915.01	35849200000	821.10
6	1996	2426057022	3299.07	40180000000	920.30
7	1997	3577330042	4864.63	44237000000	1013.22
8	1998	2634651658	3582.73	43751000000	1002.08
9	1999	2168591054	2948.95	38753000000	887.61
10	2000	3584217307	4874.00	38399300000	879.51
11	2001	5471947158	7441.02	44241000000	1013.31
12	2002	5626039508	7650.56	49307976629	1129.36
13	2003	4322747673	5878.28	47076718733	1078.26
14	2004	5771297153	7848.09	54936483255	1258.28
15	2005	7269407226	9885.29	104108693870	2384.53
16	2006	20029119267	27236.56	124082035620	2842.00
17	2007	25227740887	34305.89	156249335200	3578.78
18	2008	43406277076	59025.93	171534650310	3928.87
19	2009	35581372930	48385.25	131057052870	3001.77
20	2010	26502000000	36038.69	243703434560	5581.85
21	2011	32190000000	43773.50	220143285430	5042.22
Mean		10943148364		79258769832	
Df		20			
t-stat.		-5.472			
P-Value		0.000			
t-Value		2.086			

Source:-IMF REPORT 2012

significant level: 5 Percent

Table 1:- shows the total inflows of foreign direct investment in India and China during the period under study. 1991 is taken as a base year of India and China then calculates the trend from 1991 to 2011. The growth of inflow in India and China increased to 376.01 percent and 255.52 in 1992. From 1992 to 1997 the trend of inflow in India and China is respectively increased to 4864.63 percent and 1013.22 percent but in 1998 and 1999 the trend of inflow decreased to 3582.73 percent and 2948.95 percent in India and 1002.08 percent and 887.61 percent in China. After 1999 trend of inflow in India respectively increase in 2000 (4874.00) percent, in 2001 (7441.02) percent, in 2002 (7650.56)percent and but in China trend of inflow decrease to 879.51percent in 2000 then again increase the trend of inflow in China 1013.31percent in 2001 and 1129.36percent in 2002. In 2003 both country trend also decrease to 5878.28percent and 1078.26percent. After that in 2004 to 2008 respectively increased to 59025.93 percent and 3928.87 percent in 2008 but again decreased to 48385.25 percent and 3001.77 percent in 2009. In 2011 growth of trend inflow is 43733.50 percent in India and 5042.22 percent in china. The average of inflow of foreign direct investment in India is 10943148364 USD and in China are 79258769832 USD. The value of t-statistics reveals that there is a significant difference in the growth in the total inflows of foreign direct investment in India and China. But there is no significant difference between the growth in the total inflows of foreign direct investment in India and China because calculated value (-5.472) is less than table value (2.086).

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

http://ijrcm.org.in/

61

2 . CONTRIBUTION IN GDP OF INDIA AND CHINA

TABLE 2:- CONTRIBUTION IN GDP OF INDIA AND CHINA

Sr. No	Year	India		China	
		GDP	Trend	GDP	Trend
1	1991	2.75	100.00	3.79	100.00
2	1992	2.93	106.55	4.23	111.61
3	1993	2.84	103.27	4.40	116.10
4	1994	3.33	121.09	5.59	147.49
5	1995	3.66	133.09	7.28	192.08
6	1996	4.00	145.45	8.56	225.86
7	1997	4.23	153.82	9.53	251.45
8	1998	4.28	155.64	10.19	268.87
9	1999	4.64	168.73	10.83	285.75
10	2000	4.75	172.73	11.98	316.10
11	2001	4.92	178.90	13.25	349.60
12	2002	5.23	190.18	14.54	383.64
13	2003	6.18	224.73	16.41	432.98
14	2004	7.22	262.55	19.32	509.76
15	2005	8.34	303.27	22.57	595.51
16	2006	9.49	345.09	27.13	715.83
17	2007	12.39	450.55	34.94	921.90
18	2008	12.24	445.09	45.22	1193.14
19	2009	13.61	494.91	49.91	1316.89
20	2010	16.84	612.36	59.31	1564.91
21	2011	18.48	672.00	73.18	1930.87
Mean		7.254761905		21.53142857	
Df		20			
t-stat.		-4.339			
P-Value		0.000			
t-Value		2.086			

Source:- TAC, MOFCOM and UNCTAD, IMF report 2012

significant level: 5 Percent

Table 2:- shows the Contribution on GDP of India and China during the period under study. 1991 is taken as a base year of India and China then calculates the trend from 1991 to 2011. The contribution of GDP in India and China increased to 106.55 percent and 111.61 in 1992. In 1993 the contribution of GDP in India decline From 106.55 to 103.27 and in China it increased from 11.61 to 116.10.From 1994 to 2007 the contribution of GDP increased in India and in China it increased from 1994 to 2000 up to 168.61 percent. In 2008 the contribution of GDP decline in India 0.15 percent than 2007. The value of t-statistics reveals that there is a significant difference in the contribution in GDP of India and China. But there is no significant difference between the contribution on GDP of India and China. The calculated value (-4.339) is less than table value (2.086); therefore, null hypothesis is rejected. At 5percent significant level P-Value is 0.000 and degree of freedom is 20.

3. TOTAL OUTFLOWS OF FOREIGN DIRECT INVESTMENT

TABLE 3: TOTAL OUTFLOWS OF FOREIGN DIRECT INVESTMENT

Sr. No	Year	India		China	
		Outflow	Trend	Outflow	Trend
1	1991	NA	NA	913000000	100.00
2	1992	NA	NA	4000000000	438.12
3	1993	350640.56	100.00	4400000000	481.93
4	1994	82583302.7	23552.12	2000000000	219.06
5	1995	117189079.2	33421.43	2000000000	219.06
6	1996	239324706.5	68253.57	2114000000	231.54
7	1997	112918990.4	32203.63	2563000000	280.72
8	1998	47593027.49	13573.17	2634000000	288.50
9	1999	79357457.32	22632.14	1775000000	194.41
10	2000	509532974.7	145314.90	916000000	100.33
11	2001	1397985815	398694.84	6884000000	754.00
12	2002	1678143517	478593.7	2518407450	275.84
13	2003	1878609247	535765.00	11993358.63	1.31
14	2004	2179109086	621465.21	1963372533	215.04
15	2005	2977772976	849238.00	13729566303	1503.80
16	2006	14343661512	4090702.32	23932198468	2621.27
17	2007	17281023004	4928415.30	17154799702	1878.95
18	2008	19256527246	5491814.00	56742276630	6214.93
19	2009	15927071400	4542278.70	43889985500	4807.23
20	2010	13151021113	3750570.42	57953599366	6347.60
21	2011	0	0	49694597037	5443.00
Mean		4345703576		14180466493	
Df		20			
t-stat.		-2.87			
P-Value		0.009			
t-Value		2.086			

Source:- IMF REPORT 2012

Significant level: 5 Percent

Table 3:- shows the total outflows of foreign direct investment in India and China during the period under study. 1991 is taken as a base year of India and China then calculates the trend from 1991 to 2011. The growth of outflow in India from year 1991 to 1996 increased as 0 to 68253.57and in China it increased from 1991 to 1993.Then in India declining trend comes in 1997 and 1998 and in China the trend declines in year 1994 and remains constant in 1995.In India rising trend start from year 1999 to 2001 and in China trend increased from 1996 to 1998.Then a subsequent fall was observed in the year 1999 and 2000.After 2000 a comparative rise from 100.33 in year 2000 to 754 in year 2001 then a fall to 275.84 in year 2002 and 1.31 in 2003.Since the year 2001to 2008 in case of India an increase in trend was observed subsequently an increase in trend of GDP of china has been seen from 2003 to 2008.From 2009 to 2011 India has witnessed a decline in trend whereas china's GDP in 2009 then increased in 2010 and again decrease in 2011. The average of outflow of foreign direct investment in India is 4345703576 USD and in China are 14180466493USD.the calculated value -2,87 is less than the tabulated value that is 2,086 Hence we can say a significant difference is seen.

4. COUNTRY WISE FDI INFLOW

TABLE 4:- COUNTRY WISE FDI INFLOW (Us$ Billion 2012)

Sr. No.	Country	India	China
1	Japan	0.057581	7.38
2	Singapore	0.077588	6.539
3	USA	0.047889	3.13
4	Germany	0.020828	1.471
5	UK	0.074661	1.031
Mean		0.0557094	3.9102
Df		4	
t-stat.		-2.974	
P-Value		0.041	
t-Value		2.776	

Source:- China Foreign Investment Report 2012, Ministry of Commerce and *RBI"s Bulletin May 2012*

Table 4:-Depicts a country wise FDI inflow .From the data it was observed that India received 0.057581 from Japan and China received 7.38 billion USD from Japan. India received 0.077588 from Singapore and China received 7.38 billion USD from Singapore. India received 0.047889 from USA and China received 3.13 billion USD from USA. India received 0.020828 from Germany and China received 1.471 billion USD from Germany. India received 0.0557094 from UK and China received 3.91 billion USD from UK.

The value of t-statistics reveals that there is a significant difference in the **Country Wise Inflow** of foreign direct investment in India and **China because** calculated value (-2.974) is less than table value (2.776); therefore, null hypothesis is rejected. At 5percent significant level P-Value is 0.000 and degree of freedom is 4

5.GROWTH RATE

TABLE 5:- GROWTH RATE

Time Period	Growth rate %	
	India	China
Pre reform period(10 years)	5.5	5.7
Post reform period(10years)	10.1	5.9

Sources: World Development Indicators, World Bank

Table 5:-Displays the growth rate of India and china in pre and post reform period. It is observed that India had a growth rate of 5.5 percent in pre reform period whereas china had 5.7 percent. Post reforms India had a substantial growth of 10.1 percent but china had recorded a rate of 5.9 percent hence it can be said that growth rate of India is greater than china.

FINDINGS AND SUGGESTIONS

FINDINGS

- The average of inflow of foreign direct investment in India is 10943148364 US$ and in China are 79258769832 US$. Thus a significant difference is seen in the amount of inflow of funds in India and China. China has received funds more than India.
- The average contribution of India's GDP is 7.25 and the average contribution of China's GDP is 21.53. the value of t-statistics reveals that there is a significant difference in the contribution in GDP of India and China. But there is no significant difference between the contribution on GDP of India and China.
- The average of outflow of foreign direct investment in India is 4345703576 US$ and in China are 14180466493 US$.The calculated value is less than the tabulated value .Hence we can say that a significant difference is seen.
- There is a significant difference in the country wise inflow of foreign direct investment in India and China.
- India growth rate of 5.5 percent in pre reform period whereas China had 5.7 percent. Post reforms India had a substanial growth of 10.1 percent but China had recorded a rate of 5.9 percent hence it can be said that growth rate of India is greaer than China.

SUGGESTIONS

- The Indian Government must encourage certain relaxations in the import and export policies so as to attract more and more sectors and companies to invest in India.
- The Government must educate its own citizens regarding FDI and its benefits so that internal fictions may reduce.
- The Government and RBI must modify its rules so as to encourage more and more investors.
- The Government must increase or relax the share of investing foreign investors in the every sector so that more and more capital could be brought in.

CONCLUSION

After critically analyzing the data it can be concluded that FDI has served up as a major source of finance and money source for both India and china.
FDI has been the triggering source that has aided in development of these two Asian giants.
China has for years received more funds as compared to India .The net GDP of china is more than that of india. But india score an edge when it comes to growth.

REFERENCES

1. Denisia V**.,"Foreign Direct Investment Theories: An Overview of the Main FDI Theories"** , European Journal of Interdisciplinary Studies ,Issue 3 , December 2010 ,Pp 53-59
2. Devajit M., "Impact of Foreign Direct Investment on Indian economy", *Research Journal of Management Sciences,* Vol. 1(2), 29-31, September (2012), ISSN 2319–1171
3. Falki N. **"Impact of Foreign Direct Investment on Economic Growth in Pakistan"** International Review of Business Research Papers ,Vol. 5 No. 5 , September 2009 ,Pp. 110-120

4. Himachalapathy R., Sureshkumar A., Dhanasekaran M., Saravanan R., Anandan G." A Comparative Analysis of FDI in India and China" European Journal of Social Sciences ISSN 1450-2267 ,Vol.29 No.1,2012, pp. 26-37
5. KR.P. "**FDI in India and Its Impact –A Critical Evaluation**" VSRD international journal of business & management research,Vol.1 (3),2011, 185-196,2011
6. Sinha, Swapna S..et al 2007 **"Comparative Analysis Of FDI In China And India"** journal of asia entrepreneurship and sustainability, 2012 **volume 3**
7. *Sutradhar D., "Sectoral Analysis of FDI in India", International Academic Research Journal of Business and Management Vol No.1, Issue No.6, Page no.78-85,2011, ISSN Number:2227-1287*

BOOKS
8. Agarwal B.S. (2005), "Basic Statistics", Third Edition, New Age International (P) Ltd. Publishers, New Delhi.
9. Arya P.P. and Tandon B.B (2003), "Economic Reforms in India-From First Generation to Second Generation and Beyond" Deep and Deep Publications Pvt. Ltd., New Delhi.
10. Bhole L.M. (2004), "Financial Institutions and Market Structure Growth and Innovations", Third Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
11. Woo, David, "Two Approaches to Resolving Nonperforming Assets During   Financial Crises" IMF working Paper.

IMPROVEMENT OF WORD SENSE DISAMBIGUATION WITH RULE BASED APPROACH

SHWETA VIKRAM
STUDENT
BANASTHALI VIDYAPEETH
JAIPUR

ABSTRACT
The task of word sense disambiguation is to examine word tokens in context and specify exactly which sense of each word is being used. Word Sense Disambiguation (WSD) improves rule based machine translation in Anusaaraka. In this paper we describe one word have many ambiguities in respect of their meaning. How we remove these ambiguities with apply some methods, and also we show some results. Anusaaraka machine translation is use wsd rules for improve machine translation. Many words have multiple meanings, with respect to context. Word Sense Disambiguation task is determining the correct meaning or sense of a word with respect to context. WSD is regarded as an important research problem and is assumed to be helpful for application such as machine translation (MT) and information retrieval.

KEYWORDS
Word Sense Disambiguation, Machine Translation, Anusaaraka, wsd rule and dictionary.

1. INTRODUCTION
Firstly we are talking about Anusaaraka, because I am working on that project and specially working on Word Sense Disambiguation (Rule base). Anusaaraka is an English text to Hindi translation software. Fusion of traditional Indian shastras and sdvanced mordern technologies is what Anusaaraka is all about. Anusaaraka derive its name from the Sanskrit word "Anusaran" which means "to follow". It is so called, as the traslated Anusaaraka output apperas in layers- that is a sequence of steps that fallow each other till the final translation is displayed to the user.

2. WORKING OF ANUSAARAKA
In past decades Anusaaraka machine traditional done many things such as how to analyze a particular problems, how to categorize whole sentences in parts of speech, how to phrase the sentences, find out the ordering problems, wsd rules based problems and so on. But now day have some problems with this such as context related meaning, and some ordering problems.
Anusaaraka mainly work on word sense disambiguation rule based approach but it also use dictionary. Anusaaraka maintain many dictionaries such as default dictionary, multi-word expression dictionary, physics dictionary.

2.1. DICTIONARY BASED APPROACH
This approach is simple and less time consuming because it has word, category and meaning related. Dictionary not have any relation and one word have many Hindi meaning but always select first Hindi meaning for Hindi translation which is store in dictionary.
We take an example for word **product** –
word- product is noun category and its Hindi meaning like that in default dictionary "uwpAxa/uwpAxana/paXArWa/pariNAma/mAla/guNana/guNanaPala". As we show here always Hindi meaning will become uwpAxa because it is in first position. Dictionary Based approach gave good result when English word has only one meaning in particular category; otherwise we follow some other approach.
Many dictionaries used in dictionary based approach such as default dictionary, multi word expression dictionary, physics dictionary and so on. Priority basis this dictionary will be work, multi word expression have higher priority because it's have compound word and produce single Hindi meaning with respect to those words (two or more than two words). If multi word expression dictionary have lower priority that means first come Hindi meaning from default dictionary in particular word if that Hindi meaning is not match the context after that multiword expression dictionary will not be fire because it's have a Hindi meaning but it is not necessary that meaning match from the context.

2.2. RULE BASED APPROACH
This approach based on relation and this rule also cover all the senses of particular word and cover all category which root are same . In this approach have all senses but how particular rule fire with respect to context sense, its solution is salience. Salience decides the rule fire on first with respect to context. Which rule has more relation whose salience is high and default rule not have any salience. All wsd word file have default rule because if all rules not cover those senses with respect to context so at least this default rule will be fire. When we built a many rules in a file so we try to use least salience because high salience take more time. Default sense is play important role in rule based approach because at least this rule will be fire if no any rule fire or not any senses match from the context.
If we are not define default rule in file and also all the senses not match from the context then it will go to dictionary and take more time for giving Hindi meaning because firstly search in wsd rule then after search in dictionary. Rule base file cover all senses such as single word meaning, compound expression meaning and so on.

2.3. EXAMPLE FOR CONTEXT RELATED MEANING PROBLEM
We take the example of word "Product" multiple meaning have product such as uawapAxa, guNanaPala, paxArWa, pariNAma etc. These are in wx notation. These meaning are with respect to noun context. We have one solution for every meaning with respect to sentence context.
Example: Taken together, the product of mass and velocity, that is momentum, is evidently a relevant variable of motion.
Category with respect to sentences: Verb adverb determiner noun preposition noun conjunction noun wh-determiner verb noun verb adverb determiner adjective noun preposition noun.
Manual Hindi Translation: sAWa - sAWa lene para, saMhawi Ora vega kA guNanaPala, arWAwa saMvega, prawyakRa rUpa se gawi kA eka prAsafgika cara hE .
Machine transaction: jo vaha gawi hE, eka sAWa ll hui, parimANa Ora vega kA, vaha guNanaPala gawi kI spaRta rUpa se eka upayukwa parivarwanaSIla vaswu hE.
Sentence: This product can be used on wet or dry hair.
Category: Determiner noun verb preposition adjective conjunction adjective noun
Hindi Translation: yaha utpAwa upayoga kiya jA sakawA hEM gile ya sUKe keSa pera.
Word product has many senses with respect to context, default dictionary cover seven senses and our wsd rule cover four senses which are uawapAxa, guNanaPala, paxArWa and pariNAma. Because these are cover most of the senses of the context.

FIGURE 1: WORD "PRODUCT" HAS DIFFERENT MEANING WITH MACHINE TRANSLATION

2.1.A	Taken	together,	the	product	of	mass	and	velocity,	that	is
2.1.B	-	-		-	-	-		-	-	-
2.1.C	लिया~हुआ[-]~{@en}	एक~साथ,	-	उत्पाद^परिणाम{0}	@of{->का}	परिमाण^समूह{0}	और	वेग{0},	उतना/कि/वह[निर्धारक~अर्थ~में]/वह/जो/जिसे	होना~{@s}
2.1.I	ले{या हुआ}	एक साथ,	वह	गुणनफल	--> का	परिमाण	और	वेग,	वह	है
2.1.K	ली हुई	एक साथ,	वह	गुणनफल	~	परिमाण	और	वेग का,	वह	है

momentum, is		evidently	a	relevant	variable	of	motion.	2.2.A	Carbon	dioxide
-	-	-		-	-		-	2.2.B	-	
संवेग{0},	होना~{@s}	जाहिरी~तौर~पर	उपयुक्त[-]	परिवर्तनशील/परिवर्तनशील~वस्तु[-]	@of{->का}	प्रवर्तन^गति{0}.		2.2.C	कोयला/कार्बन{0}	डा
गति,	है	स्पष्ट रूप से	एक प्रासङ्गिक	परिवर्तनशील वस्तु	--> का	गति.		2.2.I	-	कार्बन डाइआक्साइड
गति,	है	स्पष्ट रूप से	एक प्रासङ्गिक	परिवर्तनशील वस्तु	~	गति की.		2.2.K	-	कार्बन डाइआक्साइड

is	a	waste	product	produced	by	the	burning
-	-		-	-		-	-
होना~{@s}	व्यर्थ/क्षय/नष्ट~करना[-]{0}		उत्पाद^परिणाम{0}	उत्पन्न[>प्रस्तुत]~करना~{@ed/@en}	समीप/पास~में/साथ~में^द्वारा	-	जलने~का~घाव/जलना/जलाना~{@ing}[-]
है	एक व्यर्थ		पदार्थ	उत्पादन कर	--> के द्वारा	-	दाहक
है	एक व्यर्थ		पदार्थ	उत्पादन किया हुआ	~	-	दाहक के द्वारा

of	food.	2.3.A	This	product	can	be	used	on	wet	or
-	-	2.3.B	-	-	-	-		-	-	-
@of{->का}	खाना{0}[सं.].	2.3.C	यह[-]{0}	उत्पाद^परिणाम{0}	सकना{0}/कैन होना{0}		उपयोग^प्रयोग/भोग/सेवन~{@ed/@en}	@on{->पर}	गीला/वर्षा^गीलापन[-]{0}	या
--> का	आहार.	2.3.I	यह	उत्पाद	-->	-->	उपयोग कर{या जा सकता है}	--> पर	गीला	या
~	आहार के.	2.3.K	यह	उत्पाद	--	--	उपयोग किया जा सकता है	~	गीले	या

dry	hair.	2.4.A	As	part	of	our	continuing
-	-	2.4.B	-		-	-	-
सूखा/शुष्क/सूखना/सुखाना[-]{0}	केश{0}.	2.4.C	जैसा^चूँकि	भाग-{दो~खण्डों~में~}/विभक्त~होना1[>विदाई]{0}	@of{->का}	हमारा-	जारी~रहना~{@ing}
सूखा	केश.	2.4.I	--> के जैसा	भाग	--> का	में	जारी रह
सूखे	केश पर.	2.4.K	~	भाग के जैसा	~	हमारे	जारी रहता हुआ

The above figure show that product have many meaning with respect to context. It is mainly shows three meaning which are- uwpAxa, guNanaPala and paxarWa.

2.3.1. COMPOUND EXPRESSION

If we are talking about compound expression then we used the concept of affected-id and affected-id otherwise they produce two different Hindi meaning which have its own sense. So we replace its own sense we use that ids. In this concept one word is affected by another word, which word affected by another whom is known as affected-id and which word is affecting that word known as affecting id.

For example: we take a example of product line which compound Hindi meaning is uwapAxa_ki_xiSA, but when we are talking its single meaning and not apply the concept of affected-id and affecting-id then its Hindi meaning like that "uwapAxa" for product and "paMkawi" for line.

Here we showed how affected-id and affecting-id play important role to give the suitable Hindi meaning or compound expression. Now a new problem for us when we define these compound meaning in compound expression dictionary as well as wsd rule, then how its decide where it go firstly in dictionary or wsd rule. Solution of this problem is programmer, programmer decide where it look first if programmer decide it firstly look in wsd rule file so it took that Hindi meaning if compound word is there otherwise look in dictionary.

2.3.2. VERB

We are taking an example of verb "prepare". In some sentences its meaning is wEyAra karanA and some sentences have its meaning banAnA. But how we disambiguate actual meaning of prepare. We have only one solution of that word, we analyze the context and with the help of context we decide the meaning. When we define the Hindi meaning in our rules then we put only root meaning such as wEyAra_kara because this is the meaning of verb so its vary sense of sentences. When we talking about future tense then its Hindi meaning will be wEyAra_karegA,i n past tense wEyAra_kiyA or wEyAra_kara_cukA, in presnt tense weyAra_kara_raha and so on. The meanings of verb vary tense to tense because we have written a program for verb in Anusaaraka. The same word used as different parts of speech. Except verb all the parts of speech have complete Hindi meaning (not only root meaning), for example word product has Hindi meaning UwpAxa, guNanaPala, paxArWa etc.

Hera we discuss one more and very interesting thing, when combine two words gave one Hindi meaning then we apply the rule as affecting id and affected id otherwise they gave two different meaning with respect to that word which can be wrong.

2.4. NOUN

Noun gender is the also problem in word sense disambiguation, Our Hindi sentences how decide this sentences talking about masculine or feminine or nature gender. Its solution is subject of the context.

Subject of the context decide its gender.

Example: She writes an essay.

Vaha eka nibanXa liKawI hEM.

He writes an essay.

Vaha eka nibanXa liKwA hEM.

They write an essay.

Ve nibanWa liKawe hEM.

2.4.1. THE NOUN: NUMBER

A noun that denotes a person or thing, is said to be in the singular number as-

Boy eats a mango.

LadFkA Aama KawA hEM.

A noun that denotes more than one person or thing is said to be in the plural number.

Boys eat mangoes.

LadFke Aama Kawe hEM.

Again we are seeing subject of sentences decide the number of noun.

2.5. ORDERING RELATED EXAMPLES

I.   We shall now describe some of these experiments.

Manual translation: hama unameM se kuCa prayogoM kA varNana yahAz kareMge.

Anusaaraka : hama prayoga inameM se kuCa aba varNana karezge.

We are easily seeing that in this example Anusaaraka not gave meaning of experiment (prayoge) in exact place.

II.   I learn about the stars, the trees, the birds and the animals.

Manual translation: mEM wAroM ke bAre meM, peda, cidiyoM Ora paSuoM ke bAre meM sIKawA hUz.

Anusaaraka : mEM wAroM ke bAre meM, peda, cidiyoM Ora paSuoM ke bAre meM sIKawA hUz.

Second example gave the correct Hindi translation such as manual translation.

So, we say that Anusaaraka mostly gave the correct Hindi translation. Improvement of Anusaaraka is going on day by day.

2.6. ANALYZE THE SOME ENGLISH SENTENCES

In serial no.1 we had collect 50 English sentences related to some Hindi story, These sentences have total 894 words and below result so that wsd problem is very less. Serial no. 2 define for 100 physics sentences and serial no. 3 define sort story sentences and sentences also small so our translation is more accurate for these small sentences.

TABLE 1: ANUSAARAKA MACHINE TRANSLATION RESULT

Serial no.	Sentences	Total Words	wsd Problem on words	tam problem on words	Error % on wsd Problem	Error % on tam Problem
1	50	894	26	69	2.9082	7.7181
2	100	1781	88	71	4.9410	3.9865
3	121	960	14	35	1.4583	3.6458

As we are seeing the some result which given by Anusaaraka English text to Hindi machine translation. We collect some English sentences then we ran these sentences in Anusaaraka and then we are showing here output and also we get this machine translator is more accurate and they give mostly correct Hindi translation.

In simple Hindi story have tam problem more than word-sense disambiguation problem.

3. CONCLUSIONS

Anusaaraka English Hindi machine translation improvement is very firstly. In the coming days its performance is too good. When we analyze some sentences then we find this machine translation give near about 90% to 92% correct result, but when we taste some another sentences then it gave 96% to 98% correct result which result we showed in above table. This variation depends on words and sentences. So we can say that in upcoming days Anusaaraka Machine Translation will give accurate result.

ACKNOWLEDGEMENTS

REFERENCES

1.   Speech and Language Processing an Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition, by Denial Jurasky and James H. Martin.

WEBSITES

2.   anusaaraka.iiit.ac.in

3.   Sanskrit.inria.fr/DATA/wx.html

4.   wikipedia.org/wiki/Word-sense_disambiguation

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

http://ijrcm.org.in/

NOMADIC COMPUTING: AN IMPERATIVE TO HIGHER EDUCATION SECURITY IN NIGERIA

ALADE, O. A.
PRINCIPAL LECTURER
COMPUTER SCIENCE DEPARTMENT
FEDERAL POLYTECHNIC
BIDA

RAJI F. I.
ALUMNI
COMPUTER SCIENCE DEPARTMENT
FEDERAL POLYTECHNIC
BIDA

ABSTRACT

Various tools have been used over the ages in learning and research. A deficiency in one always leads to the discovery of another. The new technologies always emerge to refine or modify the existing ones. Printing of publications in various forms is what is common at every level of formal education. This makes the learning to be sedentary and/or restricted to the forewall of a building – classrooms, laboratory or library. The emergence of computer has, over the years, revolutionized literacy in printing and providing learning tools. Computers have helped the production of better publications, analysis of experimental data, and presentation of papers and reports of all kinds. Also it has served as wonderful complement of many research equipment, yet almost all these usages tend to be restricted to classrooms, laboratories, offices, houses and conference halls. This paper discusses nomadic computing technology and then surveys the prevalence of mobile computing devices and their suitability for nomadic computing among students, then proposes the use of these handheld computing devices to promote nomadic education in our institutions of learning to secure qualitative and quantitative learning habits among staff and students. It also advocates the provision of nomadic computation infrastructures in schools to achieving a secured qualitative education, research and social networking.

KEYWORDS

Nomadic computing, mobile learning, handheld devices, social networking.

INTRODUCTION

Johnstone (2006) opines that higher education as an agent of change, national growth and instrument for the realization of collective aspiration. This should contribute to the development of the entire education system through teacher education, curriculum development and educational research thereby providing the crucial mass skills and educated populace needed by any country to ensure genuine indigenous sustainable development.

According to the Education Digest Global (2009), the number of students pursuing tertiary education has skyrocketed over the past 37 years, growing five-fold from 28.6 million in 1970 to 152.5 million in 2007. This translates into an average annual increase of 4.6 million. The Sub-Saharan Africa has experienced the highest average regional growth rate with students' enrolment that have risen by an average of 8.6 percent each year. Yet, in spite of this achievement, the region still lags behind other regions in terms of total tertiary students' enrolment. Today, there are 20 times more students than in 1970, with an additional 3.9 million enrolment. Shu'ara (2010) in his presentation reports the enrollment statistics of higher institutions in Nigeria from 2005 -2009 with the highest percentage of 18.9% in 2009 and the least in 2006 with only 8.4%. He equally shows the percentage distribution of academic staff by categories, 20% Professors and Readers; 23.6% Senior lectures and 56.4% Lecturer I and below. This show that only few applicants get admitted for intended higher education and the few admitted lacks adequate hands for their trainings. Akinyemi & Bassey (2012), in their survey observed that there has been a downward trend in the number of university teachers from 2003/2004 to 2005/2006. They attributed this to possible departure of some university teachers to other countries in search of greener pastures due to poor condition of service and facilities (physical and financial) which are inadequate compared to the rising increase in enrolments in the Nigerian higher education institutions.

Over the years, education has suffered a lot of setback in Nigeria. There appears to be no standard or standard tools to work with despite fine curriculums that have been designed in various forms and versions at different levels of education in the nation. A number of standards were explored in (Orji, Akinwumi, & Odii, 2008). Different methodologies have been taught in our colleges of education and Universities. But the attitude of students to use of the available electronics have not been included in the training of teachers nor implemented in educational practices of the nation.

Given the current situation in Nigeria, it is no coincidence that the main preoccupation of the Federal Government through its Federal Ministry of Education momentarily is the need to reach every nook and cranny of the country in order to take education to the citizens no matter where they may be located (Jegede, 2002). This can only be achieved by the use of fascinating technology that will draw the attention of people to 'studying anyhow and everywhere'

LEARNING THEORY AND LEARNING STYLE

In educational psychology, learning theory is an attempt to describe how people learn, thereby helping in understanding the inherently complex process of learning (Agbonifo & Adewale, 2009). This approach emphasis the fact that indiviuals percieves and processes information in different ways.

In learning style theory, the degree to which an individual has learned is measured by how much his/her education experience is geared towards particular learning style rather than how smart he/she is. Skinner (1976) in Agbonifo & Adewale (2009) classified the basic perspectives in learning theory as Behaviourism, cognivitism and constructivism. These theories are interconnected in this phrase 'information pictured (cognitivism) becomes information coded (contructivism) which is translated to attitudinal change (behaviourism)'. The prevalence of ICT tools and handheld mobile devices have brought about mental coding style in an average Nigerian (students and youth having higher percentage) making many electronics beings

ROLES OF IT IN HIGHER EDUCATION

Perhaps the most striking attributes of IT progress have been its pervasiveness, convergence, integration, and migration. Today, not only servers, networks, and end-user devices are interconnected and interdependent, but the network components are literarily seamless. Even organizations provide or operate more than one networks in carrying out their tasks. Network switches are essentially servers. Servers often comprise internal networks plus vast arrays of the some processors that drive the end-user devices, and the end-user devices readily tackle tasks — voice recognition, for example — that once required massive servers. The locus of technology has shifted dramatically from the institution — be it home, workplace, school, or campus — to the mobile individual. The locus of control and responsibility is shifting accordingly: connectivity, content, services, even identification come from providers external to one's immediate location or affiliation — from the "cloud" — in a sharp departure from past practice.

Through what applications might information technology help higher education evolve? Jackson (2012) stressed the need to distinguish two different but overlapping roles that information technology might play. In the *evolutionary* category are four overlapping educational functions. Information technology can

- streamline administration,
- amplify and extend traditional pedagogies, mechanisms, and resources,
- make educational events and materials available outside the original context, and/or
- enable experience-based learning.

In the *transformational* category are two more-radical functions. Information technology can

- renew and redefine the social environment and/or
- replace the didactic classroom experience.

NOMADIC COMPUTING

Several terms are currently being used to refer to cyber learning environment. Some of these are Ubiquitous computing (Weiss & Craiger, 2002), calm computing (Edware & Grinter, 2001), pervasive computing (Teredesai & Hu, 2006), nomadic computing (Alexander, 2004), ambient intelligence (Ducatel & Bagdanowicz, 2010), Mobile computing (Cobroft, Tower, Smith, & Bruns, 2006). Alexander (2004) was of the view that wireless is perhaps the leading label, for several reasons, including its sense of the unwiring of connectivity and the implicit un-tethering of hardware from local cabling. Mobile learning, or m-learning, covers this point better, but this term doesn't imply wirelessness. The combination of wireless technology and mobile computing is resulting in escalating transformations of the educational world.

Nomadic computing is made possible by portable hardware, software and communication systems that interact with non-mobile organizational information system while away from the normal fixed work place (Obiniyi, 2008). This mobile system of computing is becoming more and more prevalent in our society. Rapid developments in wireless technologies and Sensor-network-based smart spaces are creating an urgent need for well trained Pervasive Computing Engineers (Hu & Teredesai, 2006) However, with the coming of pervasive computing, an ever-increasing degree of information is collected by use of distributed networks.

In April 2010, Apple released the iPad, selling more than 3 million units in less than 90 days (Apple press release, 2010). Suddenly e-content readers were ubiquitous, with iPads appearing on campuses within hours of the release by Apple. For 2012, Gartner estimates that nearly 120 million media tablet devices will be sold worldwide. (Gartner press release, 2012). Today the e-reader platforms are improving at a rapid rate, prices for devices are plummeting, the e-content is becoming richer and more interactive, and the content publishers are developing capitalistic business models to respond to this disruptive technology. Yet despite years of discussion, many higher education institutions have found that they are ill equipped to respond to this latest technology change. Compounding this problem is the fact that what started as an interesting idea has now become a priority for the higher education community. The imperative to lower the cost of education and create a viable means to influence the costs of textbooks (one of the largest non-tuition and non-housing costs for any student) has arrived. Although institutional leaders are still discussing e-content plans, in reality the debate is over: students are asking for digital now. (Waggener, 2012)

Since Nigeria has therefore decided to embrace the open education system, which will afford the greater majority of the citizens, especially those hitherto unreached or denied access, to be educated as and when they so wish. (Jegede, 2002), inculcating cyberculture in our education system will be the best alternative to improve and secure quality education terrain both amidst the students and the teacher with more obvious growth among the students' folk.

MATERIALS AND METHOD

As a precursor to further studies in nomadic computing, a survey was conducted using structured questionnaire. The questionnaire was designed to sample the opinion of students in various schools (faculties) in the Federal Polytechnic. Bida Niger state Nigeria. The respondents were randomly selected among students in five schools in their age and sex distributions. The questionnaire contained sufficient information to look at the technology awareness of nomadic computing devices among the students. The questionnaire looks at the internet access configuration of the students' mobile phones, acquisition of other mobile computing devices aside mobile phones and the availability and accessibility of the Internet facilities provided by the institution.

ANALYSIS

Out of about 60 questionnaires administered, 53 were duly filled and returned. The frequency and percentage distribution of responses were analyzed using Statistical Package for Social Sciences (SPSS). The analyses of various devices are shown below.

MOBILE PHONE

The analysis show that the 53 (100%) respondents has mobile phones. 44 (83.0%) of the phones are camera ready, while only 8 (15.1%) are not; 1 (1.9%) was indifference. 44 (83.0%) of the phones have Bluetooth/infra red for file transfer, 9 (17%) have no Bluetooth. 45 (84.9%) of the phone are configurable to browse while 8 (15.1%) are not. With the mobile phone 20 (37.7%) visit the Net between 1-5hrs a week; 2 (3.8%) between 5-10hrs/wk; 1 (1.9%), between 10-20hrs/wk; 16 (30.2%), visits the Net always while 14 (26.4) do not visit the Net at all with there phones.

MOBILE COMPUTER (LAPTOP)

From the analysis, 23 (43.4%) of the respondent have laptop while 30 (56.6%) have not. 36 (67.9%) have access to the Internet, 17 (32.1%) do not have. 48 (90.6%) have email account, 4 (7.5%) have not whole 1 (1.9%) is indifferent. 9 (17.0%) claimed to have personal website while 44 (83.0%) did not. 21 (39.6%) visit the Internet 1-5hrs/wk; 4 (7.5%) 5-10hrs/week, 7 (13.2%) always, 18 (34,0%) not at all and 3 (5.7%) indifference.

INSTITUTION'S FACILITY

51 (96.2%) are aware of the schools internet facility while 2 (3.8%) are not. 40 (75.5%) admitted having access to the school internet facility, 12 (22.6%) disagreed while 1 (1.9%) is indifference. 5 (9.4%) access the Internet facility 1-5hrs/wk, 14 (26.4%) 6-10hrs/wk, 2 (3.8%) 11-20hrs/wk, 19 (35.8%) access it always, 11 (20.8%) do not access it at all while 2 (3.8%) are indifference. 35 (66.0%) agreed that the facility is always available while 18 (34.0%) disagree that the facility is available to them. For those who claim it non-availability ranked the thus in the possible reason for its non availability: power failure 6 (11.3%), congestion 9 (17.0%), administrative problem 1 (1.9) and logistic problem 2 (3.8%).

DISCUSSION OF THE RESULTS

It may be inferred that virtually all the phones that are camera ready have Bluetooth and are configurable to browse the Net. More so, the analysis reveals that some of the respondents that have the facility for internet connection on their phones do not use it for the purpose at all.

The fact that 43.4% of the respondents see the necessity of laptop and secure it without been forced shows that a greater ground still needs to be covered before nomadic computing is introduced. With 57.9% internet access, 90.6% e-mail account and even 17.0% personal website is an indication that the environment is poised for nomadic computing. 96.2% of the respondents are aware of the existence of internet facility in the school. This is remarkable. Also the 75.5% affirmative of having access to the facility proves that a good ground had been prepared. The 35.8% of respondents' regular visit to the center is a sign of good omen, although respondents remarked that they have no access to wireless technology of the school facility. This is great impedance to true nomadic computing.

CONCLUSION

In this paper, various literature have been reviewed that show astronomical increase in demand for tertiary education. The roles of IT in facilitating easy access to tertiary education have been discussed. Nomadic education has been proffered to be an alternative learning style to eradicated unrest among students in tertiary institution due to highly deficient infrastructural facilities require for teaching and learning. The level of awareness, and usage of nomadic education

devices are expressed in percentages. The high rate of awareness and usage of these devices is an indication that with slight motivation on the side of lecturers, parents and government, students will embrace this technology as a means of learning than regimented classroom learning system.

In most cases, one of the causes of students' unrest in higher institution of learning is the conglomeration of students of various background, philosophies and learning style in classrooms. One of the means that have been adopted over the years to diffuse the tension is to disperse the students by closing down the school. Changing the mode of learning from sedentary classroom assembly to nomadic system will reduce the tension on our campuses. More students will be accommodated, and quality knowledge will be impacted. Security threat will be drastically reduced.

RECOMMENDATIONS

It is a known fact that most of our tertiary institutions have become the training ground for political, religion and sectional thugry. Quality study is ebbing away because of academic unrest that always leads to the closure of schools. It therefore recommended that:

- the educational policy makers should include nomadic computing in the curriculum our tertiary education;
- the various institutions should provide wireless service that will adequately cover the geographical locations of campuses;
- students should be encourage to secure the technology;
- lecturers should be courageous enough enforce the usage of available mobile device in learning among the students.

REFERENCES

1. Agbonifo, O., & Adewale, O. S. (2009). Enhancing students learning capabilities through individualized learning course sequencing. Nigerian Computer Society Confernece proceeding , Vol 20. 305-312.
2. Akinyemi, S., & Bassey, O. (2012). Planning and Funding of Higher Education in Nigeria: The Challenges. International Education Studies , 87-95. Vol. 5(4). .
3. Alexander, B. (2004, September/October). Going normadic: Mobile learning in higher education. EDUCAUSE Review , pp. 28-35.
4. Apple press release. (2010, June 22).
5. Cobroft, R., Tower, S., Smith, J., & Bruns, A. (2006). Mobile learning in review: Opportunities and challenges forlearners, teachers, and institutions. Proceedings Online Learning and Teaching (OLT) Conference, , 21-30.
6. Ducatel, K., & Bagdanowicz, M. S. (2010). Senerio for Ambient Intelligence in 2010. European Commision Information Soceity Directorate General.
7. Education Digest Global. (2009). Comparing Statistics Across the World. Retrieved February 8, 2011, from UNESCO Institute for Statistics.: http://unesdoc.unesco.org/images/0018/001832/183249e.pdf
8. Edware, W. K., & Grinter, R. (2001). At Home with Ubiquitous Computing: Seven Challenges.
9. Gartner press release. (2012, April 10).
10. Hu, F., & Teredesai, A. (2006). Towards Enhancing Undergraduate Pervasive Computing Skills: An Innovative Multi-Disciplinary Approach. 9th International Conference on Engineering Education, (pp. 5-10).
11. Jackson, G. A. (2012, October 3). Enterprise IT, E-Learning, and Transformation: Prospects in Higher Education. EDUCASE Revview .
12. Jegede, O. (2002, February 3-8). An Integrated ICT-Support for ODL in Nigeria: The Vision, the Mission and the Journey so Far. National Open and Distance Education Council, FNE, Abuja .
13. Johnstone, B. (2006). Financing higher education: Cost sharing in international perspective. Boston College Center for International Higher Education , Sense Publishers. Boston.
14. Obiniyi, A. &. (2008). Vision 2020 Technological takeo-off with the development of embedded software for mobile devices. Nigeria Computer Society: 22nd National Confernce , 129-134.
15. Orji, C. E., Akinwumi, B. O., & & Odii, J. N. (2008). Enterprise modelling of the carrying capacity of a University departement. Nigerian Computer Socienty Conference proceedings , 313-324. Vol. 20.
16. Shu'ara, J. (2010). Higher Educaation Statistics- Nigeria experience in data collection. Abuja: Federal Ministtry of Education.
17. Skinner, B. (1976). About behaviourism. New York: Vintage.
18. Teredesai, A., & Hu, F. (2006). Towards Enhancing Undergraduate Pervasive Computing Skills: An Innovative Multi-Disciplinary Approach. 9th International Conference on Engineering Education (pp. M5A-10). Rochester: San Juan.
19. Waggener, S. (2012, September/October Vol 47(5)). E-Content: Opportunity and Risk. EDUCAUSE Review .
20. Weiss, R., & Craiger, J. P. (2002). Ubiquitous computing. Leading Edge. , Vol. 39(4). Pp44-52.

REQUEST FOR FEEDBACK

Dear Readers

At the very outset, International Journal of Research in Computer Application & Management (IJRCM) acknowledges & appreciates your efforts in showing interest in our present issue under your kind perusal.

I would like to request you tosupply 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 youhave 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

DISCLAIMER

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

http://ijrcm.org.in/